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Report No.: GZEM190701434904 Page: 1 of 30 FCC ID: 2ARDB-TRR11F

TEST REPORT

Application No.:	GZEM1907014349CR			
Applicant:	Beijing Kingsmith Technology Co.,Ltd			
Address of Applicant:	Floor 4, Building 25, Area 18, ABP Park, Fengtai, Beijing, China			
Manufacturer:	Beijing Kingsmith Technology Co.,Ltd			
Address of Manufacturer:	Floor 4, Building 25, Area 18, ABP Park, Fengtai, Beijing, China			
Factory:	Sunlink (Xiamen) Sports Equipments Industrial Co.,Ltd			
Address of Factory:	No.32 Bannan Road, Dongfu, Haicang District, Xiamen City, Fujian Province			
Equipment Under Test (EUT)	:			
FCC ID: 2ARDB-TRR11F				
EUT Name:	Remote controller			
Model No.:	WPRC24ND			
Trade Mark:	KINGSMITH <i>Dynamax</i>			
Standard(s) :	47 CFR Part 15, Subpart C 15.249			
Date of Receipt:	2019-07-16			
Date of Test:	2019-07-19 to 2019-08-05			
Date of Issue:	2019-10-14			
Test Result:	Pass*			

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

This report GZEM190701434904 supersedes the previous report GZEM190701434902, issued on 2019-08-09 which is hereby deemed null and void.

Kube Tim

Kobe Jian

EMC Laboratory Manager The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in this report must be approved by SGS International Electrical Approvals in the second second



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Revision Record							
Version	Chapter	Date	Remark				
01		2019-08-09		Original (Null)			
02		2019-10-14		Revised report: Revised trade mark.			

Authorized for issue by:		
Tested By	Jackson hugen	2019-07-19 to 2019-08-05
	Jackson_Yuan /Project Engineer	Date
Checked By	Ridey Lin	2019-10-14
	Ricky_Liu /Reviewer	Date



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2 Test Summary

Radio Spectrum Technical Requirement						
Item	Standard	Method	Requirement	Result		
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass		

Radio Spectrum Matter Part						
Item	Standard	Method	Requirement	Result		
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass		
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass		
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass		
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass		

This report GZEM190701434904 supersedes the previous report GZEM190701434902, revised trade mark as per applicant request.



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4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 110-127V 60Hz for the main unit
	DC 3V 'CR2032' battery for remote controller
Rated Power:	746W
Test Voltage:	DC 3 V**
Cable:	about 0.8m x 3 wires unscreened AC mains cable
Antenna type	PCB antenna
Modulation Type	GFSK
Number of Channels	4
Operation Frequency	2404MHz,2419MHz,2454MHz,2469MHz
Antenna Gain	0 dBi
**Remark:	There is no intentional transmitting in the main unit

4.2 **Operation Frequency**

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2404MHz	2	2419MHz	3	2454MHz	4	2469MHz

Using test software was control EUT work in continuous transmitter and receiver mode.and select test channel as below:

Channel	Frequency
The lowest channel (CH1)	2404MHz
The middle channel (CH2)	2419MHz
The highest channel (CH4)	2469MHz

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
DC Power supply	Instek	PS-6010	L9905E037.11



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No.	Item	Measurement Uncertainty
1	Radio Frequency	±5.5 x 10 ⁻⁸
2	Duty cycle	±0.57%
3	Occupied Bandwidth	±3%
4	RF Conducted power	±0.68dB
5	RF Power Density	±1.50dB
6	Conducted Spurious Emissions	±1.04dB
7	PE Padiated Power	±4.5dB (below 1GHz)
	nr naulaleu ruwei	±4.8dB (above 1GHz)
0	Redicted Sourious Emission Test	±4.5dB (30MHz-1GHz)
0	Radiated Spurious Emission Test	±4.8dB (1GHz-18GHz)
9	Temperature	±0.4 °C
10	Humidity	±1.3%
11	Supply Voltages	±1.5%
12	Time	±3%

4.4 Measurement Uncertainty

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory, 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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4.6 Test Facility

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

• NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

• ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

• SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

• CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

• FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

• VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

• CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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- 4.7 Deviation from Standards
 - None
- 4.8 Abnormalities from Standard Conditions None



