FCC Certification Test Report

For the Nixon, Inc.
The Ultratide Model: A476

FCC ID: 2ADQ8-A476

REPORT# **14WB1113033F-2 Rev 0 Jan.02, 2015**

Prepared for:

Nixon, Inc.
701 South Coast Highway, Encinitas, CA 92024, USA

Prepared by:

WASHINGTON TECHNOLOGY INTERNATIONAL LIMITED

This report applies only to the sample evaluated prior to the preparation date stated above.

This report must be copied in its entirety, including all technical documents.

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WLL REPORT# **14WB1113033F-2 Rev 0 Jan.02, 2015**

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Nixon, Inc. FCC ID: 2ADQ8-A476
The Ultratide Jan.02, 2015

Abstract

This report has been prepared on behalf of Nixon, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Spread Spectrum Transceiver under Part 15.247 of the FCC Rules and Regulations. This Federal Communication Commission (FCC) Certification Test Report documents the test configuration and test results for Nixon, Inc. The Ultratide.

And Testing was performed by Audix Technology (Shenzhen) Co., Ltd. has been accepted by the FCC, the FCC Registration Number is 90454.

The Ultratide is a Bluetooth V4.0 compliant device and complies with the limits for a Direct Sequence Spread Spectrum Transmitter device under Part 15.247 of the FCC Rules and Regulations.

Revision History	Reason	Date	
Rev 0	Initial Release	Jan.02, 2015	

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1 Introduction

1.1 Compliance Statement

After the modifications listed in Section 2.7 were installed:

The Nixon, Inc. The Ultratide complies with the limits for a Spread Spectrum Transceiver device under Part 15.247 of the FCC Rules and Regulations.

1.2 Test Scope Summary

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 2009 version of ANSI C63.10

Test Specification	Specific Description	Result	Modifications (Y/N)	Test Location
CFR47 Part 15.207	Conducted Emissions – AC Power Ports	Not Applicable	Not Applicable	Not Applicable
CFR47 Part 15.209	Radiated Emissions	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247	RF Power Output	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247(b)			No	Audix Technology (Shenzhen) Co., Ltd
CFR47 Part 15.247(c)	Radiated Spurious Emissions	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247	RF Power Spectral Density	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247	Occupied Bandwidth	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247	Band Edge Measurement (Conducted)	Complied	No	Audix Technology (Shenzhen) Co., Ltd.
CFR47 Part 15.247	Band Edge Measurement (Radiated)	Complied	No	Audix Technology (Shenzhen) Co., Ltd.

NOTE: The EUT is also considered as a kind of other class B digital device it has been verified to comply with the requirements of FCC Part 15B Class B (Verification) the test report has been issued by WTIL.

Nixon, Inc. FCC ID: 2ADQ8-A476
The Ultratide Jan.02, 2015

1.3 Contract Information

Customer: Nixon, Inc.

701 South Coast Highway, Encinitas, CA 92024, USA

1.4 Test and Support Personnel

Mario Wu Audix Technology (Shenzhen) Co., Ltd.

No. 6, Ke Feng Rd., 52 Block, Shenzhen

Science & Industrial Park, Nantou, Shenzhen,

Guangdong, China

Test Engineer

1.5 Abbreviations

A	Ampere		
ac	alternating current		
AM	Amplitude Modulation		
Amps	Amperes		
b/s	bits per second		
BW BandWidth			
CE	Conducted Emission		
cm	c enti m eter		
CW	Continuous Wave		
dB	d eci B el		
dc	direct current		
EMI	Electromagnetic Interference		
EUT	Equipment Under Test		
FM Frequency Modulation			
G giga - prefix for 10 ⁹ multiplier			
Hz Hertz			
IF Intermediate Frequency			
k kilo - prefix for 10 ³ multiplier			
LISN	Line Impedance Stabilization Network		
M	M ega - prefix for 10 ⁶ multiplier		
m	m eter		
μ	m icro - prefix for 10 ⁻⁶ multiplier		
NB	Narrow b and		
QP	Quasi-Peak		
RE Radiated Emissions			
RF Radio Frequency			
rms root-mean-square			
SN	Serial Number		
S/A	Spectrum Analyzer		
V	Volt		

2 Equipment Under Test

2.1 EUT Identification

The results obtained relate only to the item(s) tested.

Table 1: Overview of The Ultratide, Equipment Under Test

ITEM	DESCRIPTION
FCC ID Number	2ADQ8-A476
EUT Name:	The Ultratide
Test Model:	A476
FCC Rule Parts:	§15.247
Frequency Range:	2402MHz – 2480MHz
Maximum Output Power:	-0.282dBm
Modulation Technology:	GFSK
Necessary Bandwidth:	N/A
Keying:	Automatic
Type of Information:	Bluetooth V4.0: GFSK
Number of Channels:	40
Antenna Type	PIFA
Antenna Gain	-4.5dBi
Frequency Tolerance:	N/A
Emission Type(s):	N/A
Interface Cables:	None
Power Source & Voltage:	3 VDC from button battery

2.2 EUT Description

Product Name: The Ultratide

Model No.: A476

EUT Rated Voltage: DC 3V button battery

Equipment Configuration

The EUT were set up as outlined in Figure 1. The EUT was comprised of the following equipment. (All Modules, PCBs, etc. listed were considered as part of the EUT, as tested.)

2.3 Test Configuration

The Nixon, Inc. The Ultratide, Equipment Under Test (EUT), was operated from 3VDC button battery.

The EUT firmware/software was set up to control power, bit rate, and channel selection.

Conducted test setup:

Not Applicable

Radiated test setup:

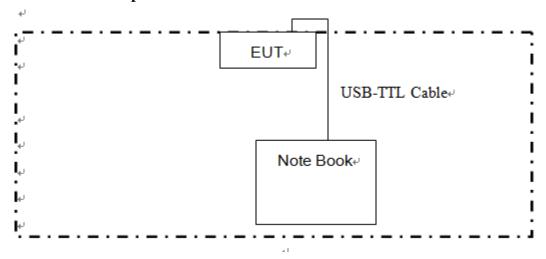


Figure 1: Test Configuration

2.4 Equipment Configuration

The EUT was set up as outlined in Figure 1. The EUT was comprised of the following equipment. (All Modules, PCBs, etc. listed were considered as part of the EUT, as tested.)

