SK TECH CO., LTD.

Certificate of Compliance

Test Report No.:	**SKTTRT-060330-009**		
NVLAP CODE:	**200220-0**		
Applicant:	**Jin Young Electronics Co., Ltd.**		
Applicant Address:	282-72, Kong Dan-Dong Gumi-City, Kyoung Sang Buk-Do, Republic of Korea		
Manufacturer:	**Jin Young Electronics Co., Ltd.**		
Manufacturer Address:	282-72, Kong Dan-Dong Gumi-City, Kyoung Sang Buk-Do, Republic of Korea		
Device Under Test:	**10.2" WIDE TFT LCD FLIP-DOWN MONITOR**		
FCC ID:	**RAZ-LFD102**	**Model No.:**	**JYT-1020**
Receipt No.:	SKTEU06-0008	**Date of receipt:**	January 10, 2006
Date of Issue:	March 30, 2006		
Location of Testing:	**SK TECH CO., LTD.** 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Procedure:	**ANSI C63.4**		
Test Specification:	**47CFR, Part 15 Rules**		
Equipment Class:	**DXX - Part 15 Low Power Communication Device Transmitter**		
Test Result:	The above-mentioned device has been tested and passed.		

Tested & Reported by: *Jong-Soo, Yoon*

2006.03.30

Signature *Date*

Approved by: *Jae-Kyung, Bae*

2006.03.30

Signature *Date*

Other Aspects:	**-**
Abbreviations:	**· OK, Pass = passed · Fail = failed · N/A = not applicable**

- **This test report is not permitted to copy partly without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of one sample of the above mentioned.**
- **This test report must not be used to claim product endorsement by NVLAP or any agency of the U.S Government.**
- **We certify that this test report has been based on the measurement standards that is traceable to the national or International standards.**

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1. GENERAL

These tests were performed using the test procedure outlined in ANSI C63.4, 2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.239 for Low Power Communication Device Transmitter. The EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards.

We attest to the accuracy of data. All measurements reported herein were performed by SK Tech Co., Ltd. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. TEST SITE

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.
This laboratory is accredited by NVLAP for NVLAP Lab. Code: 200220-0 and DATech for DAR-Registration No.: DAT-P-076197-01

2.2 List of Test and Measurement Instruments

Description	Manufacturer	Model #	Serial #	
Spectrum Analyzer	Agilent	E4405B	US40520856	
EMC Spectrum Analyzer	Agilent	E7405A	US40240203	☒
EMI Test Receiver	Rohde&Schwarz	ESIB40	100277	☒
EMI Test Receiver	Rohde&Schwarz	ESVS10	825120/008	
EMI Test Receiver	Rohde&Schwarz	ESVS10	834468/013	
EMI Test Receiver	Rohde&Schwarz	ESHS10	835871/002	
EMI Test Receiver	Rohde&Schwarz	ESHS10	862970/019	
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	836679/018	
Pre-amplifier	HP	8447F	3113A05153	☒
Pre-amplifier	MITEQ	AFS44	1116321	
Pre-amplifier	MITEQ	AFS44	1116322	
Power Meter	Agilent	E4418B	US39402179	
Power Sensor	HP	8485A	3318A13916	
Oscilloscope	Agilent	54820A	US40240160	
Diode detector	Agilent	8473C	1882A03173	
VHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	VHAP	1014 / 1015	
UHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	UHAP	989 / 990	
Loop Antenna	Schwarzbeck	HFH2-Z2	863048/019	
TRILOG Broadband Antenna	Schwarzbeck	VULB9160	3141	☒
Biconical Antenna	Schwarzbeck	VHA9103	2265	☒
Log-Periodic Antenna	Schwarzbeck	UHALP9107	1819	☒
Horn Antenna	AH Systems	SAS-200/571	304	
Horn Antenna	EMCO	3115	00040723	
Horn Antenna	EMCO	3115	00056768	
Vector Signal Generator	Agilent	E4438C	MY42080359	
PSG analog signal generator	Agilent	E8257D-520	MY45141255	
DC Power Supply	HP	6634A	2926A-01078	
DC Power Supply	HP	6268B	2542A-07856	
Digital Multimeter	HP	HP3458A	2328A14389	☒
PCS Interface	HP	83236B	3711J00881	
CDMA Mobile Test Set	HP	8924C	US35360253	
Hygro/Thermo Graph	SATO	PC-5000TRH-II	-	☒
Temperature/Humidity Chamber	All Three	ATH-50M	20030425	
Function/Arbitrary Waveform Generator	HP	33220A	MY44005753	☒