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5 Equipment List

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01

Field Strength of the Fundamental Signal (15.249(a))										
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date					
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19					
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19					
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27					
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07					
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07					
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03					
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08					
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08					
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28					
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18					
Active Loop Antenna	EMCO	6502 EMC0523		2018-03-05	2020-03-04					
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10					
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10					
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2018-12-08	2019-12-07					
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18					
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18					
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18					
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22					
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A					



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Restricted Band Around Fundamental Frequency										
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date					
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19					
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19					
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27					
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07					
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07					
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03					
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08					
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08					
Amplifier	HP	8447F	EMC2065	2019-05-29	2020-05-28					
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18					
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04					
High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2019-01-11	2020-01-10					
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10					
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2018-12-08	2019-12-07					
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18					
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18					
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18					
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22					
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A					

Radiated Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESIB26	EMC0522	2019-01-20	2020-01-19
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC0056	2019-01-20	2020-01-19
Chamber cable	HangTianXing	N/A	EMC0542	2019-06-28	2021-06-27
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9160	EMC2025	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6112B	EMC0524	2016-09-08	2019-09-07
Bi-log Type Antenna	Schaffner -Chase	CBL6143	EMC0519	2017-05-04	2020-05-03
Horn Antenna 1GHz-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2016-09-09	2019-09-08
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2019-01-07	2020-01-08



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Amplifier	HP 8447F EMC2065			2019-05-29	2020-05-28
Pre-Amplifier MH648A	ANRITSU CORP	MH648A	EMC2086	2018-11-19	2019-11-18
Active Loop Antenna	EMCO	6502	EMC0523	2018-03-05	2020-03-04
High Pass Filter(915MHz)	FSY MICROWAVE	FSY MICROWAVE HM1465-9SS EMC2079		2019-01-11	2020-01-10
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2019-01-11	2020-01-10
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2018-12-08	2019-12-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2017-12-19	2019-12-18
MXE EMI Receiver	Keysight	N9038A	EMC2139	2018-11-19	2019-11-18
EXA Signal Analyzer	Keysight	N9010A	EMC2138	2018-11-19	2019-11-18
Trilog Broadband Antenna 30MHz-1GHz	SCHWARZBECKME SS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2019-07-16	2020-07-15
DMM	Fluke	73	EMC0007	2019-07-16	2020-07-15



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 Limit:

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.1.2 Conclusion

Standard Requirement:

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. The use of a permanently

attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0 dBi.



Test result: The unit does meet the FCC requirements.



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7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.215
Test Method:	ANSI C63.10 (2013) Section 6.9
Limit:	N/A

7.1.1 E.U.T. Operation

Operating Environment:

Temperature:25.8 °CHumidity:65.3 % RHAtmospheric Pressure:1020mbarTest modeb:2.4GHz TX mode_Keep the EUT in transmitting with modulation mode.

7.1.2 Test Setup Diagram



Ground Reference Plane

7.1.3 Measurement Procedure and Data



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Mode:b; Channel:Low









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7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement	47 CFR Part 15, Subpart C 15.249(a)
Test Method:	ANSI C63.10 (2013) Section 6.5&6.6
Measurement Distance:	3m
Limit:	

Fundamental frequency(MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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7.2.1 E.U.T. Operation

Operating Environment:

Temperature:23 °CHumidity:50.7 % RHAtmospheric Pressure:1020mbarTest modeb:2.4GHz TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

	Freq	ReadAntenna Level Factor		ReadAntenna Cable Preamp Level Factor Loss Factor L		Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		-	-
1	2404.824	82.66	26.46	4.90	37.42	76.60	94.00	-17.40	HORIZONTAL	Average	
2	2404.824	83.03	26.46	4.90	37.42	76.97	114.00	-37.03	HORIZONTAL	Peak	

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

	Freq	Read/ Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2404.824	66.68	26.46	4.90	37.42	60.62	94.00	-33.38	VERTICAL	Average	
2	2404.824	68.93	26.46	4.90	37.42	62.87	114.00	-51.13	VERTICAL	Peak	



