TEST REPORT

Application No.:	SZEM1901010132CR
Applicant:	Navico Inc.
Address of Applicant:	4500 S. 129th East Avenue, Ste. 200, Tulsa, Oklahoma, 74134 United States
Manufacturer:	Navico Auckland Limited
Address of Manufacturer:	Arrenway Drive, Rosedale, Auckland, 0632 New Zealand
Factory:	Shenzhen Hytera Communications Corportion Limited
Address of Factory:	Hytera Techology Park, Baolong Industrial City, Longgang District, Shenzhen, China
Equipment Under Test (EUT):	
EUT Name:	Marine VHF Radio
Model No.:	V60-B, RS40-B ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark:	B&G, SIMRAD
Standard(s) :	47 CFR Part 15, Subpart B
Date of Receipt:	2019-01-07
Date of Test:	2019-03-11 to 2019-04-11
Date of Issue:	2019-04-15
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-04-15		Original

Authorized for issue by:				
				
		Edison Li /Project Engineer		
				
		Eric Fu /Reviewer		

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2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

Remark:

Model No.: V60-B, RS40-B

Only the model V60-B was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only differences are the trade name and model no. for trading purpose.

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4 General Information

4.1 Details of E.U.T.

Power supply:	12 VDC battery system
Cable:	DC cable: longer than 300cm unshielded
Sample Type:	Mobile device
Internal Source:	More than 108MHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC power	ZHAOXIN	RXN-305D	REF. No.SEA2700
Coaxial Attenuator	Provided by client	TS4	HYT168793
Cell Site Test Set	HP	8921A	3633A04615
Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03
Wireless Handset	Hytera	H60	1812H30110003

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radiated Emission	± 4.5dB (30MHz-1GHz)
		± 4.8dB (1GHz-6GHz)
2	Temperature test	± 1℃
3	Humidity test	± 3%

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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Radiated Emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01

Radiated Emissions (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018-07-12	2019-07-11
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2018-04-13	2019-04-12
Horn Antenna(1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-09-27	2019-09-26

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07

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6 Emission Test Results

6.1 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

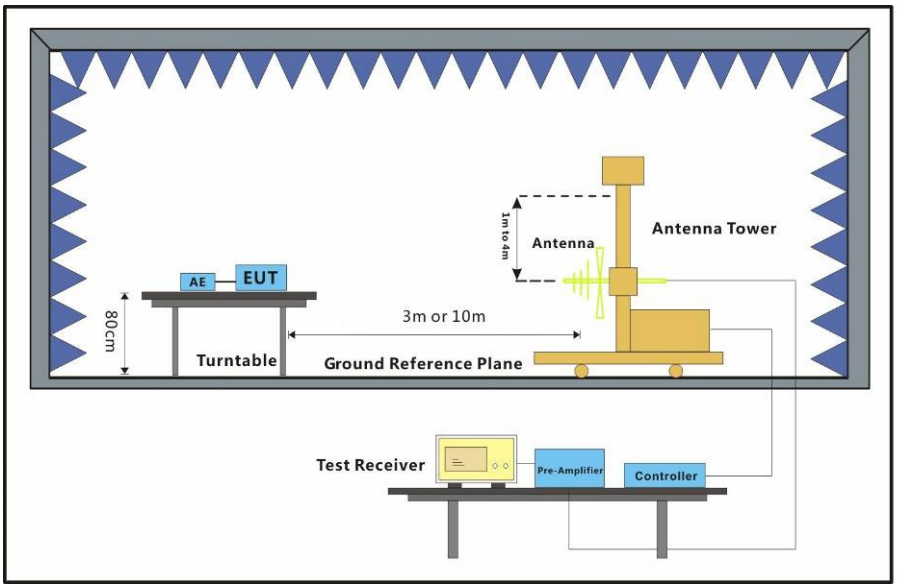
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.3 °C Humidity: 55 % RH Atmospheric Pressure: 1030 mbar

Test mode: a:Normal Working_Blank

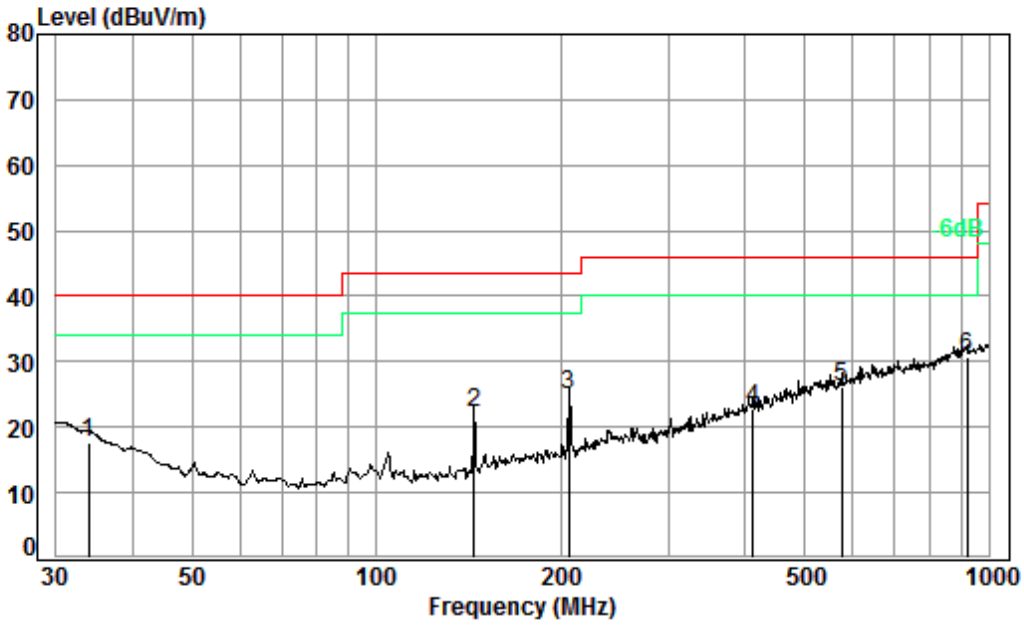
6.1.2 Test Setup Diagram



6.1.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal



Condition: 3m HORIZONTAL
Job No. : 10132CR
Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.92	0.60	20.37	27.44	24.06	17.59	40.00	-22.41
2	144.33	1.31	14.11	27.11	33.76	22.07	43.50	-21.43
3	206.40	1.44	16.73	26.88	33.75	25.04	43.50	-18.46
4	411.82	2.25	22.69	27.24	24.97	22.67	46.00	-23.33
5	574.63	2.68	26.13	27.87	25.29	26.23	46.00	-19.77
6 pp	922.52	3.62	29.92	26.93	24.08	30.69	46.00	-15.31

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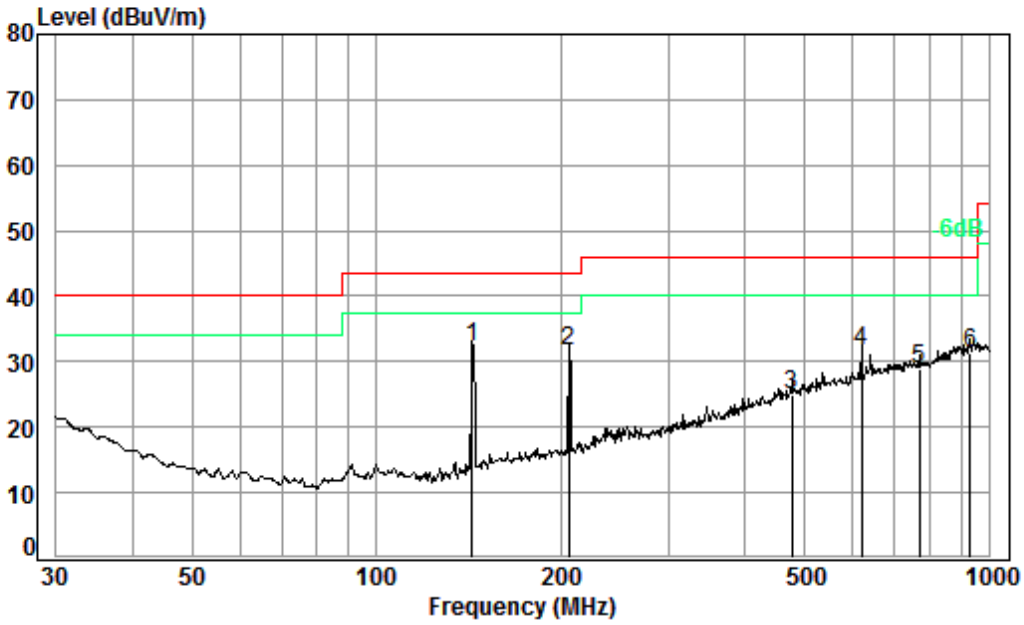
Mode:a; Polarization:Vertical



