



# FCC Test Report

Report No: FCS202304036W01

Issued for

Applicant:	Kronotech Srl
Address:	Viale Ungheria, 125 Udine 33100 Italy
Product Name:	Panel Reader PHI22
Brand Name:	Kronotech
Model Name:	3223L
Series Model:	N/A
FCC ID:	2BAQJ-2846

Issued By: Flux Compliance Service Laboratory  
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech  
Industrial, Song shan lake Dongguan  
Tel: 769-27280901 Fax:769-27280901 <http://www.fcs-lab.com>

## TEST RESULT CERTIFICATION

Applicant's Name.....: Kronotech Srl  
Address.....: Viale Ungheria,125 Udine 33100 Italy  
Manufacture's Name.....: Kronotech Srl  
Address.....: Viale Ungheria,125 Udine 33100 Italy

### Product Description

Product Name.....: Panel Reader PHI22  
Brand Name .....: Kronotech  
Model Name.....: 3223L  
Series Model.....: N/A  
Test Standards.....: FCC Rules and Regulations Part 15 Subpart C, Section 209  
Test Procedure.....: ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of FCS, this document may be altered or revised by FCS, personal only, and shall be noted in the revision of the document..

### Date of Test.....:

Date (s) of performance of tests.: Apr 06, 2023~May 18, 2023

Date of Issue.....: May 18, 2023

Test Result.....: Pass

Tested by

*Scott Shen*

(Scott Shen)

Reviewed by

*Duke Qian*

(Duke Qian)

Approved by

*Jack Wang*

(Jack Wang)

Table of Contents	Page
<b>1. SUMMARY OF TEST RESULTS .....</b>	<b>5</b>
1.1 TEST FACTORY .....	6
1.2 MEASUREMENT UNCERTAINTY .....	6
<b>2. GENERAL INFORMATION .....</b>	<b>7</b>
2.1 GENERAL DESCRIPTION OF THE EUT .....	7
2.2 DESCRIPTION OF THE TEST MODES .....	8
2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS .....	8
2.4 EQUIPMENTS LIST .....	9
<b>3. RADIATED EMISSION MEASUREMENT .....</b>	<b>10</b>
3.1 LIMIT .....	10
3.2 TEST PROCEDURE .....	11
3.3 TEST SETUP .....	12
3.4 TEST RESULTS .....	13
<b>4. 20 DB BANDWIDTH TEST .....</b>	<b>16</b>
4.1 LIMIT .....	16
4.2 TEST PROCEDURE .....	16
4.3 TEST SETUP .....	16
4.4 TEST RESULTS .....	17
<b>5. ANTENNA REQUIREMENT .....</b>	<b>18</b>
5.1 STANDARD REQUIREMENT .....	18
5.2 EUT ANTENNA .....	18

### Revision History

Rev.	Issue Date	Effect Page	Contents
00	May 18, 2023	All	Initial Issue

## 1. SUMMARY OF TEST RESULTS

FCC Rules and Regulations Part 15 Subpart C, Section 209			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	--
15.209(a) (f)	Radiated Spurious Emission	PASS	--
15.215(c)	20dB Bandwidth	PASS	--
15.203	Antenna Requirement	PASS	--

### NOTE:

- (1)" N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10-2013

## 1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number:	514908
Designation number:	CN0127
A2LA accreditation number:	5545.01

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.71$ dB
2	Unwanted Emissions, conducted	$\pm 2.98$ dB
3	Conducted Emission (9KHz-150KHz)	$\pm 4.13$ dB
4	Conducted Emission (150KHz-30MHz)	$\pm 4.74$ dB
5	All emissions, radiated (9KHz -30MHz)	$\pm 3.1$ dB
6	All emissions, radiated(<1G) 30MHz-1000MHz	$\pm 3.2$ dB
7	All emissions, radiated (1GHz -18GHz)	$\pm 3.66$ dB
8	All emissions, radiated (18GHz -40GHz)	$\pm 4.31$ dB

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Panel Reader PHI22
Trade Name	Kronotech
Model Name	3223L
Series Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
Operation frequency	125KHz
Modulation Type	ASK
Antenna Type	Internal Antenna
Power Supply	DC 5V
Hardware version number	2
Software version number	2.01
Connecting I/O Port(s)	Please refer to the User's Manual

#### Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Operation frequency:125KHz
3. Table for Filed Antenna

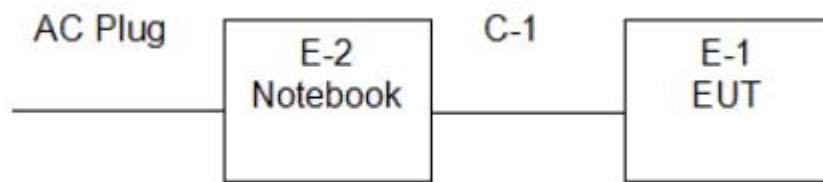
Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Internal Antenna	N/A	0.0dBi	Antenna

## 2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Tested mode, Description	
Mode	Description
Mode 1	Phone(5W) DC 5V/2A

Mark:Only the worst data is recorded in the report.Mode 4 is the worst mode.



## 2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

### Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-2	Notebook	Lenovo	5896	N/A	N/A
C-1	DC Cable	N/A	N/A	N/A	N/A

### Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

## 2.4 EQUIPMENTS LIST

### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2022.08.30	2023.08.29
Signal Analyzer	R&S	FSV40-N	FCS-E012	2022.08.30	2023.08.29
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2022.08.30	2023.08.29
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2022.08.30	2023.08.29
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2022.08.30	2023.08.29
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2022.08.30	2023.08.29
Pre-Amplifier(0.1M-3GHz)	EMCI	EM330N	FCS-E004	2022.08.30	2023.08.29
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2022.08.30	2023.08.29
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2022.08.30	2023.08.29
Temperature & Humidity	HTC-1	victor	FCS-E005	2022.08.30	2023.08.29

### Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2022.08.30	2023.08.29
LISN	R&S	ENV216	FCS-E007	2022.08.30	2023.08.29
LISN	ETS	3810/2NM	FCS-E009	2022.08.30	2023.08.29
Temperature & Humidity	HTC-1	victor	FCS-E008	2022.08.30	2023.08.29

### RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
Spectrum Analyzer	Keysight	N9020A	FCS-E015	2022.08.30	2023.08.29
Spectrum Analyzer	Agilent	E4447A	MY50180039	2022.08.30	2023.08.29
Spectrum Analyzer	R&S	FSV-40	101499	2022.08.30	2023.08.29

### 3. RADIATED EMISSION MEASUREMENT

#### 3.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

#### LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dB<sub>u</sub>V/m)=20log Emission level (uV/m).
- (4) Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- (5) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

### 3.2 TEST PROCEDURE

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz

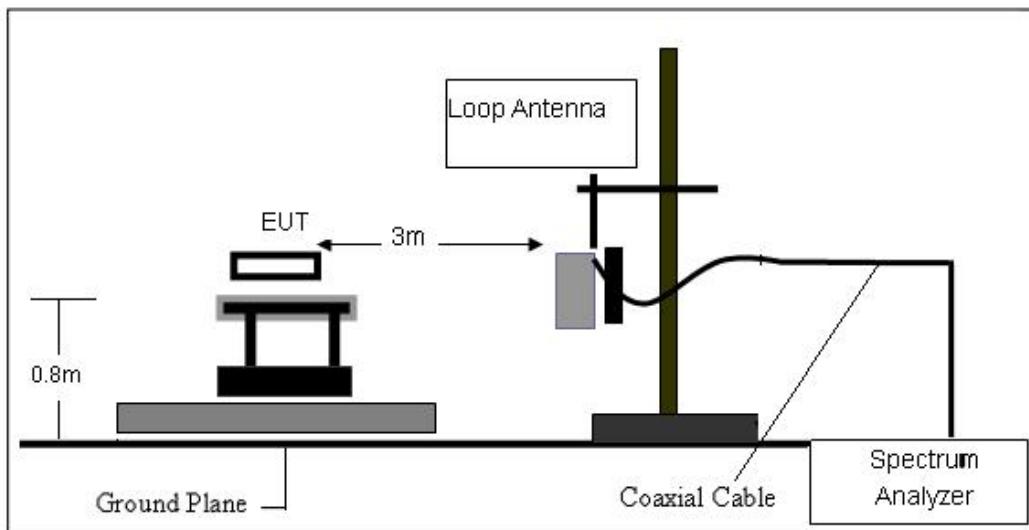
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**Note:**

