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FCC TEST REPORT

Under
FCC CFR 47 Part 80
MRD-Marine Rader

Prepared For :

Express Communication & Navigation Company Ltd.

Sinonav Building, PuBian Industrial Zone, Shanwei City, Guangdong Province, China

FCC ID: 2ACD9-KR1238
EUT: MARINE RADAR
Model: KR-1238/1538/1338

August 29, 2014 **Issue Date:**
Original Report **Report Type:**
 **Test Engineer:** KMO Tester
 **Review By:** Apollo Liu / Manager

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1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.
FCC Test Site Registration Number: 962205
IC Test Site Registration Number: 4986A-2
Internet: www.kmolab.com

1. 3 Details of Applicant

Name : Express Communication & Navigation Company Ltd.
Address : Sinonav Building, PuBian Industrial Zone, Shanwei City, Guangdong Province, China

1. 4 Application Details

Date of Receipt of Application : January 3, 2014
Date of Receipt of Test Item : March 13, 2014
Date of Test : March 15~August 29, 2014

1. 5 Test Item

Manufacturer : Express Communication & Navigation Company Ltd.
Address : Sinonav Building, PuBian Industrial Zone, Shanwei City, Guangdong Province, China
Trade Name : ONWA
Model No.(Base) : KR-1238/1538/1338
Model No.(Extension) : N/A
Description : MARINE RADAR

Additional Information

Frequency : 9300-9500 MHz; 9,410 MHz ± 30 MHz (typical)
: 4000 Watt peak power, Maximum average power = 1.92Watts EIRP
Power into final amplifier(Peak magnetron anode) :
4,000 Vdc @ 3.0 A maximum = 12,000 watts peak power at magnetron,
4,000 watts mean peak output power
4 kW peak transmitter power, calculated averages
80 ns pulse = 0.67 Watts average
350 ns pulse = 1.68 Watts average
800 ns pulse = 1.92 Watts average

Number of Channels : N/A
Power Supply : 12V，24V 32VDC(10.5 40VDC) 80W
Antenna : Dipole (18dBi) ,Size:550mm*100mm
Dimension : 604mm*420mm*270mm
Weight : Total: 8.5KG

1. 6 Test Standards

FCC Part 80, STATIONS IN THE MARITIME SERVICES

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test Results

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC 80 Rule	Test Type	Result	Notes
FCC 2, 2.1031-2.1057	-	PASS	Complies
FCC 80.205	Bandwidth	PASS	Complies
FCC 80.209	Transmitter Frequency Tolerances	PASS	Complies
FCC 80.211	Emission Limitations	PASS	Complies
FCC 80.213	Modulation Requirements	N/A	Not Applicable
FCC 80.215	Transmitter Power	PASS	Complies.
FCC 80.217 (b)	Suppression of Interface Aboard Ships	PASS	Complies

2. 2 EUT Modifications

No modification by test lab.

3. Technical Characteristics Test

3. 1 Bandwidths

3.1.1 Test Equipment

Please refer to Section 6 this report.

3.1.2 Test Procedure

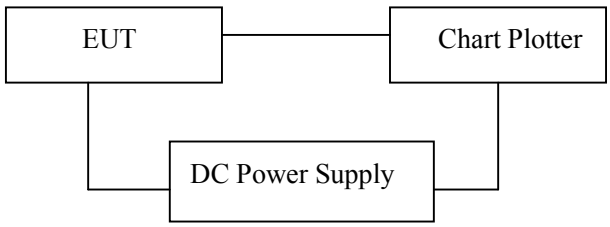
The EUT was separated from the receiving system by a distance of three meters during measurements with operating in a normal mode. The power ratio in dB representing the 26-dB and 40-dB bandwidth was recorded from the spectrum analyzer. Data for the occupied bandwidth was observed using appropriate antennas. The equipment demonstrated compliance with specifications of Paragraph 2.1046(a) and applicable Parts of 80.215 and RSS-238.

3.1.3 Test Setup

3.1.4 Configuration of the EUT

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

Conducted



The EUT was powered from a 12 V DC supply

3.1.5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2003.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.

3.1.6 Limit

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to (26 dB and 40-db down) of the total peak power radiated by a given emission.

3.1.7 Bandwidth Test Result

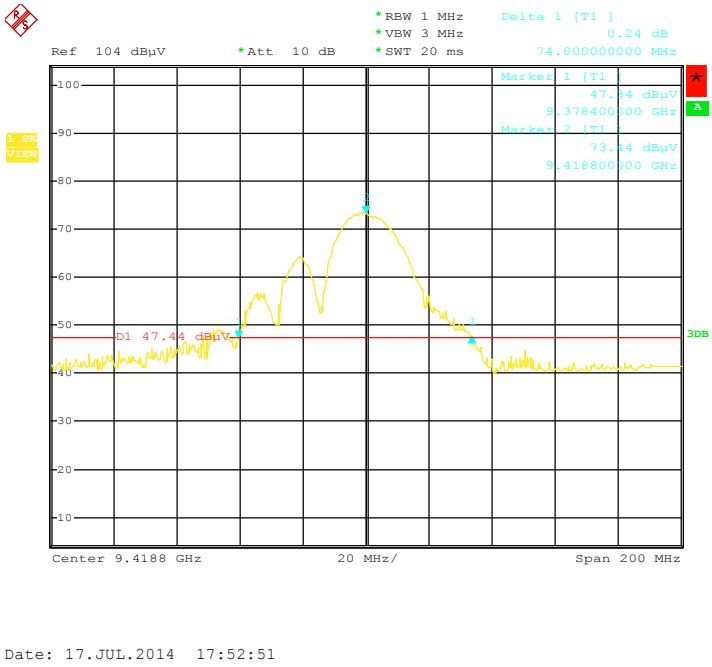
MRD

Frequency(MHz)	Measured 40dB Bandwidth(MHz)	Measured 26dB Bandwidth(MHz)
9410	-	74.0

26-dB occupied bandwidth (1/8 nm)

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

Unit of distance: NM (nautical mile)



3. 2 Transmitter Frequency Tolerances

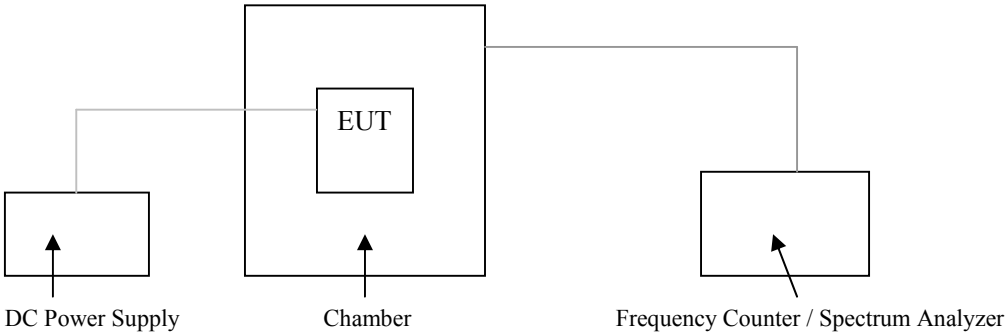
3.2.1 Test Equipment

Please refer to section 6 this report.

3.2.2 Test Procedure

The measurement procedure outlined below shall be followed.
Step 1: The transmitter shall be installed in an environmental test chamber whose temperature is controllable. Provision shall be made to measure the frequency of the transmitter.
Step 2: With the transmitter inoperative (power switched "OFF"), the temperature of the test chamber shall be adjusted to +25°C. After a temperature stabilization period of one hour at +25°C, the transmitter shall be switched "ON" with standard test voltage applied.
Step 3: The carrier shall be keyed "ON", and the transmitter shall be operated at full radio frequency power output at the duty cycle, for which it is rated, for duration of at least 5 minutes. The radio frequency carrier frequency shall be monitored and measurements shall be recorded.
Step 4: The test procedures outlined in Steps 2 and 3, shall be repeated after stabilizing the transmitter at the environmental temperatures specified, -30°C to +50°C in 10-degree increments.
The frequency was measured and the variation in parts per million calculated. Data was taken per CFR47 Paragraphs 2.1055 and applicable paragraphs of part 80 and RSS-238.