Table 2: Equipment Configuration

Name / Description Model Numb		Part Number	Serial Number	Revision
The Ultratide	A476	/	/	/

2.5 Interface Cables

Table 3: Interface Cables

Slot #	Port Identification	Connector Type	Cable Length	Shielded (Y/N)	Termination Point
1	USB-TTL Cable	Unshielded, Detachable	<1m	N	AE

2.6 Support Equipment

The following support equipment was used during testing:

N	lo.	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1	•	Note Book		DELL	PP09S		□FCC ID □BSMI ID

2.7 EUT Modifications

N/A

2.8 Testing Algorithm

The Ultratide was operated continuously by normal operating conditions. During the testing, the EUT connected with Notebook by a USB-TTL Board and controlled by Notebook software to continuously transmit Bluetooth signal at frequency band 2402MHz, 2440MHz and 2480MHz.

2.9 Test Location

And Testing was performed by Audix Technology (Shenzhen) Co., Ltd. has been accepted by the FCC, the FCC Registration Number is 90454.

2.10 Measurements

2.10.1 Measurement Method

All measurements were performed according to the 2009 version of ANSI C63.10 for testing compliance of a wide variety of unlicensed wireless devices

2.10.2 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_{c} = \pm \sqrt{\frac{a^{2}}{div_{a}^{2}} + \frac{b^{2}}{div_{b}^{2}} + \frac{c^{2}}{div_{c}^{2}} + \dots}$$

where u_c = standard uncertainty

a, b, c,.. = individual uncertainty elements

 $div_{a, b, c}$ = the individual uncertainty element

divisor based on the probability

distribution

divisor = 1.732 for rectangular distribution

divisor = 2 for normal distribution

divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

where U = expanded uncertainty

k = coverage factor

 $k \le 2$ for 95% coverage (ANSI/NCSL Z540-2

Annex G)

 u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is <u>not</u> used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 4 below.

Table 4: Expanded Uncertainty List

Scope	Expanded Uncertainty
	3.22 dB(30~200MHz, Polarize: H)
Uncertainty for Radiation Emission test	3.23 dB(30~200MHz, Polarize: V)
in 3m chamber	3.49 dB(200M~1GHz, Polarize: H)
	3.39 dB(200M~1GHz, Polarize: V)
Uncertainty for Radiation Emission test in	4.97 dB (1~6GHz, Distance: 3m)
3m chamber (1GHz-18GHz)	4.99 dB (6~18GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57 dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Power density test	2.00 dB
Uncertainty for Frequency range test	$7x10^{-8}$
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and	0.6℃
humidity	3%

3 Test Equipment

Table 5 shows a list of the test equipment used for measurements along with the calibration information.

Table 5: Test Equipment List

Frequency rang: 30~1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	Nov.23, 14	1 Year
2.	EMI Spectrum	Agilent	E4407B	MY41440292	Apr. 28,14	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	Apr. 28,14	1 Year
4.	Amplifier	HP	8447D	2648A04738	Apr. 28,14	1 Year
5.	Bilog Antenna	TESEQ	CBL6112D	35375	Jun. 18, 14	1 Year
6.	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	Apr. 28,14	1 Year
7.	Coaxial Switch	Anritsu	MP59B	6200313662	Apr. 28,14	1 Year

Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Apr. 28,14	1 Year
2.	Horn Antenna	ETS	3115	9510-4580	Jun. 06, 14	1 Year
3.	Horn Antenna	ETS	3116	00060089	Sep.20, 14	1 Year
4.	Amplifier	Agilent	8449B	3008A02495	Apr. 28,14	1 Year
5.	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	Apr. 28,14	1 Year
6.	RF Cable	Hubersuhner	SUCOFLEX106	28616/2	Apr. 28,14	1 Year
7.	Horn Antenna	ETS	3116	00060089	Sep.20, 14	1 Year

4 Test Results

4.1 RF Power Output:

To measure the output power the unit was set to transmit on a low, high and middle channel. The output from the transmitter was connected to an attenuator and then to the input of a detector diode. The output of the detector diode was displayed on an oscilloscope. The trace deflection was recorded and the transmitter was replaced with a signal generator at the same frequency. The output of the signal generator was increased until the trace deflection was the same as it was with the transmitter. The signal from the generator was then connected to a power meter and the level was taken.

4.1.1 Limit (FCC Part 15.247b(3))

For frequency hopping systems operating in the 2400-2483.5 MHz band, employing at least 75 non-overlapping hopping channels, For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

4.1.2 Test Procedure

Connected the EUT's antenna port to Power Sensor, and use power meter to test peak output power.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

4.1.3 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 RF Power Output requirements.

Table 6 provides the test results for RF Power Output.

4.1.4 Areas of Concern

None.

Table 6: RF Power Output

	atide 			
Model: A476				
Test date:2014-12-30 Pr			re: 101.3±1.0kpa	Humidity: 51.4±3.0%
Tested by: Donjon_Huang		Test si	ite: RF site	Temperature: 23.1 ± 0.6 °C
Cab	le loss: 11 dB		Attenuat	or loss: 20 dB
Test	Frequency		Peak output Power	Limit
Test Mode	Frequency (MHz)		Peak output Power (dBm)	Limit (dBm)
	* *		-	
	(MHz)		(dBm)	(dBm)

Note1: According exploratory test, EUT will have maximum output power as above bolded data rate, so those data rate were used for all test.

4.2 **RF Power Spectral Density**

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer. The analyzer offset was adjusted to compensate for the attenuator and other losses in the system.

4.2.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

4.2.2 Test Procedure

- 1. Connected the EUT's antenna port to spectrum analyzer device by 20dB attenuator.
- 2. Set the test frequency as center frequency, Set RBW=3KHz,VBW=10KHz,Span large enough capture the entire frequency, Read out maximum peak level frequency
- 3. Set the span to 1.5 times of the DTS Bandwidth Detector= Peak; Sweep time= Auto Couple; Trace Mode= Max hold.
- 4. Allow trace to fully stabilize use the peak marker function to determine the maximum amplitude level within the RBW.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude.

4.2.3 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 RF Power Spectral Density requirements.

Table 7 provides the test results for RF Power Spectral Density.

4.2.4 Areas of Concern

None.

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Table 7: RF Power Spectral Density

EUT: The Ultratide		
Model: A476		
Test date: 2014-12-30	Pressure: 101.5±1.0kpa	Humidity: 52.3 ± 3.0%
Tested by: Donjon_Huang	Test site: RF site	Temperature: 23.1 ± 0.6°C

Cable los	s: 11 dB	Attenuator lo	ss: 20 dB
Test Mode	CH (MHz)	Power density (dBm/3KHz)	Limit (dBm/3KHz)
	2402	-12.024	8
GFSK	2440	-12.526	8
	2480	-12.213	8
Conclusion: PA	SS		

Test Mode: CH0: 2402MH



Test Mode: CH19: 2440MHz



Test Mode: CH39: 2480MHz



4.3 Occupied Bandwidth

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer.

