

FCC EMC Test Report

Report No.: JYTSZ-R01-2400430G1

Applicant: Dynamox SA

Address of Applicant: Rua Coronel Luiz Caldeira, n 67 Condominio Ybira, Itacorubi, Florianópolis-SC, Brazil, 88034-110

Equipment Under Test (EUT)

Product Name: DynaGateway

Model No.: DynaGateway IoT-S

Trade Mark: N/A

FCC ID: 2AT3M-GTWIOT

Applicable Standards: FCC CFR Title 47 Part 15B

Date of Sample Receipt: 13 Aug., 2024

Date of Test: 14 Aug., to 08 Nov., 2024

Date of report Issued: 11 Nov., 2024

Test Result: PASS

Project by: _____

Date: 11 Nov., 2024

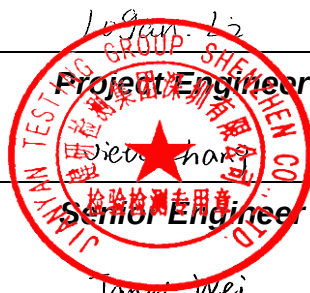
Reviewed by: _____

Date: 11 Nov., 2024

Approved by: _____

Date: 11 Nov., 2024

Manager



This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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1 Version

Version No.	Date	Description
00	11 Nov., 2024	Original

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3 General Information

3.1 Client Information

Applicant:	Dynamox SA
Address:	Rua Coronel Luiz Caldeira, n 67 Condominio Ybira, Itacorubi, Florianópolis-SC, Brazil, 88034-110
Manufacturer/Factory:	Dynamox SA
Address:	Rua Coronel Luiz Caldeira, n 67 Condominio Ybira, Itacorubi, Florianópolis-SC, Brazil, 88034-110

3.2 General Description of E.U.T.

Product Name:	DynaGateway
Model No.:	DynaGateway IoT-S
Power Supply:	DC 12V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode

Operating Mode	Detail Description
Power on and LAN mode	Keep the EUT in Power on and LAN mode(Worst case)
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

3.4 Description of Test Auxiliary Equipment

Manufacturer	Description	Model	S/N	FCC ID/DoC
Lenovo	Laptop	ThinkPad T14 Gen 1	SL10Z47277	DoC

3.5 Description of Cable Used

Cable Type	Description	Length	From	To
N/A	N/A	N/A	N/A	N/A

3.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Radiated Emission (30MHz ~ 200MHz) (3m SAC)	4.6 dB
Radiated Emission (200MHz ~ 1000MHz) (3m SAC)	5.8 dB
Radiated Emission (1GHz ~ 6GHz) (3m SAC)	4.5 dB
Radiated Emission (6GHz ~ 18GHz) (3m SAC)	4.7 dB
Radiated Emission (30MHz ~ 200MHz) (10m SAC)	4.3 dB
Radiated Emission (200MHz ~ 1000MHz) (10m SAC)	4.3 dB

Note: All the measurement uncertainty value were shown with a coverage $k=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

3.7 Additions to, Deviations, or Exclusions from the Method

No

3.8 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

3.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

3.10 Test Instruments List

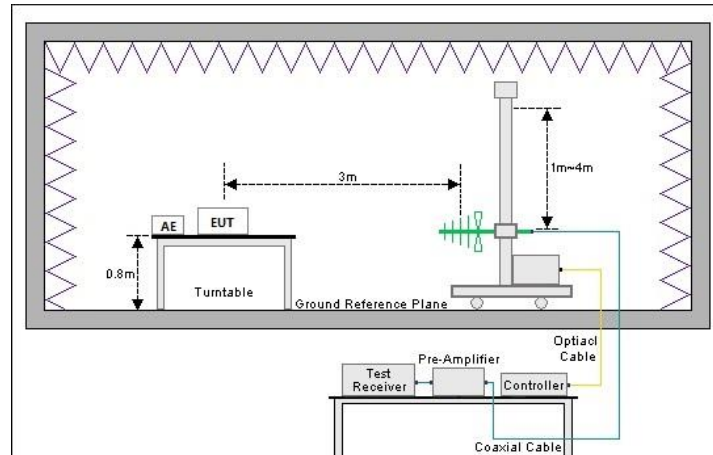
Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2026
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	01-09-2024	01-08-2025
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	01-05-2024	01-04-2025
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	12-27-2023	12-26-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	12-27-2023	12-26-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	12-27-2023	12-26-2024
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	12-27-2023	12-26-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-17-2024	01-16-2025
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-17-2024	01-16-2025
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

4 Measurement Setup and Procedure

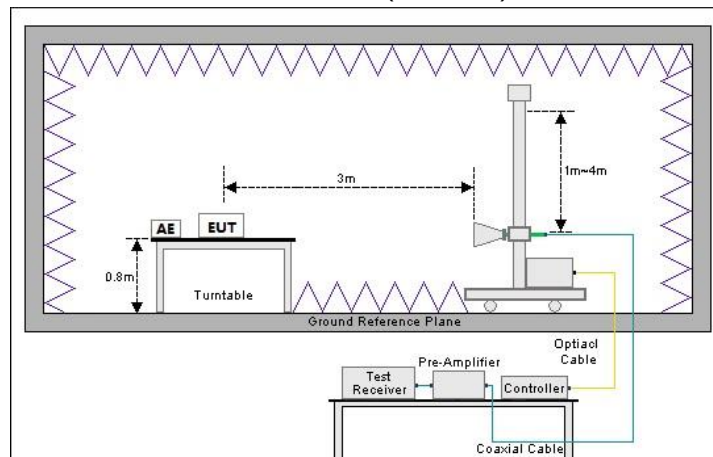
4.1 Test Setup

1) Radiated emission measurement:

Below 1GHz (3m SAC)



Above 1GHz (3m SAC)



4.2 Test Procedure

Test method	Test step
Radiated emission	For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m . 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. For above 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

5 Test Results

5.1 Summary

5.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Conducted Emission	Part 15.107	N/A	N/A
Radiated Emission	Part 15.109	See Section 5.3	Pass
Remark: 1. The EUT is a Class B digital device. 2. Pass: The EUT complies with the essential requirements in the standard. 3. N/A: Not Applicable, The EUT is powered by a DC power supply.			
Test Method:	ANSI C63.4:2014		

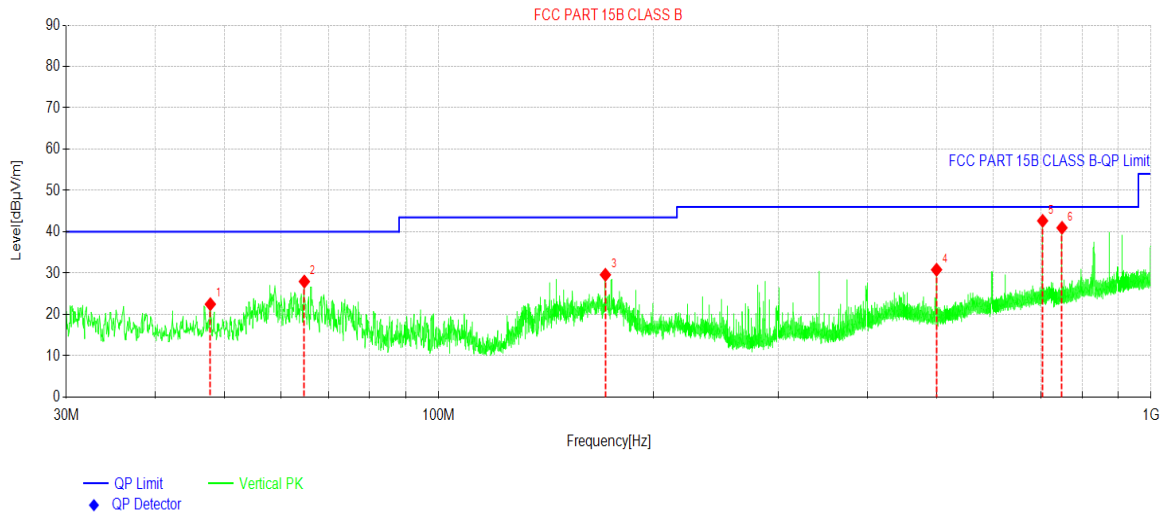
5.1.2 Test Limit

Test items	Limit				
Radiated Emission	Frequency (MHz)	Class A Limit (dBµV/m)		Class B Limit (dBµV/m)	
		Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m
	30 – 88	49.0	39.0	40.0	30.0
	88 – 216	53.5	43.5	43.5	33.5
	216 – 960	56.0	46.0	46.0	36.0
	960 – 1000	60.0	50.0	54.0	44.0
	Note: The more stringent limit applies at transition frequencies.				
	Frequency	Class A Limit (dBµV/m) @ 3m		Class B Limit (dBµV/m) @ 3m	
		Average	Peake	Average	Peake
	Above 1 GHz	60.0	80.0	54.0	74.0
	Note: The measurement bandwidth shall be 1 MHz or greater.				