2.3 Test Date

Date of Application : January 10, 2006

Date of Test : February 20, 2006 ~ March 06, 2006

2.4 Test Environment

See each test item's description.

3. DESCRIPTION OF THE EQUIPMENT UNDER TEST

The EUT is a LCD Monitor equipped with a FM transmitter to transmit audio signals to the FM broadcast receiver in vehicles. The product specification described herein was obtained from product data sheet or user's manual.

3.1 Rating and Physical Characteristics

Type (Model No.)	10.2" WIDE TFT LCD FLIP-DOWN MONITOR (JYT-1020)
Power source	12V lead-acid battery on vehicles
Local Oscillator or X-Tal	13.5 MHz , X-Tal: 7.6 MHz , 14.318 MHz
Transmit Frequency	88.3 MHz to 90.2 MHz
Antenna Type	Integral
Type of Modulation	FM
RF Output power	1mW under
Interface Ports*	A/V INPUT (×2), A/V OUTPUT (×1)

**** The EUT has no digital interface used for supporting LCD display mode being connected to a personal computer***

3.2 Equipment Modifications

The following modifications were necessary for compliance:

Ferrite cores are inserted additionally as follows:

#	Ferrite core location	Manufacturer	Model name	Quantity
1	Power cable	FEELUX	BNF-14	1

See external photographs of the EUT

3.3 Submitted Documents

Block diagram

Schematic diagram

Part List

PCB Layout

User manual

4. MEASUREMENT CONDITIONS

4.1 Description of test configuration

The EUT was configured for testing in a typical fashion. The EUT was powered from the full charged lead-acid battery, and the EUT was set to transmit the audio signals from Function/Arbitrary Waveform Generator.

Operating Mode
Transmitting audio signals from the Function/Arbitrary Waveform Generator with 1kHz, 700mV* peak to peak at the operating frequencies; low (88.3 MHz), middle (89.3 MHz), and high (90.2 MHz).

**** Declared by the applicant as the maximum-rated input level***

4.2 List of Peripherals

Equipment Type	MODEL	Manufacture	S/N	Cable
CCD Camera	JCC-27M	JONHAN INDUSTRIES CO., LTD	J00000027	1.9 m shielded
DC 12V battery	CMF50S	Solite	-	1.0 m unshielded
Function/Arbitrary Waveform Generator	33220A	Agilent	MY44005753	1.4 m shielded

4.3 Type of Used Cables

Description	Length	Type of shield	Manufacturer	Remark
A / V Cable	1.4 m	Unshielded	Supplied by the applicant	-
A / V Cable	1.9 m	Unshielded	Supplied by the applicant	-
A / V Cable	2.9 m	Unshielded	Supplied by the applicant	-

4.4 Uncertainty

Measurement Item	Combined Standard Uncertainty Uc	Expanded Uncertainty U = KUc (K = 2)
Radiated disturbance	± 2.30 dB	±4.60 dB
Conducted disturbance	± 1.96 dB	±3.92 dB

5. TEST AND MEASUREMENTS

Summary of Test Results

Requirement	CFR 47 Section	Report Section	Test Result
Antenna Requirement	15.203	5.1	PASS
Conducted Emissions	15.207(a)	*	*
Occupied bandwidth	15.239(a)	5.3	PASS
Field Strength (Fundamental)	15.239(b)	5.4	PASS
Radiated Spurious Emissions	15.239(c), 15.209(a)	5.4	PASS

**** Not required, the EUT is only battery powered.***

5.1 ANTENNA REQUIREMENT

5.1.1 Regulation

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. 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. 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.