3.2.3 Test Setup



3.2.4 Configuration of the EUT

Same as section 3.1.4 of this report

3.2.5 EUT Operating Condition

Same as section 3.1.5 of this report

3.2.6 Limit

§ 2.1055 & §80.209 (b)
(b) When pulse modulation is used in land and ship radar stations operating in the bands above 2.4 GHz the frequency at which maximum emission occurs must be within the authorized bandwidth and must not be closer than 1.5/T MHz to the upper and lower limits of the authorized bandwidth where "T" is the pulse duration in microseconds. In the band 14.00-14.05 GHz the center frequency must not vary more than 10 MHz from 14.025 GHz.

3.2.7 Transmitter Frequency Tolerance Test Result

Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

Unit of distance: NM (nautical mile)

Ambient Frequency (9410.00MHz)

Condition		Measured Frequency(MHz)	Limit(MHz)	
Voltage(Vdc)	Temperature(℃)		f(L)	f(U)
10.2	-30	9416.30	9373.75	9446.25
12.0		9415.70	9373.75	9446.25
13.8		9416.50	9373.75	9446.25
10.2	-20	9416.80	9373.75	9446.25
12.0		9417.30	9373.75	9446.25
13.8		9417.30	9373.75	9446.25
10.2	-10	9413.00	9373.75	9446.25
12.0		9413.50	9373.75	9446.25
13.8		9413.00	9373.75	9446.25
10.2	0	9412.00	9373.75	9446.25
12.0		9412.00	9373.75	9446.25
13.8		9411.50	9373.75	9446.25
10.2	+10	9408.00	9373.75	9446.25
12.0		9410.60	9373.75	9446.25
13.8		9410.50	9373.75	9446.25
10.2	+20	9410.00	9373.75	9446.25
12.0		9410.50	9373.75	9446.25
13.8		9409.80	9373.75	9446.25
10.2	+30	9407.50	9373.75	9446.25
12.0		9407.50	9373.75	9446.25
13.8		9408.00	9373.75	9446.25
10.2	+40	9405.00	9373.75	9446.25
12.0		9405.20	9373.75	9446.25
13.8		9403.90	9373.75	9446.25
10.2	+50	9402.80	9373.75	9446.25
12.0		9402.80	9373.75	9446.25
13.8		9402.10	9373.75	9446.25

Note:
Limits (FCC Rule, 80.213 (g)/80.209(b)):
Upper limit frequency, f(U) = f0 + f(AUBW)/2 -1.5/T
Lower limit frequency, f(L) = f0 - f(AUBW)/2 +1.5/T

Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
36	800	600

Unit of distance: NM (nautical mile)

Ambient Frequency (9410.00MHz)

Condition		Measured Frequency(MHz)	Limit(MHz)	
Voltage(Vdc)	Temperature(℃)		f(L)	f(U)
10.2	-30	9416.10	9356.88	9463.13
12.0		9415.50	9356.88	9463.13
13.8		9416.50	9356.88	9463.13
10.2	-20	9416.60	9356.88	9463.13
12.0		9416.70	9356.88	9463.13
13.8		9417.10	9356.88	9463.13
10.2	-10	9415.20	9356.88	9463.13
12.0		9415.60	9356.88	9463.13
13.8		9414.00	9356.88	9463.13
10.2	0	9413.00	9356.88	9463.13
12.0		9413.50	9356.88	9463.13
13.8		9412.50	9356.88	9463.13
10.2	+10	9408.30	9356.88	9463.13
12.0		9410.50	9356.88	9463.13
13.8		9410.50	9356.88	9463.13
10.2	+20	9410.20	9356.88	9463.13
12.0		9410.00	9356.88	9463.13
13.8		9409.60	9356.88	9463.13
10.2	+30	9407.50	9356.88	9463.13
12.0		9407.40	9356.88	9463.13
13.8		9408.30	9356.88	9463.13
10.2	+40	9406.00	9356.88	9463.13
12.0		9406.10	9356.88	9463.13
13.8		9403.80	9356.88	9463.13
10.2	+50	9404.10	9356.88	9463.13
12.0		9403.90	9356.88	9463.13
13.8		9403.20	9356.88	9463.13

Note:
Limits (FCC Rule, 80.213 (g)/80.209(b)):
Upper limit frequency, f(U) = f0 + f(AUBW)/2 -1.5/T
Lower limit frequency, f(L) = f0 - f(AUBW)/2 +1.5/T

3. 3 Emission Limitations

3.3.1 Test Equipment

Please refer to section 6 this report.

3.3.2 Test Procedure

Conducted

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Radiated

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximized by adjusting the antenna height, antenna polarisation and turntable azimuth.

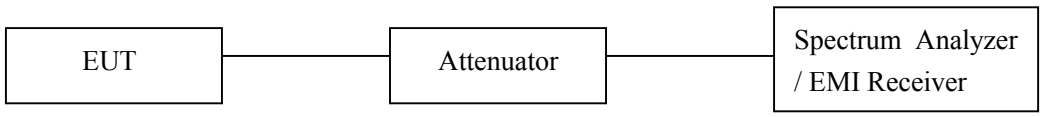
The EUT was set to transmit on maximum power with operating simultaneously.

For any emissions found the EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result was determined by a calculation using the signal generator level, antenna gain and cable loss.

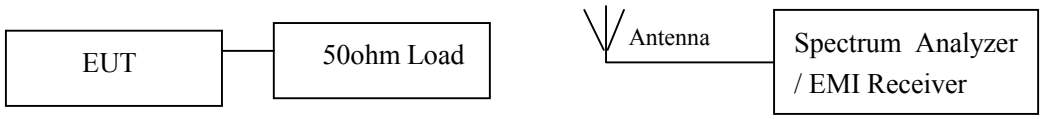
The measurements were performed at a 3m distance unless otherwise stated.

3.3.3 Test Setup

Conducted



Radiated



3.3.4 Configuration of the EUT

Same as section 3.1.4 of this report

3.3.5 EUT Operating Condition

Same as section 3.1.5 of this report

3.3.6 Limit

Spurious Emission at Antenna Terminals

§ 2.1051 & §80.211 (f)

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section:

(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

Frequency removed from the assigned frequency	Emission attenuation (mean power, dB)
50-100% (of the authorized bandwidth)	At least 25
100-250% (of the authorized bandwidth)	At least 35
More 250% (of the authorized bandwidth)	43 plus 10log10 (mean power in watts)

Note: Authorized bandwidth = 110MHz

Field Strength of Spurious Radiations

§ 2.1053 & §80.211 (f)

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section:

(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

Frequency removed from the assigned frequency	Frequency(MHz) (for X-band)	Emission attenuation (mean power, dB)
50-100% (of the authorized bandwidth)	9310-9360 9460-9510	At least 25 / 131.40
100-250% (of the authorized bandwidth)	9160-9310 9510-9660	At least 35 / 121.40
More 250% (of the authorized bandwidth)	0.009-9160 9660-40000	43 plus 10log10 (mean power in watts) / 115.14

Note: Authorized bandwidth = 110MHz; Assigned frequency (center frequency) = 9410MHz

where, [mean power in watts] = 0.67 W for S pulse. See Clause 3.5.7 of this report..

The electric field strength of the maximum power radiation was 156.40 dBuV/m with S pulse.

3.3.7 Emission Limitations Test Result

Conducted

The EUT has no provision to connect directly to the output of the transmitter. Therefore, compliance to the specifications is shown in this and other data presented with this report. The equipment demonstrated compliance with specifications of Paragraph 2.1046(a) and applicable Parts of 80.215 and RSS-238.

Radiated

The EUT was connected to the standard antenna(s) and set to transmit in a normal test mode of operation (with antenna rotation disabled during test). The amplitude of each spurious emission was then maximized and recorded. Measurements were made at a distance of three meters. All other measured spurious emissions where 20-dB or more below the specified limit. The equipment demonstrated compliance with specifications of Paragraph 2.1046(a) and applicable Parts of 80.215 and RSS-238. There are no deviations to the specifications.

RSS-238 requires out of band emissions be at least 60 dB below fundamental emission. Using measured fundamental emissions power of 157.7 dBµV/m at 3-meters, the limit would be 97.7 dBµV/m. International Maritime standard EN 60945 requires emission levels less than 54 dBµV/m at 3-meters, and CFR 47 15.109 requires lower emission levels of which the equipment.