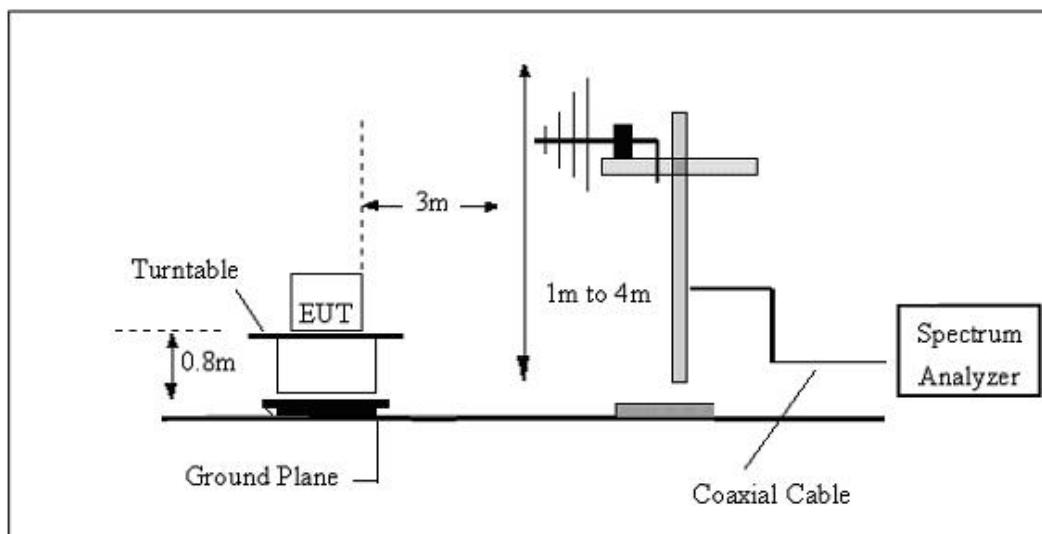
Both horizontal and vertical antenna polarities were tested. The worst case emissions were reported

### 3.3 TEST SETUP

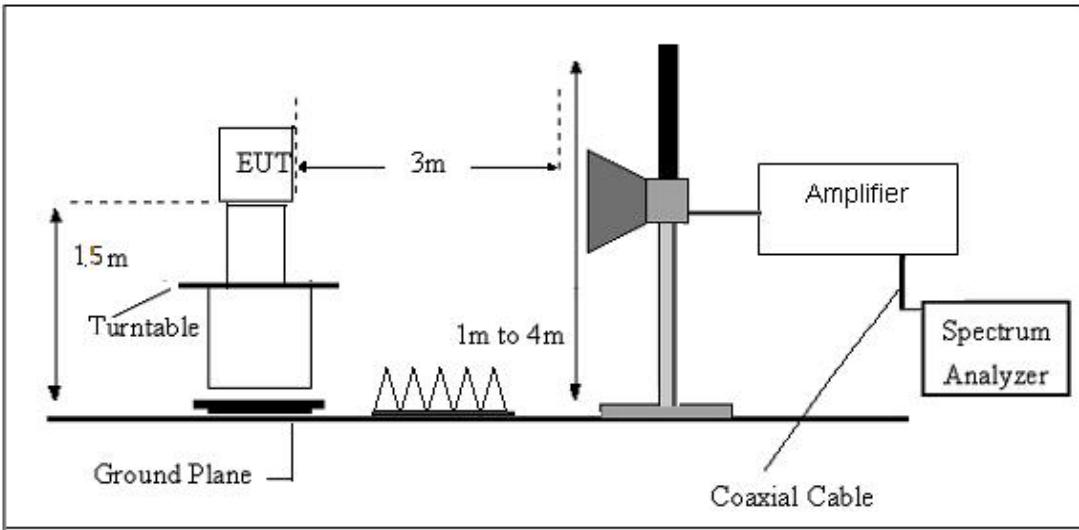
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### (C) Radiated Emission Test-Up Frequency Above 1GHz