5.1.2 Result: PASS

The transmitter has a permanently attached antenna and meets the requirements of this section.

5.2 OCCUPIED BANDWIDTH

5.2.1 Regulation

According to §15.239(a), Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.2.2 Test Procedure

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce worst-case (i.e., the widest) bandwidth.

The measurements were performed at three channels, low (88.3 MHz), middle (89.3 MHz) and high (90.2 MHz). The spectrum trace data around fundamental frequency of the EUT was obtained with the spectrum analyzer in “Max Hold” mode. The bandwidth value was determined between the two points of 26dB down from the reference level.

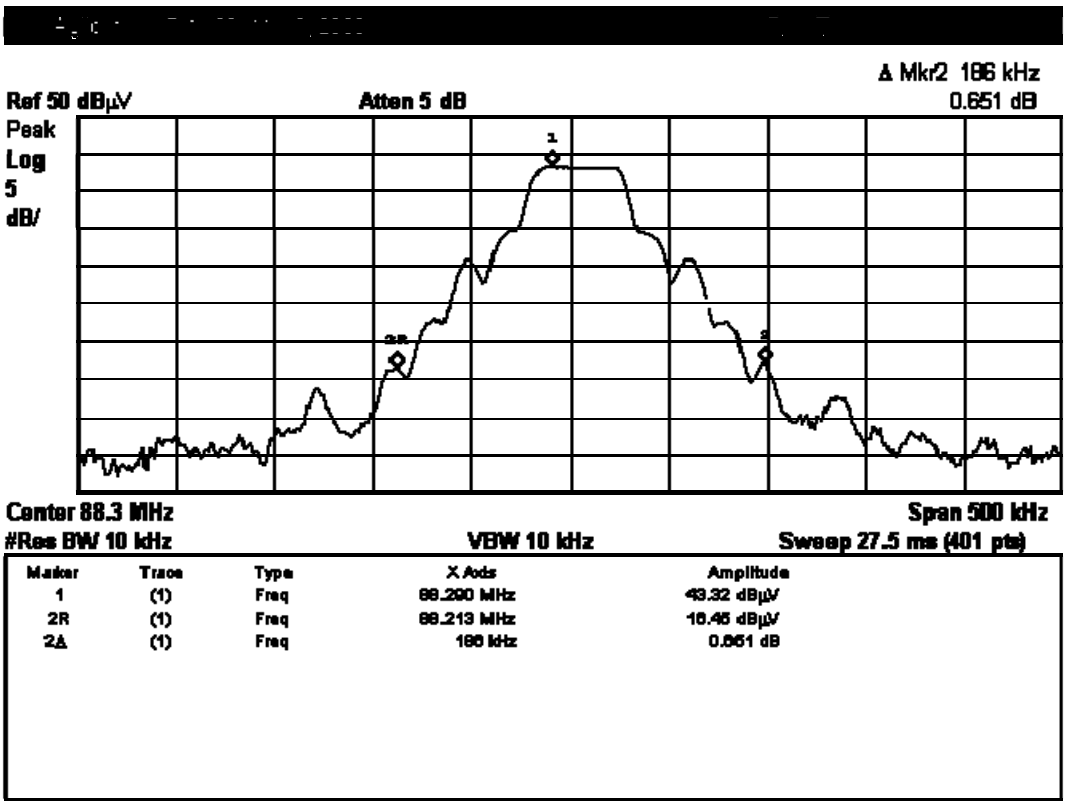
5.3.3 Test Results: PASS

Table 1: Measured values of the Occupied bandwidth

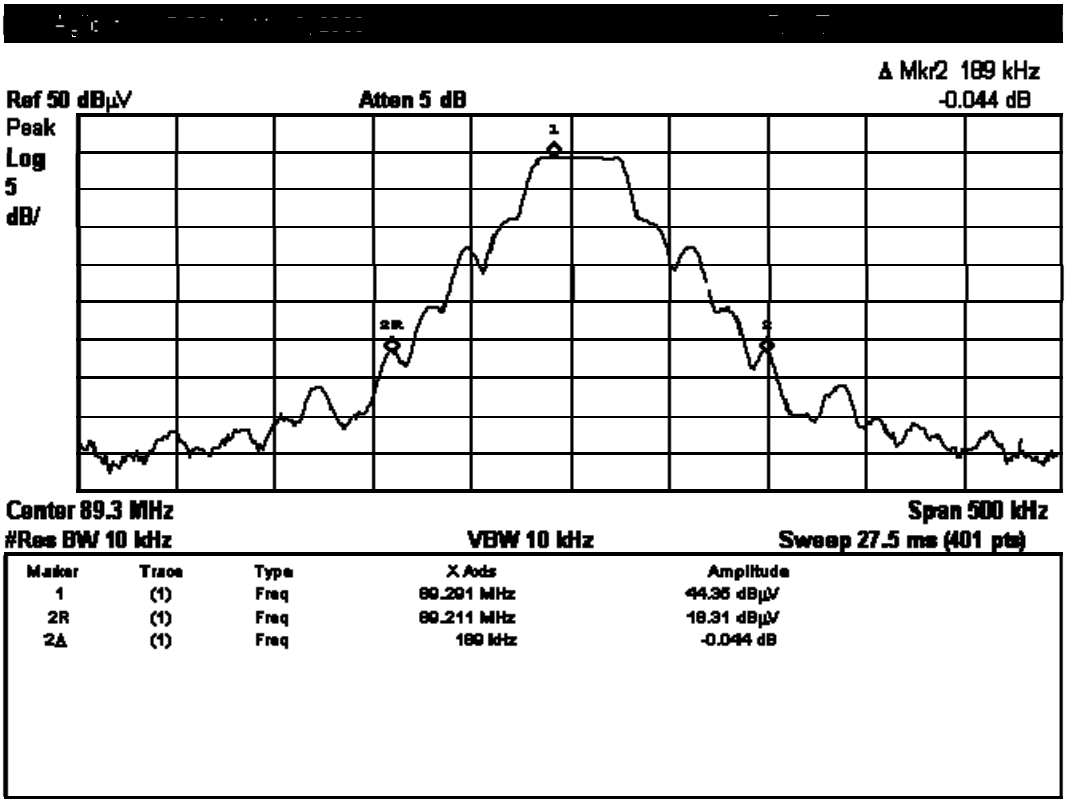
Center frequency (MHz)	Limit (kHz)	Measured occupied bandwidth (kHz)
88.3	200	186
89.3	200	189
90.2	200	194

Figure 1: Plot of the Occupied bandwidth

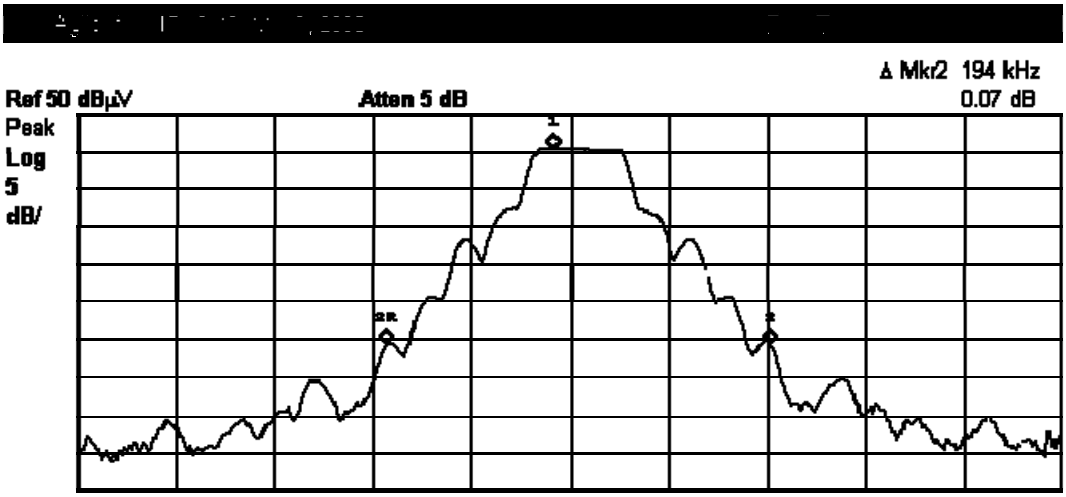
Lowest Channel (operating at 88.3 MHz)