Condition: 3m VERTICAL
Job No. : 10132CR
Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	143.33	1.30	14.02	27.12	43.97	32.17	43.50	-11.33
2	206.40	1.44	16.73	26.88	40.30	31.59	43.50	-11.91
3	477.17	2.52	24.14	27.52	25.91	25.05	46.00	-20.95
4	620.71	2.75	26.89	27.91	29.75	31.48	46.00	-14.52
5	771.45	3.12	28.34	27.68	25.13	28.91	46.00	-17.09
6	932.27	3.63	29.97	26.88	24.61	31.33	46.00	-14.67

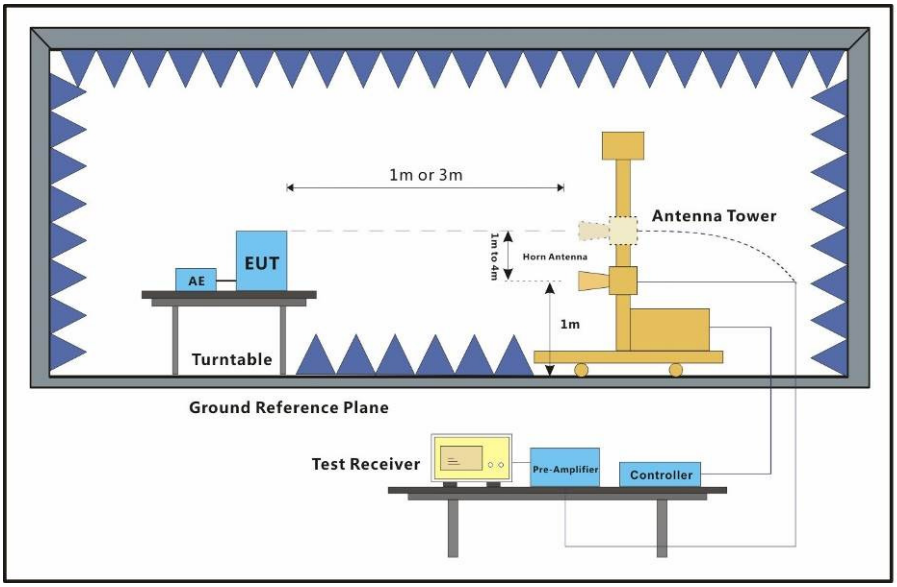
6.2 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B
Test Method: ANSI C63.4:2014
Frequency Range: Above 1GHz
Measurement Distance: 3m
Limit:
Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average
Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 21.2 °C Humidity: 68.2 % RH Atmospheric Pressure: 1030 mbar
Test mode: a:Normal Working_Blank

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

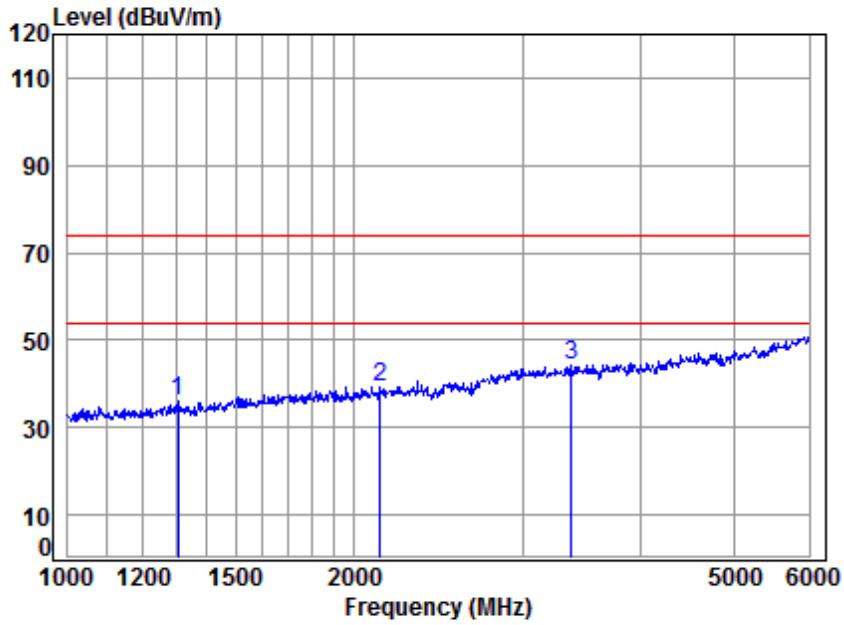
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Remark:

1) Scan from 9kHz to 25GHz, the disturbance above 6GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

2) For frequencies above 1GHz, the emission limits are based on average limits. However, the peak emissions shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

