Intertek Testing Services
ETL Testing Laboratories

IDT Technology Ltd.

Application
For
Class II Permissive Change
(FCC ID: NMTBAR888A-01)

Superregenerative Receiver

WO# 9804292
CKL/at
July 10, 1998

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Telephone (852) 2746 8600 Fax (852) 2785 5487

LIST OF EXHIBITS

INTERTEK TESTING SERVICES

MEASUREMENT/TECHNICAL REPORT

IDT Technology Ltd. - MODEL: Top Weather Station BAA928
FCC ID: NMTBAR888A-01

This report concerns (check one:) Original Grant_____ Class II Change__X__

Equipment Type: Superregenerative Receiver (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes___ No_X__

If yes, defer until: ___________
date

Company Name agrees to notify the Commission by: _______________
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes___ No_X__

If no, assumed Part 15, Subpart B for unintentional radiator - the new 47 CFR [10-1-96 Edition] provision.

Report prepared by:

C. K. Lam
Intertek Testing Services
Hong Kong Ltd.
2/F., Garment Centre,
576, Castle Peak Road,
Kowloon, Hong Kong
Phone: 852-746-8218
Fax: 852-785-5487

Table of Contents

List of Figures

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a superregenerative receiver operating at 433.92 MHz. the EUT is powered by four AA size batteries. This application is a Class II Permissive Change. The following pages list the technical description and the change description.

1.2 Related Submittal(s) Grants

This is an application for Certification of a receiver. The FCC ID for the transmitter associated with this receiver is NMTTHR128-01 and is granted on May 29, 1998.

Technical description of BAR928 UHF receiver

The UHF receiver employs superregenerative technique. The LC circuitry, L2, C2, C4, and C6 provides channel selection and the resonant frequency is set to 433.92 MHz. By extracting the emitter output of the transistor, Q2, a regenerated signal is obtained. The circuitry, R8 and R10, acts as a low pass filter which extracts the envelope of the regenerated signal. Demodulated signal is obtained from the output port of operational amplifier, pin 1 of TL062C. The other part of TL062C composes a schmitt-trigger circuitry that converts the demodulated signal into pulses that can be read by micro-controller.

9/F Kaiser Estate, 41 Man Yue Street, Hunghom, Kowloon, Hong Kong Tel 2764 7873 Fax 2765 6620 Cable IDTRAYMOND Telex 36567-IDTHK HX

IDT

IDT Technology Ltd.
萬威科技有限公司

FACSIMILE COMMUNICATION

To	: Intertek Testing Services.	FAX#	: 27855487
Attn.	: Mr. Kenneth Lam		
From	: Dennis Cheng		
Subject	: Derviations of BAA928 to BAR888A		
Date	: 29th June, 1998.		
Page(s)	: 1 of 1		

Recd June 30, 98

We have sent you a BAA928 sample that will be used to apply FCC part 15 permissive change. The derivations of this model (BAA928) from the BAR888A (FCC ID: NMTBAR888A-01) are shown below.

1) The PCB layout of the control logic is changed to allow additional circuits. The RF receiver have not changed and it is the same as the BAR888A.
2) A humidity measuring function is added.
3) The LCD is changed to allow more information to users.
4) The controller IC is changed to reduce the cost but the protocol have not changed. This do not affect the average power level from the transmitter.

Best regards,

FCC ID: NMTBAR888A-01

9F Kaiser Estate, 41 Man Yue Street, Hunghom, Kowloon, Hong Kong. Tel 2764 7873
Fax 2765 6620 Cable IDTRAYMOND Telex 36567-IDTHK HX

1.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (1992). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (1992).

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The device was powered from four AA size batteries.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a cardboard box, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it received continuously.

2.3 Support Equipment List and Description

This product was tested in standalone configuration.

2.4 Equipment Modification

Any modifications installed previous to testing by IDT Technology Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

2.5 Special Accessories

There are no special accessories necessary for compliance of this product.

Confirmed by:

C. K. Lam
Assistant Manager - EMC
Intertek Testing Services
Hong Kong Ltd.
Agent for IDT Technology Ltd.

Lam Ching ____________ Signature

July 10, 1998 ____________ Date

EXHIBIT 3

EMISSION RESULTS

3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBµV/m

RR = 23.0 dBµV
LF = 9.0 dB

Level in mV/m = Common Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 12.9 dB

*All readings are peak unless stated otherwise

TEST PERSONNEL:

K. Lam

Signature

Kenneth H. M. Lam, Compliance Engineer
Typed/Printed Name

June 23, 1998

Date

Company: IDT Technology Ltd.
Model: Top Weather Station BAA928

Date of Test: 8 June, 1998

Table 1

FCC Class B Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBμV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	425.851	20.8	25	16	29.8	46	-16.2
V	427.213	21.3	25	16	30.3	46	-15.7
V	428.864	21.8	25	16	30.8	46	-15.2
V	429.111	21.1	25	16	30.1	46	-15.9
V	431.001	21.9	25	16	30.9	46	-15.1
V	432.247	21.3	25	16	30.3	46	-15.7
V	434.311	23.1	25	16	32.1	46	-13.9
V	435.554	23.1	26	16	33.1	46	-12.9
V	436.792	21.5	26	16	31.5	46	-14.5
V	437.637	20.8	26	16	30.8	46	-15.2
V	438.460	19.5	26	16	29.5	46	-16.5

NOTES:
1. Negative sign in the column shows value below limit.
2. Peak Detector Data.
3. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

Test Engineer: Kenneth H. M. Lam

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

4.0 Equipment Photographs

Photographs of the tested EUT are attached.