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

	Freq	ReadAntenna Level Factor		ReadAntenna Cable Preamp Freq Level Factor Loss Factor Lev			Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			-	
1	2419.671	81.97	26.49	4.99	37.42	76.03	94.00	-17.97	HORIZONTAL	Average		
2	2419.671	83.67	26.49	4.99	37.42	77.73	114.00	-36.27	HORIZONTAL	Peak		

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

	Freq	ReadA Level	ntenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2419.671	67.51	26.49	4.99	37.42	61.57	94.00	-32.43	VERTICAL	Average	
2	2419.671	68.64	26.49	4.99	37.42	62.70	114.00	-51.30	VERTICAL	Peak	



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

	Freq	Read/ Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2469.024	82.69	26.56	5.18	37.40	77.03	94.00	-16.97	HORIZONTAL	Average
2	2469.024	84.36	26.56	5.18	37.40	78.70	114.00	-35.30	HORIZONTAL	Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High

	Freq	Read/ Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2469.024	67.35	26.56	5.18	37.40	61.69	94.00	-32.31	VERTICAL	Average	
2	2469.024	69.33	26.56	5.18	37.40	63.67	114.00	-50.33	VERTICAL	Peak	



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7.3 Restricted Band Around Fundamental Frequency

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance:	3m
Limit:	

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.



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7.3.1 E.U.T. Operation

Operating Environment:

Temperature:23 °CHumidity:50.7 % RHAtmospheric Pressure:1020mbarTest modeb:2.4GHz TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

	Frea	ReadA	ntenna Factor	Cable	Preamp	Level	Limit	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		-
1	2310.000	36.71	26.25	5.03	37.44	30.55	54.00	-23.45	HORIZONTAL	Average
2	2310.000	45.74	26.25	5.03	37.44	39.58	74.00	-34.42	HORIZONTAL	Peak
3	2390.000	35.71	26.43	4.88	37.42	29.60	54.00	-24.40	HORIZONTAL	Average
4	2390.000	46.50	26.43	4.88	37.42	40.39	74.00	-33.61	HORIZONTAL	Peak
5	2483.500	35.65	26.58	5.23	37.40	30.06	54.00	-23.94	HORIZONTAL	Average
6	2483.500	47.21	26.58	5.23	37.40	41.62	74.00	-32.38	HORIZONTAL	Peak
7	2500.000	36.97	26.60	4.95	37.39	31.13	54.00	-22.87	HORIZONTAL	Average
8	2500.000	46.36	26.60	4.95	37.39	40.52	74.00	-33.48	HORIZONTAL	Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

	Freq	ReadA Level	ntenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	37.17	26.25	5.03	37.44	31.01	54.00	-22.99	VERTICAL	Average
2	2310.000	44.40	26.25	5.03	37.44	38.24	74.00	-35.76	VERTICAL	Peak
3	2390.000	36.17	26.43	4.88	37.42	30.06	54.00	-23.94	VERTICAL	Average
4	2390.000	46.12	26.43	4.88	37.42	40.01	74.00	-33.99	VERTICAL	Peak
5	2483.500	35.75	26.58	5.23	37.40	30.16	54.00	-23.84	VERTICAL	Average
6	2483.500	45.64	26.58	5.23	37.40	40.05	74.00	-33.95	VERTICAL	Peak
7	2500.000	36.42	26.60	4.95	37.39	30.58	54.00	-23.42	VERTICAL	Average
8	2500.000	45.77	26.60	4.95	37.39	39.93	74.00	-34.07	VERTICAL	Peak



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

		Read/	Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		-	-
1	2310.000	37.55	26.25	5.03	37.44	31.39	54.00	-22.61	HORIZONTAL	Average	
2	2310.000	46.81	26.25	5.03	37.44	40.65	74.00	-33.35	HORIZONTAL	Peak	
3	2390.000	39.87	26.43	4.88	37.42	33.76	54.00	-20.24	HORIZONTAL	Average	
4	2390.000	46.11	26.43	4.88	37.42	40.00	74.00	-34.00	HORIZONTAL	Peak	
5	2483.500	46.66	26.58	5.23	37.40	41.07	54.00	-12.93	HORIZONTAL	Average	
6	2483.500	54.50	26.58	5.23	37.40	48.91	74.00	-25.09	HORIZONTAL	Peak	
7	2500.000	42.52	26.60	4.95	37.39	36.68	54.00	-17.32	HORIZONTAL	Average	
В	2500.000	51.07	26.60	4.95	37.39	45.23	74.00	-28.77	HORIZONTAL	Peak	

