

FCC PART 15.231
MEASUREMENT AND TEST REPORT
FOR

SUNYAN Electronic Co., Ltd.

7TH South Street, QingGong Road 3, FoShan City, GuangDong, P.R. China

FCC ID: V5WS-510

Report Concerns: Original Report	Equipment Type: Remote Smoker Thermometer
Model: <u>S-510</u>	
Report No.: <u>STR08038043I</u>	
Test/Witness Engineer: <u>Lahm Peng</u>	
Test Date: <u>2008-03-13 to 2008-03-21</u>	
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Approved & Authorized By:  _____ Jandy So / PSQ Manager	

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permission by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant: SUNYAN ELECTRONIC CO., LTD.
Address of applicant: 7TH South Street, QingGong Road 3, FoShan City,
GuangDong, P.R. China

Manufacturer: SUNYAN ELECTRONIC CO., LTD.
Address of manufacturer: 7TH South Street, QingGong Road 3, FoShan City,
GuangDong, P.R. China

General Description of E.U.T

Items	Description
EUT Description:	Remote Smoker Thermometer
Trade Name:	/
Model No.:	S-510
Rated Voltage:	DC 3 V Battery
Output Power:	<10uW
Frequency Range:	433.92MHz±200kHz
Antenna Type:	Integral Antenna
Size:	9.0X7.0X7.5 cm
Comment:	Auto Operation Device

For more information refer to the circuit diagram form and the user's manual.

The test data is gathered from a production sample, provided by the manufacturer,

1.2 Test Standards

The following report is prepared on behalf of SUNYAN Electronic Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

1.5 Test Facility

The 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 files which the Registration No.: **759397**. Measurement required was performed at laboratory of Solid Industrial Co., Ltd. at 333 Bulong Highway Buji Longgang, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software, provided by the customer, is started while the whole system is running.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Cord/Without Cord
/	/	/	/

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.203 Antenna Requirement	Compliant
§15.205 Restricted Band	Compliant
§15.209 General Requirement	Compliant
§15.231 (e) Deactivation Testing	Compliant
§15.231 (c) 20dB Band Width Testing	Compliant
§15.231 (e) Radiated Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has a permanent antenna, fulfill the requirement of this section.

4. §15.205, §15.209, §15.231 (e)- RADIATED EMISSION

4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±3.0 dB.

4.2 Standard Applicable

According to §15.231(e), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70.....	1000.....	100
70-130.....	500	50
130-174.....	\1\ 500 to 1500	\1\ 50 to 150
174-260.....	1500.....	150
260-470.....	\1\ 1500 to.....	\1\ 150 to 500
	5000	
Above 470.....	5000.....	500

\1\ Linear interpolations.

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

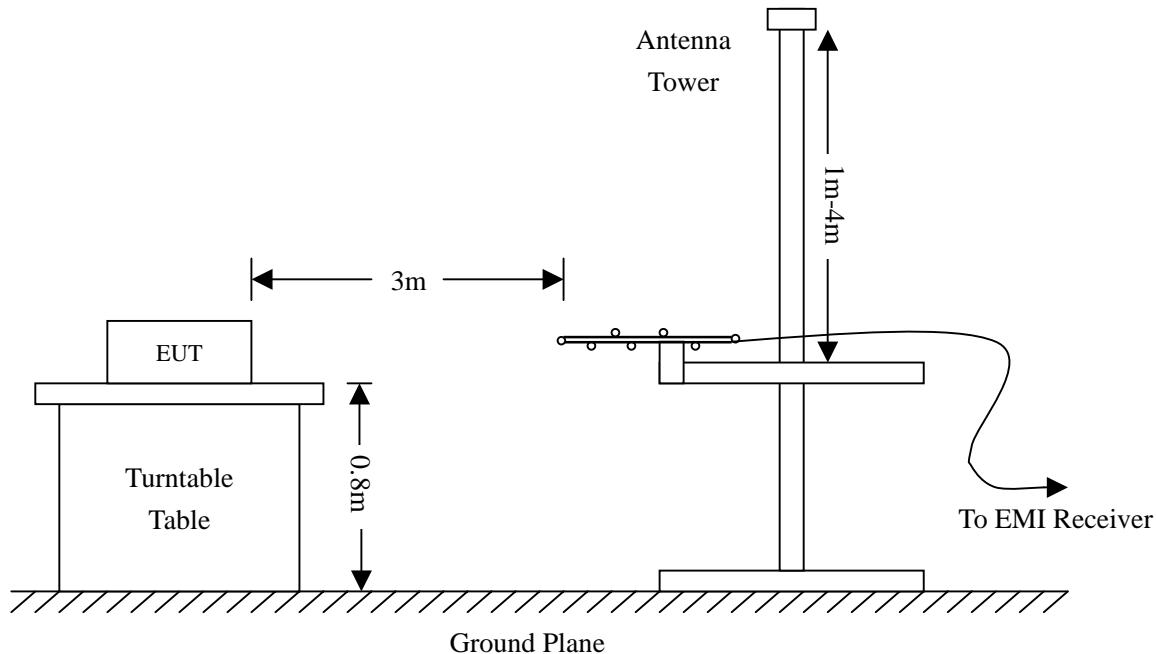
4.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2007-06-30	2008-06-29
Multi_Device Controller	ETS	2090	57230	2007-06-30	2008-06-29
Receiver Antenna	ETS	2175	57337	2007-06-30	2008-06-29
Horn Antenna	Rohde & Schwarz	HF906	100013	2007-06-30	2008-06-29
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2007-06-30	2008-06-29
3m chamber	Albatross Projects	9X6X6	----	2007-06-30	2008-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.231(b) and FCC Part 15.209 Limit.



4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant.Loss} + \text{Cab. Loss} - \text{Ampl.Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.231 Limit}$$

4.6 Environmental Conditions

Temperature:	21° C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

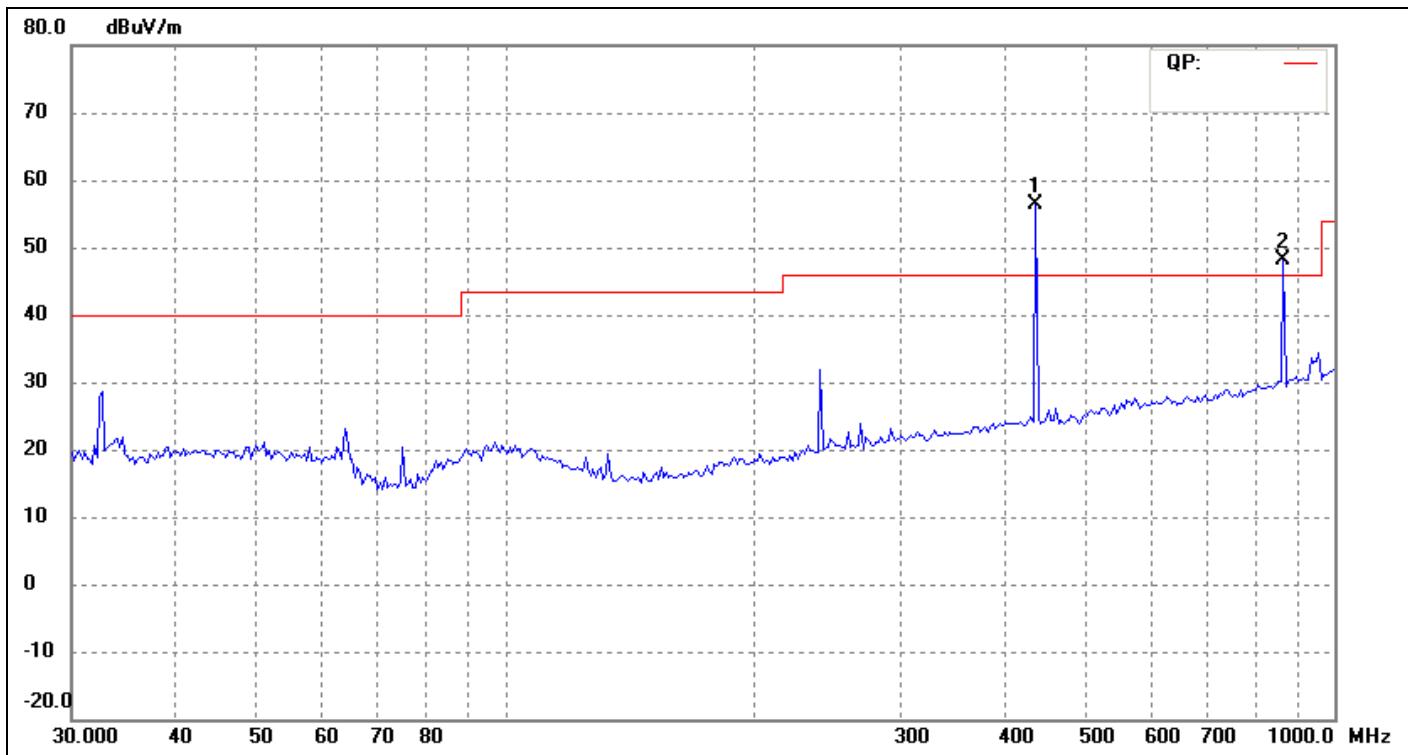
4.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.231 standards, and had the worst margin of:

-8.08 dB μ V at 868.886 MHz in the Horizontal, AV Detector polarization, 30 MHz to 5 GHz, 3Meters

Plot of Radiation Emissions Test

Horizontal

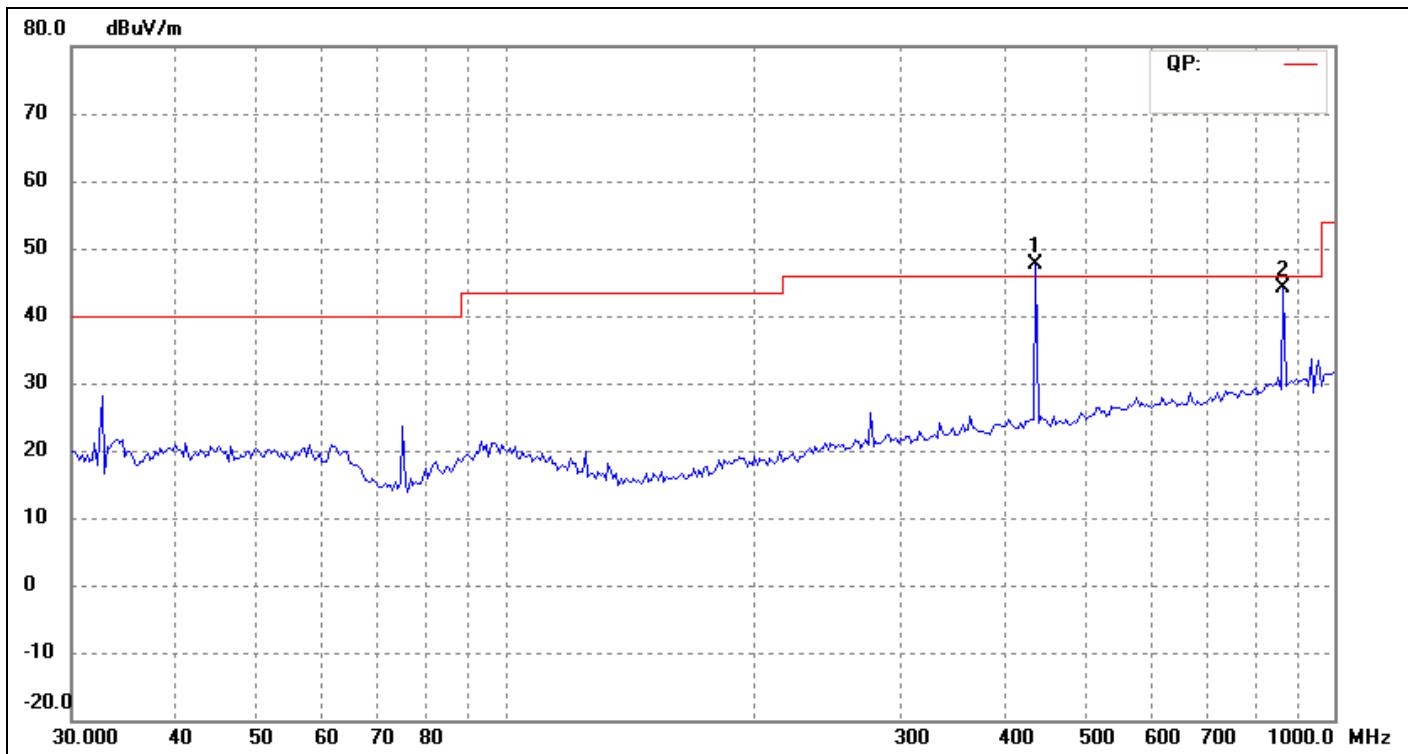


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	434.0205	44.26	12.02	56.28	92.8	-36.52	120	100	peak
2	868.8860	31.65	16.47	48.12	72.8	-24.68	45	120	peak
3	434.0205	40.86	12.02	52.88	72.8	-19.92	120	100	AV
4	868.8860	28.25	16.47	44.72	52.8	-8.08	45	120	AV

Above 1GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	1302	26.54	20.95	47.49	74	-26.51	45	150	peak
2	1736	24.94	21.77	46.71	72.8	-26.09	310	120	peak
3	1302	23.14	20.95	44.09	54	-9.91	45	150	AV
4	1736	21.54	21.77	43.31	52.8	-9.49	310	120	AV

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	434.0205	35.70	12.02	47.72	92.8	-45.08	0	150	peak
2	868.8860	27.73	16.47	44.20	72.8	-28.60	180	120	peak
3	434.0205	32.30	12.02	44.32	72.8	-28.48	0	150	AV
4	868.8860	28.90	16.47	40.80	52.8	-12.00	180	120	AV

Above 1GHz

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	1302	24.73	20.95	45.68	74	-28.32	120	110	peak
2	1736	22.98	21.77	44.75	72.8	-28.05	11	100	peak
3	1302	21.33	20.95	42.28	54	-11.72	120	110	AV
4	1736	19.58	21.77	41.35	52.8	-11.45	11	100	AV

Note: The EUT was tested in all three orthogonal planes and frequency rang 30MHz to the tenth harmonics.

Emissions attenuated closely to the noise base are not reported.

5. §15.231(c) 20dB BANDWIDTH TESTING

5.1 Standard Applicable

According to FCC 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2007-06-30	2008-06-29
ETS	Receiver Antenna	2175	57337	2007-06-30	2008-06-29
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2007-06-30	2008-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

5.4 Environmental Conditions

Temperature:	21° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

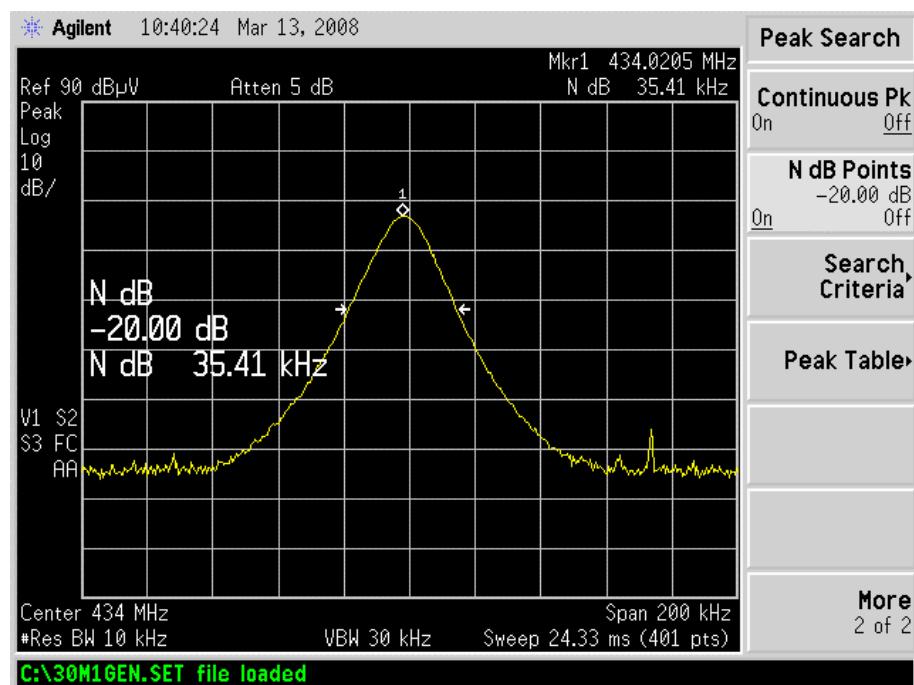
5.5 Summary of Test Results/Plots

Frequency MHz	20dB Bandwidth KHz	Limit kHz
434.10	35.41	1085

$$\text{Limit} = \text{Frequency} \times 0.25\% = 434.10 \times 0.25\% = 1085 \text{ kHz}$$

Test Result Pass

Refer to the attached plots.



6. §15.231(e)-DEACTIVATION TESTING

6.1 Standard Applicable

According to FCC 15.231 (a)(3) there is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

According to FCC 15.231 (e) devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2007-06-30	2008-06-29
Receiver Antenna	ETS	2175	57337	2007-06-30	2008-06-29
50 ohm Coaxial Cable	ETS	SUCOFLEX 104	25498514	2007-06-30	2008-06-29

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 434.01MHz, than set the spectrum analyzer to Zero Span for the release time reading.