4.3.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

4.3.2 Test Procedure

The transmitter output was connected to a spectrum analyzer, The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.3 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 Occupied bandwidth requirements.

Table 8 provides the test results for Occupied bandwidth.

4.3.4 Areas of Concern

None.

Table 8: Occupied Bandwidth Results

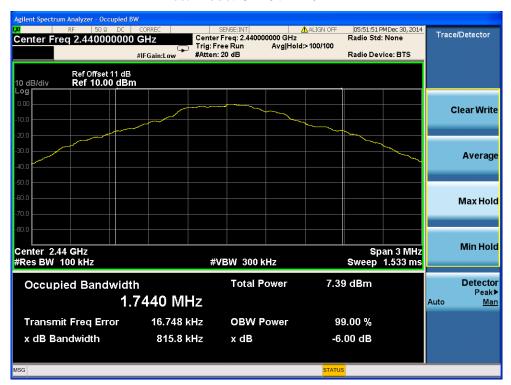
EUT: The Ultratide		
Model: A476		
Test date:2014-12-30	Pressure: 101.5±1.0kPa	Humidity: 52.3±3.0%
Tested by: Donjon_Huang	Test site: RF site	Temperature: 22.6±0.6°C

Cable lo	ss: 11 dB	Attenuator l	oss: 20 dB
Test Mode	CH 6 dB bandwidth (MHz) (kHz)		Limit (kHz)
	2402	786.8	>500
GFSK	2440	815.8	>500
	2480	787.2	>500
Conclusion: P.	ASS		

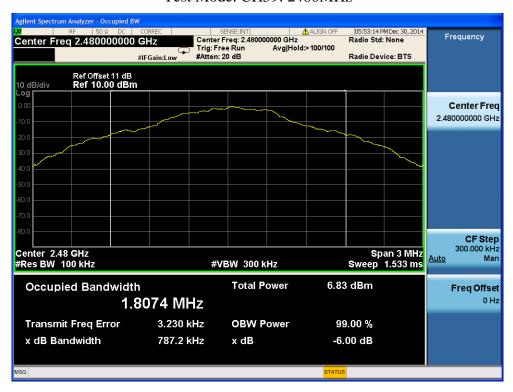
Test Mode: CH0: 2402MHz



Test Mode: CH19: 2440MHz



Test Mode: CH39: 2480MHz



4.4 Spurious Emissions at Antenna Terminals (FCC Part §15.247(b))

4.4.1 Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

4.4.2 Test Procedure

The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

4.4.3 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 Spurious Emissions at Antenna Terminals requirements.

Table 9 provides the test results for Spurious Emissions at Antenna Terminals.

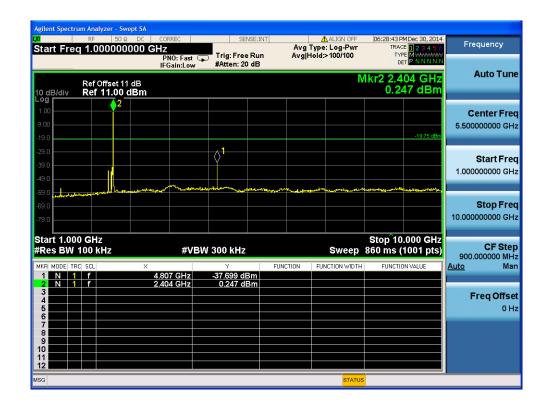
4.4.4 Areas of Concern

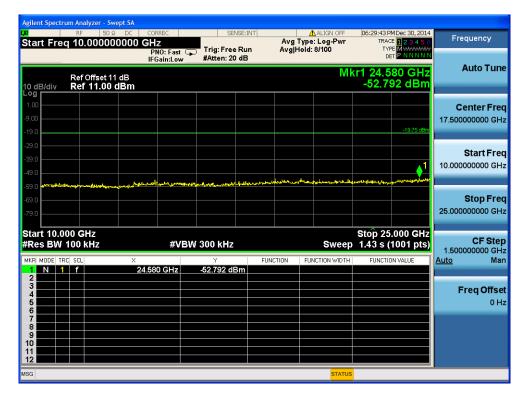
None.

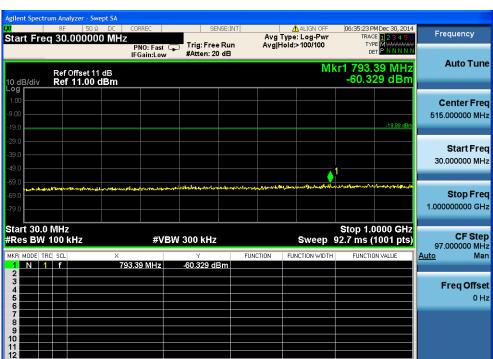
Table 9: Spurious Emissions at Antenna Terminals Results

Frequency **Auto Tune** Mkr1 883.60 MH: -59.244 dBn Ref Offset 11 dB Ref 11.00 dBm Center Fred 515.000000 MHz Start Fred 30.000000 MHz Stop Freq 1.000000000 GHz Stop 1.0000 GHz Start 30.0 MHz #Res BW 100 kHz **CF Step #VBW 300 kHz** Sweep 92.7 ms (1001 pts) 97.000000 MHz -59.244 dBm 883.60 MHz Freq Offset