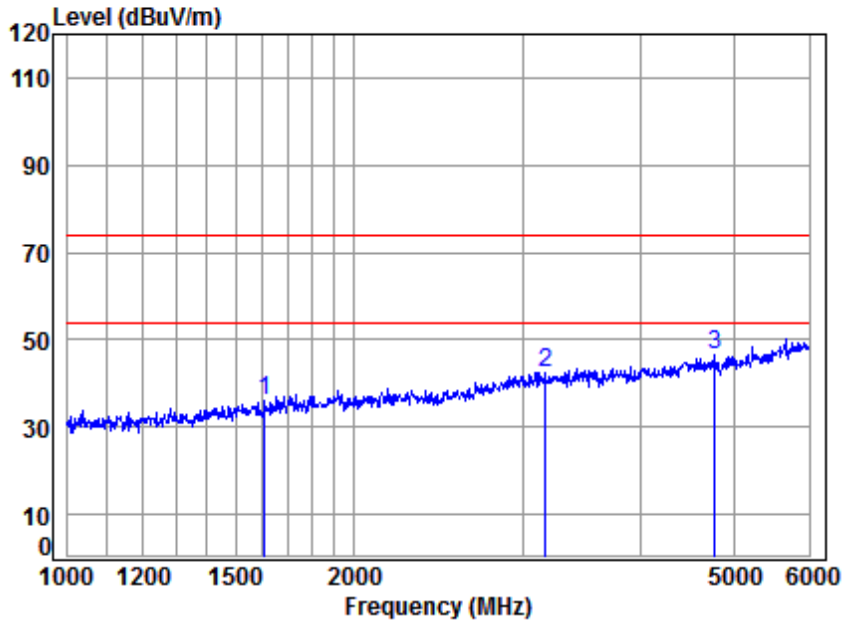
Mode:a; Polarization:Horizontal



Site : chamber
Condition: 3m Horizontal
Job No : 10132CR
Mode : a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1303.666	4.81	25.04	40.57	46.62	35.90	74.00	-38.10	Peak
2	2130.001	5.10	28.05	41.06	47.35	39.44	74.00	-34.56	Peak
3	3381.760	6.35	31.52	41.96	48.34	44.25	74.00	-29.75	Peak

Mode:a; Polarization:Vertical

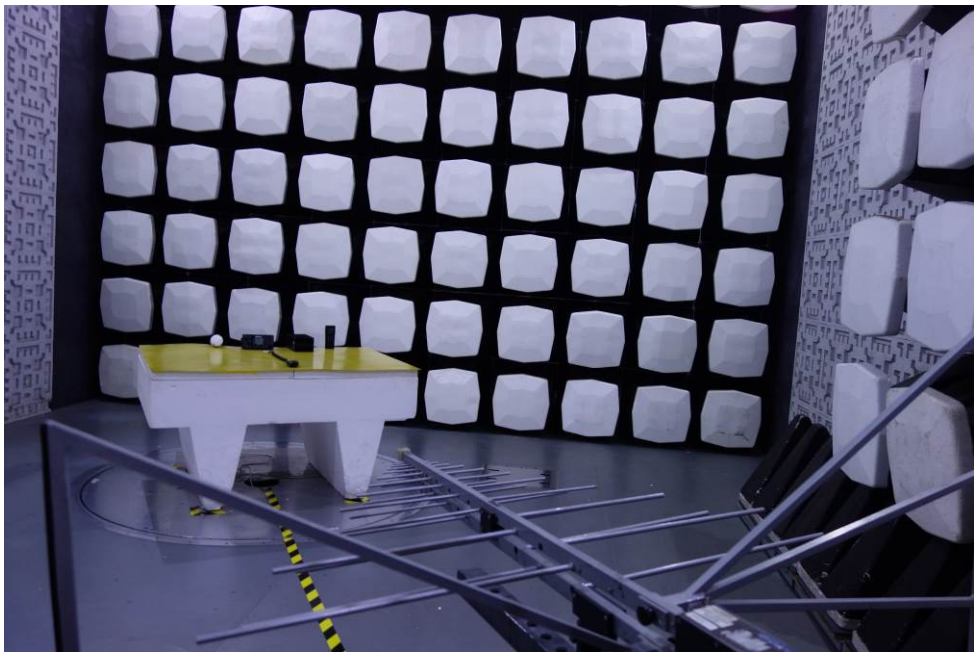


Site : chamber
Condition: 3m VERTICAL
Job No : 10132CR
Mode : a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1607.719	5.34	26.28	40.78	45.02	35.86	74.00	-38.14	Peak
2	3170.512	6.15	31.19	41.66	46.88	42.56	74.00	-31.44	Peak
3	4778.879	7.86	33.94	43.59	48.12	46.33	74.00	-27.67	Peak

7 Photographs

7.1 Radiated Emissions (30MHz-1GHz) Test Setup



7.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -

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