


FCC PART 15.231
EMI MEASUREMENT AND TEST REPORT

For

DT Communications Inc.

245-M, MT. Hermon Rd. PMB #305
Scotts Valley, CA 95066

| |
|---------------------------|
| FCC ID: S9KFOB101A |
|---------------------------|

| | |
|---|---|
| This Report Concerns: <input checked="" type="checkbox"/> Original Report | Equipment Type: Fob Tag Transmitter |
|  | |
| Test Engineer: Hang Tan / | |
| Report No.: R0504085 | |
| Test Date: 2005-04-28 | |
|  | |
| Reviewed By: Snell Leong / | |
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Note: This test report is specially limited to the above client company and this particular sample only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *DT Communications Inc.* product, FCC ID: S9KFOB101A or the "EUT" as referred to in this report is a Fob Tag Transmitter which measures approximately 6.0cmL x 3.3cmW x 1.2cmH.

** The test data gathered are from production sample, serial number: 101A-1 provided by the manufacturer.*

Objective

This report is prepared on behalf of *DT Communications Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC rules, Part 15, Sec 231 for radiated emission, 20dB Bandwidth, and Deactivation.

Related Submittal(s)/Grant(s)

No Related Submittals

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. All radiated and conducted emissions measurement was performed at BACL.

Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested in accordance with ANSI C63.4-2003.

EUT Exercise Software

The EUT exercising software program was designed to exercise the various installed components in accordance with ANSI C63.4-2003.

Special Accessories

The unit was tested with the normally supplied cabling and accessories provided by the supporting equipment and no special accessories were used.

Schematics / Block Diagram

Exhibit A contains a copy of the EUT's schematics diagram as reference.

Equipment Modifications

No modifications were made to the EUT.

Printed Circuit Boards in EUT

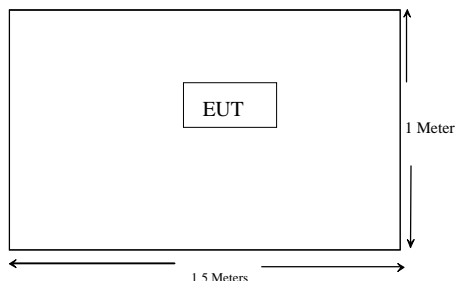
| Manufacturer/Description | Rev. | # of Layers | Crystals (MHz) |
|--------------------------|------|-------------|----------------|
| DT Communications | 2-05 | 2 | 418 |

Configuration of Test System



EUT

Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: *101A-1*.

| FCC Rules | REQUIREMENTS | RESULT |
|----------------------------------|--------------------------------|---|
| FCC 15.203 | Antenna Requirement | Pass |
| FCC 15.205, 15.209, 15.231(e) | Spurious Radiated Emissions | Within the Measurement of Uncertainty |
| FCC 15.207 (a) | Conducted Emissions | N/A |
| FCC 15.231(b)(2) | Average Measurement Duty Cycle | Compliance |
| FCC 15.231(c) | 20dB Bandwidth | Pass |

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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.

Refer to statement below for compliance.

“The antenna for this device is an integral antenna that the end user cannot access”.

Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.

§15.205 - RADIATED EMISSION DATA

Measurement Uncertainty

All measurements involve certain levels of uncertainties. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ± 4.0 dB.

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC Subpart C limits.

The spacing between the peripherals was 10 centimeters.

The EUT was placed on the center of the back edge on the test table.

The EUT was battery operated.

Receiver Setup

According to FCC CFR 47, Section 15.31, the EUT was tested to 5GHz.

During the radiated emission test, the CISPR quasi-peak detection was employed:

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date |
|-----------------|---------------------------|----------------------|---------------|------------|
| Agilent | Amplifier, Pre | 8447D | 2944A10187 | 08-25-2005 |
| Sunol Sciences | Antenna | JB1 | A013105-3 | 02-11-2006 |
| HP | Amplifier, Pre, Microwave | 8449B | 3147A00400 | 06-14-2005 |
| Sunol Sciences | System Controller | SC99V | 122303-1 | N/R |
| Rohde & Schwarz | Receiver, EMI Test | ESCI 1166.5950K03 | 100044 | 09-29-2005 |

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

According to §15.231, Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emission, based on the average value of the measured emissions. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

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

Summary of Test Results

According to the data in the following table, the EUT complied with the FCC 15.231(e) standards and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations. The EUT measured -0.3dB within the measurement uncertainty of $\pm 4.0\text{dB}$, and had the worst margin reading of:

- 0.3 dB at 418.05 MHz in the Horizontal polarization

Radiated Emissions Test Data, 3 meters

Environmental Conditions

| | |
|--------------------|----------|
| Temperature: | 12° C |
| Relative Humidity: | 64% |
| ATM Pressure: | 1021mbar |

The testing was performed by Hang Tan on 2005-04-12.