5.2 Radiated Emission

Below 1GHz:

Product Name:	DynaGateway	Product Model:	DynaGateway IoT-S
Test By:	Alan Chen	Test mode:	Power on & Lan mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



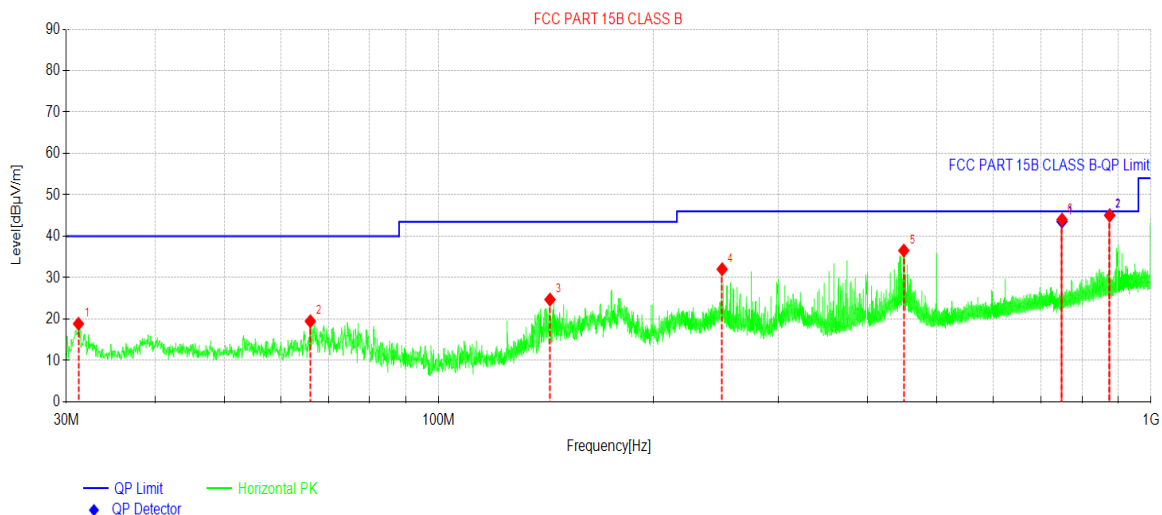
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	47.8004	36.44	-13.96	22.48	40.00	17.52	PK	Vertical
2	64.7762	43.57	-15.60	27.97	40.00	12.03	PK	Vertical
3	171.433	43.91	-14.31	29.60	43.50	13.90	PK	Vertical
4	500.037	38.99	-8.16	30.83	46.00	15.17	PK	Vertical
5	704.523	46.18	-3.52	42.66	46.00	3.34	PK	Vertical
6	750.018	43.52	-2.54	40.98	46.00	5.02	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	DynaGateway	Product Model:	DynaGateway IoT-S
Test By:	Alan Chen	Test mode:	Power on & Lan mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	31.2126	33.65	-14.78	18.87	40.00	21.13	PK	Horizontal
2	66.0373	35.36	-15.88	19.48	40.00	20.52	PK	Horizontal
3	143.301	39.19	-14.48	24.71	43.50	18.79	PK	Horizontal
4	250.007	47.54	-15.49	32.05	46.00	13.95	PK	Horizontal
5	449.740	45.53	-8.98	36.55	46.00	9.45	PK	Horizontal
6	750.018	46.58	-2.54	44.04	46.00	1.96	PK	Horizontal
7	875.057	45.74	-0.72	45.02	46.00	0.98	PK	Horizontal

Final Data List

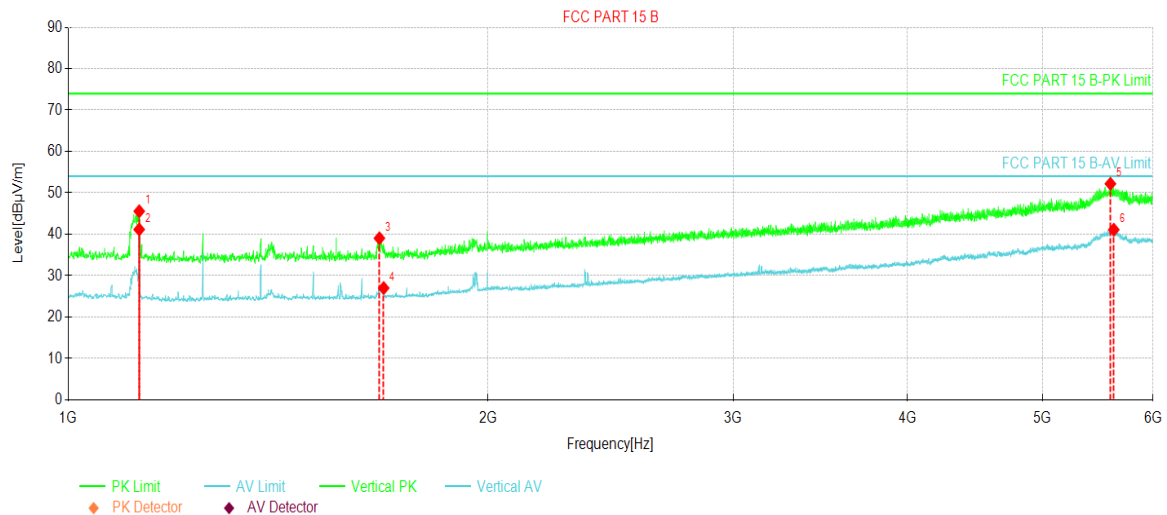
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Angle [°]	Verdict
1	750.018	46.11	-2.54	43.57	46.00	2.43	151.7	PASS
2	875.028	45.79	-0.72	45.07	46.00	0.93	132.8	PASS

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

Product Name:	DynaGateway	Product Model:	DynaGateway IoT-S
Test By:	Alan Chen	Test mode:	Power on & Lan mode
Test Frequency:	1000 MHz ~ 6000 MHz	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



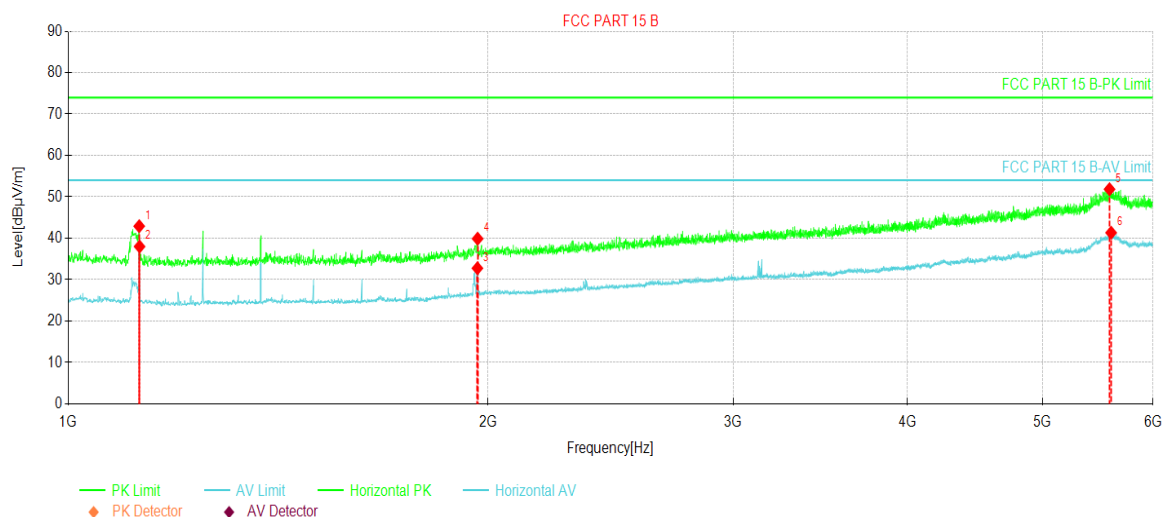
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1124.39	68.43	45.56	-22.87	74.00	28.44	PK	Vertical
2	1124.39	64.03	41.16	-22.87	54.00	12.84	AV	Vertical
3	1671.95	61.61	39.03	-22.58	74.00	34.97	PK	Vertical
4	1683.83	49.56	27.01	-22.55	54.00	26.99	AV	Vertical
5	5592.44	56.67	52.19	-4.48	74.00	21.81	PK	Vertical
6	5623.70	45.67	41.10	-4.57	54.00	12.90	AV	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	DynaGateway	Product Model:	DynaGateway IoT-S
Test By:	Alan Chen	Test mode:	Power on & Lan mode
Test Frequency:	1000 MHz ~ 6000 MHz	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1124.39	65.79	42.92	-22.87	74.00	31.08	PK	Horizontal
2	1125.01	60.87	38.00	-22.87	54.00	16.00	AV	Horizontal
3	1965.74	53.75	32.76	-20.99	54.00	21.24	AV	Horizontal
4	1966.37	60.87	39.89	-20.98	74.00	34.11	PK	Horizontal
5	5584.32	56.47	51.85	-4.62	74.00	22.15	PK	Horizontal
6	5599.32	45.70	41.34	-4.36	54.00	12.66	AV	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

-----End of report-----