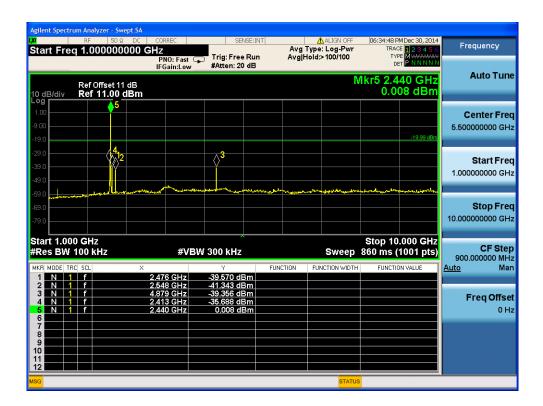
Test Mode: CH0: 2402MHz





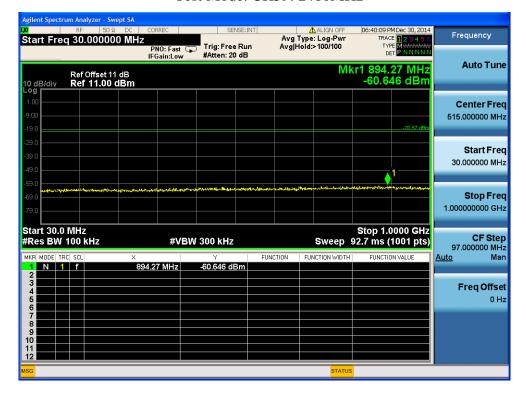


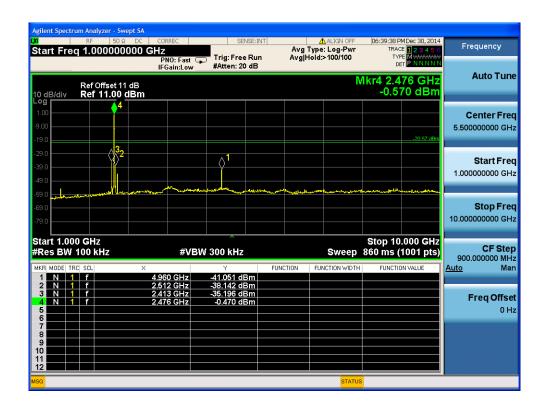
Test Mode: CH19: 2440MHz





Test Mode: CH39: 2480MHz







4.5 Radiated Spurious Emissions: (FCC Part §15.247(c))

Radiated emissions that fall in the restricted bands must comply with the general emissions limits in 15.209(a).

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>30 kHz
>1000 MHz	1 MHz	<30 Hz

Harmonic and Spurious emissions that were identified as coming from the EUT were checked in Peak and in Average Mode. The high frequency, which started from 18 to 26.5 GHz, was pre-scan and the test result which was 20 dB lower than the limit was not reported.

Peak measurements and average measurements are made. All emissions were determined to have a peak-to-average ratio of less than 20 dB.

4.5.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.10-2009. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

4.5.2 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 Radiated Spurious Emissions requirements.

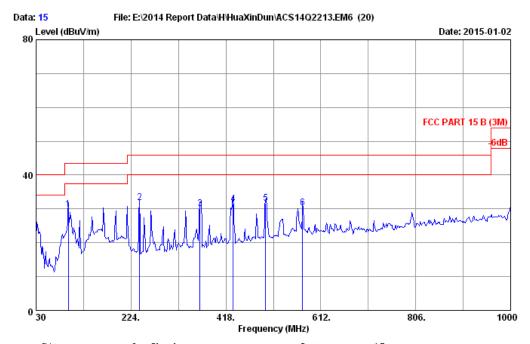
Table 10, 11 provide the test results for Radiated Spurious Emissions.

4.5.3 Areas of Concern

None.

Table 10: Radiated Emission Test Data (Below 1GHz)

Test Mode: TX Mode



Env. / Ins. : 26*C/58% Engineer : Donjon

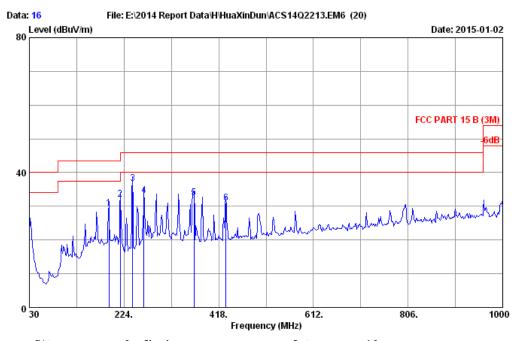
EUT : The Ultratide M/N:A476

Power rating : DC 3V Test Mode : TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	95.960	10.59	1.09	18.11	29.79	43.50	13.71	QP
2	241.460	12.45	2.04	17.31	31.80	46.00	14.20	QP
3	364.650	15.61	2.63	11.82	30.06	46.00	15.94	QP
4	432.550	17.10	2.95	11.27	31.32	46.00	14.68	QP
5	499.480	18.29	3.22	10.03	31.54	46.00	14.46	QP
6	575.140	19.30	3.60	7.44	30.34	46.00	15.66	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

The emission levels that are 20dB below the official limit are not reported.



Site no. Data no. : 16 Ant. pol. : HORIZONTAL : 3m Chamber Dis. / Ant. : 3m 2014 CBL6112D 35375

Limit : FCC PART 15 B (3M)

Env. / Ins. : 26*C/58% Engineer : Donjon

EUT : The Ultratide M/N:A476

Power rating : DC 3V

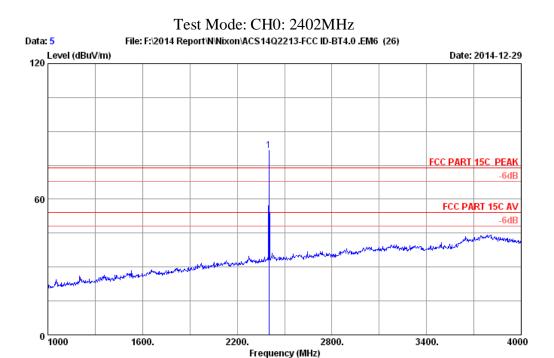
Test Mode : TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	192.960	9.85	1.80	17.78	29.43	43.50	14.07	QP
2	216.240	10.51	1.92	19.70	32.13	46.00	13.87	QP
3	241.460	12.45	2.04	22.24	36.73	46.00	9.27	QP
4	264.740	13.93	2.14	17.20	33.27	46.00	12.73	QP
5	367.560	15.65	2.65	14.15	32.45	46.00	13.55	QP
6	432.550	17.10	2.95	11.03	31.08	46.00	14.92	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official $\,$ limit are not reported.

Table 11: Radiated Emission Test Data (Above 1GHz)



Site no. : 3m Chamber Data no. : 5
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

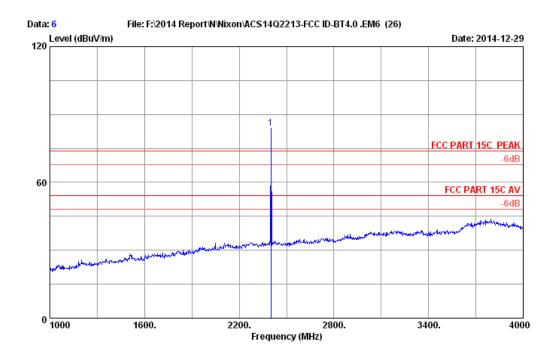
Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide
Power rating : DC 3V

Power rating : DC 3V
Test Mode : GFSK 2402MHz
M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)		AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
1	2402.000	28.18	5.80	35.70	83.31	81.59	74.00	-7.59	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor



Site no. : 3m Chamber Data no. : 6
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

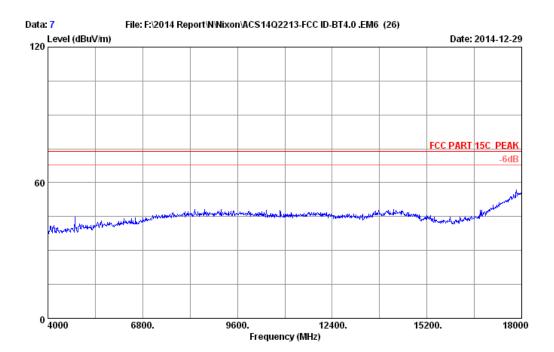
Test Mode : GFSK 2402MHz

M/N : A476

		Ant.	Cable	AMP		Emission			
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2402.000	28.18	5.80	35.70	85.63	83.91	74.00	-9.91	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 7
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

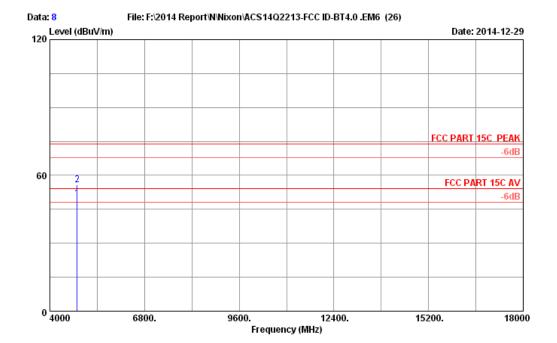
Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2402MHz

M/N : A476



Site no. : 3m Chamber Data no. : 8
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54% Engineer : Donjon EUT : The Ultratide

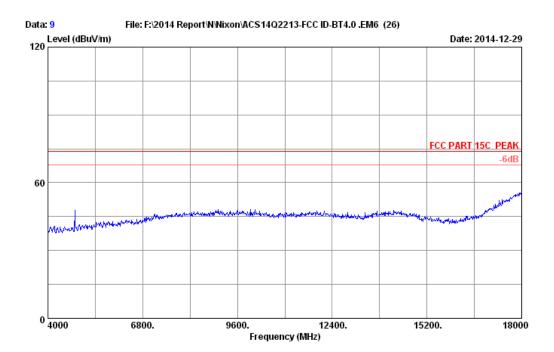
Power rating : DC 3V

Test Mode : GFSK 2402MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
_	4804.000	32.85	8.56	35.70	43.94	49.65	54.00	4.35	Average
	4804.000	32.85	8.56	35.70	50.20	55.91	74.00	18.09	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor



Site no. : 3m Chamber Data no. : 9
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

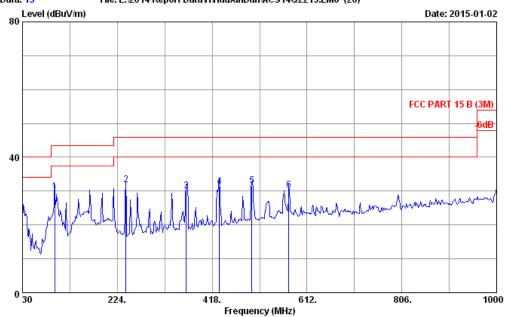
Test Mode : GFSK 2402MHz

M/N : A476

1476

2015





Env. / Ins. : 26*C/58% Engineer : Donjon

EUT : The Ultratide M/N:A476

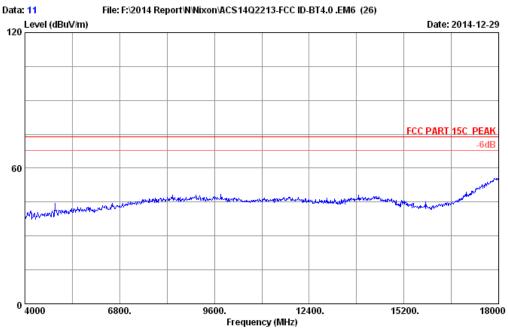
Power rating : DC 3V Test Mode : TX Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	95.960	10.59	1.09	18.11	29.79	43.50	13.71	QP
2	241.460	12.45	2.04	17.31	31.80	46.00	14.20	QP
3	364.650	15.61	2.63	11.82	30.06	46.00	15.94	QP
4	432.550	17.10	2.95	11.27	31.32	46.00	14.68	QP
5	499.480	18.29	3.22	10.03	31.54	46.00	14.46	QP
6	575.140	19.30	3.60	7.44	30.34	46.00	15.66	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

^{2.} The emission levels that are 20dB below the official limit are not reported.

Test Mode: CH19: 2440MHz

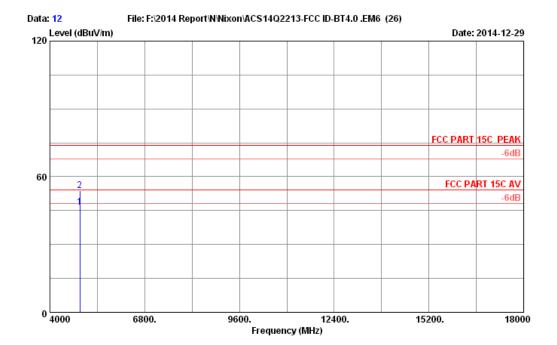


Limit : FCC PART 15C PEAK Env. / Ins. : 23*C/54%

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide
Power rating : DC 3V

Test Mode : GFSK 2440MHz

M/N : A476



Site no. : 3m Chamber Data no. : 12
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

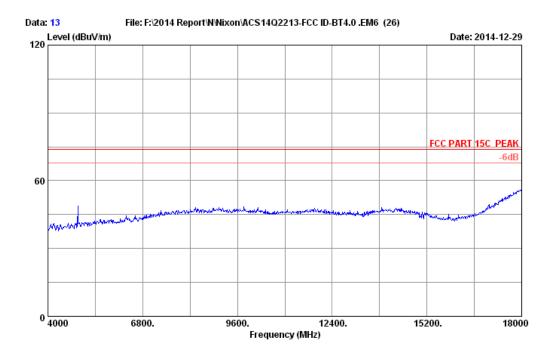
Test Mode : GFSK 2440MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
1	4880.000	32.98	8.64	35.70	40.67	46.59	54.00	7.41	Average
2	4880.000	32.98	8.64	35.70	47.95	53.87	74.00	20.13	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official



Site no. : 3m Chamber Data no. : 13
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

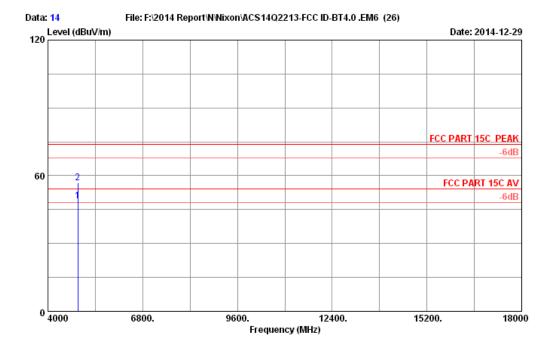
Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2440MHz

M/N : A476



Site no. : 3m Chamber Data no. : 14
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

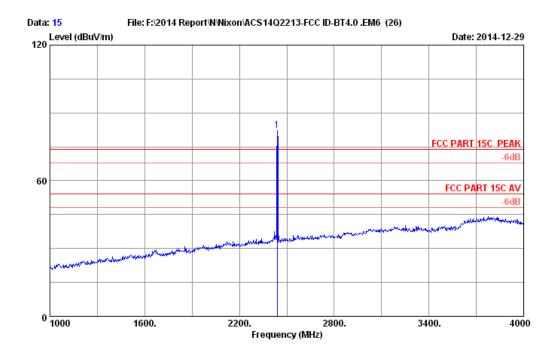
Test Mode : GFSK 2440MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
1	4880.000	32.98	8.64	35.70	42.94	48.86	54.00	5.14	Average
2	4880.000	32.98	8.64	35.70	50.95	56.87	74.00	17.13	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official



Site no. : 3m Chamber Data no. : 15
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2440MHz

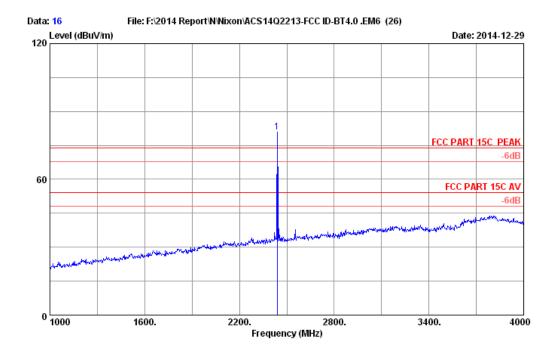
M/N : A476

		Ant.	Cable	AMP		Emission				
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark	
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2440.000	28.27	5.86	35.70	83.67	82.10	74.00	-8.10	Peak	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading

-Amp Factor

The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 16
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54% Engineer : Donjon EUT : The Ultratide

Power rating : DC 3V

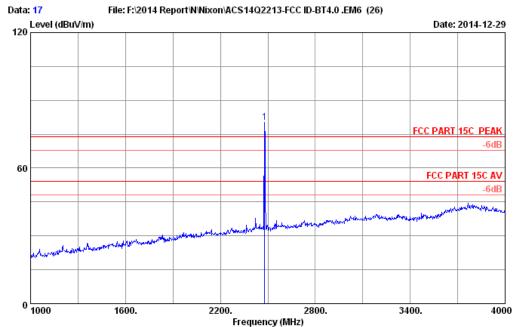
Test Mode : GFSK 2440MHz

M/N : A476

		Ant.	Cable	AMP		Emission			
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2440.000	28.27	5.86	35.70	82.39	80.82	74.00	-6.82	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

Test Mode: CH39: 2480MHz



Site no. : 3m Chamber Data no. : 17
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK Env. / Ins. : 23*C/54%

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide
Power rating : DC 3V

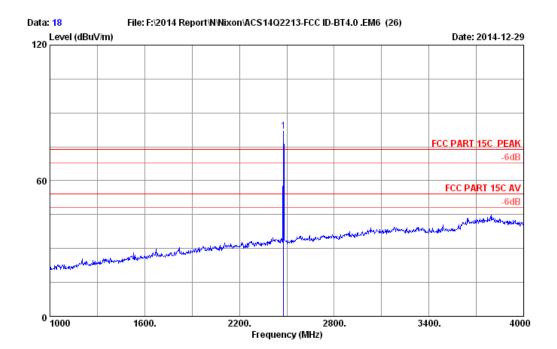
Test Mode : GFSK 2480MHz

M/N : A476

		Ant.	Ant. Cable AMP Emission						
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.000	28.36	5.91	35.70	81.49	80.06	74.00	-6.06	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 18
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

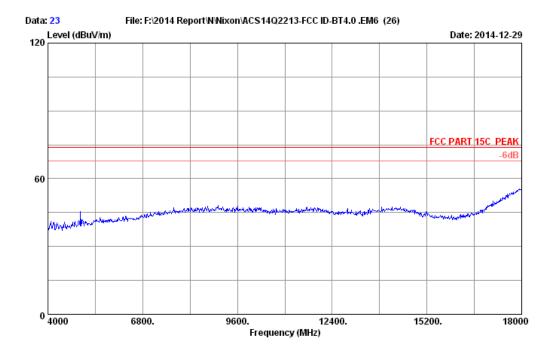
Test Mode : GFSK 2480MHz

M/N : A476

		Ant.	Cable	AMP		Emission			
No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.000	28.36	5.91	35.70	83.17	81.74	74.00	-7.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 23
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

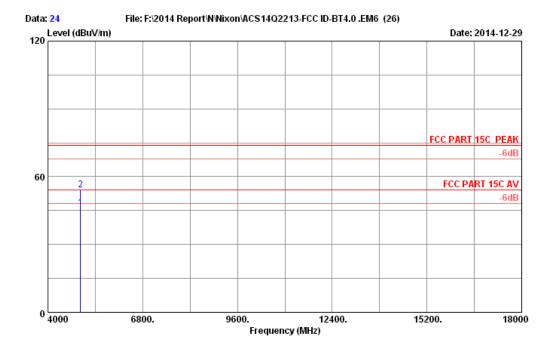
Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2480MHz

M/N : A476



Site no. : 3m Chamber Data no. : 24 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

: FCC PART 15C PEAK Limit

Env. / Ins. : 23*C/54% : Donjon Engineer EUT : The Ultratide

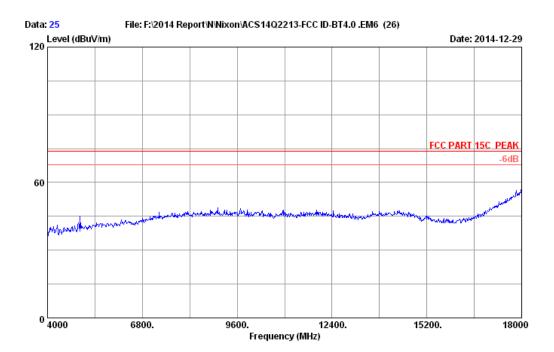
Power rating : DC 3V

Test Mode : GFSK 2480MHz M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
1	4960.000	33.13	8.72	35.70	39.88	46.03	54.00	7.97	Average
2	4960.000	33.13	8.72	35.70	47.92	54.07	74.00	19.93	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official limit are not renorted



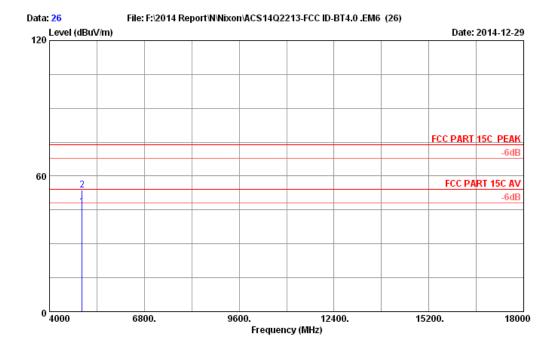
Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54%
Engineer : Donjon
EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2480MHz

M/N : A476



Data no. : 26 Site no. : 3m Chamber Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK Env. / Ins. : 23*C/54% : Donjon Engineer EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2480MHz

M/N : A476

						Emission			
No.	Freq.	Factor	Loss	factor	Reading			Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	33.13	8.72	35.70	40.31	46.46	54.00	7.54	Average
2	4960.000	33.13	8.72	35.70	47.55	53.70	74.00	20.30	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor

2. The emission levels that are 20dB below the official $% \left(1\right) =\left(1\right) +\left(1\right) =\left(1\right) =\left($ limit are not reported.

4.6 Band Edge Measurements (Conducted)

Conducted band edge measurements at 2390MHz and 2483MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the shielding room and the table lists the corrected levels of the emissions at the band edge for comparison to the limit.

4.6.1 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 Conducted band edge emissions requirements.

Table 12 provides the test results for Conducted band edge emissions.

4.6.2 Areas of Concern

None.

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FCC ID: 2ADQ8-A476

Jan.02, 2015

Table 12: Band Edge Measurements (Conducted)

Test Mode:CH0: 2402MHz



Test Mode:CH39: 2480MHz



Nixon, Inc. FCC ID: 2ADQ8-A476
The Ultratide Jan.02, 2015

4.7 Band Edge Measurements (Radiated)

Radiated band edge measurements at 2390 MHz and 2483 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 1 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz for average levels).

4.7.1 Test Data

The EUT The Ultratide complied with the FCC Part 15.247 Radiated band edge emissions requirements.

Table 13 provides the test results for Radiated band edge emissions.

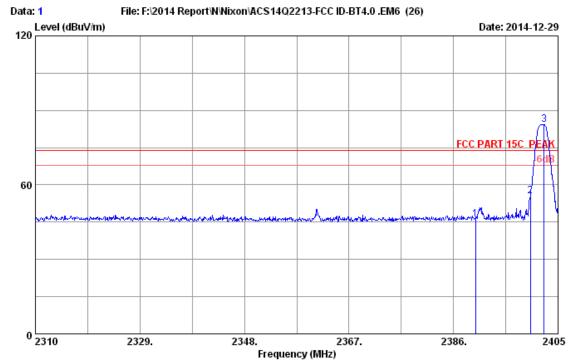
4.7.2 Areas of Concern

None.

Nixon, Inc. FCC ID: 2ADQ8-A476
The Ultratide Jan.02, 2015

Table 13: Band Edge Measurements (Radiated)

Test Mode: CH0: 2402MHz



Site no. : 3m Chamber Data no. : 1
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

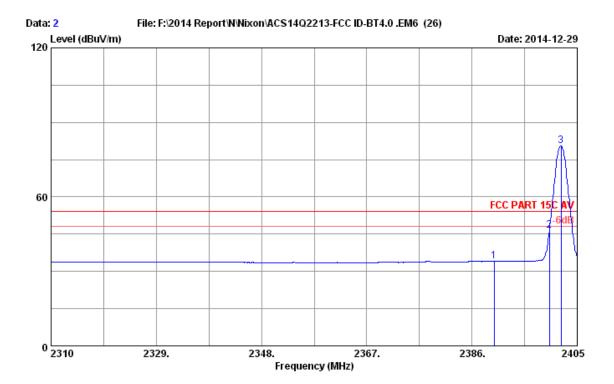
Env. / Ins. : 23*C/54% Engineer : Donjon EUT : The Ultratide

Power rating : DC 3V Test Mode : GFSK 2402MHz

M/N : A476

			Ant.	Cable	AMP		Emission			
	No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
		(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
•										
	1	2389.990	28.16	5.78	35.70	47.79	46.03	74.00	27.97	Peak
	2	2400.000	28.18	5.80	35.70	57.05	55.33	74.00	18.67	Peak
	3	2402.435	28.19	5.80	35.70	85.89	84.18	74.00	-10.18	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor



Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C AV

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

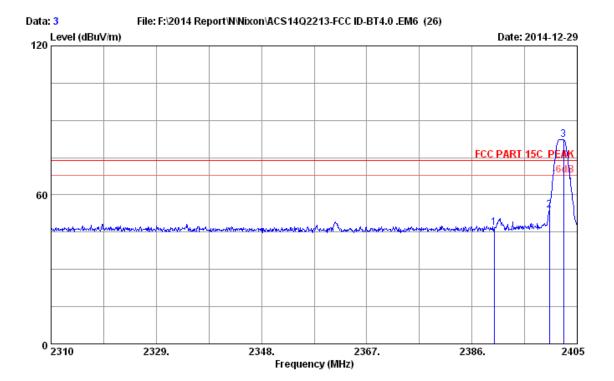
Power rating : DC 3V

Test Mode : GFSK 2402MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.16	5.78	35.70	35.75	33.99	54.00	7.43	Average
2	2400.000	28.18	5.80	35.70	48.29	46.57	54.00		Average
3	2402.055	28.18	5.80	35.70	82.26	80.54	54.00		Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
-Amp Factor