Radiated Emissions Test Data, 3 meters

| Frequency | Peak | Average | Direction | Height | Polar | Antenna Loss | Cable loss | Amplifier | Correction Factor | 15.231(e) | 15.231(e) |
|-----------|-------|---------|-----------|--------|-------|--------------|------------|-----------|-------------------|-------------|--------------|
| MHz | dBuV | dBuV | Degree | Meter | H / V | dB | dB | dB | dBuV (Ave) | Limit (Ave) | Margin (Ave) |
| 418.05 | 86.51 | 79.0 | 90 | 1.1 | H | 16.8 | 4.4 | 28.1 | 72.1 | 72.33 | -0.3 |
| 1672.13 | 49.68 | 42.1 | 100 | 1.1 | V | 25.3 | 8.7 | 31.2 | 45.0 | 52.33 | -7.4 |
| 418.04 | 77.05 | 69.5 | 210 | 3.0 | V | 16.8 | 4.4 | 28.1 | 62.6 | 72.33 | -9.7 |
| 2091.74 | 41.96 | 34.4 | 150 | 3.0 | H | 28.1 | 9.9 | 29.8 | 42.6 | 52.33 | -9.7 |
| 1672.13 | 45.74 | 38.2 | 30 | 2.1 | H | 25.3 | 8.7 | 31.2 | 41.0 | 52.33 | -11.3 |
| 2091.74 | 40.38 | 32.8 | 90 | 1.1 | V | 28.1 | 9.9 | 29.8 | 41.0 | 52.33 | -11.3 |
| 836.06 | 47.55 | 40.0 | 270 | 1.6 | V | 22.3 | 6.4 | 27.8 | 40.9 | 52.33 | -11.4 |
| 836.06 | 40.27 | 32.7 | 100 | 1.1 | H | 22.3 | 6.4 | 27.8 | 33.6 | 52.33 | -18.7 |
| 1254.10 | 34.95 | 27.4 | 270 | 1.1 | V | 24.0 | 7.7 | 30.3 | 28.8 | 52.33 | -23.5 |
| 1254.10 | 30.78 | 23.2 | 170 | 1.1 | H | 24.0 | 7.7 | 30.3 | 24.6 | 52.33 | -27.7 |

Average = Peak * Duty Cycle

§15.231(c) – 20dB BANDWIDTH

Requirement

Per 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date |
|--------------------|------------------------------|----------------------|---------------|------------|
| Agilent | Amplifier, Pre | 8447D | 2944A10187 | 08-25-2005 |
| Sunol Sciences | Antenna | JB1 | A013105-3 | 02-11-2006 |
| HP | Amplifier, Pre, Microwave | 8449B | 3147A00400 | 06-14-2005 |
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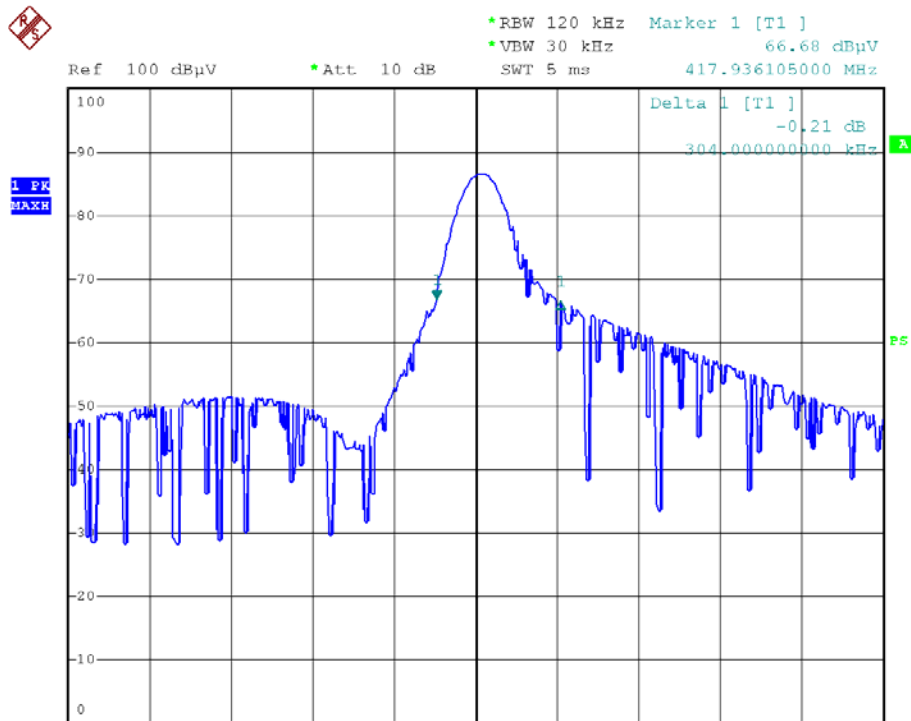
Test Result

| | |
|--------------------|----------|
| Temperature: | 12° C |
| Relative Humidity: | 64% |
| ATM Pressure: | 1021mbar |

The testing was performed by Hang Tan on 2005-04-12.

| Fund. Frequency (MHz) | 20dB Bandwidth Emission (MHz) | Limit (MHz) | Result |
|--------------------------|----------------------------------|-------------|------------|
| 418.03 | 0.304 | 1.045075 | Compliance |

Please refer to the following plot.



Date: 13.APR.2005 00:12:01