Harmonic Radiated Emission Data

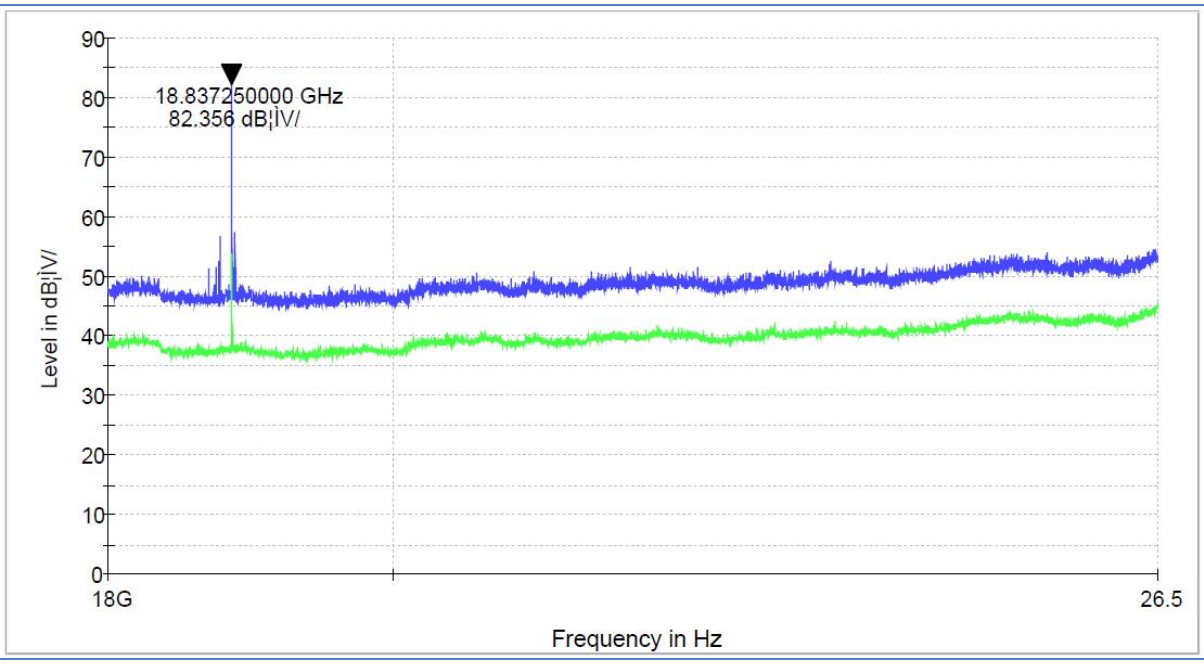
Product	: MARINE RADAR	Test Mode	: Normal
Test Item	: Harmonic Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**	Model	:

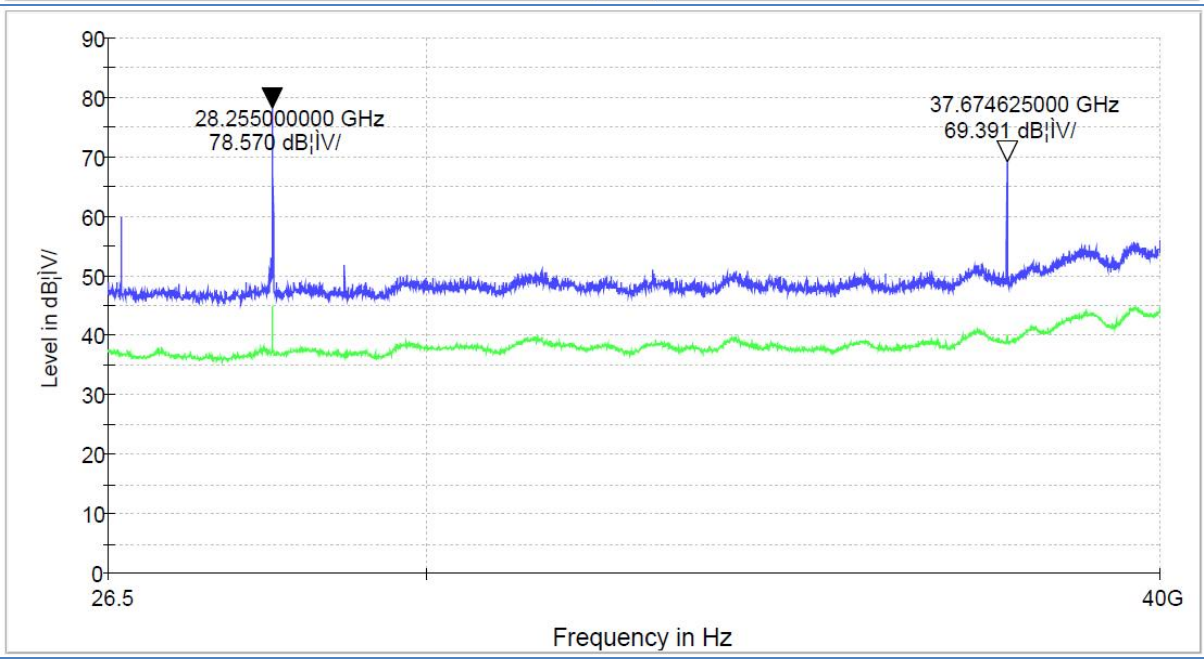
Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

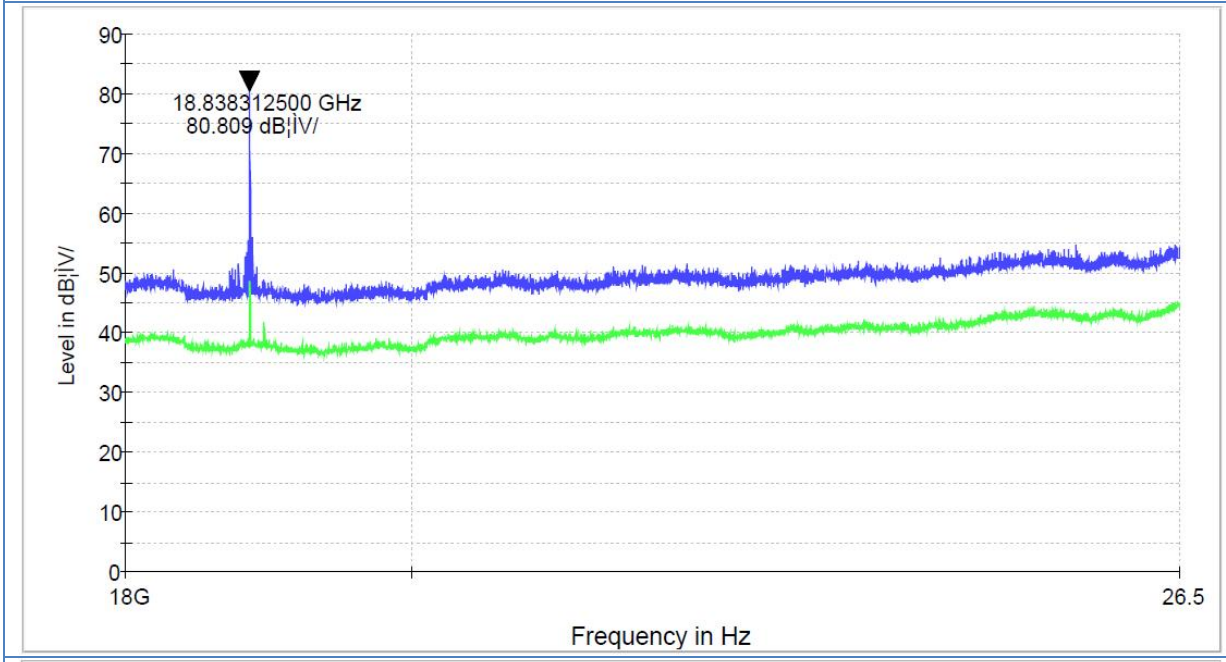
Unit of distance: NM (nautical mile)

