

Date: 1999-10-21
No.: HM101465

TEST REPORT

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APPLICANT:

RADIOSHACK (A DIVISION OF TANDY CORP.)
100 THROCKMORTON ST., STE. 1500 FORT WORTH, TX 76102-2802, USA.

DATE OF SAMPLES RECEIVED: 1999-08-31

DATE OF TESTING: 1999-10-19

DESCRIPTION OF SAMPLE(S):

A sample of product said to be:

Product: 49 MHZ TRANSCEIVER
Manufacturer: Yams' Electronics Factory Ltd.
Model Number: 21-417
Brand Name: RADIOSHACK
Rating: 9Vd.c. ("6F22" size battery × 1)
Origin: CHINA

INVESTIGATIONS REQUESTED:

Measurement to the relevant clauses of F.C.C. Rules and Regulations Part 15 Subpart B - Unintentional Radiator and Subpart C - Intentional Radiator.

RESULT/ REMARK: Please see attached sheet(s).

CONCLUSION:

From the measurement data obtained, the tested sample was considered to have COMPLIED after modification by customer with the clause 15.109(a) and ANSI C63.4-1992 Section 12.1.1.1-2 for the Receiver Section and for the Transmitter Section with the clause 15.235 of Federal Communications Commission Rules and Regulations Part 15.

TEST EQUIPMENT AUDIT: Please see Appendix A

Law Man Kit

Testing Engineer

Kitty Choy

Verify by

Patrick Wong

Patrick Wong
for Managing Director

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TEST SUMMARY

UNINTENTIONAL RADIATOR

- (A) Measurement of Radiated Emissions Satisfactory
- (B) Line Conducted Voltage Test Not applicable

*** INTENTIONAL RADIATOR*** :

- (1) Measurement of Emission of RF energy on the carrier frequency..... Satisfactory
- Measurement of the out-of band emissions including harmonics..... Satisfactory
- (2) Measurement of Emission Within Band Edges..... Satisfactory
- (3) Measurement of Line-Conducted Voltage onto AC Power Line..... Not applicable

TEST DATA

Please refer to the attached result sheets.

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UNINTENTIONAL RADIATOR

(A) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Subpart B section 15.109(a)

TEST CONDITION : Normal

TEST DATE : 1999-10-19

| Freq. to which tuned | Freq of the emission | Polarization H-V | Meter reading (at 3m) | | Antenna factor | Field Strength (at 3m) | | FCC limit @ |
|-------------------------|-------------------------|---------------------|--------------------------|----|-------------------|---------------------------|------|----------------|
| MHz | MHz | | dB(μV) | dB | | dB(μV/m) | μV/m | μV/m |
| 49.860 | 49.9 | < | 1.0 | + | 15.0 | < | 16.0 | <6.3 |
| | 99.7 | < | 1.0 | + | 12.2 | < | 13.2 | < 5 |
| | 149.6 | < | 1.0 | + | 9.8 | < | 10.8 | < 3 |
| | 199.4 | < | 1.0 | + | 11.5 | < | 12.5 | < 4 |
| | 249.3 | < | 1.0 | + | 15.9 | < | 16.9 | < 7 |
| | 299.1 | < | 1.0 | + | 17.0 | < | 18.0 | < 8 |
| | 349.0 | < | 1.0 | + | 17.2 | < | 18.2 | < 8 |
| | 398.8 | < | 1.0 | + | 18.8 | < | 19.8 | <10 |
| | 448.7 | < | 1.0 | + | 19.7 | < | 20.7 | <11 |
| | 498.6 | < | 1.0 | + | 20.6 | < | 21.6 | <12 |
| | 548.4 | < | 1.0 | + | 22.2 | < | 23.2 | <14 |
| | 598.3 | < | 1.0 | + | 23.4 | < | 24.4 | <17 |
| | 648.1 | < | 1.0 | + | 23.5 | < | 24.5 | <17 |
| | 698.0 | < | 1.0 | + | 25.0 | < | 26.0 | <20 |
| | 747.8 | < | 1.0 | + | 26.2 | < | 27.2 | <25 |
| | 797.7 | < | 1.0 | + | 27.2 | < | 28.2 | <25 |
| | 847.5 | < | 1.0 | + | 27.2 | < | 28.2 | <25 |
| | 897.5 | < | 1.0 | + | 27.2 | < | 28.2 | <25 |
| | 947.2 | < | 1.0 | + | 27.8 | < | 28.8 | <27 |
| | 997.1 | < | 1.0 | + | 28.5 | < | 29.5 | <27 |