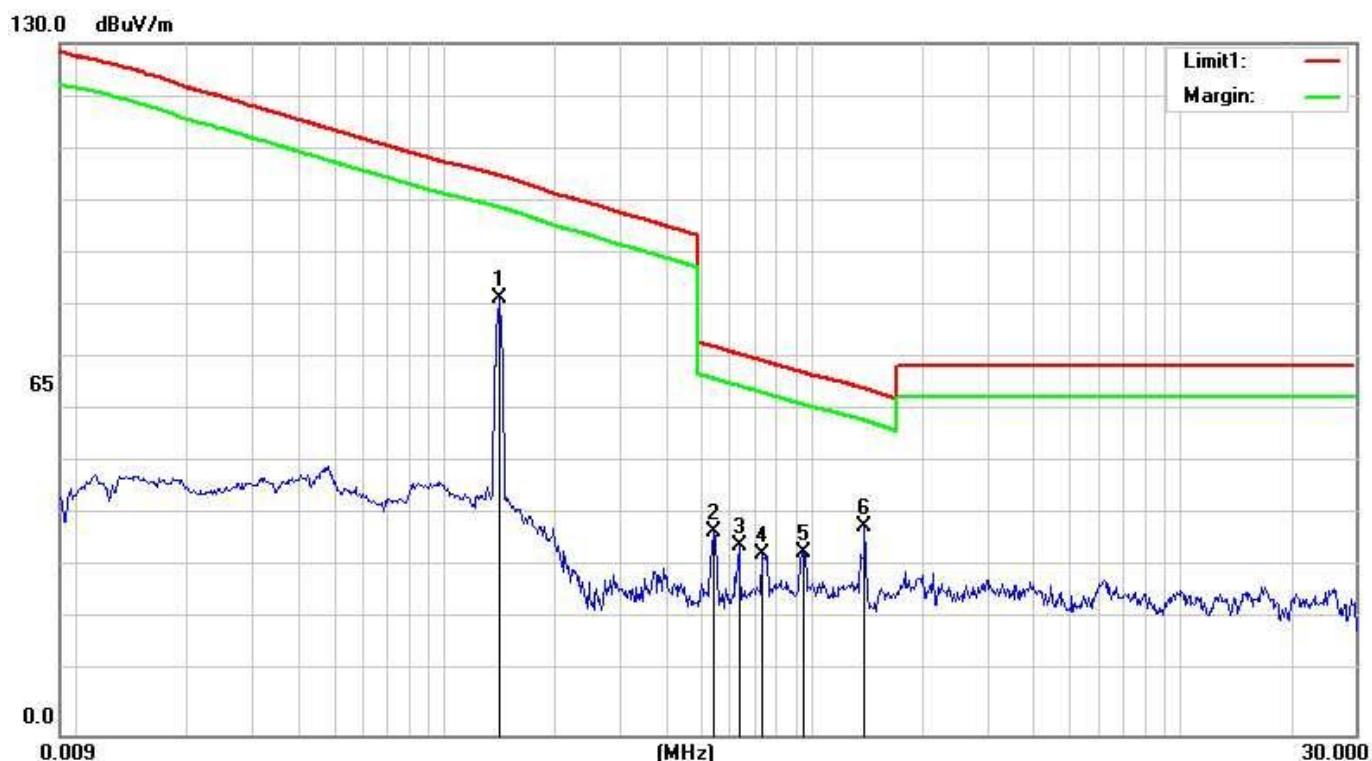


## 3.4 TEST RESULTS

For spurious emission

(9KHz-30MHz)