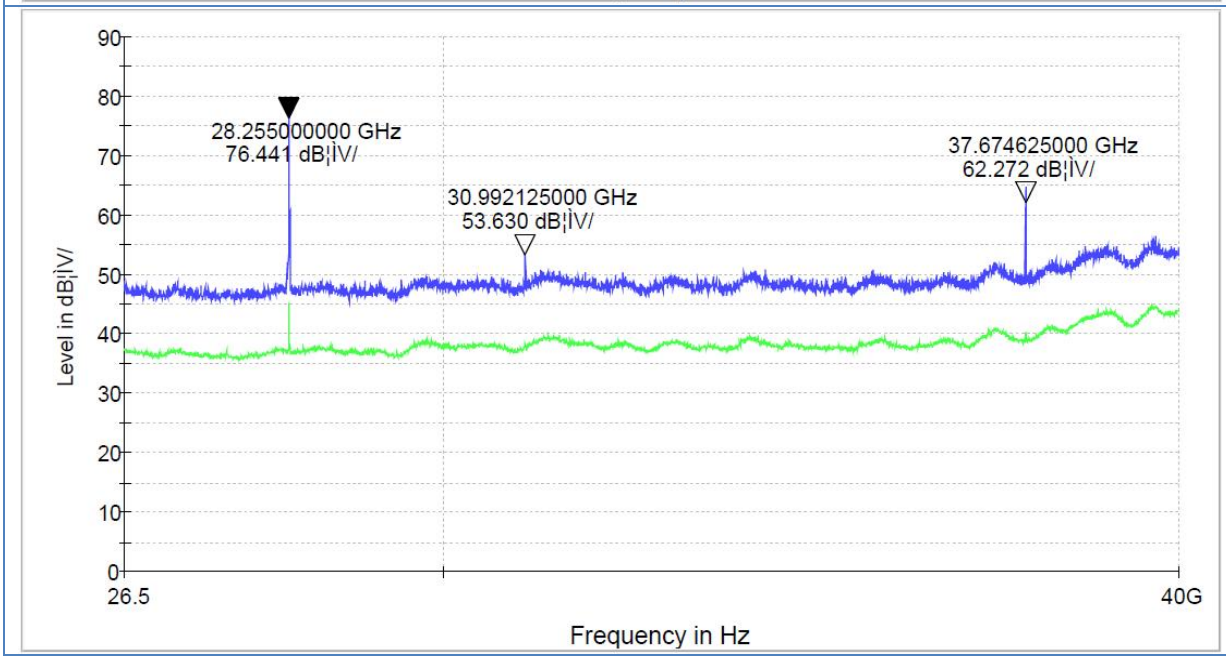
Horizontal





Vertical





Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.
(3) Receiver setting (Peak Detector) : RBW=1MHz; VBW=1MHz; Span=100MHz
(4) Receiver setting (AVG Detector): RBW=1MHz; VBW=30Hz; Span=20MHz
(5) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(6) Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

General Radiated Emission Data

Product	: MARINE RADAR	Test Mode	: Normal
Test Item	: General Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**	Model	:

Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

Unit of distance: NM (nautical mile)

For Frequency Below 30MHz

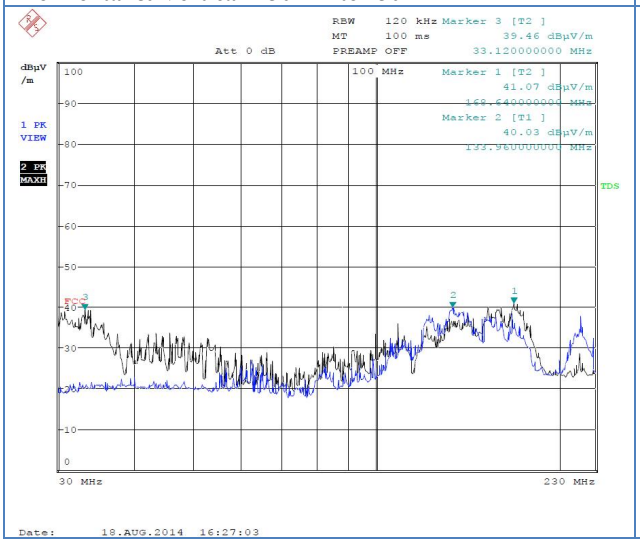
Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
N/A	N/A	N/A	N/A	N/A

Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

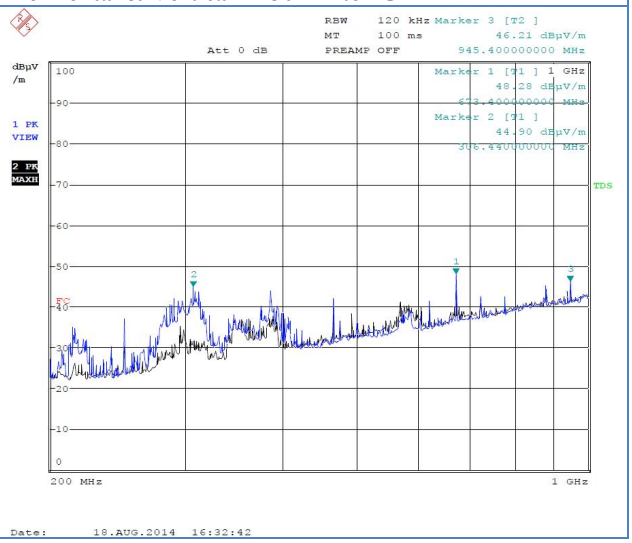
Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

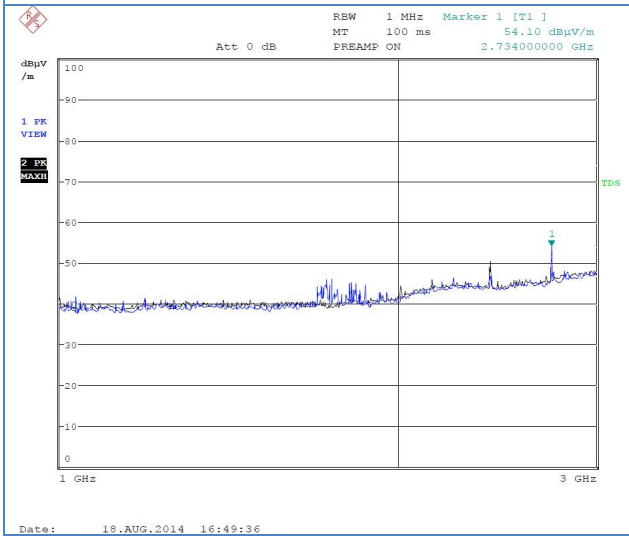
Horizontal & Vertical – 30MH to 230MHz



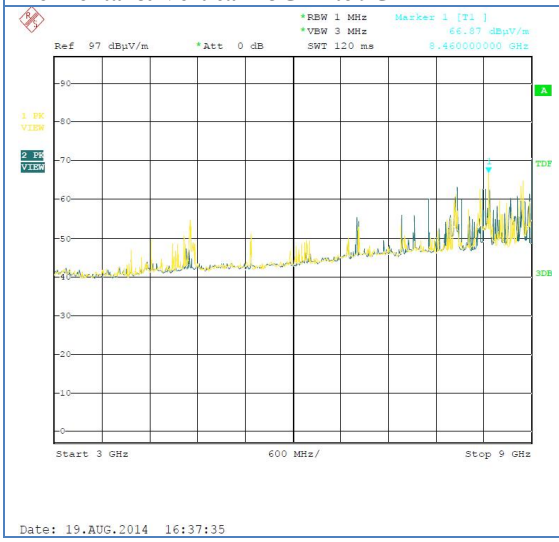
Horizontal & Vertical – 230MH to 1GHz



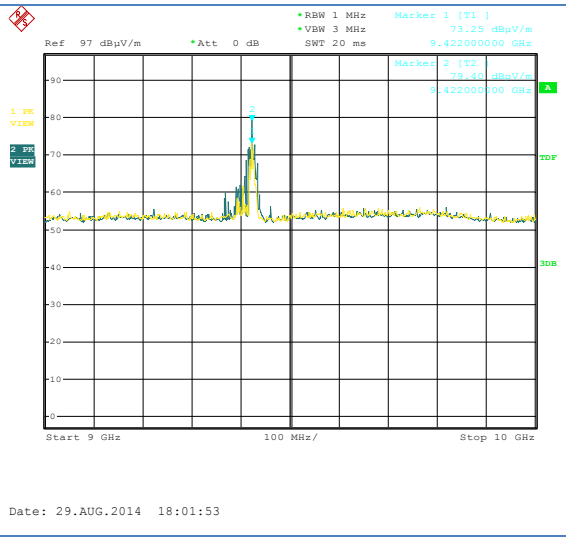
Horizontal & Vertical – 1GHz to 3GHz



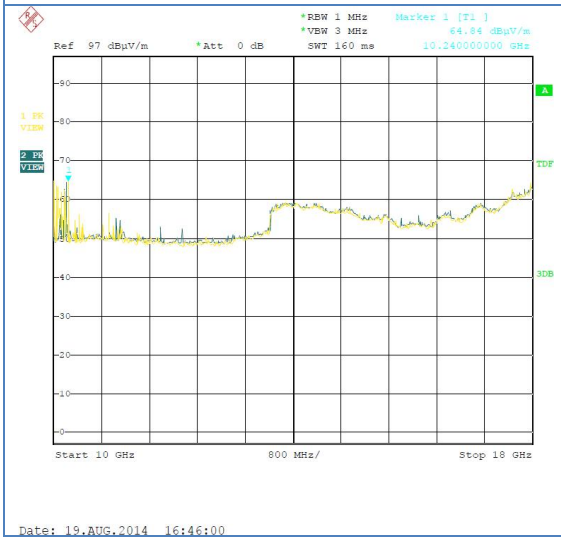
Horizontal & Vertical – 3GHz to 9GHz



Horizontal & Vertical – 9GHz to 10GHz



Horizontal & Vertical – 10GHz to 18GHz



Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

3. 4 Modulation Requirements

3.4.1 Test Equipment

Please refer to section 6 this report.

3.4.2 Test Procedure

The EUT was configured to transmit three different packet data loads. The RF envelope of the magnetron output pulse was measured using an envelope detector and an oscilloscope. Each pulse spectrum was measured using a spectrum analyzer. The traces were recorded as shown below.

3.4.3 Test Setup

Same as section 3.1.3 of this report

3.4.4 Configuration of The EUT

Same as section 3.1.4 of this report

3.4.5 EUT Operating Condition

Same as section 3.1.5 of this report

3.4.6 Limit

§80.213 (g)
Upper limit frequency, f(U) = f0 + f(AUBW)/2 -1.5/T
Lower limit frequency, f(L) = f0 - f(AUBW)/2 +1.5/T

Note: Assigned frequency (f0): 9410 MHz
Authorized bandwidth (f(AUBW)): 110 MHz

3.4.7 Modulation Requirements test Result

The EUT transmits no message and uses no modulation. Therefore, no curves are supplied. The equipment demonstrated compliance with specifications of Paragraph 2.1046(a) and applicable Parts of 80.215 and RSS-238.

3. 5 Transmitter Power

3.5.1 Test Equipment

Please refer to section 6 this report.

3.5.2 Test Procedure

The design's peak output power is a function controlled strictly by the magnetron. The radio frequency power output was measured with the transmitter operating in a normal mode through all available transmission states. The EUT was separated from the receiving system by a distance of three meters during measurements. The spectrum analyzer had an impedance of 50Ω to match the impedance of the receiving antenna. A Rohde and Schwarz Spectrum Analyzer and appropriate mixers were used to measure the radio frequency power at a three-meter distance. During testing data was taken in dBμV/m.

3.5.3 Test Setup

Same as section 3.1.3 of this report

3.5.4 Configuration of The EUT

Same as section 3.1.4 of this report

3.5.5 EUT Operating Condition

Same as section 3.1.5 of this report

3.5.6 Limit

§80.215

(a) Transmitter power shown on the radio station authorization is the maximum power the licensee is authorized to use. Power is expressed in the following terms:

For P0N and F3N emission: Mean power.

Maximum Power: 80.215, 20.0 Watts EIRP as listed on license.

RSS238 Section 4.2

The transmitter output power shall not exceed 60 kW and the antenna gain shall not exceed 35 dBi.

3.5.7 Transmitter Power test Result

MRD

Transmitter Range Setting	Measured Emission dBuV/m @3m	Antenna Factor dB/m	Calculated Emission Level dBuV/m @3m
36 NM	136.05	38.97	175.02
1/8 NM	117.43	38.97	156.40

*Measured Emission = Reading Level + Probe Factor + Cable Loss + ext Attenuator (30dB)
(BBHA 9120D antenna factor is 38.97dB for 9410MHz).

The average power output was also calculated using the pulse width and pulse repetition frequency, which define the duty cycle.

P(ave) = Po multiplied by duty factor

Duty factor = Pulse width (PW) x Pulse repetition (PRF)

P(ave) = Peak Power (W) x Pulse width (s) (PW) x Pulse repetition (Hz) (PRF)

P(ave) = Po multiplied by duty factor, Duty factor = Pulse width (PW) x Pulse repetition (PRF)

Example: P(ave) = 4000 watts x 350nS (PW) x 1200 (PRF)

P(ave) = 1.68 watts

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)	Calculated Average Power(Watts)
0.125	80	2100	0.67
0.25	80	2100	0.67
0. 5	80	2100	0.67
0.75	80	2100	0.67
1.5	80	2100	0.67
1.5	350	1200	1.68
2	350	1200	1.68
3	350	1200	1.68
3	800	600	1.92
4	800	600	1.92
6	800	600	1.92
8	800	600	1.92
12	800	600	1.92
16	800	600	1.92
24	800	600	1.92
36	800	600	1.92

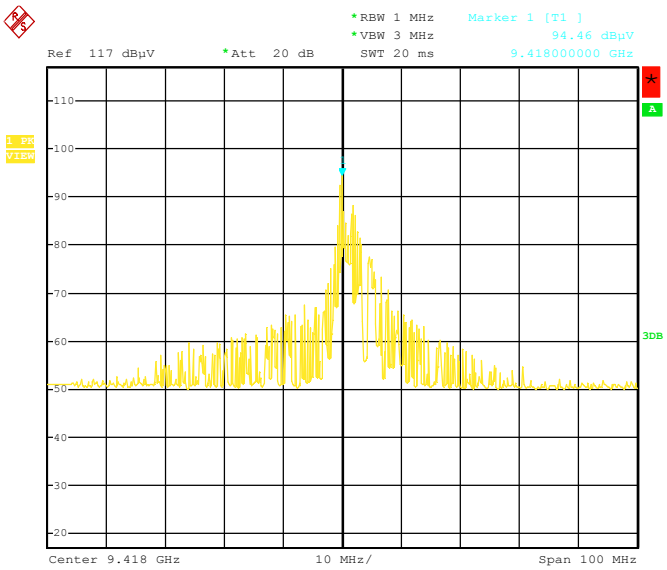
Data was taken per Paragraph 2.1046(a) and applicable parts of Part 80 and RSS-238. The equipment demonstrated compliance with specifications of Paragraph 2.1046(a) and applicable Parts of 80.215 and RSS-238. There were no modifications or deviations to the specifications.

RF power output at 3 meters distance 36 nm range

Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
36	800	600

Unit of distance: NM (nautical mile)

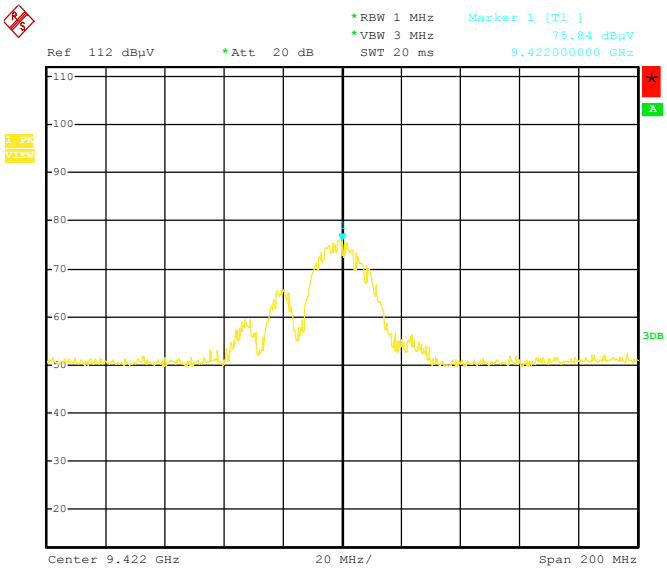


RF power output at 3 meters distance 1/8 nm range

Pulse type

Range (nm)	Pulse Width(ns)	Pulse Repetition Frequency(Hz)
0.125	80	2100

Unit of distance: NM (nautical mile)



3. 6 RF Exposure Requirements

3.6.1 Test Equipment

Please refer to section 6 this report.

3.6.2 Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)(1) of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

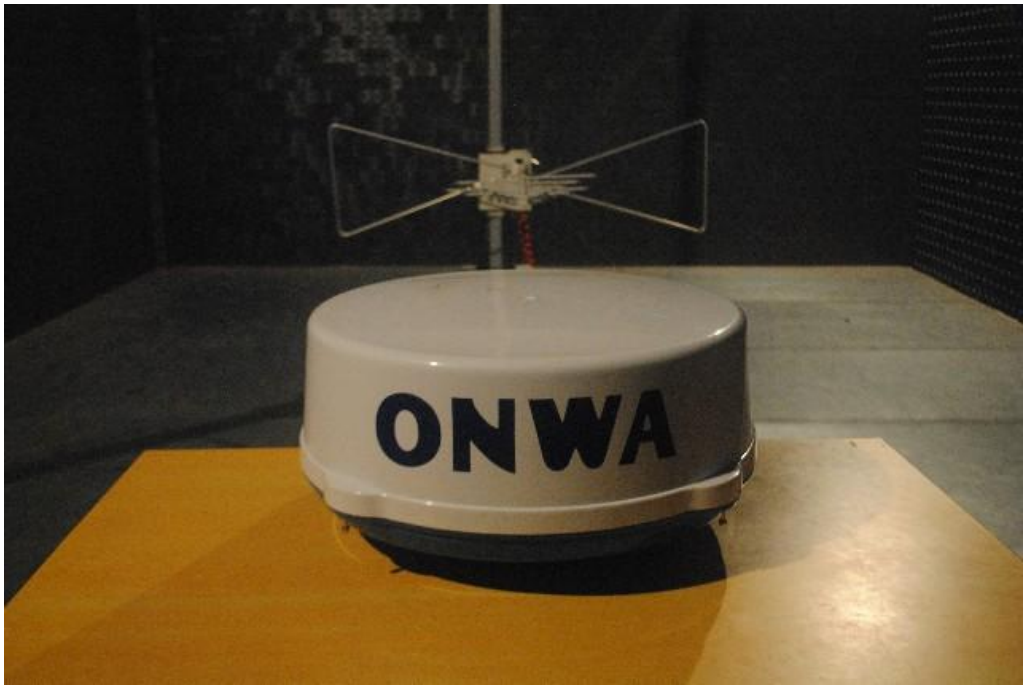
3.6.3 Test Result

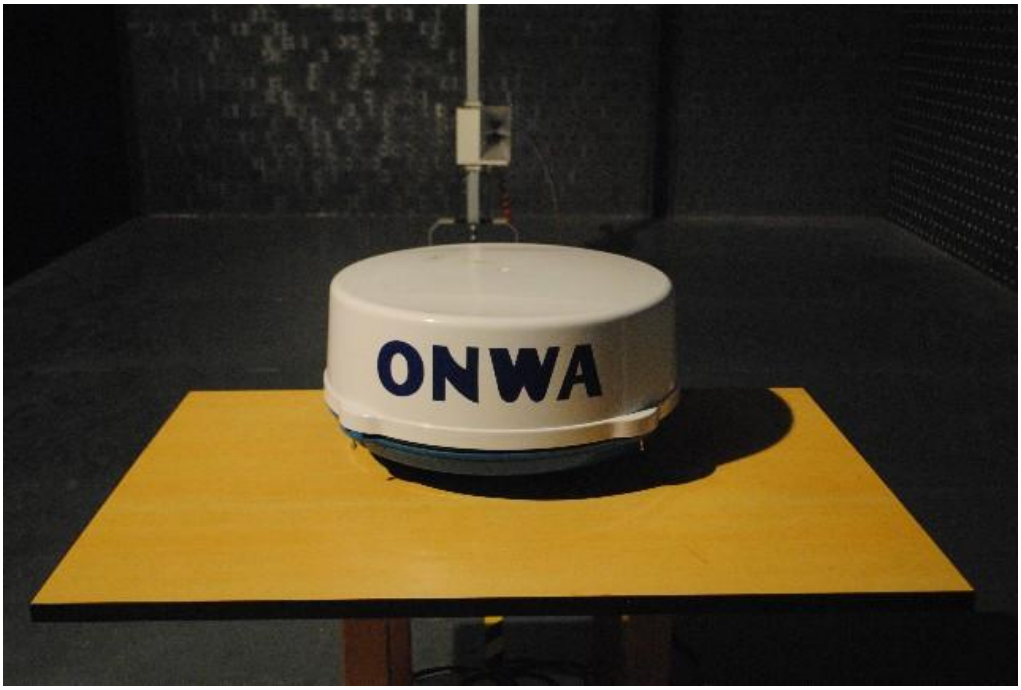
Evaluation of RF Exposure Compliance Requirements MPE Prediction of MPE according to OET Bulletin 65	
RF Exposure Requirements	**Compliance with FCC Rules**
Calculation Method of RF Safety Distance: **$S = PG/4\pi r^2 = EIRP/4\pi r^2$** Where: P: power input to the antenna in mW EIRP: Equivalent (effective) isotropic radiated power. S: power density mW/cm2 G: numeric gain of antenna relative to isotropic radiator r: distance to centre of radiation in cm **$r = \sqrt{PG/4\pi S}$**	**Power density** $S = PG/4\pi r^2 = EIRP/4\pi r^2$ $=0.964 mW/cm^2$ R =100cm Where: Max Average Power=1.92 W , f=9410MHz Antenna gain =18 dBi EIRP=121143.81mW MPE limit for General Population/Uncontrolled exposure at prediction frequency: 1.0 mW/cm^2