6.4 Environmental Conditions

Temperature:	20° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

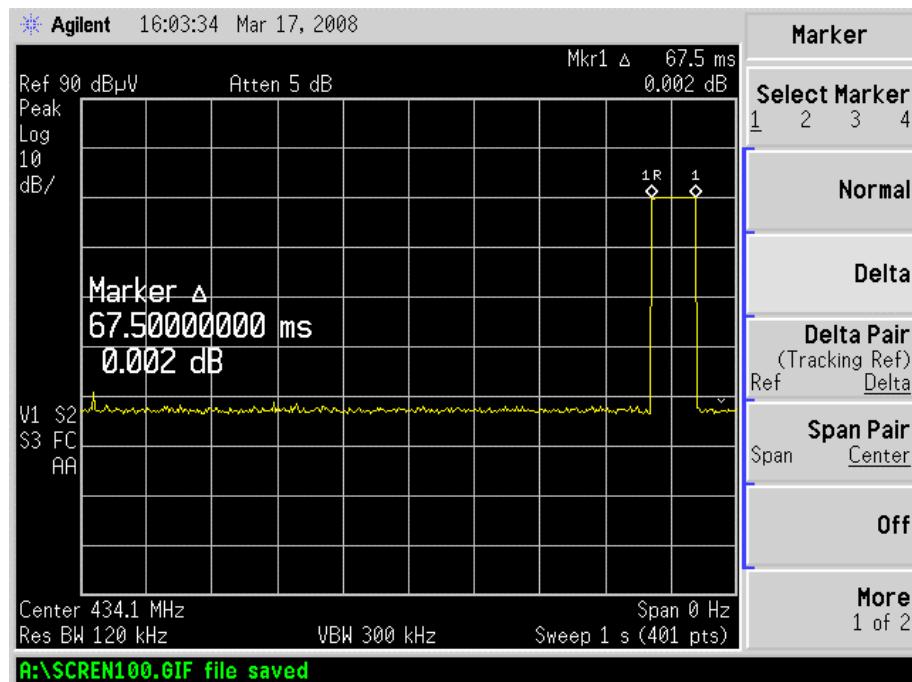
Refer to the attached plots.

$$\begin{aligned}
 \text{The total transmission time} &= \text{Transmission time} * 3600s / \text{Silent time} \\
 &= 0.0675 s * 3600 s / 266.25s \\
 &= 0.913 s < 2 s
 \end{aligned}$$

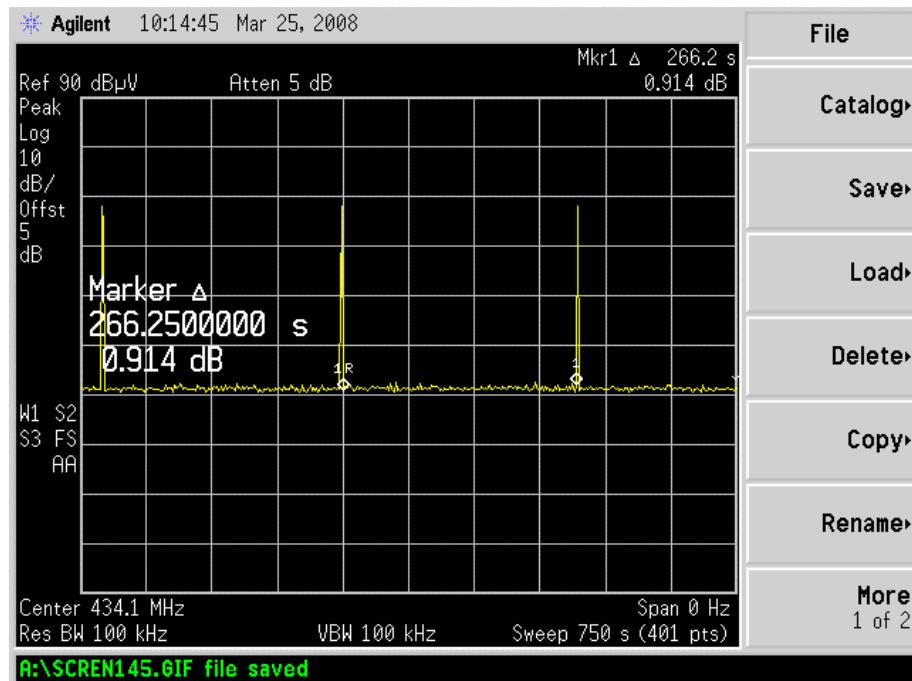
Transmission time = $0.0675\text{s} < 1\text{s}$

Silent time = $266.25\text{s} > 10\text{s}$ and Silent time = $266.25\text{s} > 30 * 0.0675\text{s} = 2.025\text{s}$

Transmission Time



Silent Time



Result: Pass