=====SUMMARY=====

All data is within limits

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Broad-band Antennas were used and both polarizations of emissions were measured

Polarizations at highest reading indicated as:

H -- Horizontal

V -- Vertical

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NOTES FOR THE RADIATION MEASUREMENT

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC Rules.

(2) Distance between the ET and measuring antenna:

3 meters.

(3) Measuring instrumentation:

CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz.). 6 dB bandwidth set at 120 KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.35(b) of the FCC new Rules.

(4) Measuring antenna:

Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.

(5) Frequency range scanned:

The frequency range from 25 MHz to 1000 MHz had been searched. Readings of the highest emissions relating to the limit were reported as above.

(6) Arrangement of EUT:

During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.

(7) Measuring Procedure:

In accordance with the relevant clauses of the FCC Rules Part 15 section 15.109(a) and ANSI C63.4:1992 section 12.1.1.1-2.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-
30MHz to 300MHz = $\pm 3.7\text{dB}$, 300MHz to 1000MHz = $+ 3.0\text{dB}/-2.7\text{dB}$.

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC Equipment Authorization Program. This test itself is not an Approval Test.

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** INTENTIONAL RADIATOR ***

(1) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Subpart Section 15.235(49.82-49.90 MHz)

TEST CONDITION : Normal (Channel A)

TEST DATE : 1999-10-19

Emission of RF energy on the carrier frequency -- 49.832 MHz (PEAK VALUE)

| Emission Frequency | Meter Reading | Polarization | Antenna Factor | Field Strength | FCC Limit |
|-----------------------|------------------|--------------|-------------------|----------------|--------------|
| MHz | dB(μV) | H-V | dB | dB(μV/m) μV/m | μV/m |
| 49.90 | 44.7 | H | + | 15.0 59.7 | 966.1 100000 |

Emission of RF energy on the carrier frequency -- 49.832 MHz (AVERAGE VALUE)

| Emission Frequency | Meter Reading | Polarization | Antenna Factor | Field Strength | FCC Limit |
|-----------------------|------------------|--------------|-------------------|----------------|-------------|
| MHz | dB(μV) | H-V | dB | dB(μV/m) μV/m | μV/m |
| 49.90 | 44.5 | H | + | 15.0 59.5 | 944.1 10000 |

... to be continued

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*** INTENTIONAL RADIATOR ***

(1) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE: FCC Rules Part 15 Section 15.235(49.82-49.90 MHz)

TEST CONDITION : Normal (Channel A)

TEST DATE : 1999-10-19

The out-of-band emissions, including harmonics (25-1000 MHz) (CISPR VALUE)