4. Photos of Testing

4. 1 EUT Test Photographs

Radiated emission test view



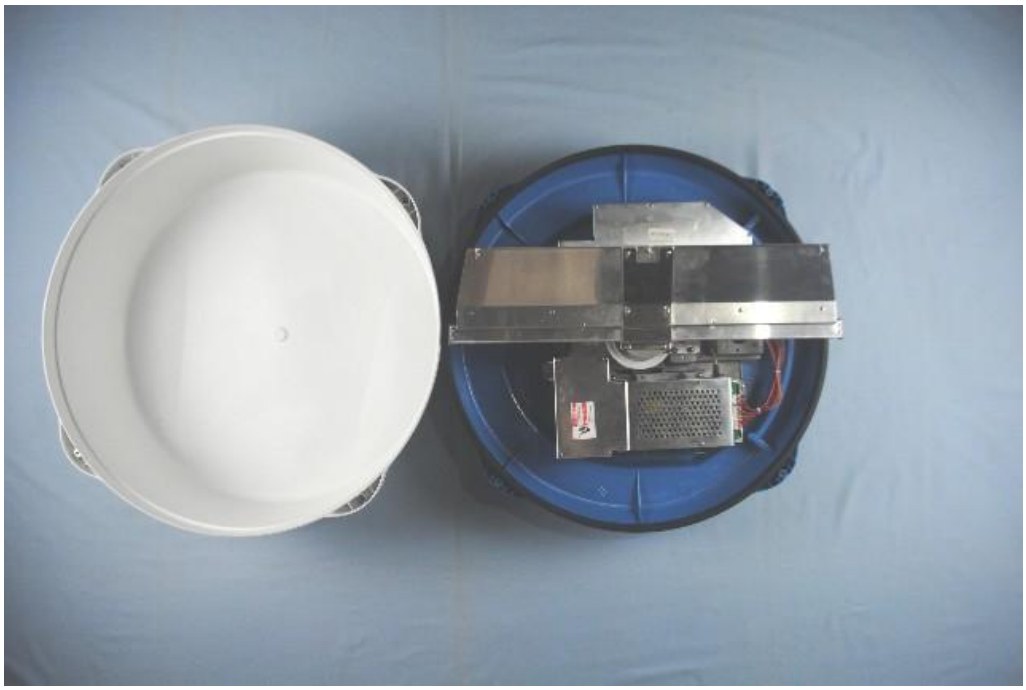


4. 2 EUT Detailed Photographs

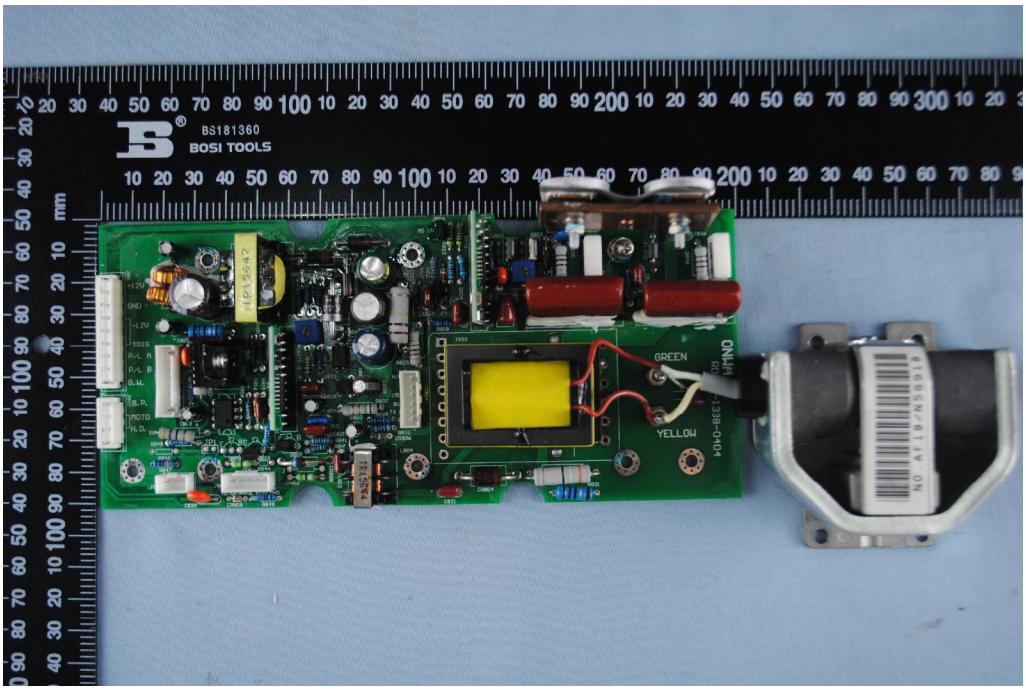
EUT top view

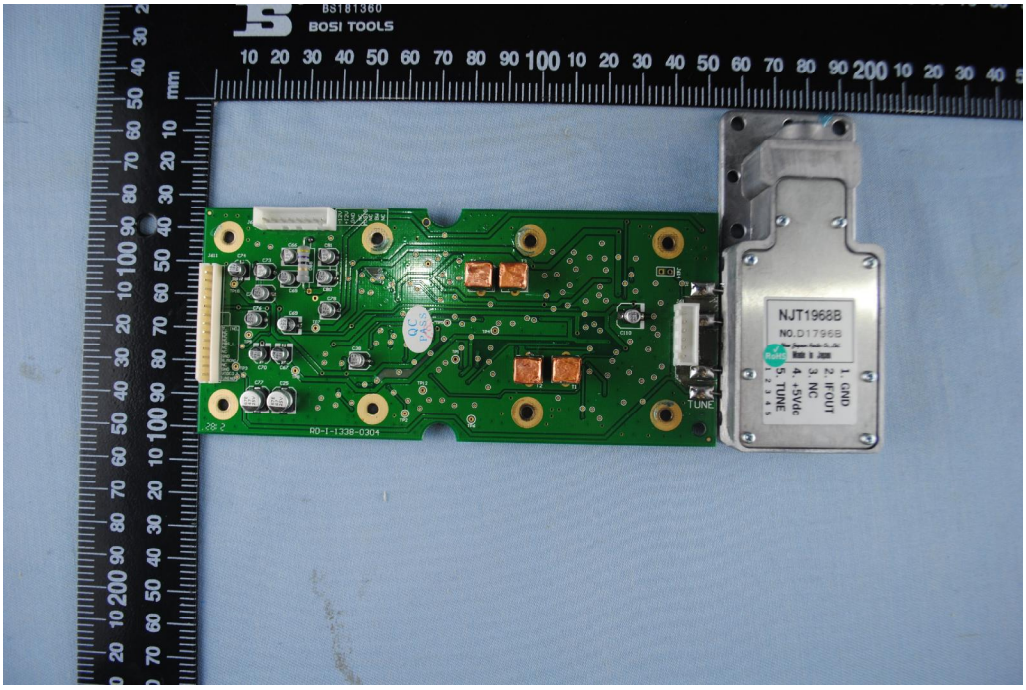
EUT bottom view

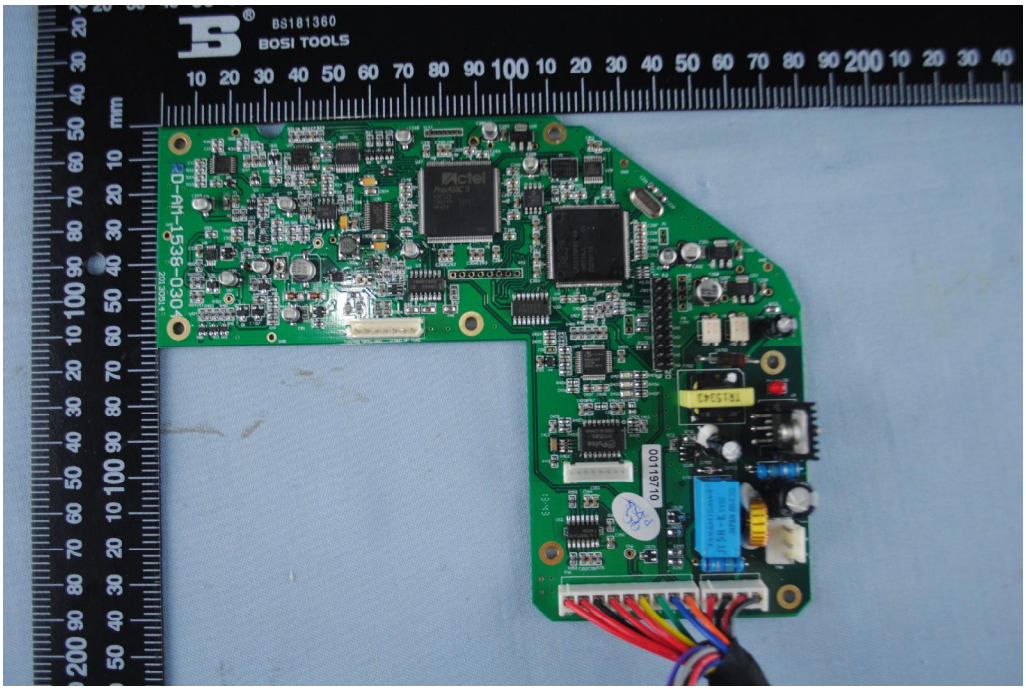
EUT inside whole view



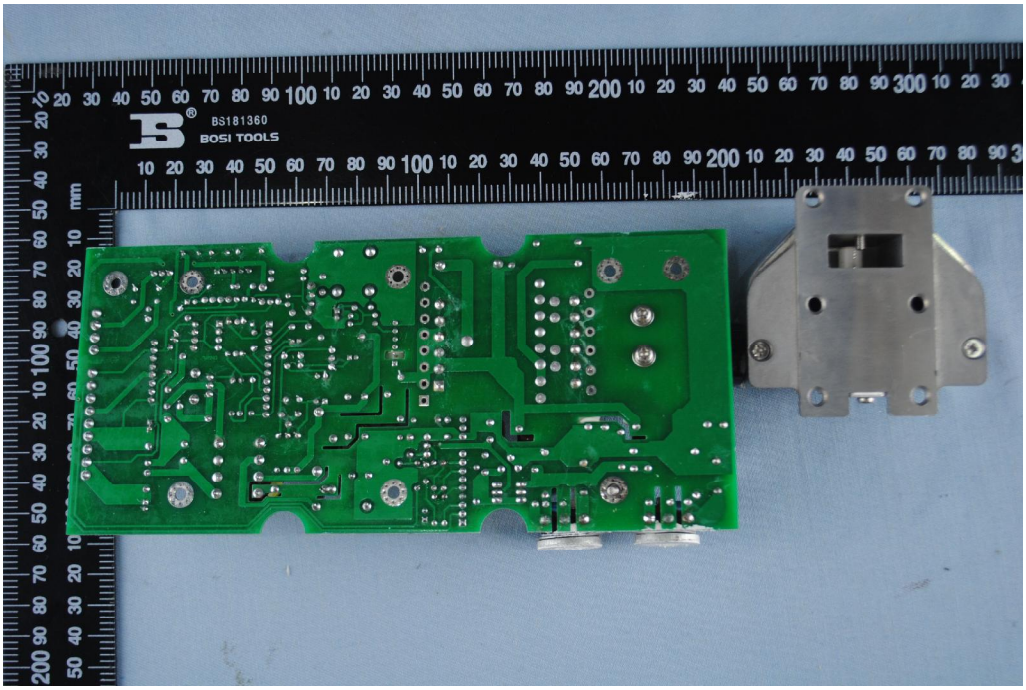
Main board component side

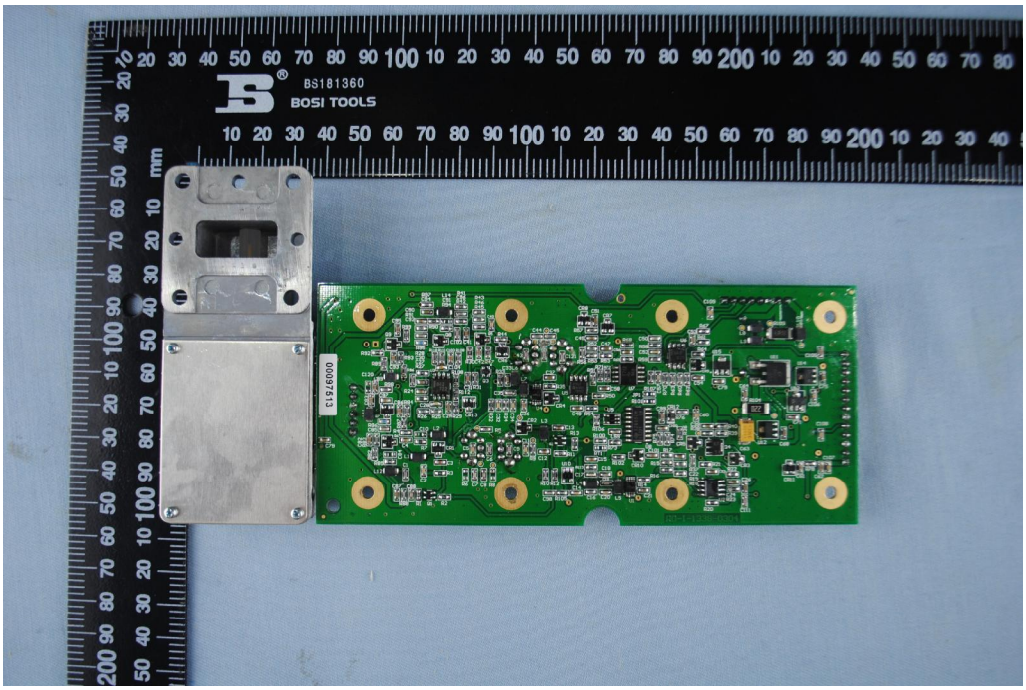


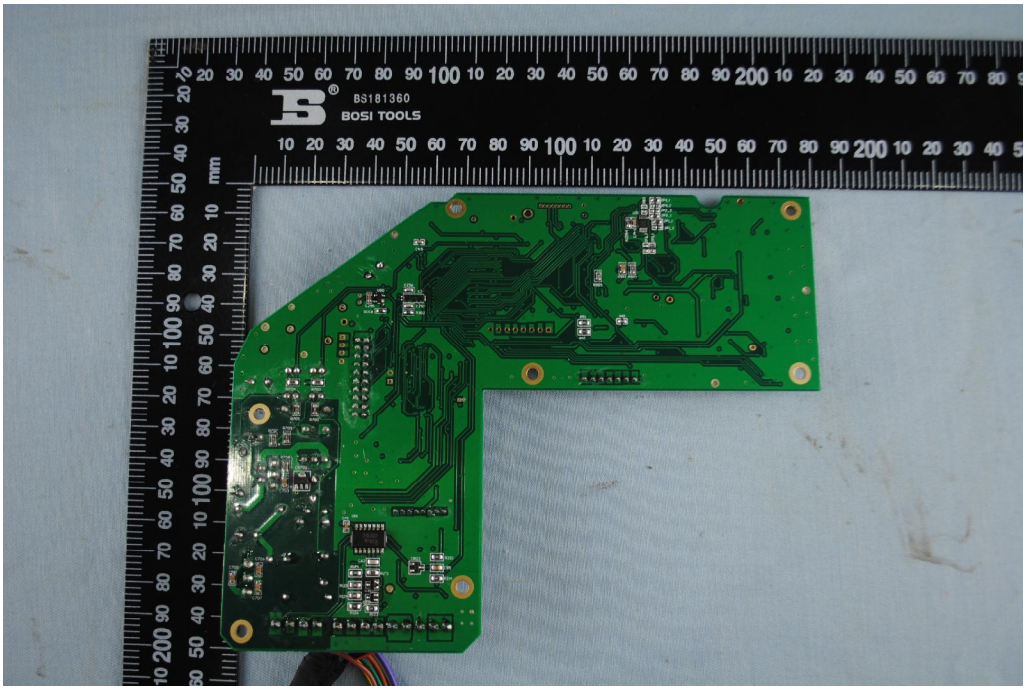




Main board solder side




BS181360
BOSI TOOLS


BS181360
BOSI TOOLS

5. FCC ID Label

FCC ID: 2ACD9-KR1238

This device complies with Part 80 of the FCC Rules. Operation is subject to the condition that device does not cause harmful interference.

Proposed Label Location on EUT

EUT Bottom View/Proposed FCC ID Label Location

6. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	Innco systems GmbH	CT-0801	KMO-SZ114	NCR
Antenna Tower	Innco systems GmbH	MM4000-PP	KMO-SZ115	NCR
Controller	Innco systems GmbH	CO2000	KMO-SZ116	NCR
Pre-Amplifier	Agilent	87405C	KMO-SZ155	Dec.6, 2014
Pre-Amplifier	Com-Power	PAM-840	KMO-SZ156	Dec.6, 2014
Horn Antenna	Com-Power	AH-840	KMO-SZ157	Dec.6, 2014
EMI Test Receiver	Rohde & Schwarz	ESPI7	KMO-SZ002	June 27, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP40	KMO-SZ003	June 27, 2015
