Emissions
Test Report

EUT Name: SportBand

EUT Model: Sportband

CFR 47 Part 15.249: 2007, RSS 210, Issue 7, June 2007 and RSS Gen, Issue 2, June 2007

Prepared for:

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Report/Issue Date: 21 January 2008
Report Number: 30752291.015

Statement of Compliance

Manufacturer:	NIKE, Inc. One Bowerman Drive Beaverton, OR 97005-6453 (503) 532-2144
Requester / Applicant:	Mike McBride
Name of Equipment:	SportBand
Model No.	Sportband
Type of Equipment:	Information Technology Equipment (ITE)
Application of Regulations:	CFR 47 Part 15.249: 2007, RSS 210, Issue 7, June 2007 and RSS Gen, Issue 2, June 2007
Test Dates:	9 January 2008 to 16 January 2008

Guidance Documents:

Emissions: FCC 47 CFR Part 15

Test Methods:

Emissions: ANSI C63.4:2003, RSS 210 Issue 7 :2007

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland of North America, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.

Aanbjid Ahelopal

NVLAP Signatory

21 January 2008

Date

500011-0 **0014391684** **IC4453-1**

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.249: 2007, RSS 210, Issue 7, June 2007 and RSS Gen, Issue 2, June 2007 based on the results of testing performed on *9 January* 2008 through *16 January* 2008 on the *SportBand* Model No. *Sportband* manufactured by NIKE, Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Emission	Test Method(s)	Test Parameters	Result
Transmitter Emissions	ANSI C63.4:2003, and RSS 210: 2007	30 MHz to 26000 MHz	compliant
Conducted Emissions	ANSI C63.4:2003, RSS-210: 2007	150 kHz to 30 MHz	compliant
Variations in Voltage vs. Frequency Stability	ANSI C63.4:2003, RSS-Gen.:2007	-20 °C to 55°C	Compliant
Band Edge Compliance	47 CFR Part 15.215 (c)	Below emission limit per CFR47 Part 15.209	Compliant
Receiver Emissions	ANSI C63.4:2003, and RSS 210: 2007	30 MHz to 26000 MHz	Compliant
Occupied Bandwidth	ANSI C63.4:2003, and RSS 210: 2007	99% Bandwidth 26dB Bandwidth	Compliant

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

No modifications were found to be necessary in order to achieve compliance.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Lane, Pleasanton, CA, 94566 is accredited by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (FRN # **0014391684**). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 Industry Canada

TUV Rheinland of North America at the 1279 Quarry Lane, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number IC 4453-1). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.3 NIST / NVLAP

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:1999 and ISO 9002 (Lab code **500011-0**). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.4 Japan - VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Lane, Pleasanton, CA, 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-2366, C-2585, C-2586)

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2.1.5 Acceptance By Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Lane, Pleasanton, CA, 94566 test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, USA.

(2305 Mission College, Santa Clara, 95054, USA location is Pleasanton Annex)

2.2.1 Emission Test Facility

The Semi-Anachoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at a test distance of 3 and 5 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by NVLAP (code 500011-0). The 5m semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 kΩ resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st addition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

Table 2: Summary of Uncertainties

Test	System	Combined Standard Uncertainty
Conducted Emissions	LISN, spectrum analyzer, coaxial cables, and pads	± 1.2 dB
Radiated Emissions	antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads	± 1.6 dB
Radiated Immunity	antenna, amplifier, cables, signal generator field probe, and spectrum analyzer	± 2.7 dB
Conducted Immunity	coupling/decoupling device, amplifier, cables, signal generator, and spectrum analyzer	± 1.5 dB
Voltage Dips, Drops, and Interruptions	AC power source and interruptions generator	± 4.3 dB
Electrical Fast Transient Immunity	AC power output source and fast transient generator	± 5.8 dB
Lightning Surge Immunity	AC power output source and lightning surge generator	± 8.0 dB
Electrostatic Discharge Immunity	air and contact discharge generators	± 4.1 dB
Power Frequency Magnetic Field Immunity	AC voltage source	± 0.58 dB
Damped Oscillatory Wave Immunity	AC power output source and oscillatory wave generator	± 8.7 dB
Harmonic Current and Voltage Flicker	AC power source and detection devices	± 11.6 dB

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 17025:1999.

3 Product Information

3.1 Product Description

The SportBand is a wristband that is worn by runners. It communicates wirelessly with a device worn in the shoe (Nike+ Sensor) to record such data as distance traveled and calories burned. It can then be plugged into the USB port of any computer so that users can track their results and compare their performance with other runners on the Nike+ network.

The Sportband is used the integral antenna at 2.4GHz

3.2 Unique Antenna Connector

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.2.1 Results

The antenna is permanently attached.

4 Emissions

4.1 Radiated Emissions (CFR47 Part 15.249, RSS210 A2.9)

Testing was performed in accordance with ANSI C63.4:2003, and RSS 210. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.1 Test Methodology

4.1.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

4.1.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

4.1.1.3 Deviations

There were no deviations from this test methodology.

4.1.2 Test Results

Section 4.1.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.1.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and without any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions

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EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21°C / 31%rh
EUT Serial	DVT1-9	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC / Freq**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / DRH-118_A040806	**Performed by**	Erin Hails

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Fundamental Limit (dBuV/m)	Spec Margin (dB)
Fundamental CH 1: Peak Mesurements at 3 Meter Distance										
2425	H	1.8	11	101.28	-31.85	6.49	28.87	97.77	114	-16.23
2425	V	1.7	328	89.00	-31.85	6.49	28.94	85.42	114	-28.58
Fundamental CH 1: Average Mesurements at 3 Meter Distance										
2425	H	1.8	11	85.62	-31.85	6.49	28.87	82.11	94	-11.89
2425	V	1.7	328	72.61	-31.85	6.49	28.94	69.03	94	-24.97

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value + Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes:
Transmit signal has the duty cycle = (1.207ms/7.575ms) = 0.16 (16%)

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

SOP 1 Radiated Emissions

EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21°C / 33%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Power
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / DRA-118_A040806	**Performed by**	Jeremy Luong

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Harmonics CH 1: EUT transmits										
Spurious Emissions: Peak Measurements at 1 meter distance										
4850.15	H	1.2	220	61.83	-31.19	3.76	32.77	67.17	83.94	-16.77
7274.77	H	1.1	235	49.38	-30.46	4.68	36.36	59.96	83.94	-23.98
9699.61	H	1.0	120	41.89	-30.06	5.50	37.50	54.83	83.94	-29.11
12125.01	H	1.0	270	48.63	-30.79	6.3	39.40	63.54	83.94	-20.40
4849.81	V	1.0	5	60.34	-31.19	3.76	32.83	65.74	83.94	-18.20
7274.99	V	1.0	210	48.79	-30.46	4.68	36.40	59.41	83.94	-24.53
12125.00	V	1.0	90	48.86	-30.79	6.3	39.40	63.77	83.94	-20.17
Spurious Emissions: Average Measurements at 1 meter distance										
4850.15	H	1.0	220	55.50	-31.19	3.76	32.77	60.84	63.94	-3.10
7274.77	H	1.0	235	37.78	-30.46	4.68	36.36	48.36	63.94	-15.58
9699.61	H	1.0	120	35.10	-30.06	5.50	37.50	48.04	63.94	-15.90
12125.01	H	1.0	270	36.65	-30.79	6.3	39.40	51.56	63.94	-12.38
4849.81	V	1.0	5	53.04	-31.19	3.76	32.83	58.44	63.94	-5.50
7274.99	V	1.0	210	37.48	-30.46	4.68	36.40	48.1	63.94	-15.84
12125.00	V	1.0	90	37.42	-30.79	6.3	39.40	52.33	63.94	-11.61

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes:
RBW/VBW=1MHz/3MHz for frequencies above 1 GHz for peak measurements.
RBW/VBW=1MHz/10Hz for frequencies above 1 GHz for average measurements.

All above emission was taken at 1 meter distance from the device under test; therefore, the above limit were adjusted:
Peak Limit (per FCC Part 15.35) is corrected from 73.94dBuV/m to 83.94dBuV/m
Average Limit is corrected from 53.94dBuV/m to 63.94dBuV/m

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

SOP 1 Radiated Emissions

EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.4°C / 31%rh
EUT Serial	DVT1-4	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz/300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Fundamental CH 1: EUT Transmits										
Spurious Emissions: Peak Measurements at 3 meter										
172.917	H	1.5	330	30.60	-24.88	1.44	12.10	19.26	53.94	-34.68
144.333	V	1.0	150	29.27	-25.01	1.34	13.30	18.9	53.94	-35.04
458.750	V	1.0	220	29.96	-25.90	2.52	16.89	23.47	53.94	-30.47

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value + Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes:
RBW/VBW= 120kHz/300kHz for frequencies from 30MHz to 1GHz for peak measurements.
No Quasi-Peak measurement was necessary since peak readings are more than 30dB below the limit

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; therefore, all final measurements were performed on the XY plane; Hand flat down, Watch facing up. .

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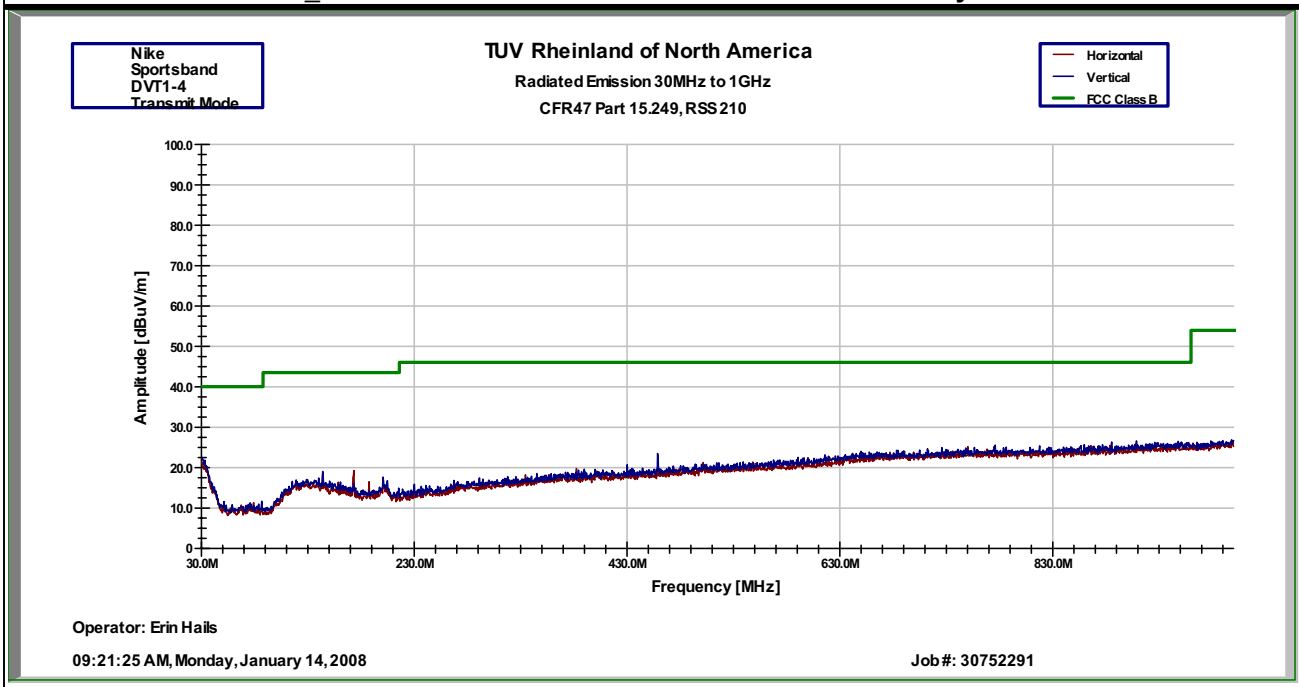
EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	20.5°C / 31%rh
EUT Serial	DVT1-4	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails

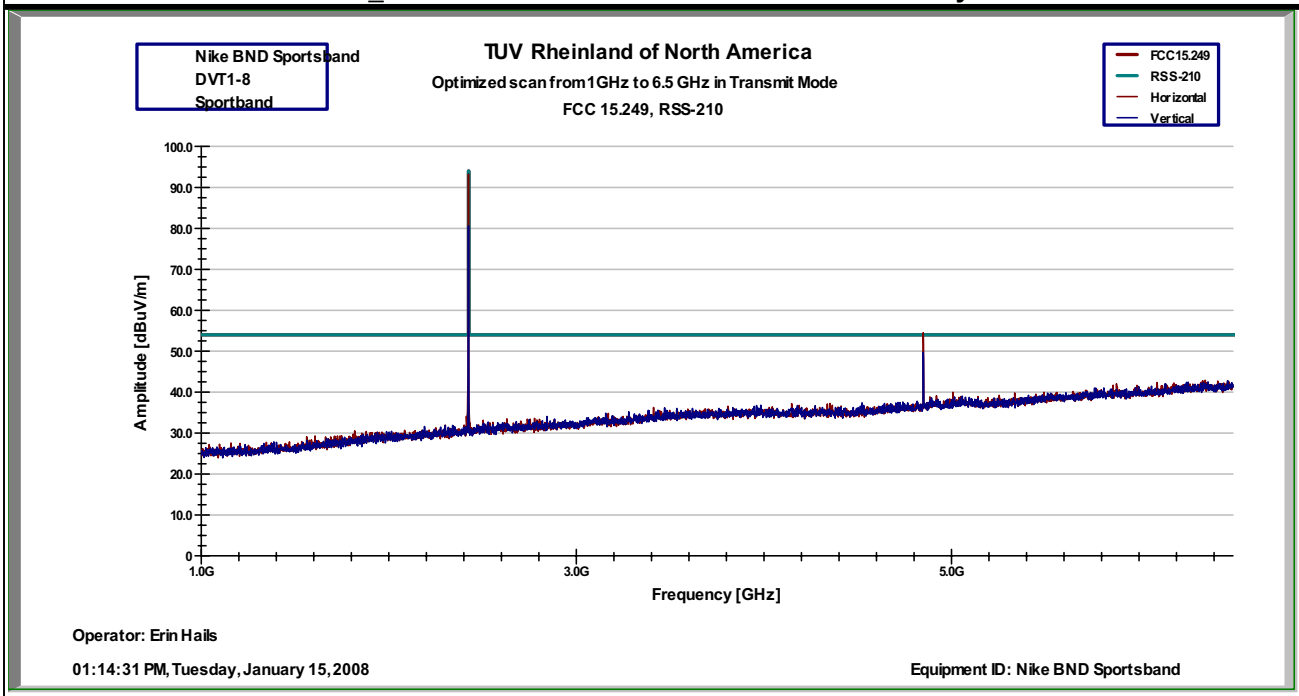


Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

Mode: Transmitted

SOP 1 Radiated Emissions

EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.3°C / 32%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Power
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / DRA-118_A040806	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.
The first peak is the fundamental signal.

Mode: Transmitted

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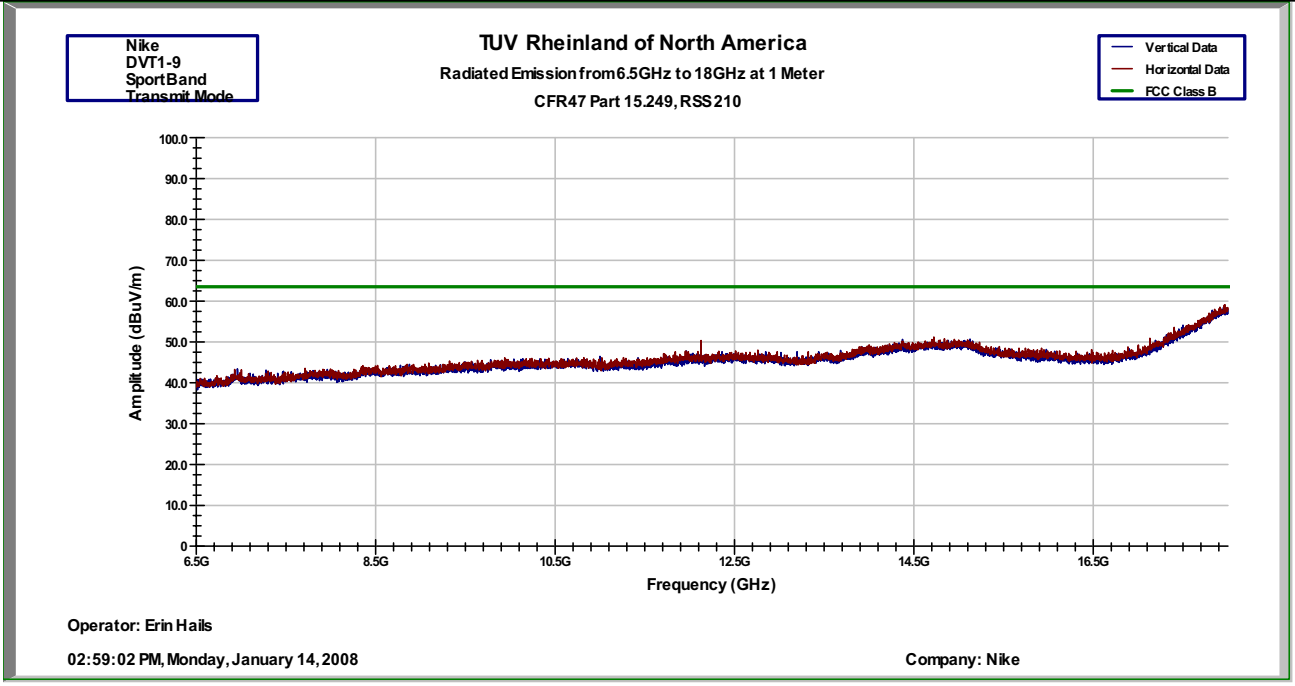
EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.3°C / 32%rh
EUT Serial	DVT1-9	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / DRA-118_A040806	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

Mode: Transmitted

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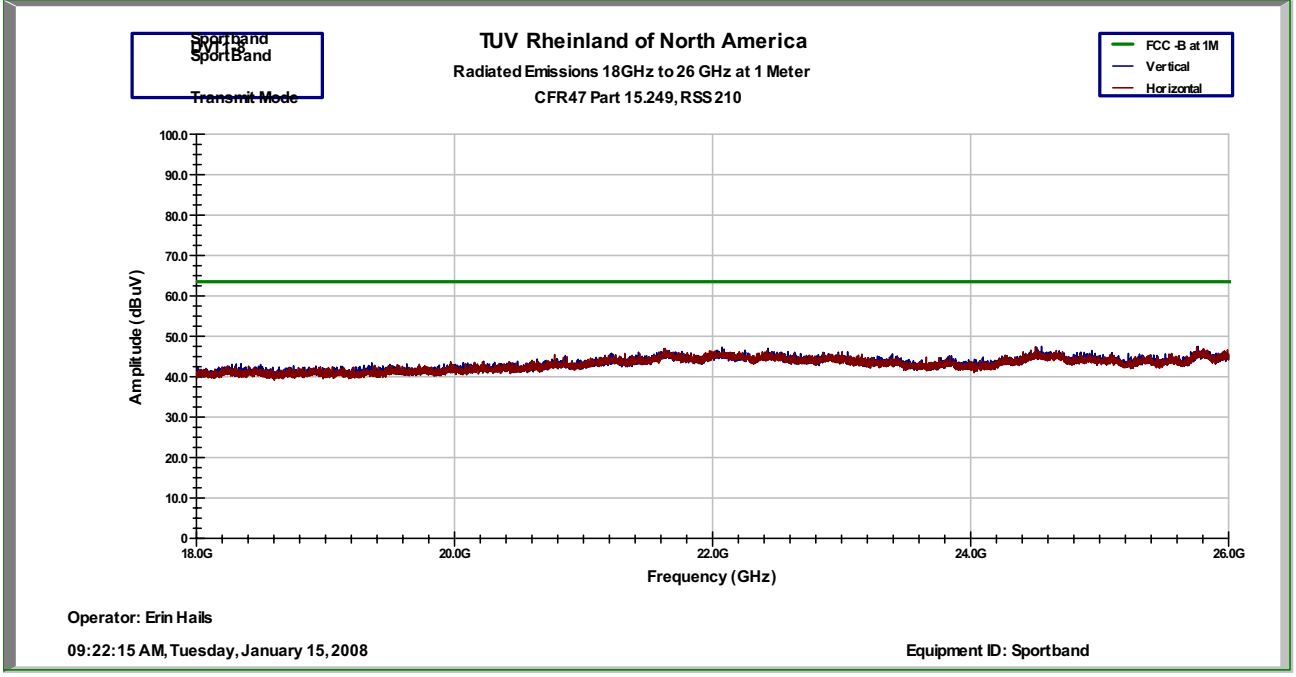
EUT Name	SportBand	**Date**	15 January 2008
EUT Model	Sportband	**Temp / Hum in**	20.7°C / 33%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / RA42-K-F-4B-C	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

No emission was observed from 18GHz to 26GHz in the transmit mode.

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EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.4°C / 31%rh
EUT Serial	DVT1-7	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz/300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Fundamental CH 1: EUT Receives										
Spurious Emissions: Peak Measurements at 3 meter										
143.925	H	1.5	200	31.07	-25.01	1.34	13.30	20.70	53.94	-33.24
173.325	H	1.5	75	30.74	-24.88	1.44	12.10	19.40	53.94	-34.54
458.750	H	1.8	220	29.18	-25.90	2.52	16.89	22.69	53.94	-31.25

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value + Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes:
RBW/VBW= 120kHz/300kHz for frequencies from 30MHz to 1GHz for peak measurements.
No Quasi-Peak measurement was necessary since peak readings are more than 30dB below the limit

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; therefore, all final measurements were performed on the XY plane; Hand flat down, Watch facing up. .

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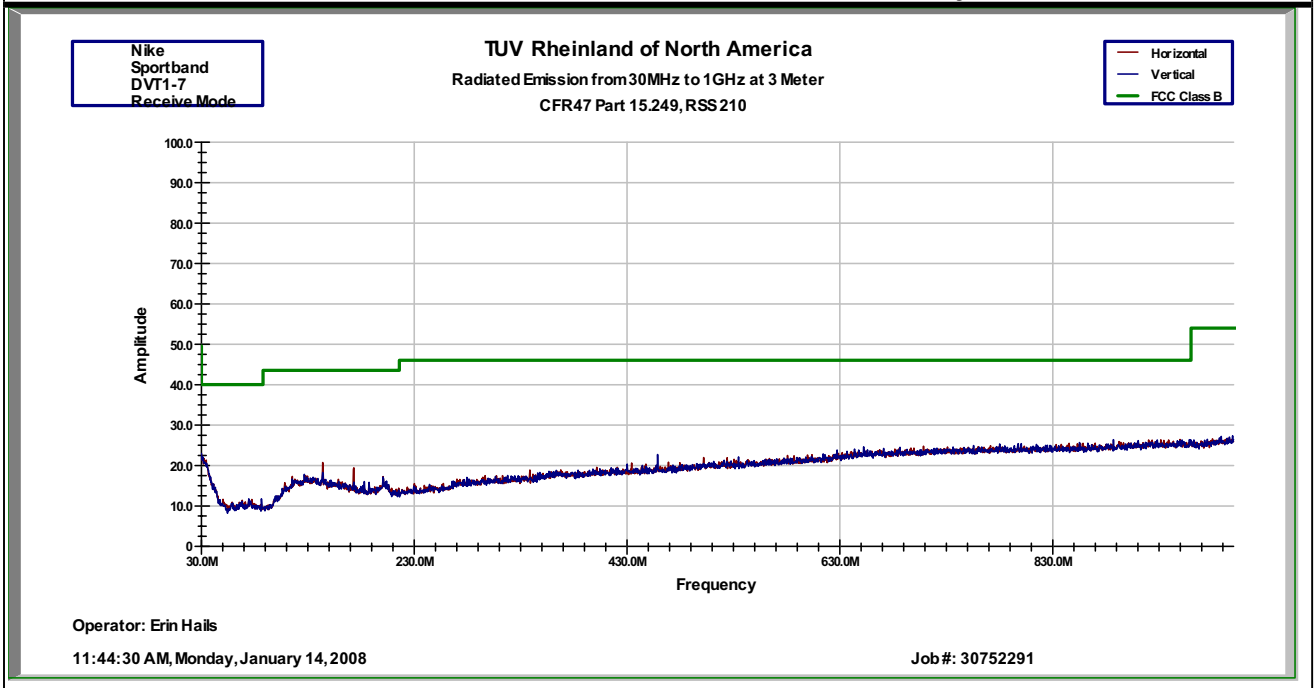
EUT Name	SportBand	**Date**	14 Janurary 2008
EUT Model	Sportband	**Temp / Hum in**	21°C / 33%rh
EUT Serial	DVT1-7	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

No emission was observed within 20dB to the limit in the receive mode.

SOP 1 Radiated Emissions

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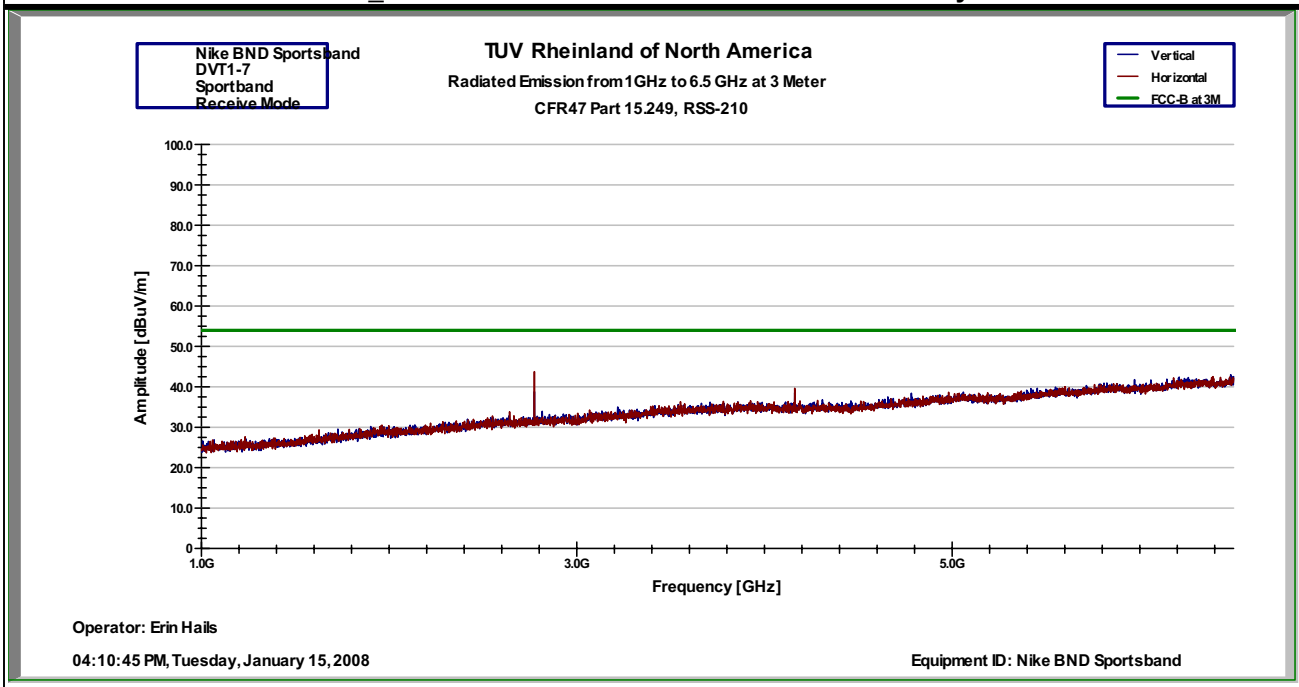
EUT Name	SportBand	**Date**	15 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.5°C / 32%rh
EUT Serial	DVT1-7	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Power
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / DRA-118_A040806	**Performed by**	Erin Hails



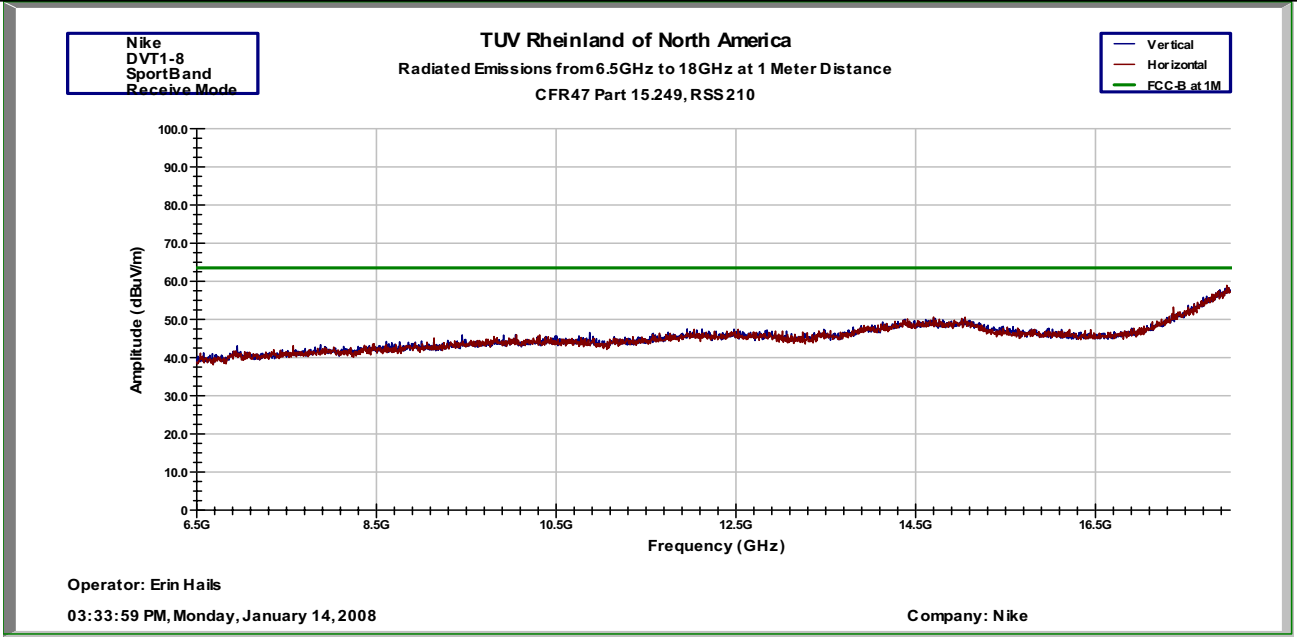
Notes:

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

SOP 1 Radiated Emissions

Tracking # 30752291.015 Page 11 of 17

EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21°C / 33%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / DRA-118_A040806	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

No emission was observed in the receive mode.

SOP 1 Radiated Emissions

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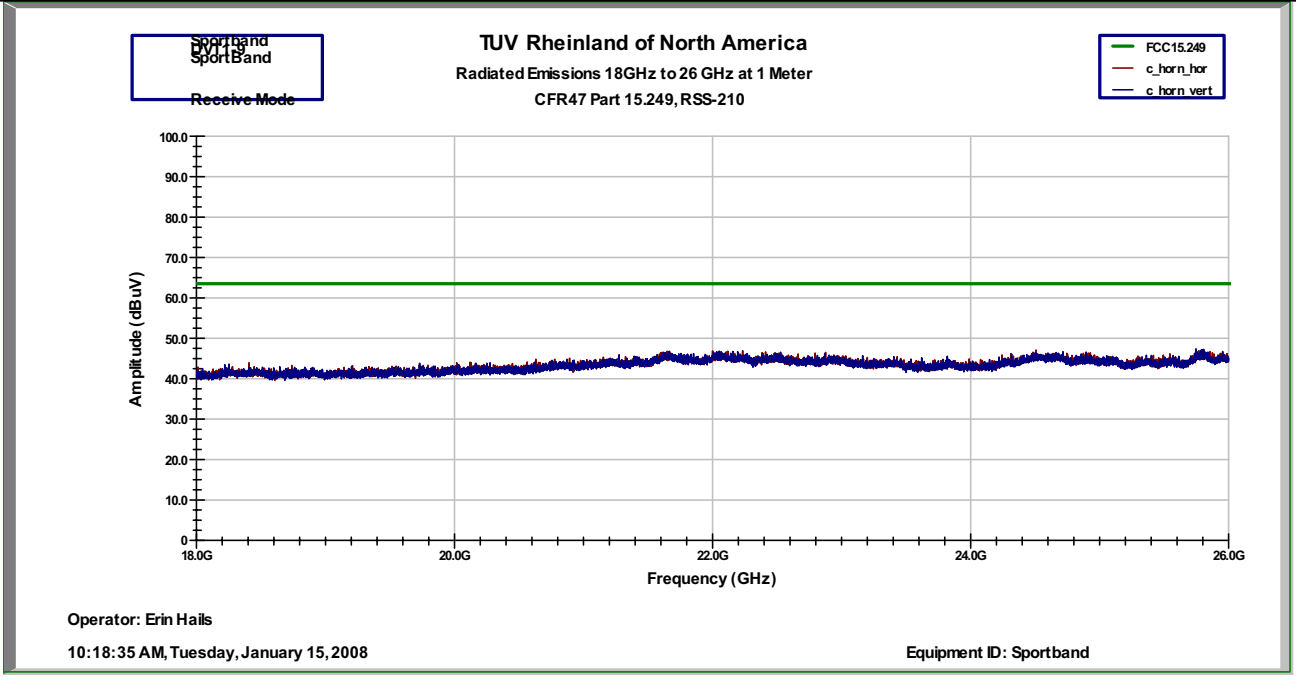
EUT Name	SportBand	**Date**	15 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.2°C / 32%rh
EUT Serial	DVT1-9	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / RA42-K-F-4B-C	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

No emission was observed from 18GHz to 26GHz in receive mode.

SOP 1 Radiated Emissions

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EUT Name	SportBand	**Date**	11 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.3°C / 31%rh
EUT Serial	DVT1-4	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz/300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Fundamental CH 1: EUT in Standby										
Spurious Emissions: Peak Measurements at 3 meter										
143.925	H	1.7	260	28.97	-25.01	1.34	13.30	18.60	53.94	-35.34
172.916	H	1.5	290	29.79	-24.88	1.44	12.10	18.45	53.94	-35.49

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value + Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes:
RBW/VBW= 120kHz/300kHz for frequencies from 30MHz to 1GHz for peak measurements.
No Quasi-Peak measurement was necessary since peak readings are more than 30dB below the limit

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; therefore, all final measurements were performed on the XY plane; Hand flat down, Watch facing up. .

SOP 1 Radiated Emissions

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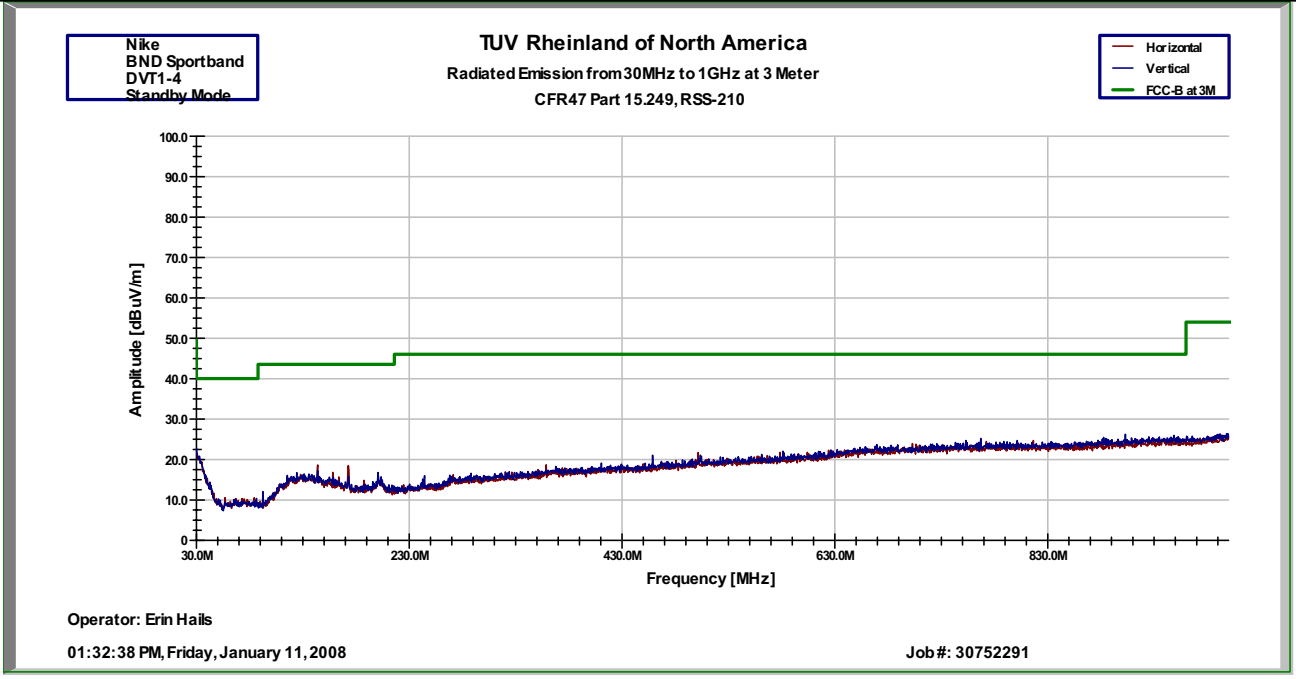
EUT Name	SportBand	**Date**	11 January 2008
EUT Model	Sportband	**Temp / Hum in**	21°C / 31%rh
EUT Serial	DVT1-4	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3_A102606	**Performed by**	Erin Hails



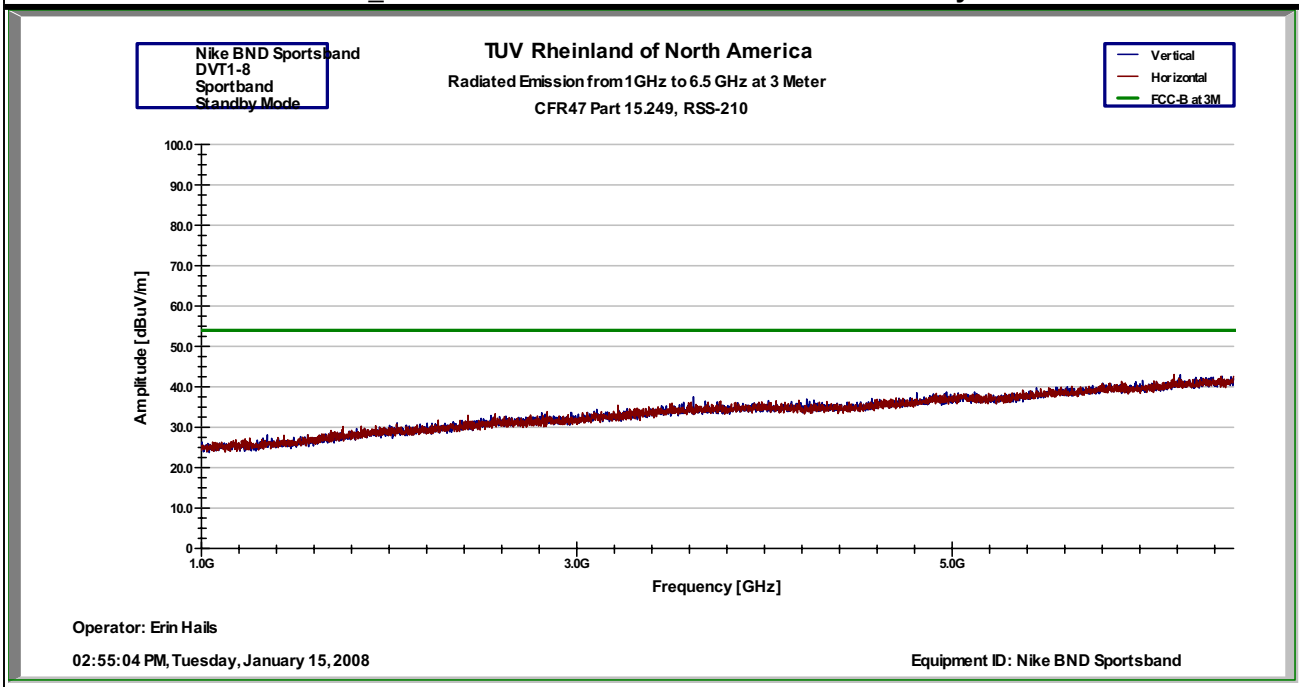
Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

No emission was observed within 20dB to the limit in standby mode.

SOP 1 Radiated Emissions

Tracking # 30752291.015 Page 15 of 17

EUT Name	SportBand	**Date**	15 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.1°C / 30%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Power
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / DRA-118_A040806	**Performed by**	Erin Hails



Notes:

The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

No emission was observed in Standby Mode.

SOP 1 Radiated Emissions

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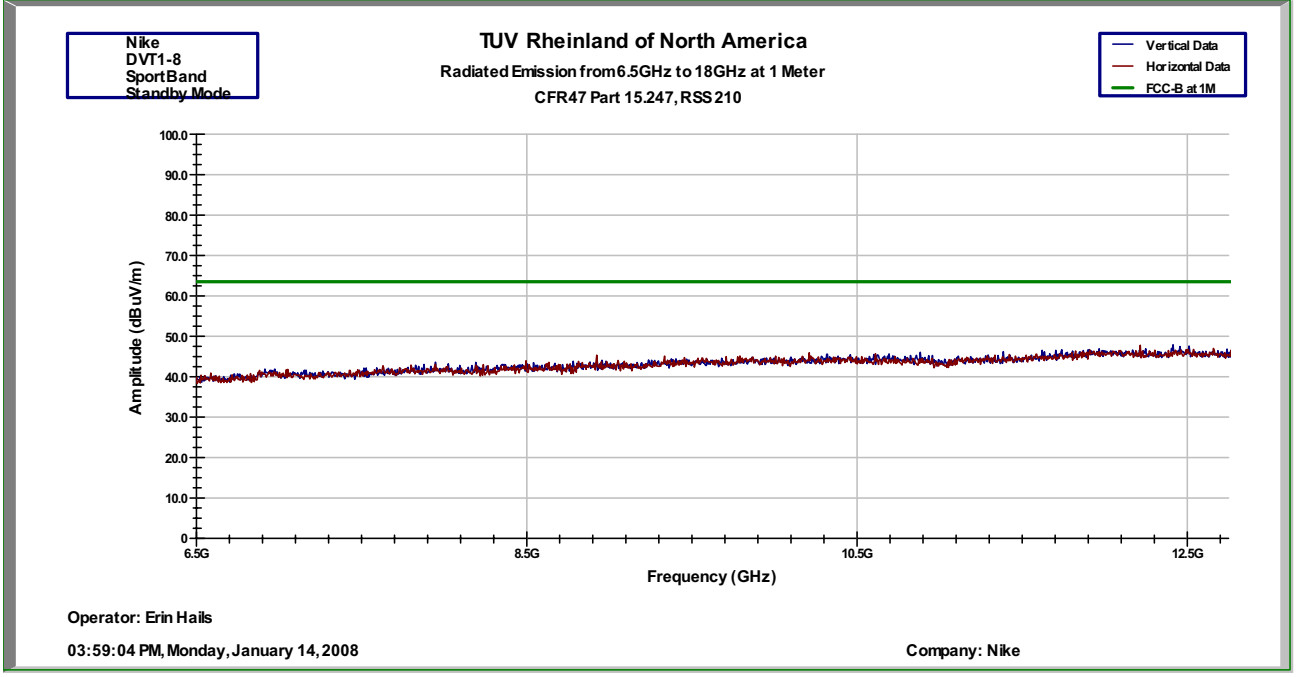
EUT Name	SportBand	**Date**	14 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.5°C / 32%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / DRA-118_A040806	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

No emission was observed in Standby Mode.

SOP 1 Radiated Emissions

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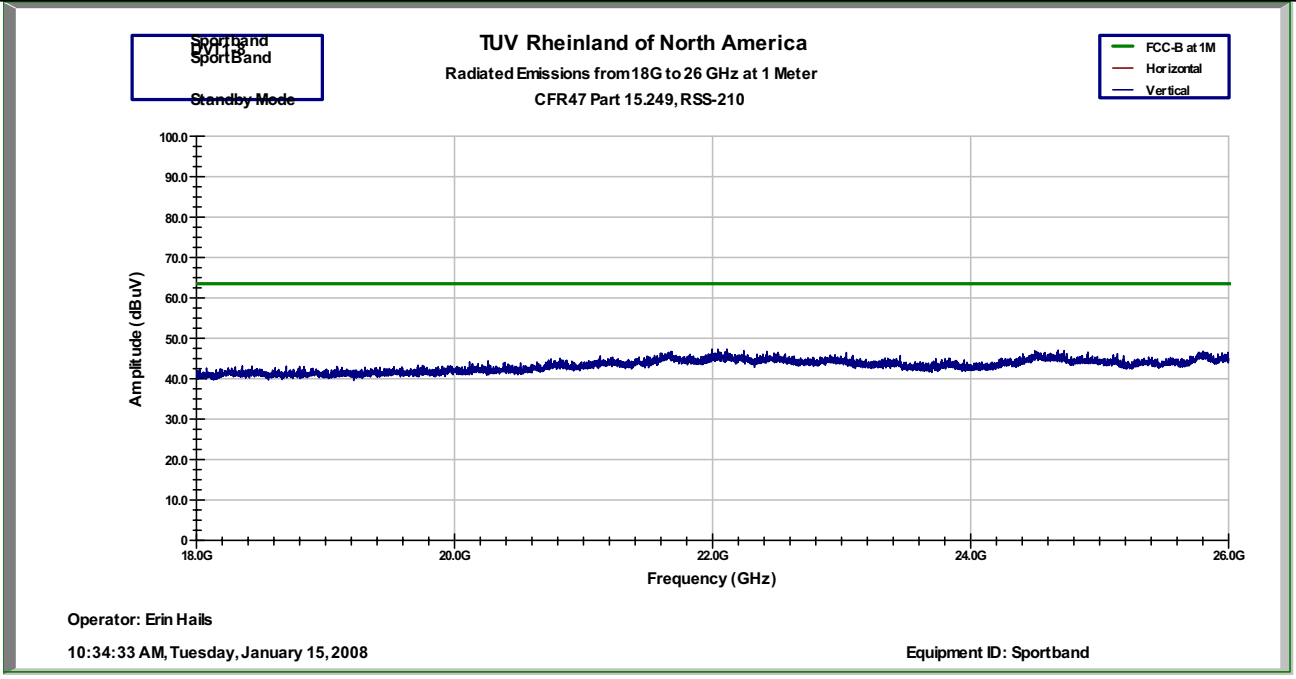
EUT Name	SportBand	**Date**	15 January 2008
EUT Model	Sportband	**Temp / Hum in**	21.4°C / 32%rh
EUT Serial	DVT1-8	**Temp / Hum out**	N/A
Standard	FCC 47 CFR Part 15	**Line AC**	Battery Powered
Deg/sweep	N/a	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	1m / RA42-K-F-4B-C	**Performed by**	Erin Hails



Notes:
The fundamental of the EUT was tested in all three planes and the XY plane was worst case; Hand flat down, Watch facing up.

FCC Limit was adjusted to 1 meter distance

No emission was observed from 18GHz to 26GHz in Standby mode.

4.1.3 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBµV/m) = FIM - AMP + CBL + ACF

Where: FIM = Field Intensity Meter (dBµV)
AMP = Amplifier Gain (dB)
CBL = Cable Loss (dB)
ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

4.2 Conducted Emissions (CFR47 Part 15.207, RSS-Gen)

Testing was performed in accordance with ANSI C63.4:2003, RSS-210. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.2.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. For each frequency sub-range, each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50µH / 50Ω LISNs.

Testing is either performed in the semi-anechoic chamber or on EMC Lab 5. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel,and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.2.1.1 Deviations

There were no deviations from this test methodology.

4.2.2 Test Results

The EUT is compliant to the requirements of the test standard(s) since it is a battery power unit.

4.3 Variations in Voltage vs. Frequency Stability (CFR47 Part 15.31, RSS-GEN)

The setup was identical to radiated emissions. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the new set of battery or fully charged.

Sample: DVT1-5 at nominal voltage (3.7VDC)

Table 3 – Frequency Stability

Time	Temp	Center Frequency (MHz)	Freq. Drift from 2425MHz	Results
Startup	20°C	2425.01754	17.54 kHz	Pass
Startup	-20°C	2425.01253	12.53 kHz	Pass
Startup	55°C	2424.99749	-2.51 kHz	Pass
2 min.	20°C	2425.01253	12.53 kHz	Pass
2 min.	-20°C	2425.01253	12.53 kHz	Pass
2 min.	55°C	2424.99749	-2.51 kHz	Pass
5 min.	20°C	2425.01253	12.53 kHz	Pass
5 min.	-20°C	2425.00752	7.52 kHz	Pass
5 min.	55°C	2424.99248	-7.52 kHz	Pass
10 min.	20°C	2425.00752	7.52 kHz	Pass
10 min.	-20°C	2425.00251	2.51 kHz	Pass
10 min.	55°C	2424.99248	-7.52 kHz	Pass

Table 4 – Overall Result Summary:

Frequency Drift at 20°C	10.02 kHz
Frequency Drift at -20°C	10.02 kHz
Frequency Drift at 55°C	5.01 kHz
Maximum overall Drift	-7.52kHz to 17.54kHz

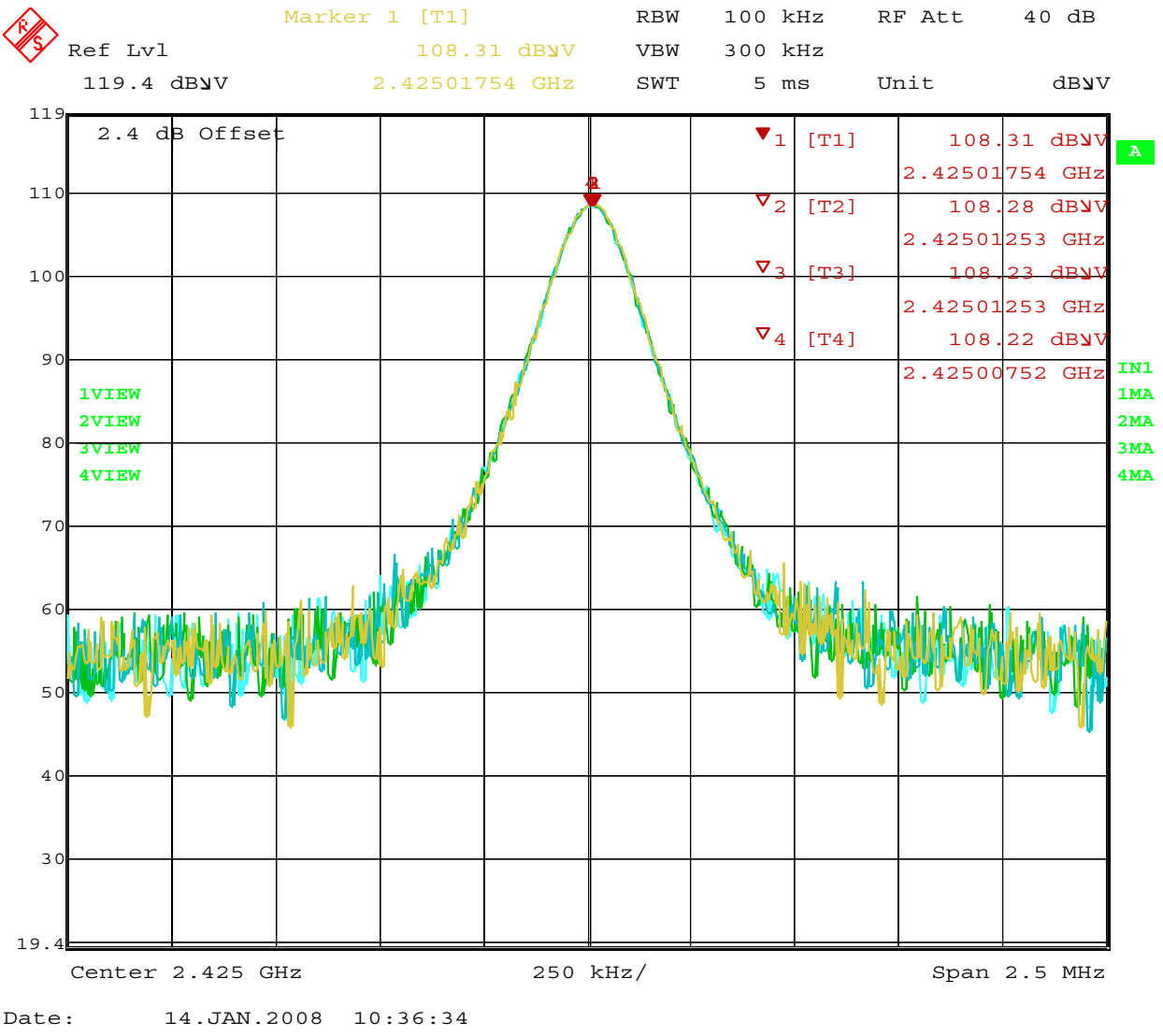


Figure 1 – Frequency Stability at 20°C

Note: Frequency was measured at startup (Marker 1), 2 minutes (Marker 2), 5 minutes (Marker 3), and 10 minutes (Marker 4). The maximum frequency drift was 10.02 kHz at 20°C.

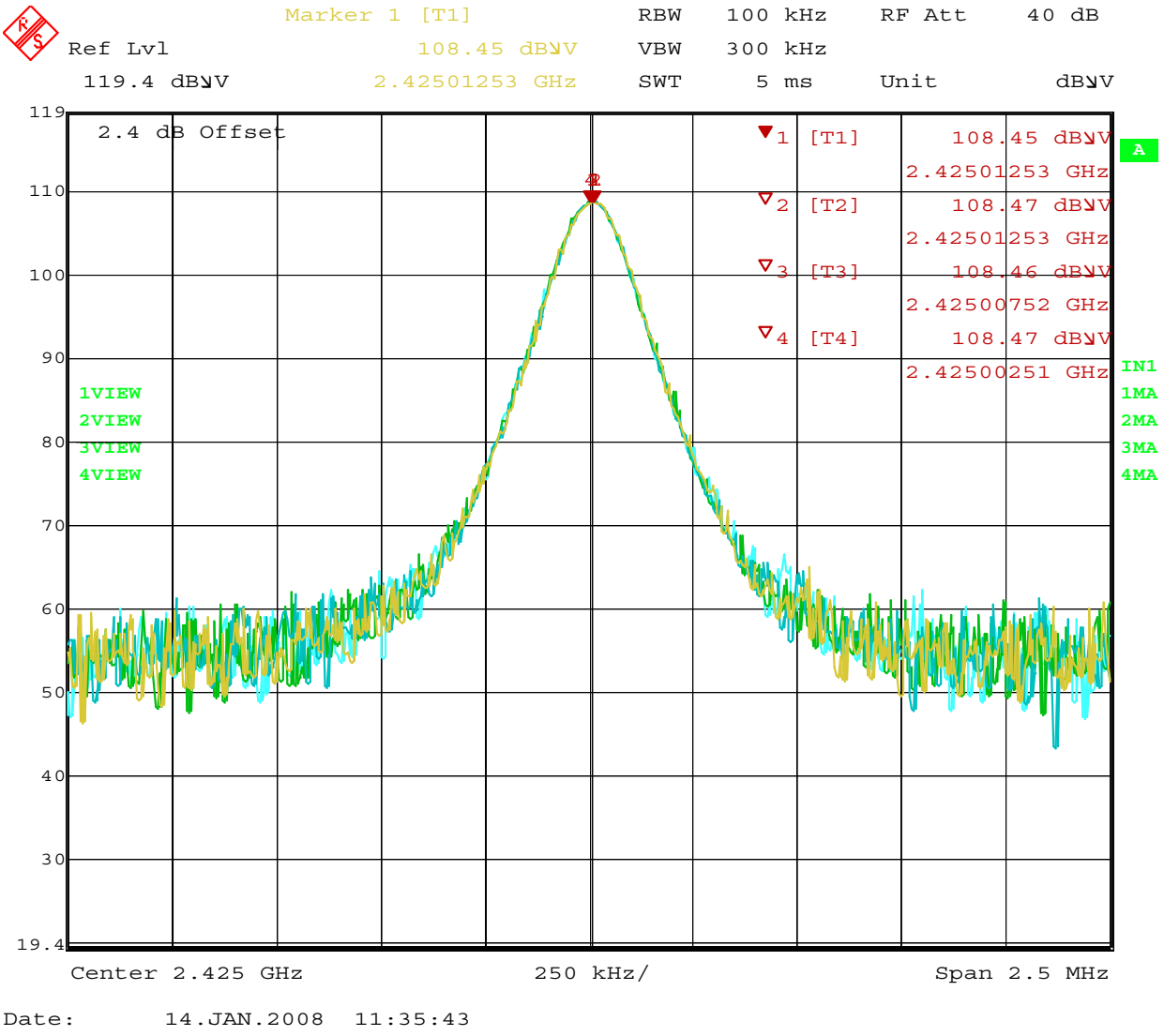


Figure 2 – Frequency Stability at -20°C

Note: Frequency was measured at startup (Marker 1), 2 minutes (Marker 2), 5 minutes (Marker 3), and 10 minutes (Marker 4). The maximum frequency-drift was 10.02 kHz at -20°C.

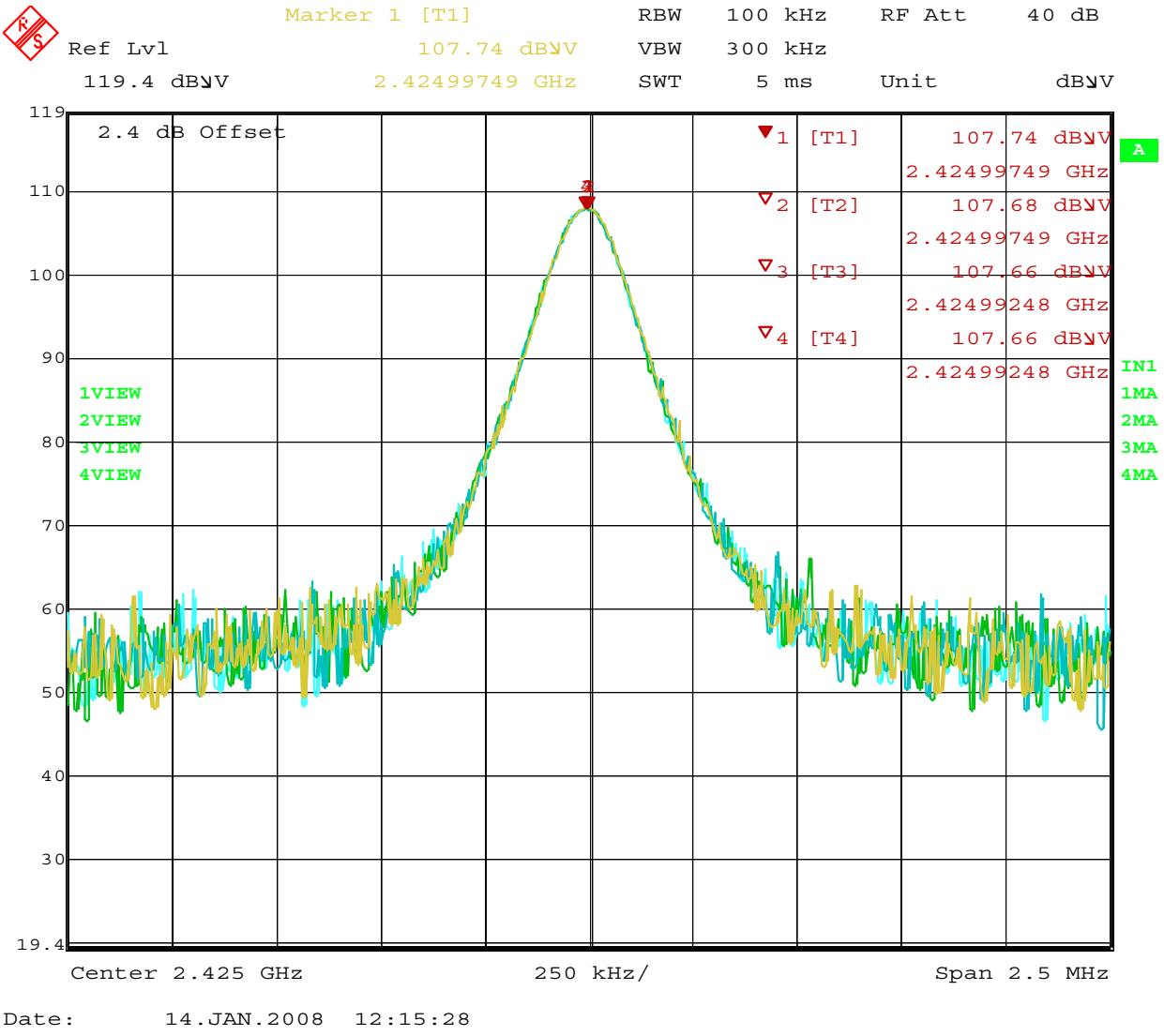


Figure 3 – Frequency Stability at 55°C

Note: Frequency was measured at startup (Marker 1), 2 minutes (Marker 2), 5 minutes (Marker 3), and 10 minutes (Marker 4). The maximum frequency drift was 5.01 kHz at 55°C.

4.4 Band Edge Compliance (CFR47 Part 15.209, RSS 210 A2.9)

The setup was identical to radiated emissions. Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If the frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

4.4.1 Results

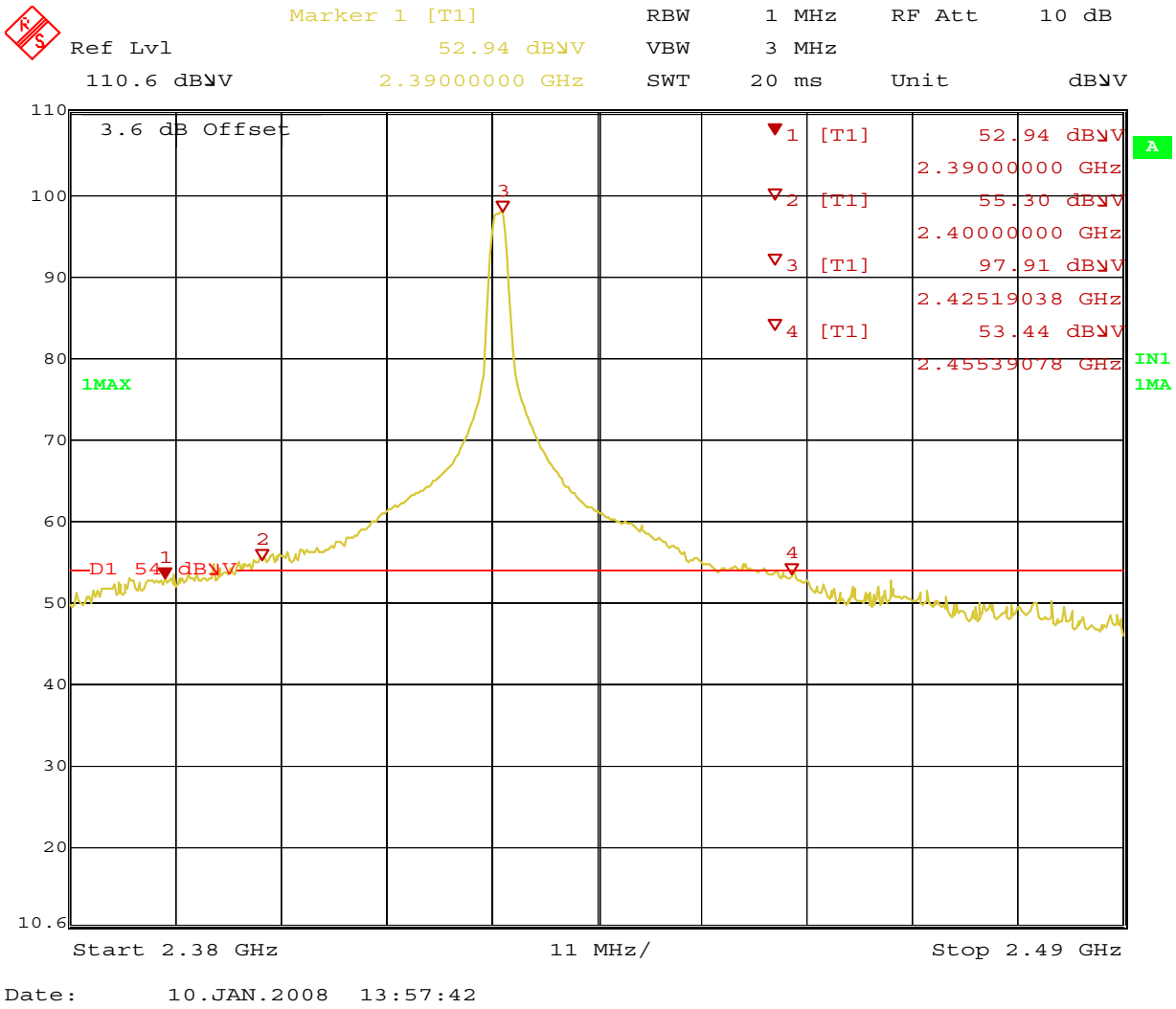


Figure 4 – Channel 1 Band edge Results – Peak Mode

Note: The above bandedge was measured on horizontal polarity since this is the worst case. The sidebands below the 2390MHz and above 2483.5MHz are below the spurious limit (53.94dBuV/m)

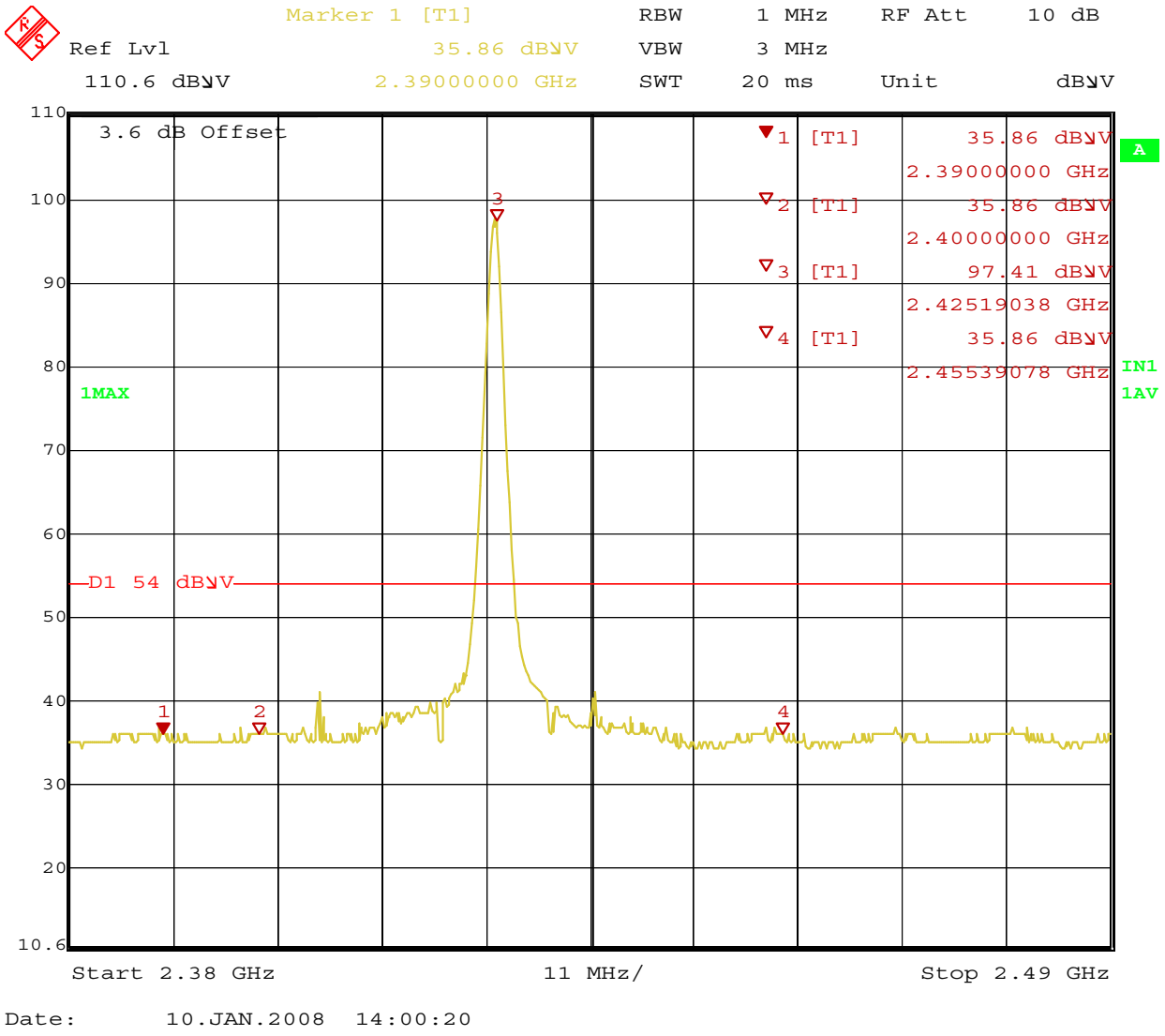


Figure 5 – Channel 1 Band edge Result – Average Mode

Note: Since the Sportband only operates in the 2425MHz channel, the plot showed the corrected fundamental signal in the applied range (2400MHz to 2483.5MHz). All the leakages outside the band are under the spurious emission limit per FCC Part 15.209

4.5 Occupied Bandwidth

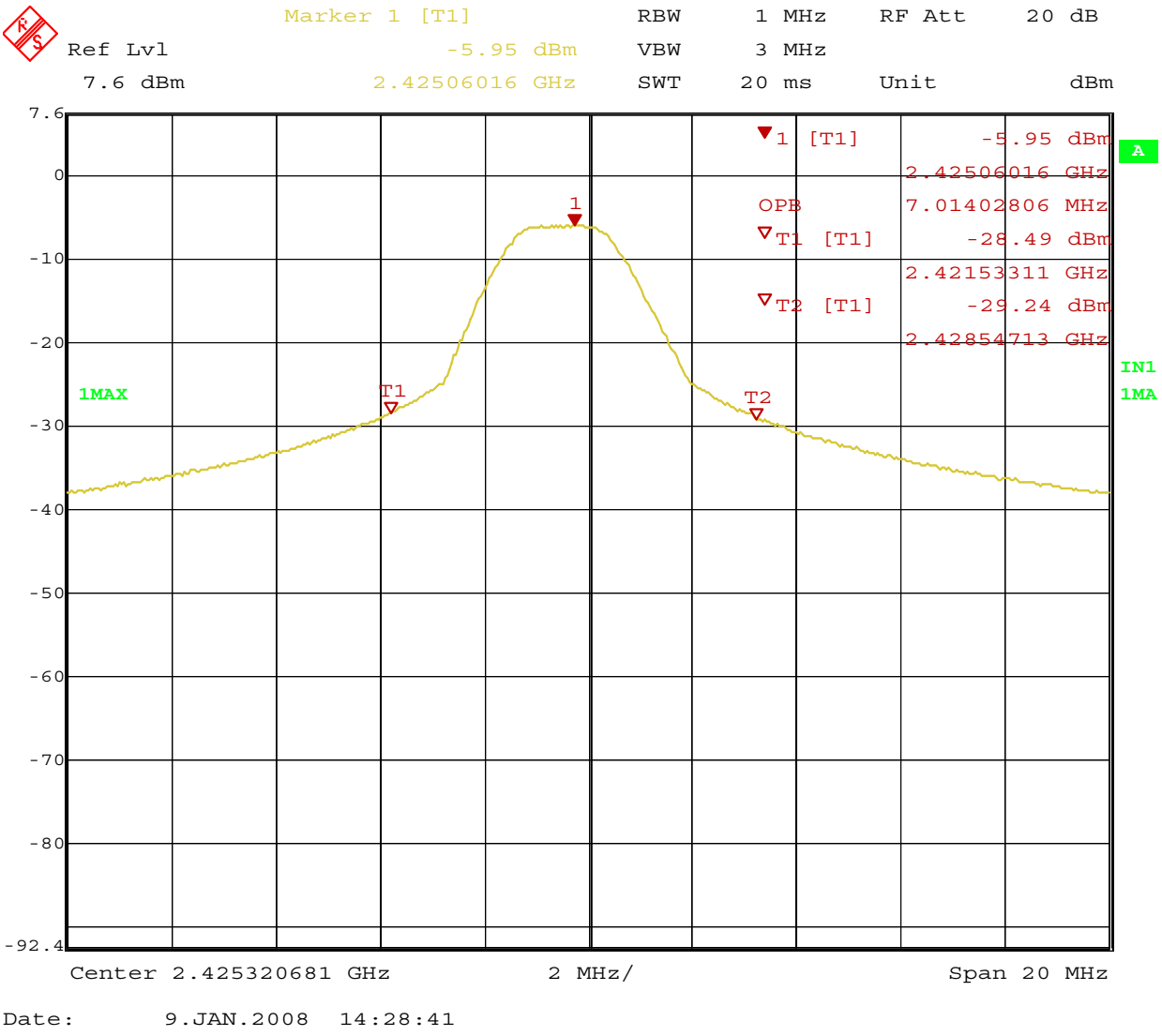


Figure 6 – Channel 1 – 99% Bandwidth Results

The 99% BW is 7.014MHz

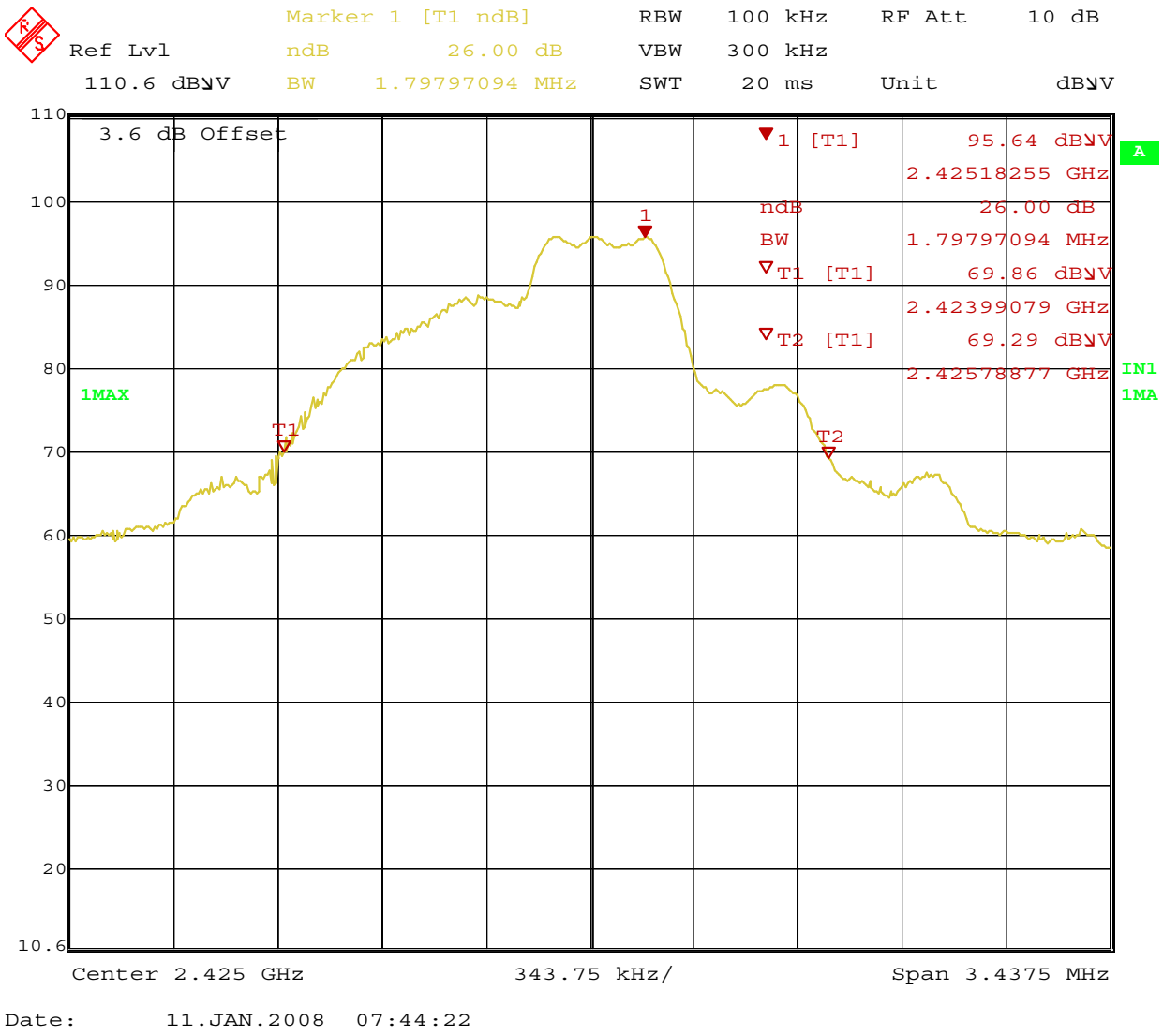


Figure 7 – Channel 1 – 26dB Bandwidth Results

The 26dB bandwidth is 1.797MHz

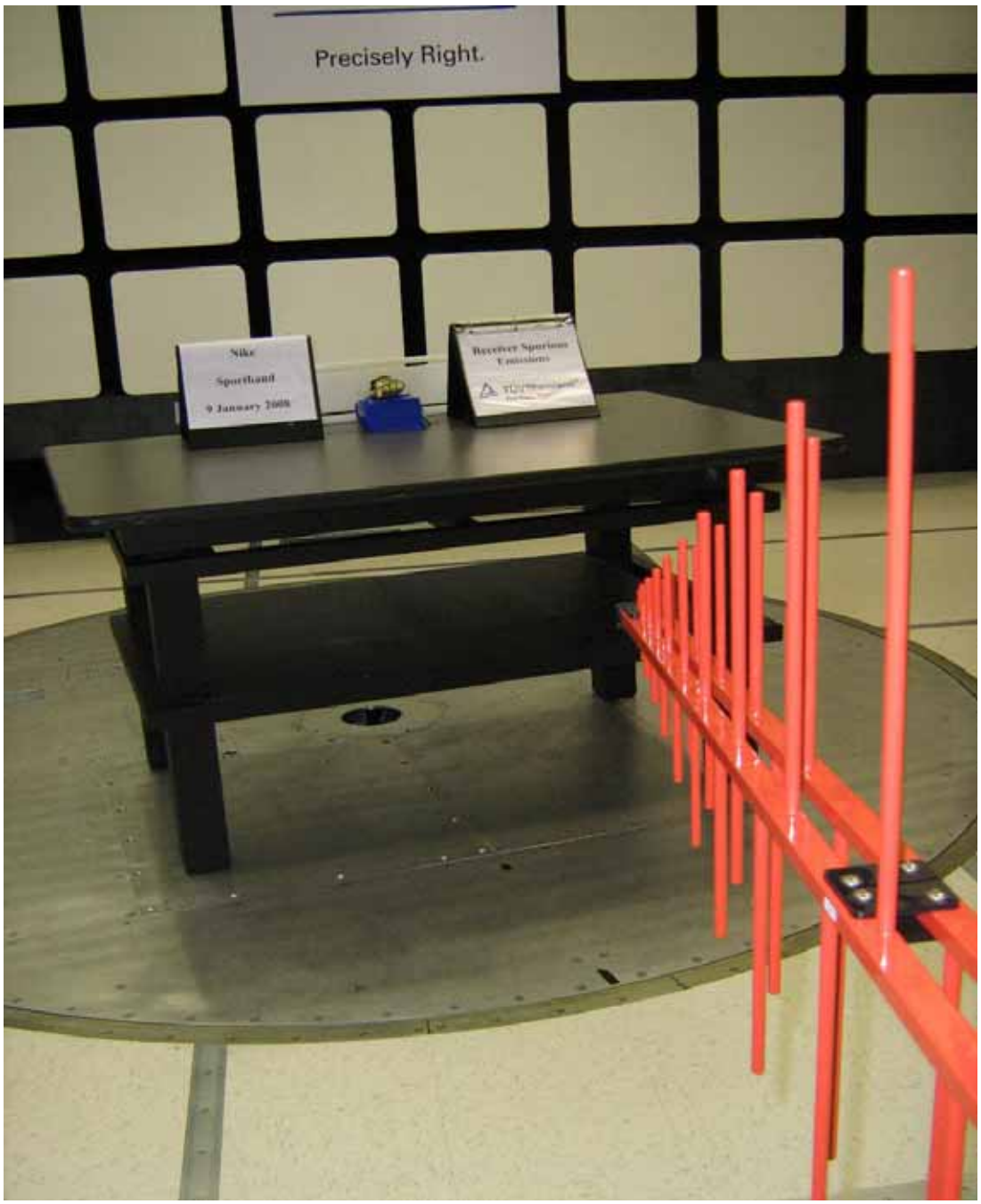
5 Test Equipment Use List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
Antenna Bilog	Sunol Science	JB3	A102606	7/20/06	7/20/08
Antenna Horn (1-18GHz)	Sunol Science	DRA_118	A040806	7/19/06	7/19/08
Antenna Horn (18-26GHz) w/ Amp.	Rhode&Schwarz	RA42-K-F-4B-C	020131-004	6/19/06	6/19/08
EMI Receiver	Hewlett Packard	8546A	3807A00445	9/28/06	9/28/08
Amplifier	Hewlett Packard	8447D	2805A03230	12/6/06	12/6/08
Spectrum Analyzer	Rhode&Schwarz	ESIB	DE31284	6/19/06	6/19/08
Amplifier	Hewlett Packard	8449B	30008A0113	4/19/06	4/19/08
Thermo Chamber	Tenney Engineering	T30RS	10,785-19	12/4/06	12/4/08
RMS Multimeter	Fluke	87	54660402	8/3/07	8/3/08
Thermometer	Fluke	52 II	88650033	8/3/07	8/3/08
DC Power Supply	Hewlett Packard	6205C	2411A-10488	VBU	VBU

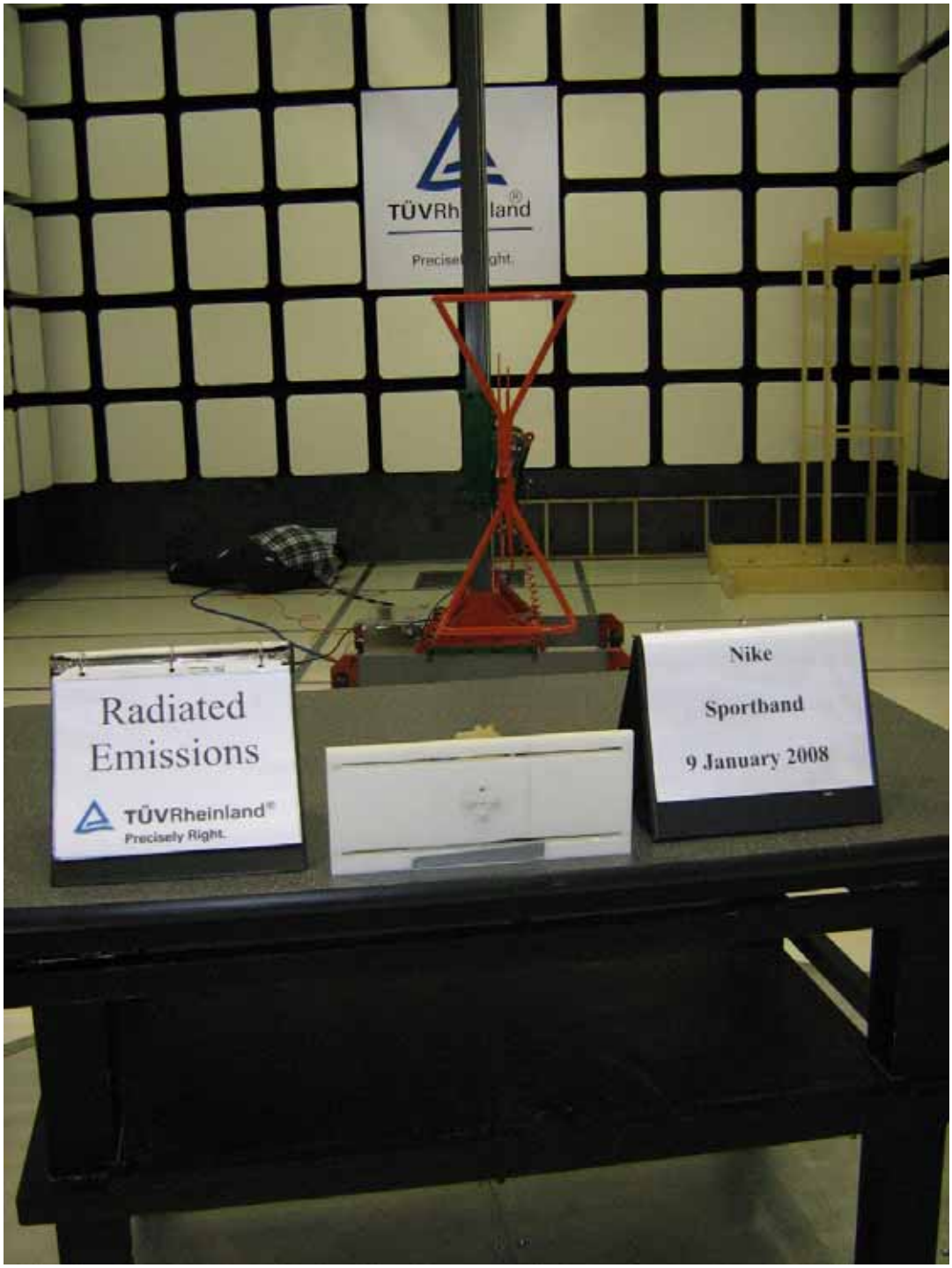
6 Photo

6.1 Test Setup Photo

Test Setup: Radiated Emission from 30MHz to 1GHz at 3 Meter Distance – Front View



Test Setup: Radiated Emission from 30MHz to 1GHz at 3 Meter Distance – Rear View

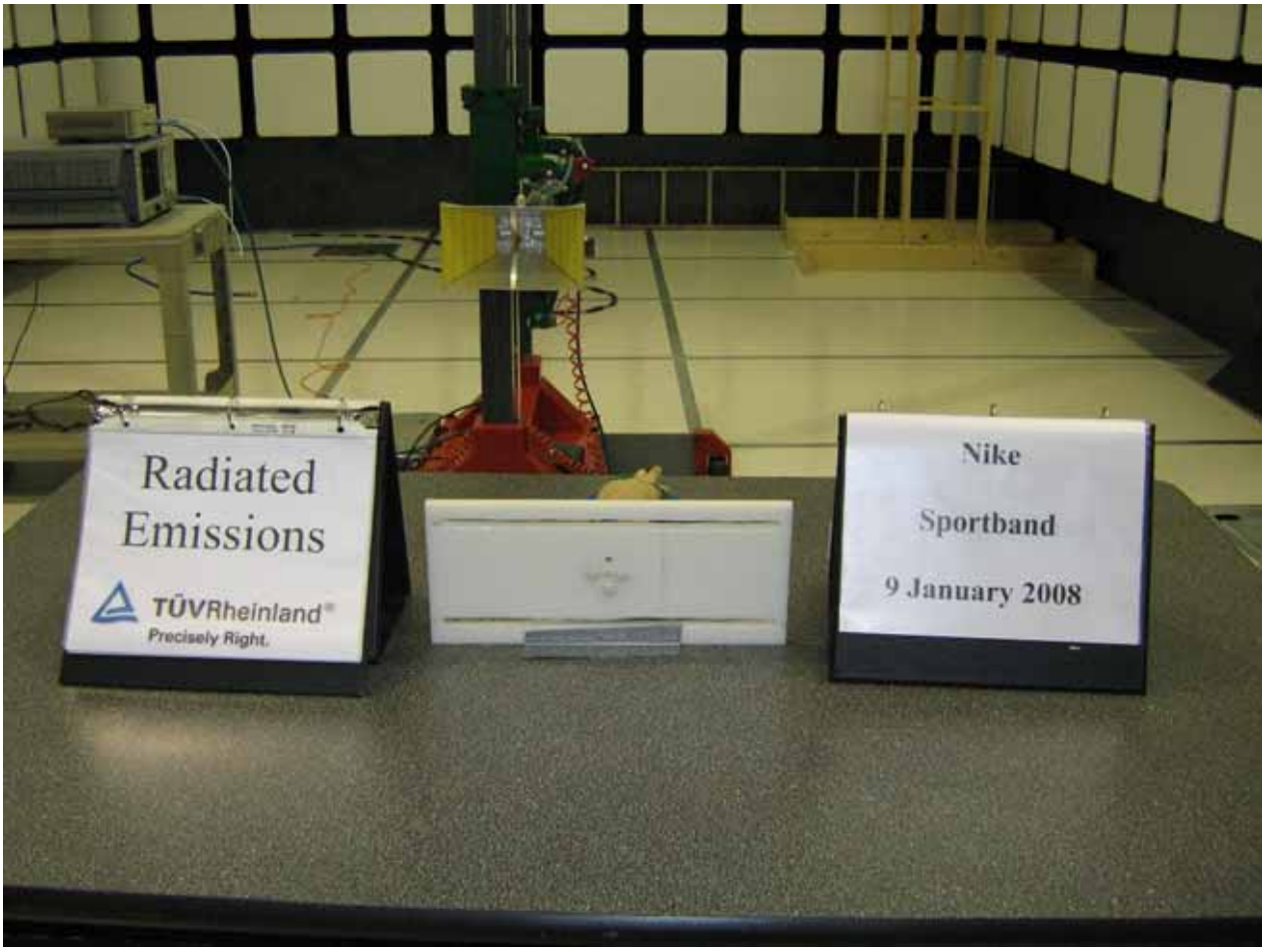


Test Setup: Radiated Emission from 1GHz to 6.5 at 3 Meter Distance – Front View

Test Setup: Radiated Emission from 1GHz to 6.5 at 3 Meter Distance – Rear View

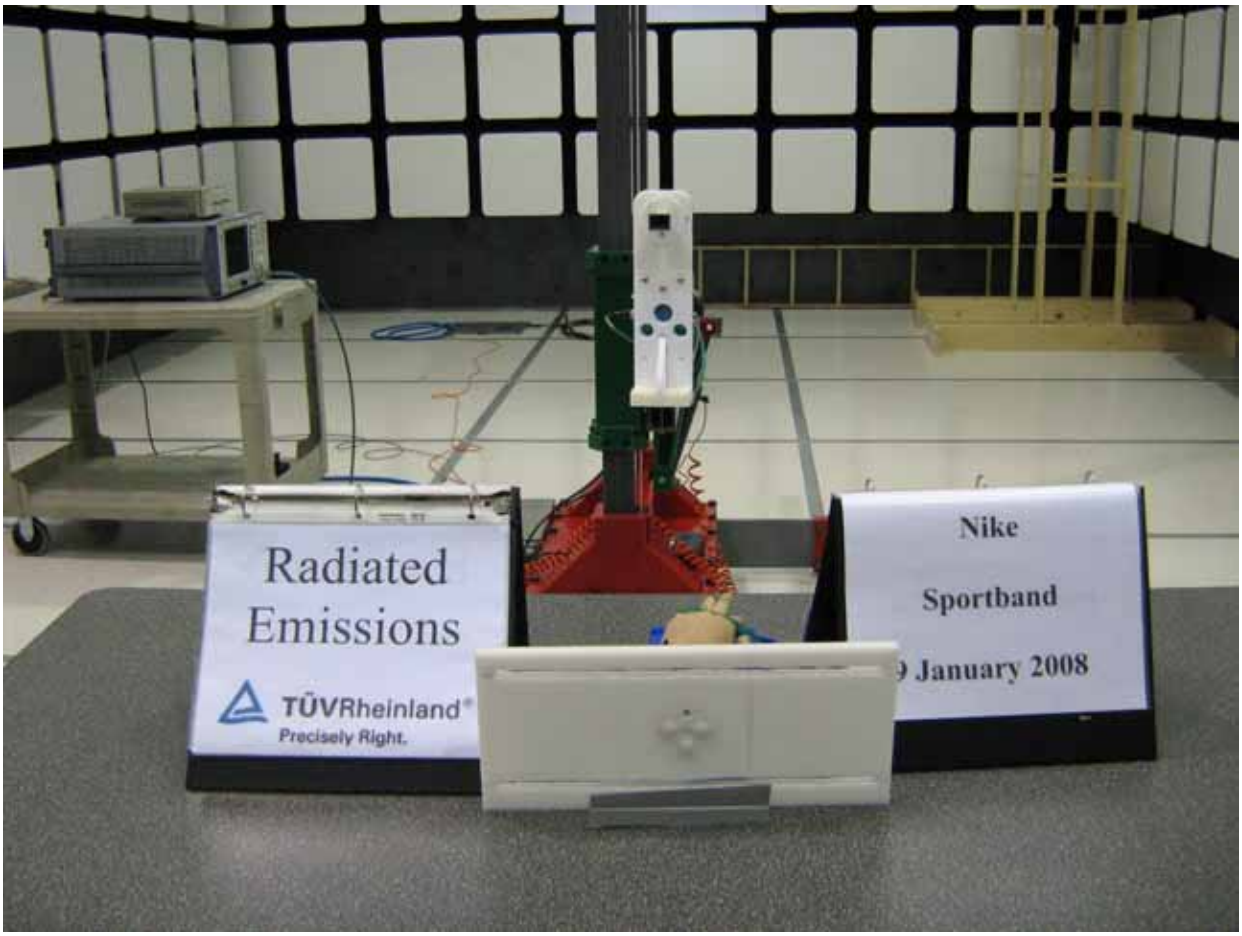
Test Setup: Radiated Emission from 6.5GHz to 18GHz at 1 Meter Distance – Front View

Test Setup: Radiated Emission from 6.5GHz to 18GHz at 1 Meter Distance – Rear View



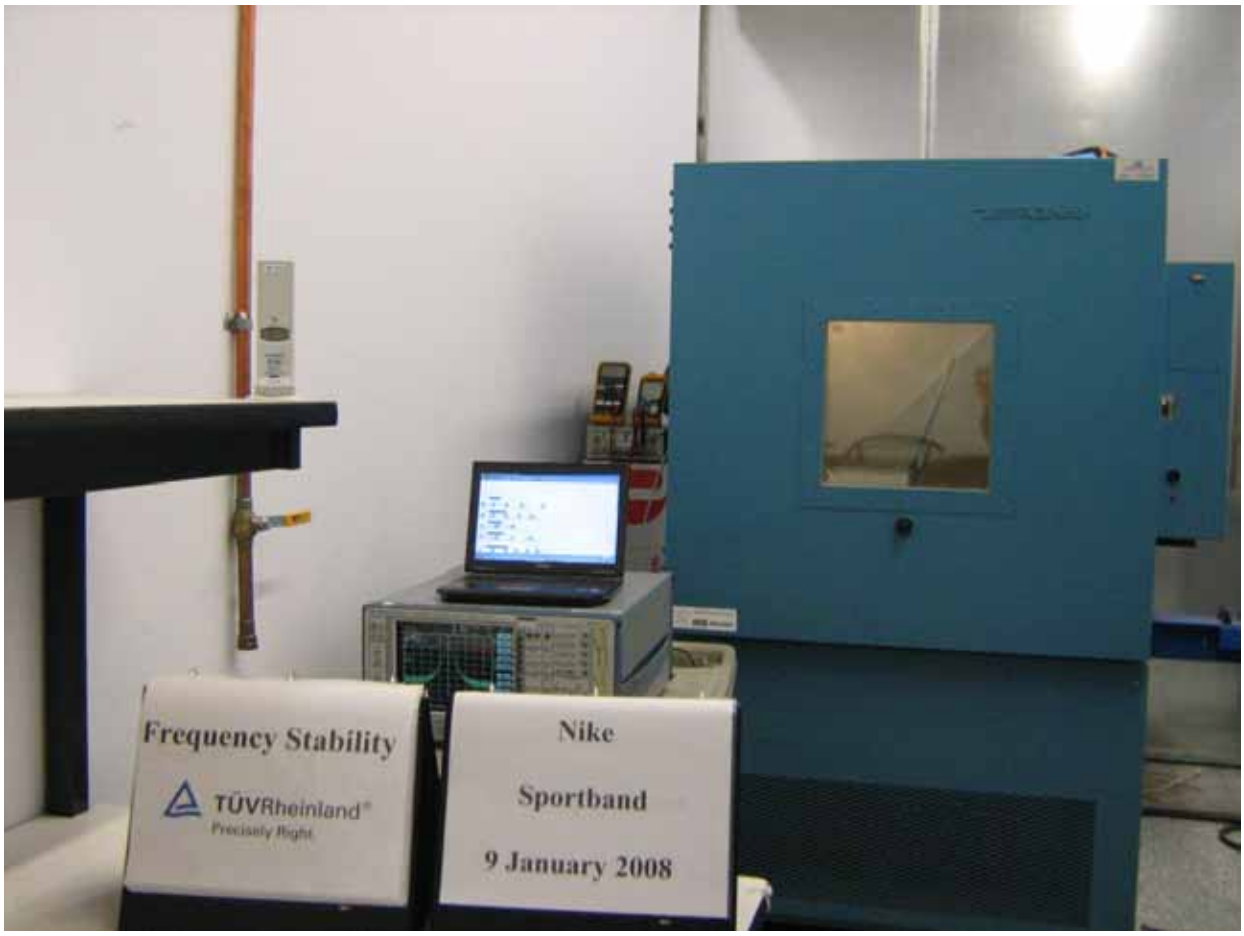
Test Setup: Radiated Emission from 18GHz to 26GHz at 1 Meter Distance – Front View

Test Setup: Radiated Emission from 18GHz to 26GHz at 1 Meter Distance – Rear View



Test Setup: Radiated Emission – Close-up View

Test Setup: Frequency Stability – Outside View



Test Setup: Frequency Stability – Inside View

6.2 EUT External Photo

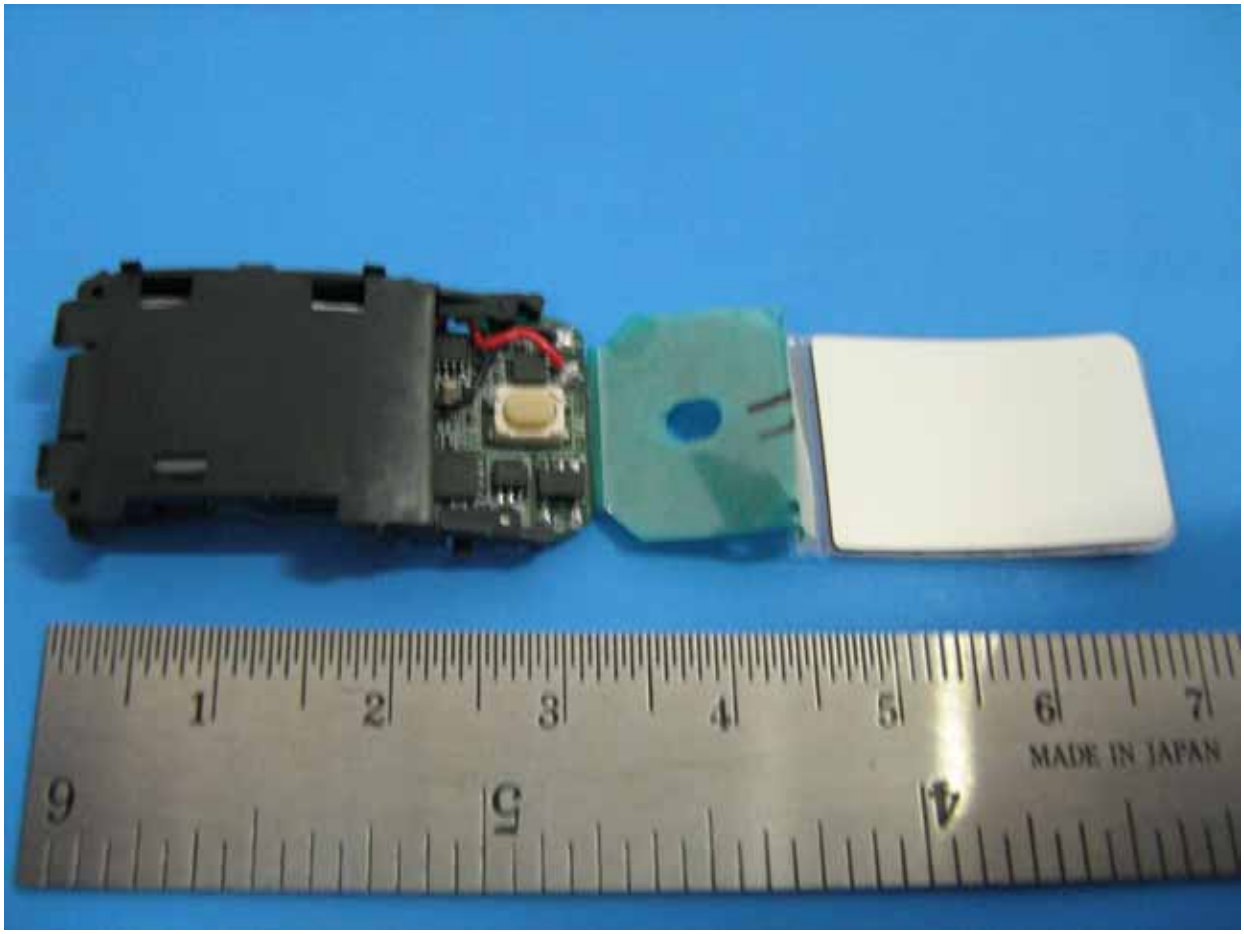
EUT External Photo: SportBand - Front View

EUT External Photo: SportBand - Rear View

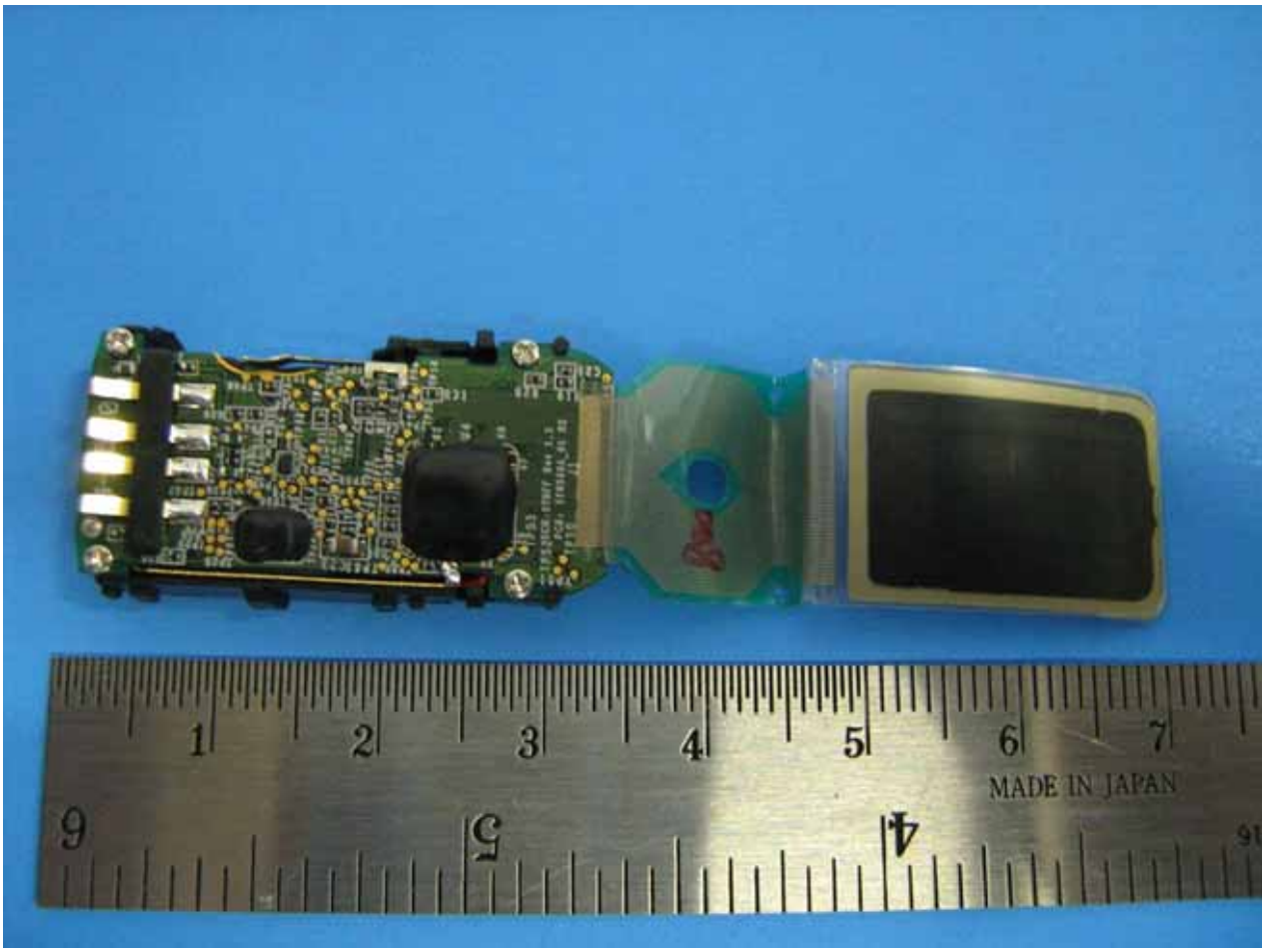
6.3 EUT Internal Photo

EUT Internal Photo: SportBand - Assemblies

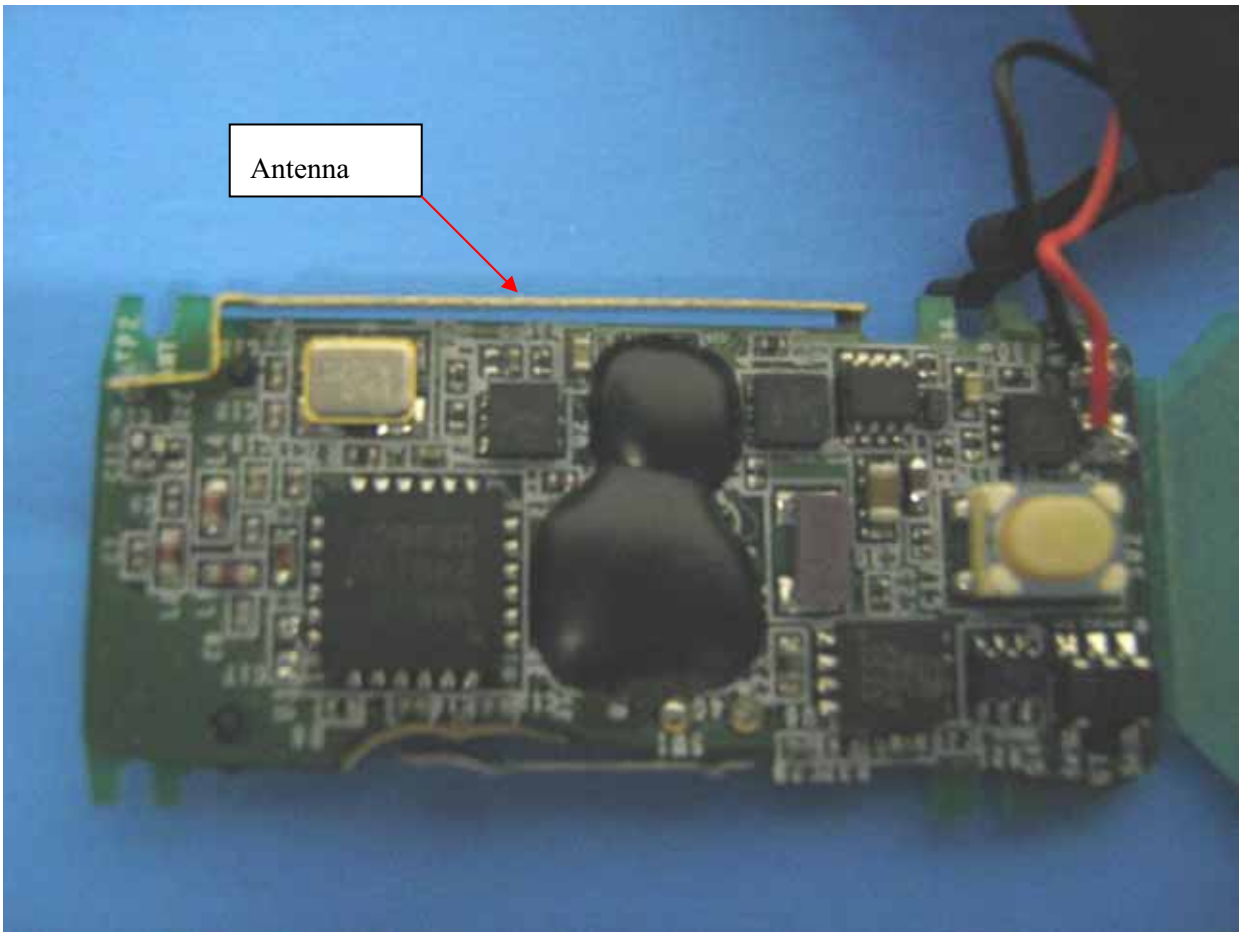
EUT Internal Photo: Electronics –Top Side



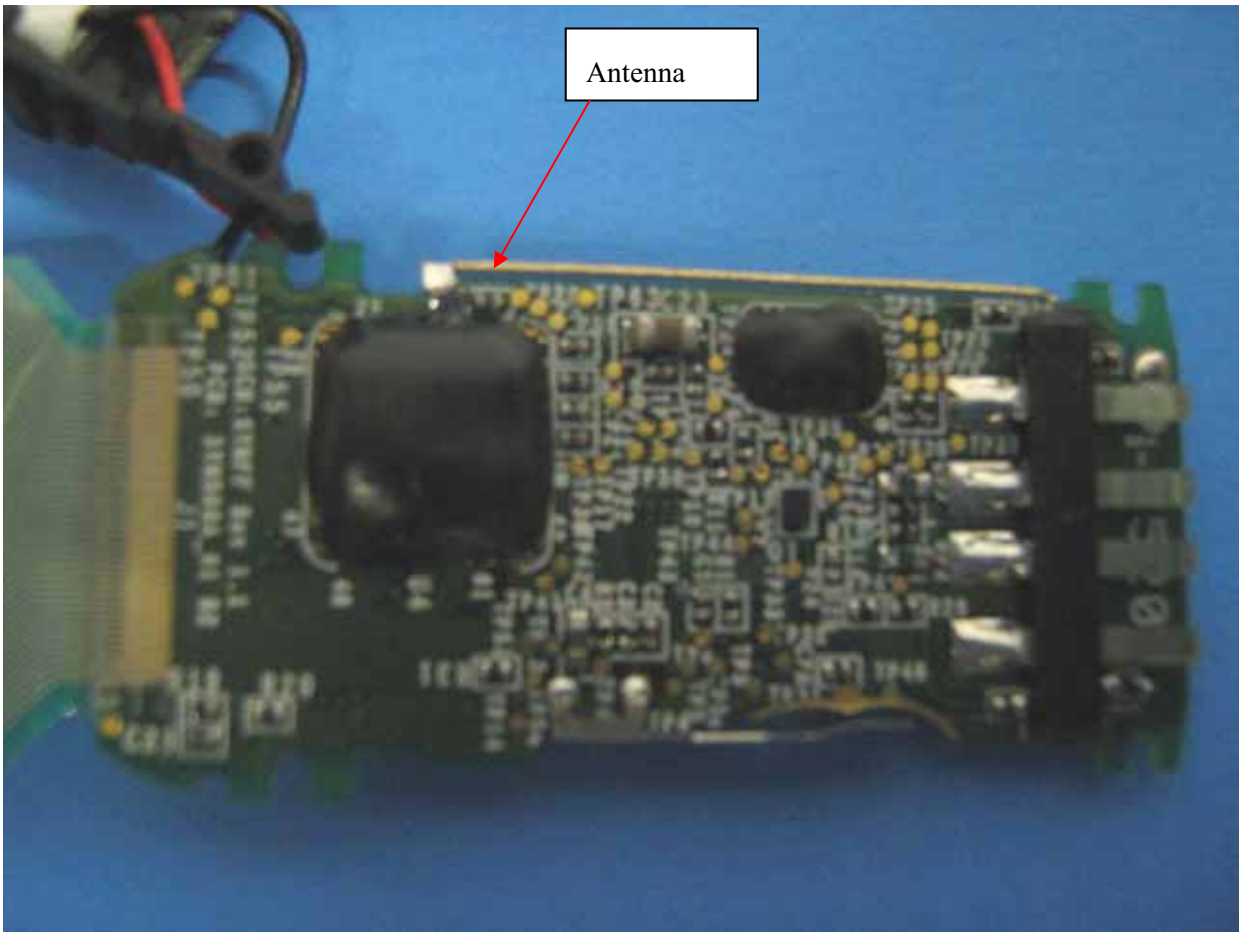
EUT Internal Photo: Electronics –Rear Side



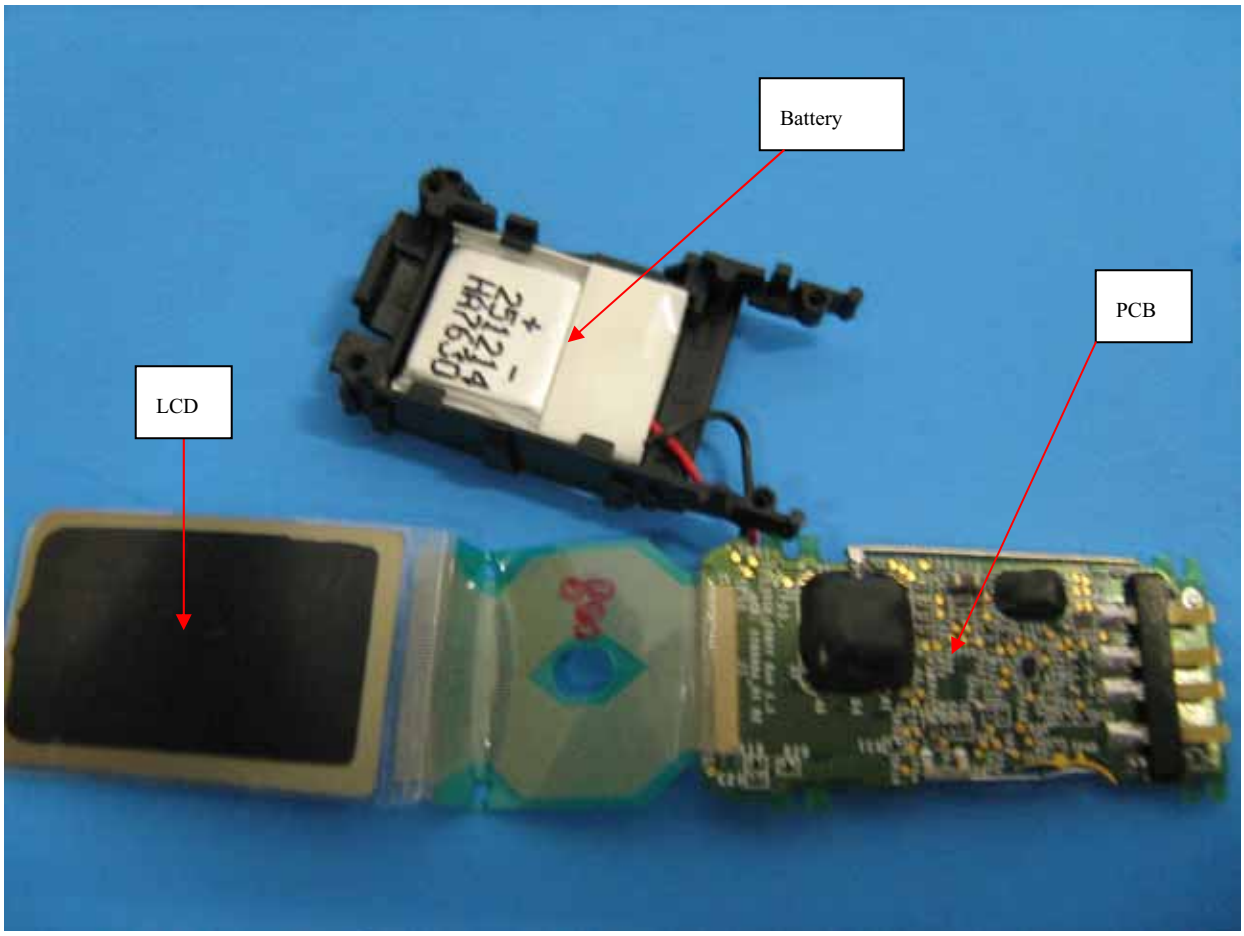
EUT Internal Photo: Circuit Board – Component Side



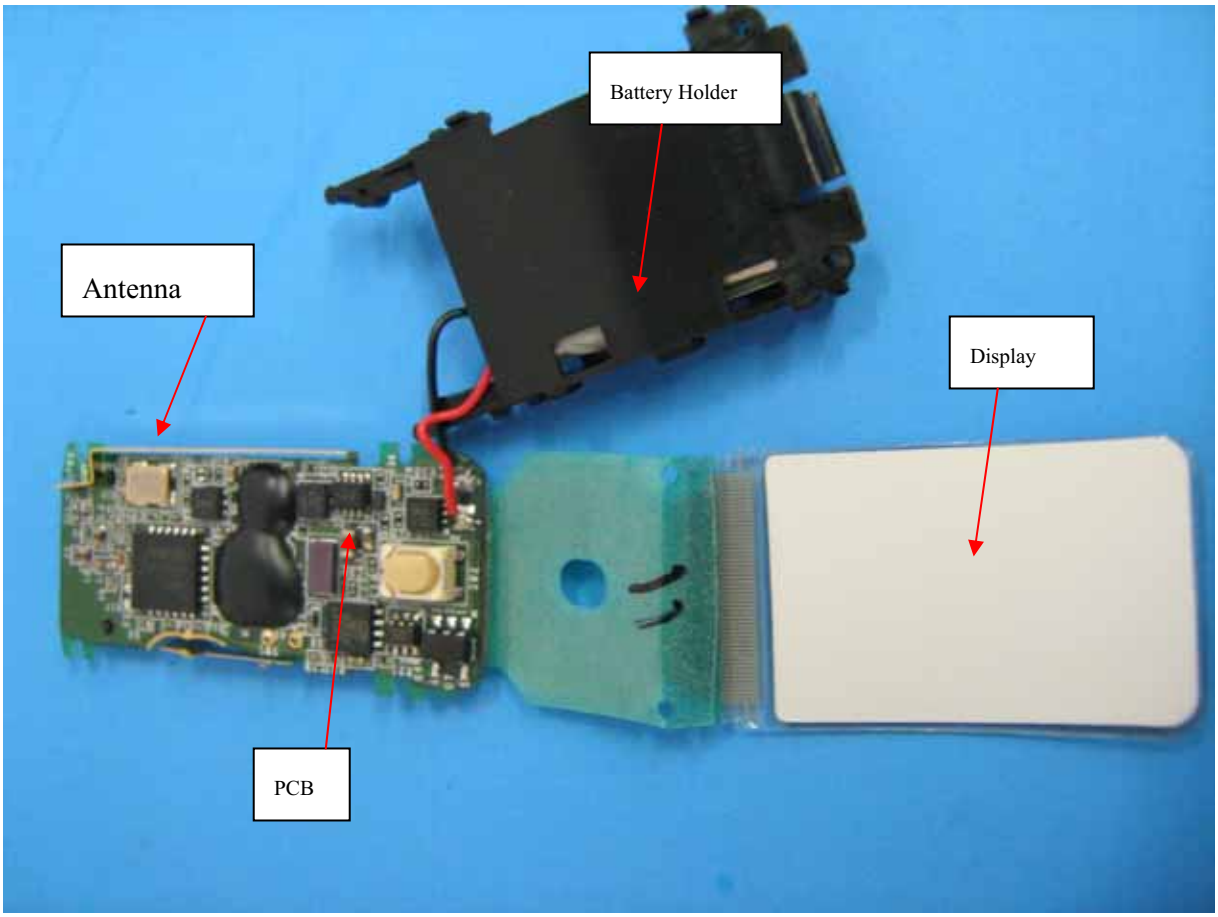
EUT Internal Photo: Circuit Board –Soldered Side



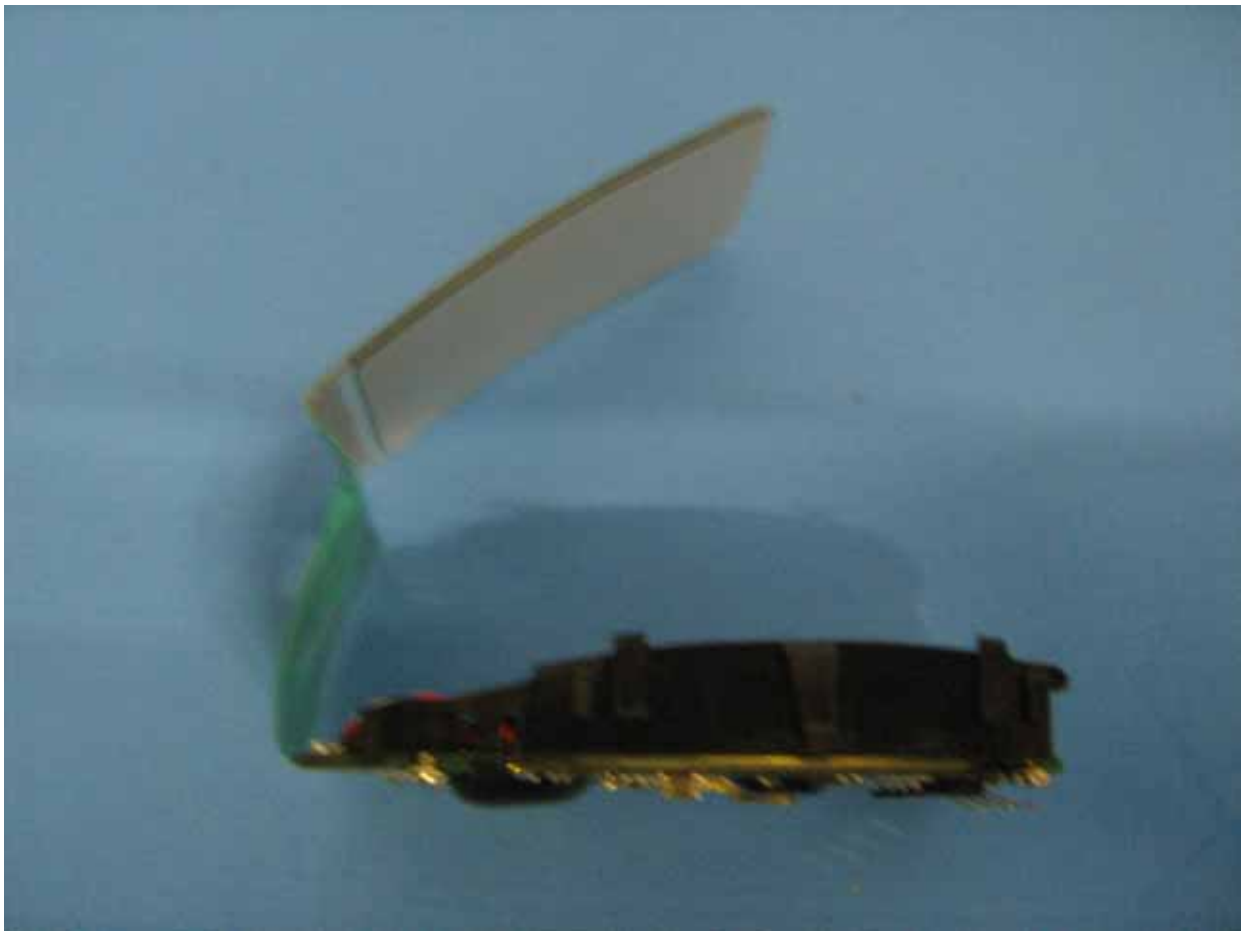
EUT Internal Photo: Electronics – Rear Side



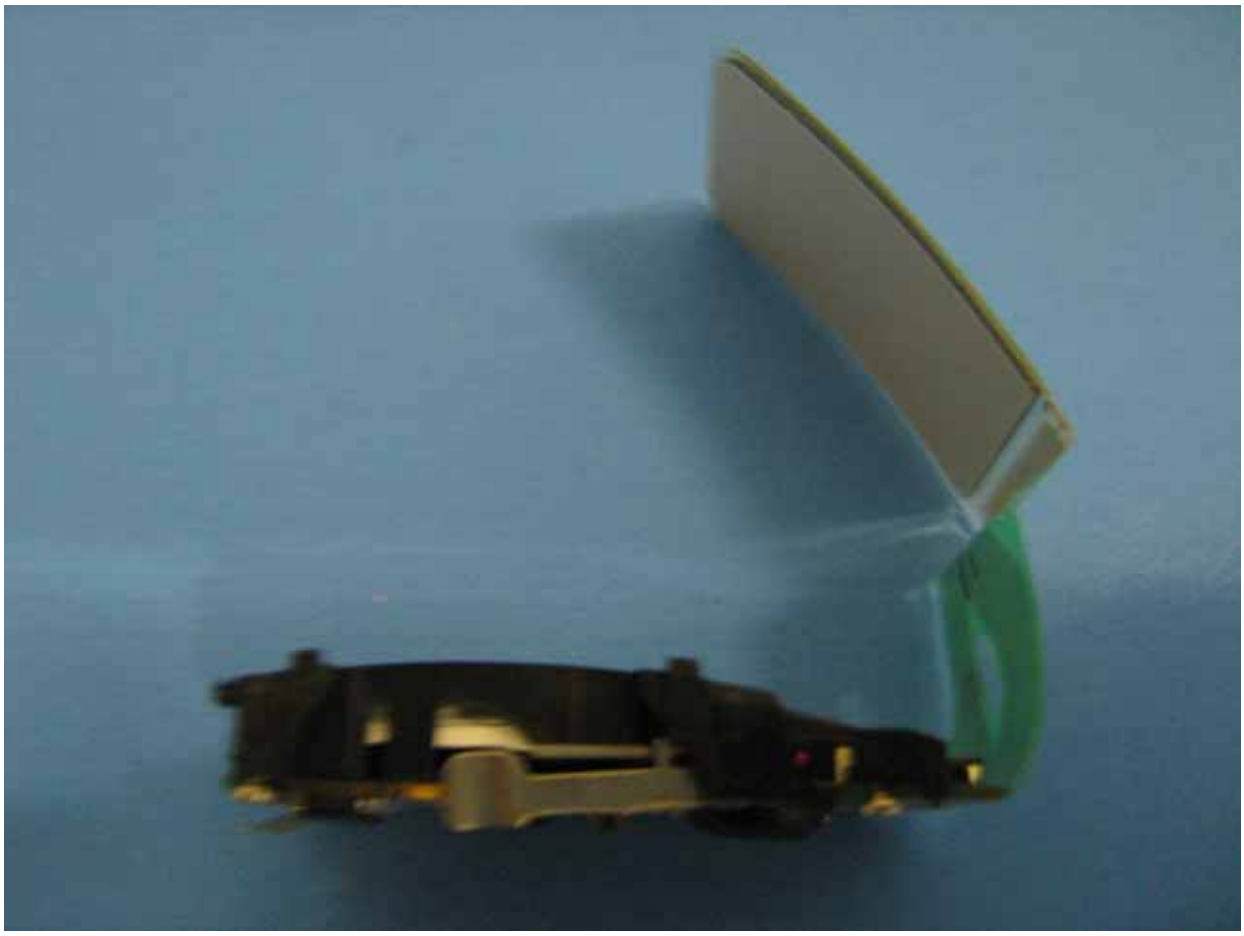
EUT Internal Photo: Electronics – Rear Side



EUT Internal Photo: Electronics – Antenna Side



EUT Internal Photo: Electronics – Button Side



7 EMC Test Plan

7.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

7.2 Customer

Table 5: Customer Information

Company Name	NIKE, Inc.
Address	One Bowerman Drive
City, State, Zip	Beaverton, OR 97005-6453
Country	USA
Phone	(503) 532-2144
Fax	(503) 671-6300

Table 6: Technical Contact Information

Name	Aaron Weast
E-mail	aaron.weast@nike.com
Phone	(503) 532-2144
Fax	(503) 671-6300

7.3 Equipment Under Test (EUT)

Table 7: EUT Specifications

Dimensions	10 mm x 20 mm x 50 mm
Mass	8.5 g
Power Supply *(check all that apply)*	Voltage Type: ☒ DC ☐ AC
	Operating Voltage: 3.7 VDC Max Current: 30 mA Max Power Consumption: 111 mW
	Multiple Feeds: ☐ Yes and how many ☒ No
Operating Frequencies:	2.425 GHz
Type of Equipment	☒ Table Top ☐ Rack mount ☐ Floor standing cabinet ☐ Other *describe:*

Table 8: Interface Specifications

Cabled with what type of cable?	**Is the cable shielded?**	**Maximum potential length of the cable?**	**Metallic (M), Coax (C) or Fiber (F)?**
N/A	☐ Yes ☐ No		☐ M ☐ C ☐ F

Table 9: Description of first four units used for testing

Serial Number	Communication/ Power Mode	Updates over previous units	Photo (Top)	Photo (Bottom)
DVT1-1	SMA connector, DC power leads	N/A		
DVT1-2				
DVT1-3	Integrated battery and antenna			
DVT1-4				

Table 10: Description of last seven units used for testing

Serial Number	Communication/ Power Mode	Updates over previous units	Photo (Top)	Photo (Bottom)
DVT1-5	SMA connector, DC power leads	Better screen resolution; fixed software glitch that caused sporadic resets.		
DVT1-6				
DVT1-7	Integrated battery and antenna			
DVT1-8				
DVT1-9				
DVT1-10		Includes software to detect and correct any radio failure.		
DVT1-11				

Figure 8: Internal photo of unit with circuit board

7.4 Test Specifications

Testing requirements

Table 11 – EUT Designation

Emissions	
Standard	Requirement
CFR47 Part 15.249, RSS 210	All