| Emission Frequency | Meter Reading | Polarization | Antenna Factor | Field Strength (at 3m) | FCC Limit |
|--------------------|---------------|--------------|----------------|------------------------|-----------|
| MHz | dB(μV) | H-V dB | dB(μV/m) | μV/m | μV/m |
| 99.7 | 16.6 | H | + 12.2 | 28.8 | 27.5 |
| 149.6 | 28.7 | V | + 9.8 | 38.5 | 84.1 |
| 199.4 | 15.8 | H | + 11.5 | 27.3 | 23.2 |
| 249.3 | 16.7 | H | + 15.9 | 32.6 | 42.7 |
| 299.1 | 19.6 | H | + 17.0 | 36.6 | 67.6 |
| 348.8 | < 1.0 | | + 17.2 | < 18.2 | < 8.1 |
| 398.6 | < 1.0 | | + 18.8 | < 19.8 | < 9.8 |
| 448.5 | < 1.0 | | + 19.7 | < 20.7 | < 10.8 |
| 498.3 | < 1.0 | | + 20.6 | < 21.6 | < 12.0 |
| 543.1 | < 1.0 | | + 22.2 | < 23.2 | < 14.5 |
| 598.1 | < 1.0 | | + 23.4 | < 24.4 | < 16.6 |
| 647.8 | < 1.0 | | + 23.5 | < 24.5 | < 16.8 |
| 697.4 | < 1.0 | | + 25.0 | < 26.0 | < 20.0 |
| 747.8 | < 1.0 | | + 26.2 | < 27.2 | < 22.9 |
| 797.7 | < 1.0 | | + 27.2 | < 28.2 | < 25.7 |
| 847.5 | < 1.0 | | + 27.2 | < 28.2 | < 25.7 |
| 897.4 | < 1.0 | | + 27.2 | < 28.2 | < 25.7 |
| 947.2 | < 1.0 | | + 27.8 | < 28.8 | < 27.5 |
| 997.1 | < 1.0 | | + 28.5 | < 29.5 | < 29.9 |

=====SUMMARY=====

All data is within limits

=====

Broad-band Antennas were used and both polarizations of emissions were measured.
polarizations at highest reading indicated as:

H -- Horizontal V -- Vertical

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*** INTENTIONAL RADIATOR ***

(2) Measurement of Emissions Within Band Edges.

TEST REFERENCE: FCC Rules Part 15 section 15.235(49.82-49.90 MHz)
TEST CONDITION: Normal (Channel A)
TEST DATE : 1999-10-19

Please see exhibit of bandwidth

RESULTS AND NOTES

The bandwidth of the emission shall be no wider than 200kHz of the center frequency for devices operating within 49.82MHz to 49.90MHz . The bandwidth is determined at the points 26dB down from the modulated carrier.

The bandwidth at 26dB down is 13.4kHz which is within the allowable limit of 200kHz at 49.82-49.90MHz.

L: FCC Lower Band Edge.....-> 49.820MHz
H: FCC Higher Band Edge.....-> 49.900MHz
C: Unmodulated carrier at frequency.....-> 49.832MHz
D: No. of dB from unmodulated carrier.....-> 37.70dB

SPECTRUM ANALYZER SETTINGS

Resolution bandwidth : 1.0KHz
Frequency span : 10.0KHz/div
No. of dB/div : 10.0dB/div

FCC Limit

Minimum No. of dB from unmodulated carrier required : 26.0dB

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=====SUMMARY=====

All data is within limits

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NOTES FOR THE RADIATION MEASUREMENT

- (1) Test site facility:
Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules.
- (2) Distance between the EUT and measuring antenna:
3 meters.
- (3) Measuring instrumentations:
CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz). 6 dB bandwidth set at 120KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.35(b) of the FCC new Rules.
- (4) Measuring antenna:
Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.
- (5) Frequency range scanned:
The frequency range from 25 MHz to 1000 MHz had been searched. Readings of the highest emissions relating to the limit were reported as above.
- (6) Arrangement of EUT:
During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.
- (7) Measuring Procedure:
In accordance with the relevant clauses of the FCC Rules Part 15 section 15.235.
- (8) Measuring Uncertainty:
The calculated uncertainty for measurement performed at 3M test distance are:-
30MHz to 300MHz = $\pm 3.7\text{dB}$, 300MHz to 1000MHz = $+ 3.0\text{dB}/-2.7\text{dB}$.

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC Equipment Authorization Program. This test itself is not an Approval Test.

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