Signal Generator	FLUKE	PM5418+Y/C	KMO-SZ020	May 27, 2015
Loop Antenna	Rohde & Schwarz	HFH2-Z2	KMO-SZ004	Jan. 30, 2015
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	Sep.18, 2014
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ006	Sep.18, 2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ007	Sep.18, 2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ008	Sep.18, 2014
AMN	Rohde & Schwarz	ESH3-Z5	KMO-SZ009	June 27, 2015
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	KMO-SZ077	Nov.29, 2014
ISN	SCHWARZBECK	NTFM 8158 CAT3	KMO-SZ070	Nov.19, 2014
ISN	SCHWARZBECK	NTFM 8158 CAT5	KMO-SZ071	Nov.19, 2014
ISN	SCHWARZBECK	NTFM 8158 CAT6	KMO-SZ072	Nov.19, 2014
KMO Shielded Room	KMO	KMO-001	KMO-SZ036	NCR
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	KMO-SZ037	Sep.18, 2014
AC Power Source / Analyzer	Agilent	6813B	KMO-SZ166	July 22, 2015
Digital Radio Communication Tester	Rohde & Schwarz	CMD60	KMO-SZ169	April 10, 2015
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	KMO-SZ170	April 10, 2015
Program Control Telephone Exchanger	Excelltel	CDX8000-M	KMO-SZ221	NCR
3m Anechoic Chamber	KMO	KMO-3AC	KMO-3AC-1	Nov.12, 2016
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2015