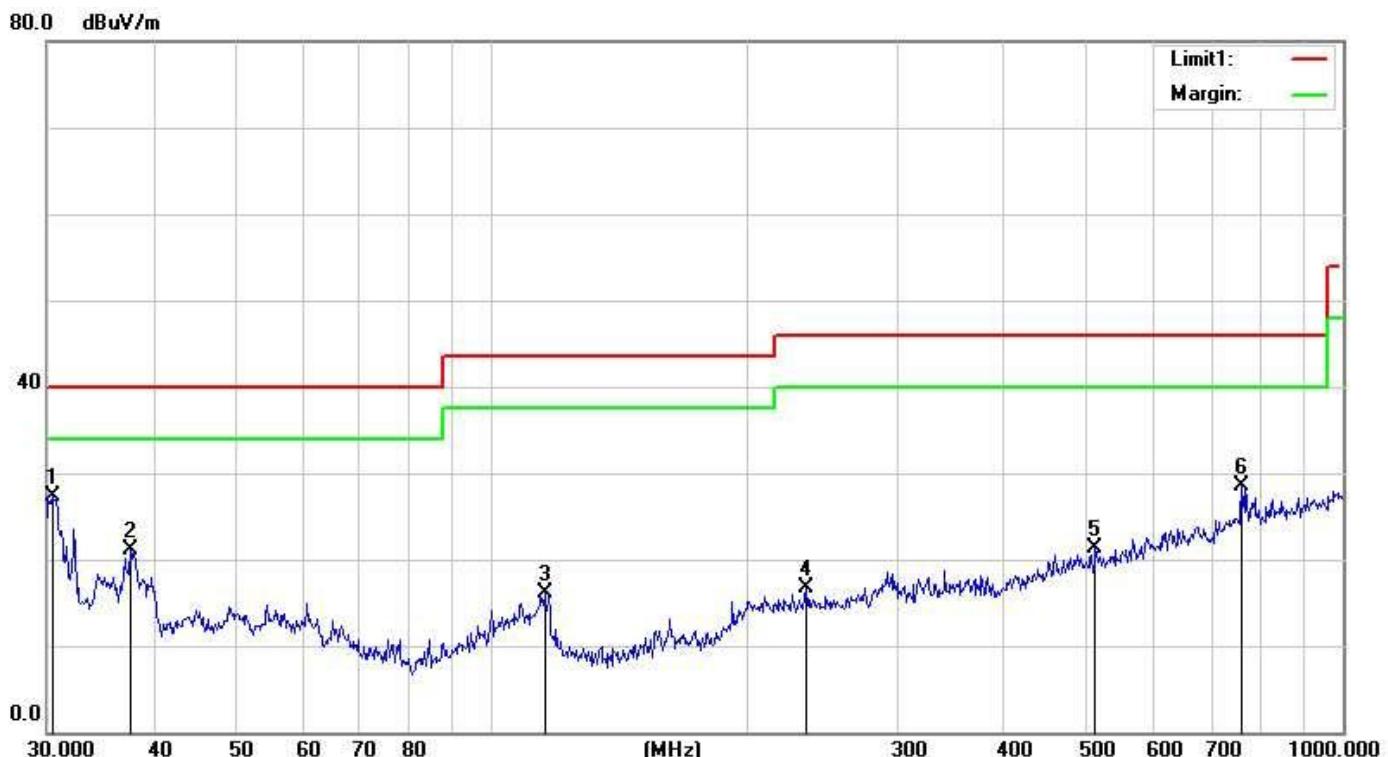
Temperature:	23.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1250	59.64	22.48	82.12	105.67	-23.55	Peak
2	0.1250	59.60	22.48	82.08	105.67	-23.59	AVG
3	0.5410	15.56	22.61	38.17	72.94	-34.77	QP
4	0.6312	13.00	22.54	35.54	71.59	-36.05	QP
5	0.7304	11.43	22.49	33.92	70.34	-36.42	QP
6	0.9471	12.02	22.39	34.41	68.08	-33.67	QP
7	1.3866	16.52	22.62	39.14	65.08	-25.94	QP

(30MHZ-1000MHZ)

Temperature:	23.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.4238	40.69	-13.37	27.32	40.00	-12.68	QP
2	37.5480	37.87	-16.72	21.15	40.00	-18.85	QP
3	115.3205	34.58	-18.43	16.15	43.50	-27.35	QP
4	234.1684	32.06	-15.34	16.72	46.00	-29.28	QP
5	511.8352	31.08	-9.80	21.28	46.00	-24.72	QP
6	760.7036	33.41	-4.84	28.57	46.00	-17.43	QP

Remarks:

1. Final Level = Receiver Read level + Factor

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	Mode 1		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	38.4810	47.99	-16.89	31.10	40.00	-8.90	QP
2	64.8865	39.37	-19.30	20.07	40.00	-19.93	QP
3	108.2667	52.79	-17.07	35.72	43.50	-7.78	QP
4	234.1684	43.43	-15.34	28.09	46.00	-17.91	QP
5	438.6554	35.60	-11.40	24.20	46.00	-21.80	QP
6	779.6068	36.29	-4.88	31.41	46.00	-14.59	QP

### Remarks:

1. Final Level =Receiver Read level + Factor

## 4. 20 DB BANDWIDTH TEST

### 4.1 LIMIT

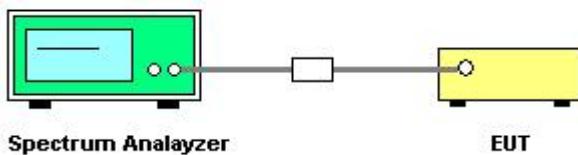
According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation

## 4.2 TEST PROCEDURE

Check the calibration of the measuring instrument using either an internal calibrator or a

- a. known signal from an external generator
- b. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

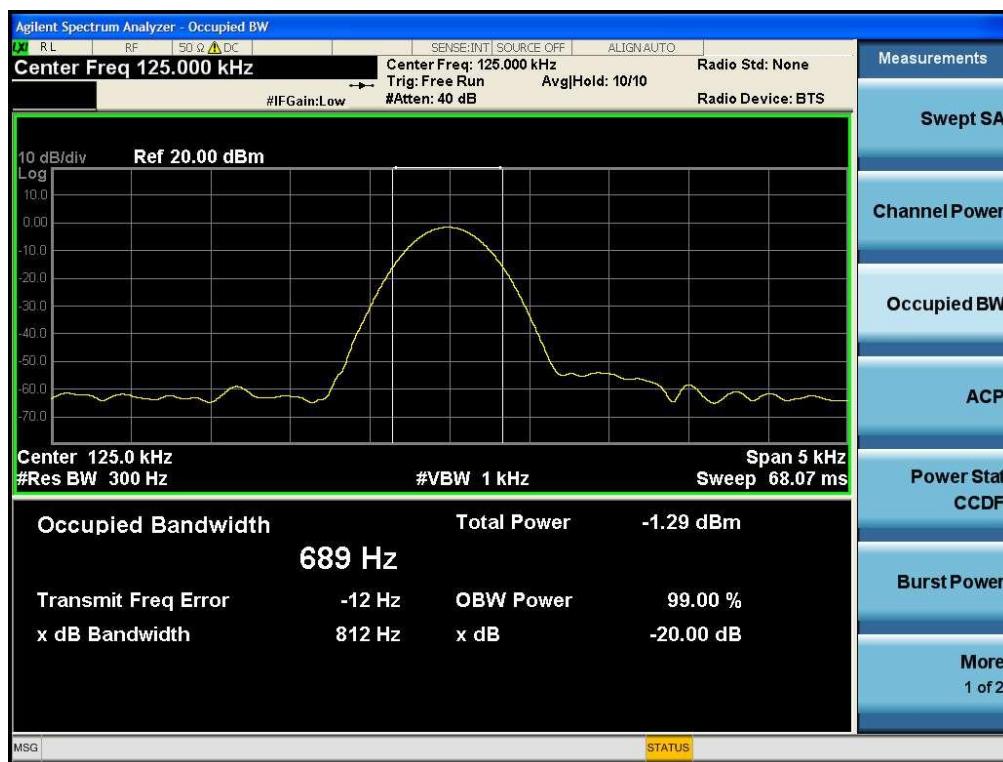
## 4.3 TEST SETUP



#### 4.4 TEST RESULTS

Temperature:	25°C	Relative Humidity:	50%
Test Mode:	Mode 1	Test Voltage:	DC 5V

Frequency (KHz)	20dB Bandwidth (Hz)	Result
125.8	812	PASS



## 5. ANTENNA REQUIREMENT

### 5.1 STANDARD REQUIREMENT

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

### 5.2 EUT ANTENNA

The antennas used for this product is Inductive Loop Antenna and no other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0.0dBi.

\*\*\*\*\*END OF THE REPORT\*\*\*\*\*