Middle Channel (operating at 89.3 MHz)



Highest Channel (operating at 90.2 MHz)



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	90.191 MHz	45.38 dBµV
2R	(1)	Freq	90.108 MHz	19.37 dBµV
2Δ	(1)	Freq	194 kHz	0.07 dB

5.3 RADIATED EMISSIONS

5.3.1 Regulation

According to §15.239(b), The field strength of any emissions within the permitted 200kHz band shall not exceed the 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

Fundamental frequency (MHz)	Field strength of fundamental (μV/m @ 3m)	Field strength of fundamental (dB μV/m @ 3m)
88-108	250	48.0

According to §15.239(c), the field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

Frequency (MHz)	Field strength (μV/m @ 3m)	Field strength (dB μV/m @ 3m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0

5.4.2 Test Procedure

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 30 to 1000 MHz using the TRILOG broadband antenna, and from 1000 MHz to 18000 MHz using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.
7. The EUT was operated in transmitting mode. The measurements were performed at three modulated carrier frequencies: 88.3 MHz, 89.3 MHz and 90.2 MHz.

5.4.3 Test Results: PASS

POWER SOURCE: 12 V_{DC} battery

Table 2: Measured values of the Field strength

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. (V/H)	Antenna Height [m]	Table Angle [°]	Reading [dB(μV)]	Amp Gain [dB]	AF / CL [dB(1/m)]	Actual [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Emissions AVERAGE DATA 15.239(b) Bands										
88.30	120	V	2.0	61	63.6	28.0	7.9/0.8	44.3	48.0	3.7
89.30	120	V	2.0	61	64.2	28.0	8.2/0.8	45.2	48.0	2.8
90.20	120	V	1.9	84	64.7	28.0	8.4/0.7	45.8	48.0	2.2
Emissions PEAK DATA 15.239(b) Bands										
88.30	120	V	2.0	61	65.1	28.0	7.9/0.8	45.8	68.0	22.2
89.30	120	V	2.0	61	65.7	28.0	8.2/0.8	46.7	68.0	21.3
90.20	120	V	1.9	84	66.2	28.0	8.4/0.7	47.3	68.0	20.7
Emissions Quasi-peak DATA 15.209; general radiated emissions										
45.34	120	V	1.3	107	50.5	28.3	12.8/0.4	35.4	40.0	4.6
129.05	120	V	2.1	95	49.1	27.8	13.8/1.2	36.3	43.5	7.2
181.36	120	V	2.1	210	47.8	27.5	15.8/1.2	37.3	43.5	6.2
264.90	120	V	1.8	178	43.8	26.9	17.9/1.4	36.1	46.0	9.9
45.34	120	V	1.7	113	50.7	28.3	12.8/0.4	35.6	40.0	4.4
129.05	120	V	1.7	116	49.5	27.8	13.8/1.2	36.7	43.5	6.8
181.36	120	V	1.2	57	47.9	27.5	15.8/1.2	37.4	43.5	6.1
267.90	120	V	2.0	215	43.8	26.9	17.9/1.4	36.2	46.0	9.8
45.34	120	V	1.2	105	50.9	28.3	12.8/0.4	35.8	40.0	4.2
129.05	120	V	2.0	95	49.7	27.8	13.8/1.2	36.9	43.5	6.6
181.36	120	V	1.4	210	48.1	27.5	15.8/1.2	37.6	43.5	5.9
270.60	120	V	1.7	298	43.8	27.0	18.0/1.5	36.3	46.0	9.7

Margin (dB) = Limit – Actual
[Actual = Reading – Amp Gain + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. AF/CL = Antenna Factor and Cable Loss

NOTE: The spectrum was scanned from 30 MHz to 1 GHz. All emissions not reported were more than 20 dB below the specified limit or in the noise floor.