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High

	Freq	ReadA Level	ntenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB			
1	2310.000	38.52	26.25	5.03	37.44	32.36	54.00	-21.64	VERTICAL	Average	
2	2310.000	46.02	26.25	5.03	37.44	39.86	74.00	-34.14	VERTICAL	Peak	
3	2390.000	37.41	26.43	4.88	37.42	31.30	54.00	-22.70	VERTICAL	Average	
4	2390.000	47.25	26.43	4.88	37.42	41.14	74.00	-32.86	VERTICAL	Peak	
5	2483.500	37.42	26.58	5.23	37.40	31.83	54.00	-22.17	VERTICAL	Average	
6	2483.500	46.72	26.58	5.23	37.40	41.13	74.00	-32.87	VERTICAL	Peak	
7	2500.000	37.42	26.60	4.95	37.39	31.58	54.00	-22.42	VERTICAL	Average	
8	2500.000	48.13	26.60	4.95	37.39	42.29	74.00	-31.71	VERTICAL	Peak	



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7.4 Radiated Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method:	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance:	3m
Limit:	

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3



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7.4.1 E.U.T. Operation

Operating Environment:

Temperature:25.9 °CHumidity:54.3 % RHAtmospheric Pressure:1020mbarTest modeb:2.4GHz TX mode_Keep the EUT in transmitting with modulation mode.

7.4.2 Test Setup Diagram



Above 1GHz

7.4.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Measured Level I=Read Level + Antenna Factor + Cable Loss - Preamp Factor



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

	Free	ReadAntenna		Cable Preamp	Level	Limit Line	: Over	Pol/Phase	Demails	
	Freq	Level	Factor	LOSS	Factor	Level	Line	LIMIC	POI/Phase	Remark
-	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	35.005	24.21	13.87	0.60	26.53	12.15	40.00	-27.85	HORIZONTAL	QP
2	59.649	23.73	14.11	0.80	26.49	12.15	40.00	-27.85	HORIZONTAL	QP
3	152.130	24.47	13.48	1.31	26.44	12.82	43.50	-30.68	HORIZONTAL	QP
4	317.701	25.50	14.18	1.86	26.98	14.56	46.00	-31.44	HORIZONTAL	QP
5	547.098	26.45	19.20	2.48	27.45	20.68	46.00	-25.32	HORIZONTAL	QP
6	810.265	26.85	22.48	3.03	27.28	25.08	46.00	-20.92	HORIZONTAL	QP

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

	ReadAntenna			Cable	Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		-
1	3958.309	34.22	29.42	7.35	36.90	34.09	54.00	-19.91	HORIZONTAL	Average
2	3958.309	44.75	29.42	7.35	36.90	44.62	74.00	-29.38	HORIZONTAL	Peak
3	4838.419	45.21	30.85	6.15	36.94	45.27	54.00	-8.73	HORIZONTAL	Average
4	4838.419	51.70	30.85	6.15	36.94	51.76	74.00	-22.24	HORIZONTAL	Peak
5	5503.143	38.67	31.90	7.89	36.99	41.47	54.00	-12.53	HORIZONTAL	Average
6	5503.143	46.28	31.90	7.89	36.99	49.08	74.00	-24.92	HORIZONTAL	Peak
7	7212.015	35.50	35.50	7.35	36.93	41.42	54.00	-12.58	HORIZONTAL	Average
8	7212.015	44.83	35.50	7.35	36.93	50.75	74.00	-23.25	HORIZONTAL	Peak
9	9616.349	35.06	37.51	8.15	37.08	43.64	54.00	-10.36	HORIZONTAL	Average
10	9616.349	45.81	37.51	8.15	37.08	54.39	74.00	-19.61	HORIZONTAL	Peak
11	12020.390	33.11	39.50	10.67	37.20	46.08	54.00	-7.92	HORIZONTAL	Average
12	12020.390	45.64	39.50	10.67	37.20	58.61	74.00	-15.39	HORIZONTAL	Peak