Site no. : 3m Chamber Data no. : 3
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2402MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits	Margin (dB)	Remark
2	2390.000	28.16	5.78	35.70	48.41	46.65	74.00	27.35	Peak
	2400.000	28.18	5.80	35.70	55.53	53.81	74.00	20.19	Peak
	2402.530	28.19	5.80	35.70	83.98	82.27	74.00	-8.27	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C AV

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2402MHz

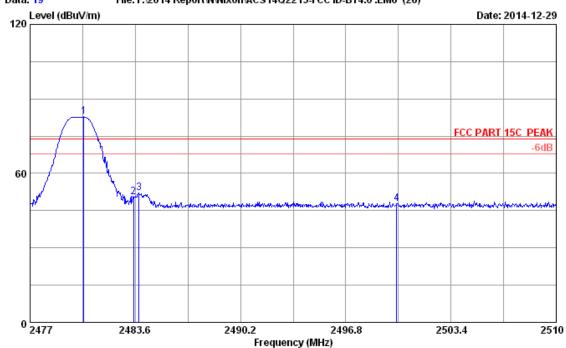
M/N : A476

		Ant.	Cable	AMP		Emission			
No.	Freq. (MHz)	Factor (dB/m)	Loss (dB)	factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)		Remark
1	2389.990	28.16	5.78	35.70	35.72	33.96	54.00	20.04	Average
2	2400.000	28.18	5.80	35.70	46.92	45.20	54.00	8.80	Average
3	2402.055	28.18	5.80	35.70	80.48	78.76	54.00	-24.76	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor

Test Mode: CH39: 2480MHz

Data: 19 File: F:\2014 Report\N\Nixon\ACS14Q2213-FCC ID-BT4.0 .EM6 (26)



Site no. : 3m Chamber Data no. : 19
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

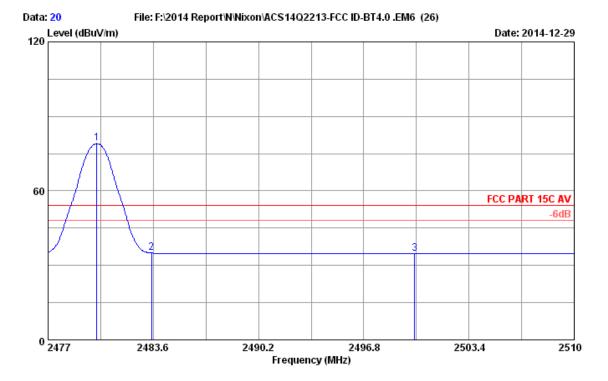
Power rating : DC 3V Test Mode : GFSK 2480MHz

M/N : A476

		Ant.	Cable	AMP	Emission				
No.	Freq. (MHz)	Factor (dB/m)	Loss (dB)	factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.366	28.36	5.91	35.70	84.17	82.74	74.00	-8.74	Peak
2	2483.500	28.36	5.92	35.70	51.74	50.32	74.00	23.68	Peak
3	2483.831	28.36	5.92	35.70	53.54	52.12	74.00	21.88	Peak
4	2500.000	28.40	5.94	35.70	49.20	47.84	74.00	26.16	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
-Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 20
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL

Limit : FCC PART 15C AV

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

Power rating : DC 3V

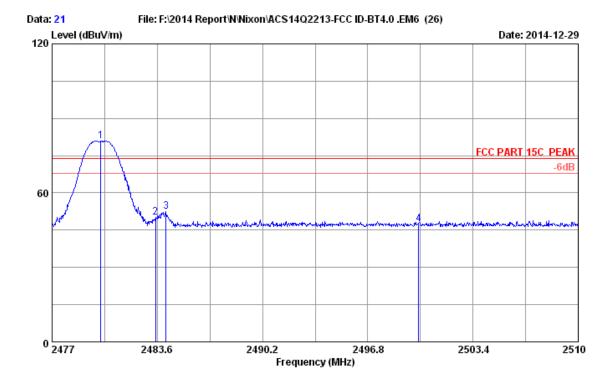
Test Mode : GFSK 2480MHz

M/N : A476

			Ant.	Cable	AMP					
	No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	Margin	Remark
		(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
	1	2480.069	28.36	5.91	35.70	80.49	79.06	54.00	-25.06	Average
	2	2483.500	28.36	5.92	35.70	36.38	34.96	54.00	19.04	Average
	3	2500.000	28.40	5.94	35.70	36.03	34.67	54.00	19.33	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
-Amp Factor

2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 21
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C PEAK

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

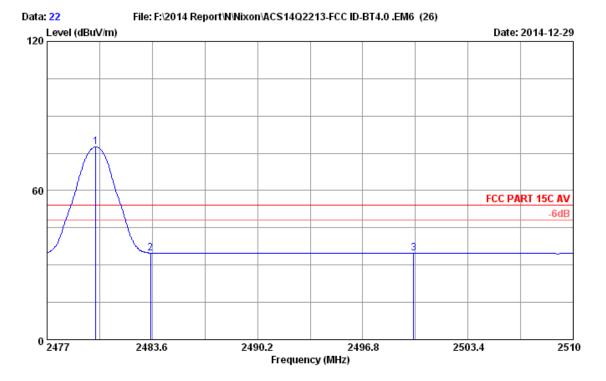
Power rating : DC 3V

Test Mode : GFSK 2480MHz

M/N : A476

			Ant.	Cable	AMP					
	No.	Freq.	Factor	Loss	factor	Reading	Level	Limits	_	Remark
		(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
								74 00		Peak
	T	2480.069	28.36	5.91	35.70	82.26	80.83	74.00	-6.83	reak
	2	2483.500	28.36	5.92	35.70	51.65	50.23	74.00	23.77	Peak
	3	2484.161	28.37	5.92	35.70	53.73	52.32	74.00	21.68	Peak
	4	2500.000	28.40	5.94	35.70	48.94	47.58	74.00	26.42	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor



Site no. : 3m Chamber Data no. : 22
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL

Limit : FCC PART 15C AV

Env. / Ins. : 23*C/54% Engineer : Donjon

EUT : The Ultratide

Power rating : DC 3V

Test Mode : GFSK 2480MHz

M/N : A476

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
2	2480.069	28.36	5.91	35.70	78.97	77.54	54.00	-23.54	Average
	2483.500	28.36	5.92	35.70	36.29	34.87	54.00	19.13	Average
	2500.000	28.40	5.94	35.70	36.06	34.70	54.00	19.30	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading - Amp Factor

Nixon, Inc.

FCC ID: 2ADQ8-A476
The Ultratide

Jan.02, 2015

4.8 AC Powerline Conducted Emissions: (FCC Part §15.207)

-----The End------