Test Report

Product Name : RFID Patrol Data Carrier

Model No. : F-20M, F-18M, F-20, F-18

FCC ID.: PI3-CARRIER-F-20M

Test Report Certification

Test Date : Feb. 05, 2002
Report No. : 01CH018F

QuieTek Corporation
Accredited by NIST (NVLAP)
NVLAP Lab Code: 200347-0

Product Name	:	RFID Patrol Data Carrier
Applicant	:	SUMMIT AUTOMATION CO., LTD.
Address	:	2F., No. 68, Chungkung 1 st. Rd., Taichung, Taiwan 407, R.O.C.
Manufacturer	:	SUMMIT AUTOMATION CO., LTD.
Model No.	:	F-20M, F-18M, F-20, F-18
FCC ID.	:	DoC
Rated Voltage	:	DC 3V(Battery)
Trade Name	:	SUMMIT
Measurement Standard	:	FCC Part 15 Subpart B
Measurement Procedure	:	ANSI C63.4:1992
Classification	:	Class B
Test Result	:	Complied

NVLAP
NVLAP Lab Code : 200347-0

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

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(Lisa Chen)

Tested By : Vincent Lin
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Approved By :
(Kevin Wang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	RFID Patrol Data Carrier
Trade Name	:	SUMMIT
FCC ID.	:	PI3-CARRIER-F-20M
Model No.	:	F-20M, F-18M, F-20, F-18
RS232 Cable	:	Shielded, 1.8m

Note:

1. This EUT is a RFID Patrol Data Carrier.
2. This device is a composite device in accordance with Part 15 regulations. The function for the receiver was, measured and made a test report that the report number is 01CH018F, certified under verification.
3. QuieTek has verified all construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:
   Test Mode: Mode 1: Transmit

1.2. EUT Description

The EUT is a DC operated lock with 134.2kHz transmitter and its associated key with passive tag reflector for code confirmation. The IC TMS3705A from TI was used as the transponder device by 4MHz clock. A 2cm *1cm multi-turn inductive loop was connected to the device as the transmitter antenna. The passive tag will reflect the matched energy to the EUT.

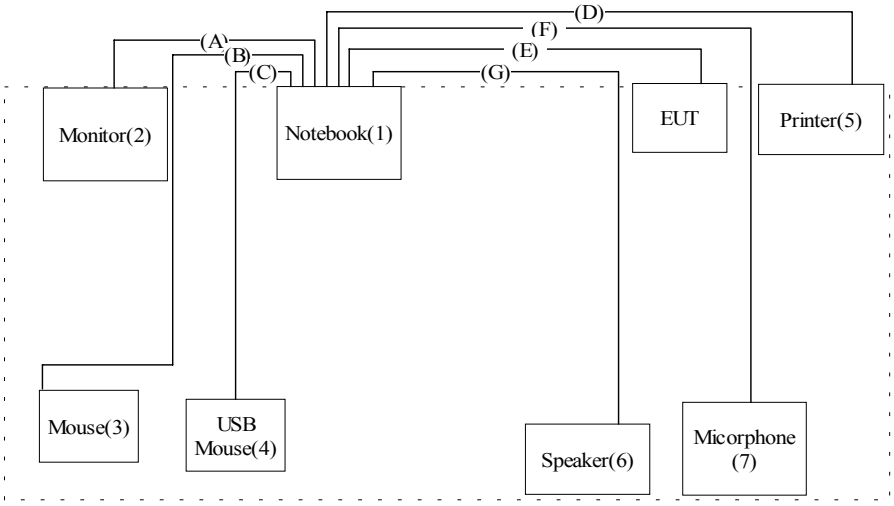
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord	FCC ID
(1)	Notebook	DELL	PP01L	2724903568	Non-shielded, 1.8m	DoC
(2)	Monitor	HITACHI	CM752ET-311	T8D003312	Shielded, 1.8m	DoC
(3)	Mouse	Logitech	M-S34	LZA82474119	--	DZL211029
(4)	USB Mouse	Logitech	M-UE55	LTC93813273	--	DoC
(5)	Printer	HP	C2642A	MY75L1D2XN	Non-Shielded, 0.7m	B94C2642X
(6)	Speaker	JS	J-008	99-D-235399-D	--	--
(7)	Microphone	AIWA	CD-8000	N/A	--	DoC

Signal Cable Type		Signal cable Description
A.	VGA Cable	Shielded, 1.8m, two ferrite cores bonded
B.	Mouse Cable	Shielded, 1.8m
C.	USB Mouse Cable	Shielded, 1.0m
D.	Printer Cable	Shielded, 1.2m
E.	RS232 Cable	Shielded, 1.8m
F.	Microphone Cable	Non-shielded, 1.8m
G.	Speaker Cable	Non-shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

(1) Setup the EUT and simulators as shown on 1.3

(2) Turn on the power of all equipment.