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Mode:b;	Polarization:Vertical;	Modulation:GFSK;	; Channel:Low
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	Freq	ReadA Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	45.695	24.46	14.23	0.70	26.51	12.88	40.00	-27.12	VERTICAL	QP
2	60.492	25.25	14.06	0.80	26.48	13.63	40.00	-26.37	VERTICAL	QP
3	164.330	24.18	13.52	1.36	26.44	12.62	43.50	-30.88	VERTICAL	QP
4	362.985	25.04	15.71	1.97	27.26	15.46	46.00	-30.54	VERTICAL	QP
5	588.905	25.47	20.17	2.58	27.43	20.79	46.00	-25.21	VERTICAL	QP
6	869.130	26.42	23.17	3.10	27.16	25.53	46.00	-20.47	VERTICAL	QP

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

	_	ReadAntenna		Cable	Preamp		Limit	Over	D-1 (D)	Description
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Po1/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	-	-
1	3790.361	34.51	28.97	7.83	36.92	34.39	54.00	-19.61	VERTICAL	Average
2	3790.361	44.57	28.97	7.83	36.92	44.45	74.00	-29.55	VERTICAL	Peak
3	4808.993	38.55	30.79	5.87	36.94	38.27	54.00	-15.73	VERTICAL	Average
4	4808.993	47.32	30.79	5.87	36.94	47.04	74.00	-26.96	VERTICAL	Peak
5	5932.638	33.57	32.26	7.32	37.00	36.15	54.00	-17.85	VERTICAL	Average
6	5932.638	44.81	32.26	7.32	37.00	47.39	74.00	-26.61	VERTICAL	Peak
7	7212.114	37.87	35.50	7.35	36.93	43.79	54.00	-10.21	VERTICAL	Average
8	7212.114	45.18	35.50	7.35	36.93	51.10	74.00	-22.90	VERTICAL	Peak
9	9616.349	35.83	37.51	8.15	37.08	44.41	54.00	-9.59	VERTICAL	Average
10	9616.349	44.56	37.51	8.15	37.08	53.14	74.00	-20.86	VERTICAL	Peak
11	12020.600	33.98	39.50	10.67	37.20	46.95	54.00	-7.05	VERTICAL	Average
12	12020.600	44.89	39.50	10.67	37.20	57.86	74.00	-16.14	VERTICAL	Peak



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

		Read/	ReadAntenna		Cable Preamp		Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3790.361	36.29	28.97	7.83	36.92	36.17	54.00	-17.83	HORIZONTAL	Average
2	3790.361	44.66	28.97	7.83	36.92	44.54	74.00	-29.46	HORIZONTAL	Peak
З	4838.016	43.67	30.85	6.15	36.94	43.73	54.00	-10.27	HORIZONTAL	Average
4	4838.016	51.72	30.85	6.15	36.94	51.78	74.00	-22.22	HORIZONTAL	Peak
5	6142.019	39.68	32.76	6.97	37.00	42.41	54.00	-11.59	HORIZONTAL	Average
6	6142.019	45.22	32.76	6.97	37.00	47.95	74.00	-26.05	HORIZONTAL	Peak
7	7257.349	35.29	35.60	7.36	36.92	41.33	54.00	-12.67	HORIZONTAL	Average
8	7257.349	44.21	35.60	7.36	36.92	50.25	74.00	-23.75	HORIZONTAL	Peak
9	9676.430	35.70	37.58	8.21	37.08	44.41	54.00	-9.59	HORIZONTAL	Average
10	9676.430	43.34	37.58	8.21	37.08	52.05	74.00	-21.95	HORIZONTAL	Peak
11	12095.710	34.88	39.42	10.76	37.15	47.91	54.00	-6.09	HORIZONTAL	Average
12	12095.710	44.72	39.42	10.76	37.15	57.75	74.00	-16.25	HORIZONTAL	Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

		Antenna	Cable	Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	-	
1	3725.195	38.55	28.64	7.42	36.92	37.69	54.00	-16.31	VERTICAL	Average
2	3725.195	45.73	28.64	7.42	36.92	44.87	74.00	-29.13	VERTICAL	Peak
3	4838.016	37.11	30.85	6.15	36.94	37.17	54.00	-16.83	VERTICAL	Average
4	4838.016	45.86	30.85	6.15	36.94	45.92	74.00	-28.08	VERTICAL	Peak
5	5932.638	35.03	32.26	7.32	37.00	37.61	54.00	-16.39	VERTICAL	Average
6	5932.638	44.42	32.26	7.32	37.00	47.00	74.00	-27.00	VERTICAL	Peak
7	7257.741	36.56	35.60	7.36	36.92	42.60	54.00	-11.40	VERTICAL	Average
8	7257.741	44.53	35.60	7.36	36.92	50.57	74.00	-23.43	VERTICAL	Peak
9	9676.432	34.11	37.58	8.21	37.08	42.82	54.00	-11.18	VERTICAL	Average
10	9676.432	44.21	37.58	8.21	37.08	52.92	74.00	-21.08	VERTICAL	Peak
11	12095.710	32.51	39.42	10.76	37.15	45.54	54.00	-8.46	VERTICAL	Average
12	12095.710	45.19	39.42	10.76	37.15	58.22	74.00	-15.78	VERTICAL	Peak



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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

		ReadAntenna		Cable Preamp		Limit	Over			
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	3890.255	38.80	29.27	7.61	36.91	38.77	54.00	-15.23	HORIZONTAL	Average
2	3890.255	45.48	29.27	7.61	36.91	45.45	74.00	-28.55	HORIZONTAL	Peak
3	4938.490	41.67	31.03	7.67	36.95	43.42	54.00	-10.58	HORIZONTAL	Average
4	4938.490	52.14	31.03	7.67	36.95	53.89	74.00	-20.11	HORIZONTAL	Peak
5	6621.375	35.90	34.46	7.14	36.98	40.52	54.00	-13.48	HORIZONTAL	Average
6	6621.375	44.98	34.46	7.14	36.98	49.60	74.00	-24.40	HORIZONTAL	Peak
7	7407.020	37.60	35.89	7.42	36.92	43.99	54.00	-10.01	HORIZONTAL	Average
8	7407.020	47.44	35.89	7.42	36.92	53.83	74.00	-20.17	HORIZONTAL	Peak
9	9876.717	37.98	37.86	8.52	37.09	47.27	54.00	-6.73	HORIZONTAL	Average
10	9876.717	45.25	37.86	8.52	37.09	54.54	74.00	-19.46	HORIZONTAL	Peak
11	12345.350	32.98	38.98	11.13	36.97	46.12	54.00	-7.88	HORIZONTAL	Average
12	12345.350	44.84	38.98	11.13	36.97	57.98	74.00	-16.02	HORIZONTAL	Peak

Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High

	Freq	ReadAntenna Freq Level Factor		Cable Preamp Loss Factor		Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		-
1	3823.371	36.60	29.08	7.83	36.91	36.60	54.00	-17.40	VERTICAL	Average
2	3823.371	44.88	29.08	7.83	36.91	44.88	74.00	-29.12	VERTICAL	Peak
3	4938.058	38.75	31.03	7.67	36.95	40.50	54.00	-13.50	VERTICAL	Average
4	4938.058	45.72	31.03	7.67	36.95	47.47	74.00	-26.53	VERTICAL	Peak
5	6340.436	34.59	33.76	6.97	36.99	38.33	54.00	-15.67	VERTICAL	Average
6	6340.436	46.41	33.76	6.97	36.99	50.15	74.00	-23.85	VERTICAL	Peak
7	7407.267	35.56	35.89	7.42	36.92	41.95	54.00	-12.05	VERTICAL	Average
8	7407.267	45.04	35.89	7.42	36.92	51.43	74.00	-22.57	VERTICAL	Peak
9	9876.187	34.10	37.86	8.52	37.09	43.39	54.00	-10.61	VERTICAL	Average
10	9876.187	44.34	37.86	8.52	37.09	53.63	74.00	-20.37	VERTICAL	Peak
11	12345.270	32.70	38.98	11.13	36.97	45.84	54.00	-8.16	VERTICAL	Average
12	12345.270	44.17	38.98	11.13	36.97	57.31	74.00	-16.69	VERTICAL	Peak

--End of Report--



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