EXHIBIT 8

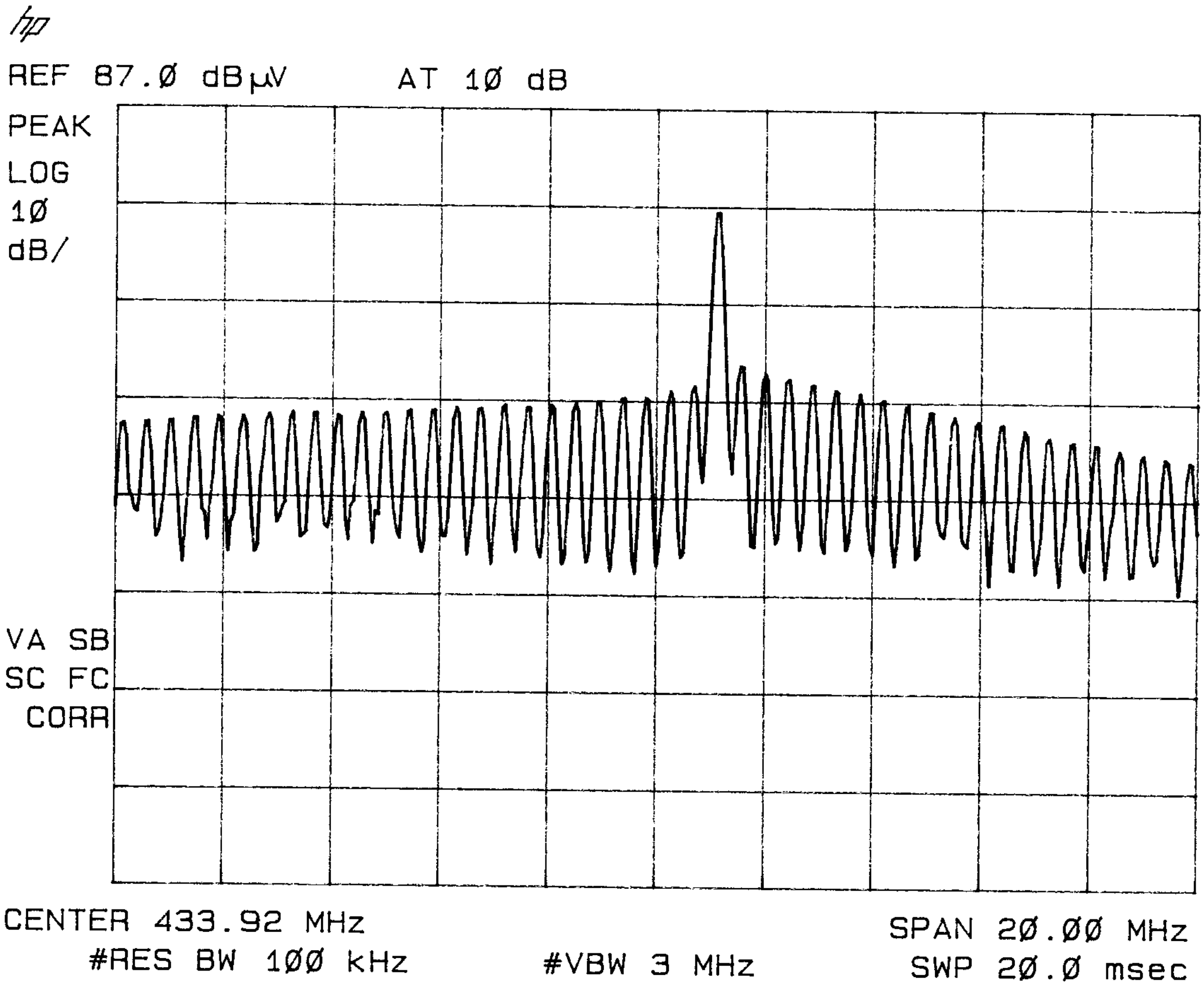
MISCELLANEOUS INFORMATION

8.0 Miscellaneous Information

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform), the test procedure and calculation of factors such as pulse desensitization and averaging factor.

8.1 Stabilization Waveform

Previous to the testing, the superregenerative receiver was stabilized as outlined in the test procedure. The plot on the following page shows the fundamental emission when a signal generator was used to stabilize the receiver. Please note that the antenna was placed as close as possible to the EUT for clear demonstration of the waveform and that accurate readings are not possible from this plot.



FCC ID: NMTBAR888A-01

8.2 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

This device is a superregenerative receiver. The stabilized signals are continuous, and no desensitization of the measurement equipment occurs.

8.3 Calculation of Average Factor

The emission limits are specified using spectrum analyzers or receivers which incorporate quasi-peak detectors. Typical measurements are made using peak detectors, however, emissions which approach the respective emission limit are measured using a quasi-peak detector.

For measurements above 1 GHz, spectrum analyzers or receivers using average detectors are employed, or the appropriate average factor can be applied.

Measurements using spectrum analyzers with filters other than peak detectors are recorded in the data table section of this report.

This device is a superregenerative receiver.

It is not necessary to apply average factor to the measurement results.

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of superregenerative receivers operating under the Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 1992. Superregenerative receivers are stabilized prior to measurement by generating a signal well above the receiver threshold whose frequency is tuned until the emissions stabilize into a line spectrum. The signal is usually generated as CW with a Marconi 2022D signal generator and a short whip antenna and is at a level of several hundred to several thousand mV/m. Plots of the stabilized signal will be shown. If a modulated signal is used, it will be noted.

The equipment under test (EUT) is attached to a cardboard box and placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the groundplane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The cardboard box is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 450 kHz to 30 MHz.

8.4 Emissions Test Procedures (cont)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 - 1992.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.