(3) Verify the operation is normal.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

August 30, 2001 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

NVLAP Lab Code : 200347-0

Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwa, R.O.C.
TEL : 886-3-5928858 / FAX : 886-3-5928859
E-Mail : service@quietek.com

2. Conducted Emission

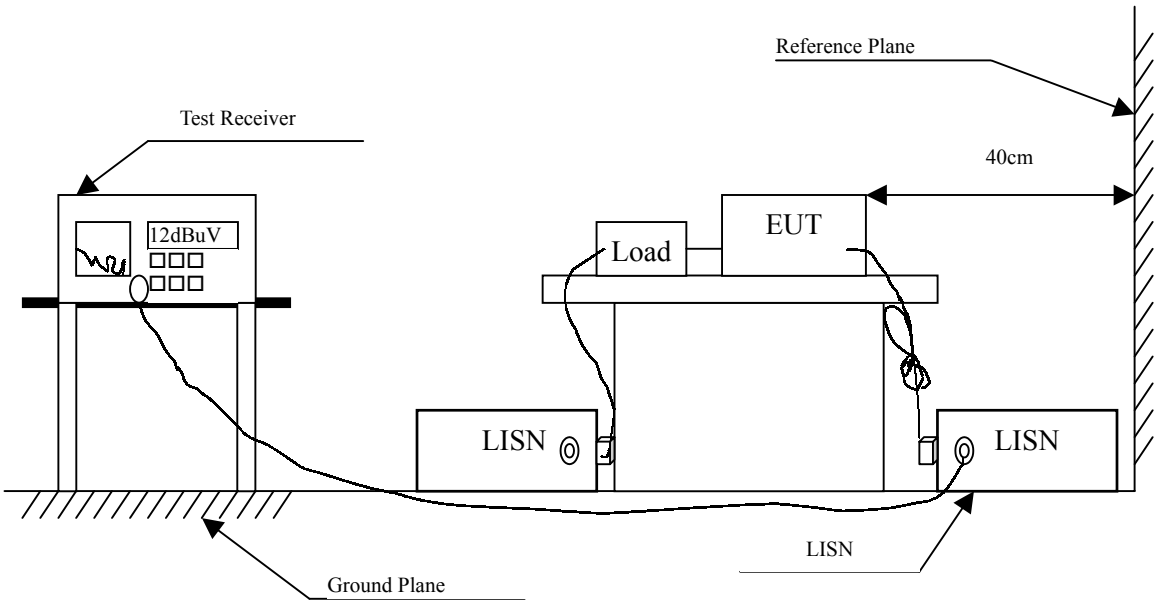
2.1. Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2001	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	No.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Paragraph 15.207		
Frequency MHz	Limits	
	uV	dBuV
0.45 - 30	250	48.0

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:1992 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

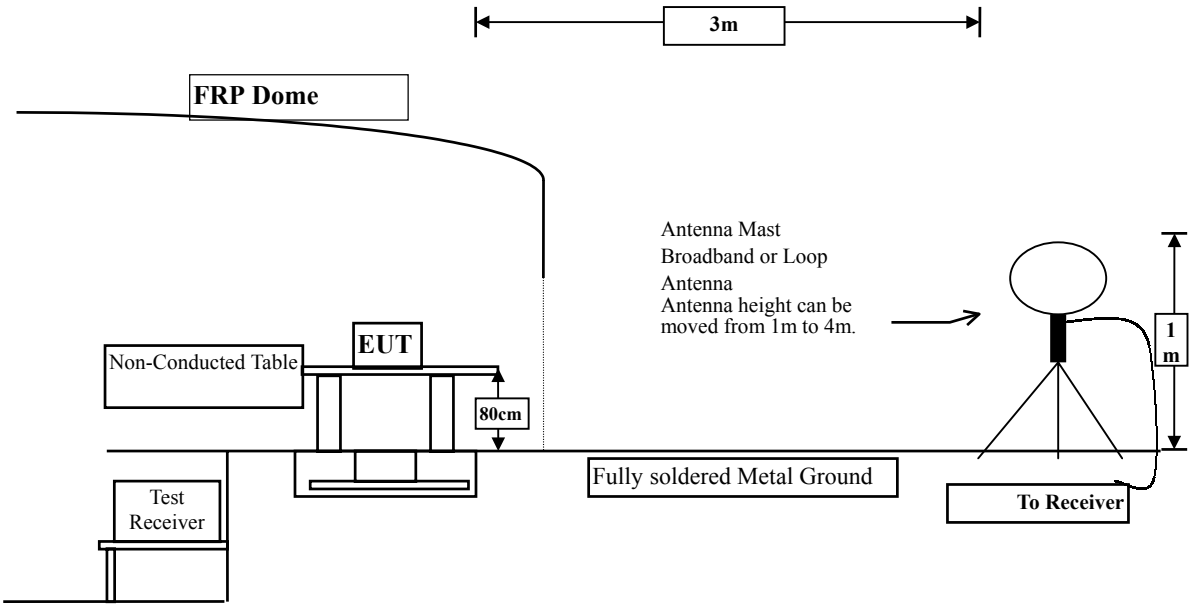
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
	X	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
	X	Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2001
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
	X	Loop Antenna	R&S	HFH2-Z2/833799/004	July, 2001
Site # 2		Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
		Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2001
		Horn Antenna	EM	EM6917 / 103325	May, 2001
		Loop Antenna	R&S	HFH2-Z2/833799/004	July, 2001

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limits

FCC Part 15 Paragraph 15.209		
Frequency MHz	Field Strength (Microvolts/meter)	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	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted. The collection factor will be 80dB for this case.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Regard to the characterstic and operation band of EUT, Loop antenna was used for this measurement. The measurement method is hosed or ANSI C63.4 section 8.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

Radiated emissions were invested over the frequency range from 9kHz to 30MHz using a receive bandwidth of 9kHz and 30MHz to1GHz using a receiver bandwidth of 120kHz.

The emission limit shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emission limit in these three bands are based on measurements employing an average detector.

3.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.

5. Summary of Test Datas

The test results in the emission was performed according to the requirements of measurement standard and process. Quietek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission is listed as below.

All the tests were carried out with the EUT in normal operation, which was defined as:

Test Mode: Mode 1: Transmit

5.1. Test Data of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

5.2. Test Data of Radiated Emission

Product : RFID Patrol Data Carrier
Test Item : Radiated Emission (Fundamental)
Test Site : No.1 OATS
Test Mode : Mode 1: Transmit

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
0.134	0.04	0.00	0.00	56.79	56.83	68.24	125.07
Vertical							
0.134	0.04	0.00	0.00	45.60	45.64	59.43	105.07

Note:

1. All Reading Levels below 1GHz are Quasi-Peak value, except for the frequency bands 9-90kHz and 110-490kHz are Average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss.

Product : RFID Patrol Data Carrier
Test Item : Radiated Emission (Harmonic Emissions)
Test Site : No.1 OATS
Test Mode : Mode 1: Transmit

	Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector								
	0.268	0.04	0.00	0.00	52.64	52.68	66.36	119.04
	0.403	0.04	0.00	0.00	50.72	50.76	64.74	115.50
Average Detector								
	0.268	0.04	0.00	0.00	43.16	43.20	55.84	99.04
	0.403	0.04	0.00	0.00	40.30	40.34	55.16	95.50
Quasi-Peak Detector								
	0.537	0.04	0.00	0.00	41.20	41.24	31.76	73.00
	0.671	0.04	0.00	0.00	38.90	38.94	32.13	71.07
	0.805	0.04	0.00	0.00	36.40	36.44	33.05	69.49
	0.939	0.04	0.00	0.00	43.80	43.84	24.31	68.15
	1.074	0.04	0.00	0.00	28.90	28.94	38.04	66.98
	1.208	0.04	0.00	0.00	34.22	34.26	31.70	65.96
	1.342	0.04	0.00	0.00	36.76	36.80	28.25	65.05
*	1.476	0.04	0.00	0.00	41.46	41.50	22.72	64.22

Note:

1. All Reading Levels below 1GHz are Quasi-Peak value, except for the frequency bands 9-90kHz and 110-490kHz are Average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss.

Product : RFID Patrol Data Carrier
Test Item : Radiated Emission (Spurious Emissions)
Test Site : No.1 OATS
Test Mode : Mode 1: Transmit

Freq. MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal							
* 52.310	1.11	7.44	26.86	40.60	22.29	17.71	40.00
69.770	1.18	7.49	26.86	36.00	17.81	22.19	40.00
95.960	1.29	9.62	26.87	31.00	15.04	28.46	43.50
143.490	1.48	13.53	26.89	30.60	18.72	24.78	43.50
256.980	1.95	12.52	26.93	30.60	18.13	27.87	46.00
408.300	2.57	15.18	26.78	29.60	20.57	25.43	46.00
Vertical							
* 44.550	1.08	6.12	26.86	45.40	25.74	14.26	40.00
76.560	1.21	7.70	26.87	33.60	15.64	24.36	40.00
115.360	1.37	10.16	26.88	30.60	15.24	28.26	43.50
154.160	1.53	14.12	26.90	28.80	17.55	25.95	43.50
332.640	2.26	13.60	26.90	28.80	17.76	28.24	46.00
463.590	2.80	16.46	26.69	30.00	22.56	23.44	46.00

Note:

1. All Reading Levels below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss-PreAmp.

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs