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Round Rock, TX 78665
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(512) 244-3371 Fax: (512) 244-1846

October 24, 2013

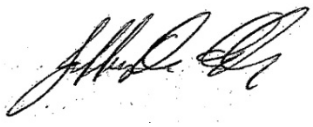
Tim Fiebrich
Naztec
522 Gillingham Dr
Sugar Land, TX 77478

Dear Tim:

Enclosed is the Wireless Test Report for the Naztec RM01 Radio Module. This report can be used to demonstrate compliance with FCC requirements for wireless devices in the United States.

If you have any questions, please contact me.

Sincerely,



Jeffrey A. Lenk
President

Enclosure

Project 13022-15

Naztec
RM01 Radio Module

Wireless Certification Report

Prepared for:

Naztec
522 Gillingham Dr.
Sugar Land, TX 77478

By

Professional Testing (EMI), Inc.
1601 N. A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

October 24, 2013

Reviewed by

Larry Finn
Product Development Engineer

Written by

Eric Lifsey
Test Engineer

Table of Contents

Revision History

Revision Number	Description	Date
00A	Initial Release	September 3, 2013
01	Revised per PTI Reviewer Larry Finn	September 4, 2013
02	Revised per ACB Comment	October 7, 2013
03	Revised per ACB Comment	October 24, 2013

Applicant: Naztec
Applicant's Address: 522 Gillingham Dr.
Sugar Land, TX 77478

FCC ID: MD5-RM01
Model: RM01
Project Number: 13022-15

The **RM01 Radio Module** by **Naztec** was tested utilizing the following documents and found to be in compliance with the required criteria on the indicated test date.

47 CFR (USA)		
Section Reference	Parameter	Date
2.1049, 15.247(a)	Occupied Bandwidth, Hopping Frequency Separation, Number of Hopping Channels, Channel Occupancy Time	8/02/2013, 8/30/2013
15.247(b)	Peak Output Power (conducted)	2/27/2013
15.247(d)	Conducted Spurious Emissions + Band Edge	2/27/2013
15.207	Power line Conducted Emissions	2/14/2013
15.203	Antenna Requirements	6/18/2013
2.1091	Maximum Permissible Exposure*	8/30/2013

*Reported separately.

I, Eric Lifsey, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.

Eric Lifsey
EMC Engineer

This report has been reviewed and accepted by **Naztec.** The undersigned is responsible for ensuring that this device will continue to comply with the FCC rules.

_____

Representative of **Naztec**

1.0 Introduction

1.1 Scope

This report describes the extent of the equipment under test (EUT) conformance to the intentional radiator requirements of the United States.

Professional Testing (EMI), Inc., (PTI) follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing. The procedure of ANSI C63.4: 2009 were utilized for making all emissions measurements. Additional FCC measurement procedures or guidelines were also applied.

1.2 EUT Description

The **RM01 Radio Module** by **Naztec** (Marketed under Trafficware brand.) is a modular transceiver provided with an external antenna connector port. The external connector is a reverse-center-pin SMC style. The transceiver is used in traffic monitoring systems as a network node that collects data from remote wireless sensors embedded in the roadway, or communicates with other stations in the overall traffic network.

Table 1.2.1: Equipment Under Test

Manufacturer	Naztec, INC
Model Name	RM01
Model Number	RM01
FCC ID	MD5-RM01
Frequency (MHz)	902-928 MHz

1.3 EUT Operation

EUT was operated consistent with normal use.

1.4 Modifications

No modifications were made to the EUT during the performance of the test program.

1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. This site is registered with the FCC under Section 2.948 and Industry Canada per RS-GEN, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas, 78758, while the main office is located at 1601 N. A.W. Grimes Blvd., Suite B, Round Rock, Texas, 78665.

2.0 Applicable Documents and Clauses

Table 2.1: Applicable Documents

Document	Title	Release
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment	2009
DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems	3/30/ 2000
47 CFR	Part 15 – Radio Frequency Devices Subpart C -Intentional Radiators	

Table 2.2: Applicable Clauses

Clause Subject	Section References	Required?	Result
Fundamental Output Power	15.247	Yes	Pass
Occupied Bandwidth, 20 dB	2.1049	Yes	Pass
Field Strength of Radiated Spurious/Harmonic Emissions (30 MHz to 9 GHz)	15.205, 15.209	Yes	Pass
Frequency Hopping Characteristics	15.247(d)	Yes	Pass
Power line Conducted Emissions	15.207	Yes	Pass
Antenna Construction	15.203	Yes	Pass
Maximum Permissible Exposure*	2.1091	Yes	Pass

*Reported separately.

3.0 Occupied Bandwidth

Occupied bandwidth measurement was made on the EUT.

3.1 Test Procedure

The EUT is configured for best signal/power and the bandwidth then is measured. A recording of the results is included.

3.2 Test Criteria

Section Reference	Parameter	Date
2.1049, 15.247(a)(1)(i)	Bandwidth, 20 dB 500 kHz Maximum	2013-02-27

3.3 Test Results

EUT was found to be in compliance with applicable requirements.

Channel	Measured BW (kHz)
L	165
M	172
H	173

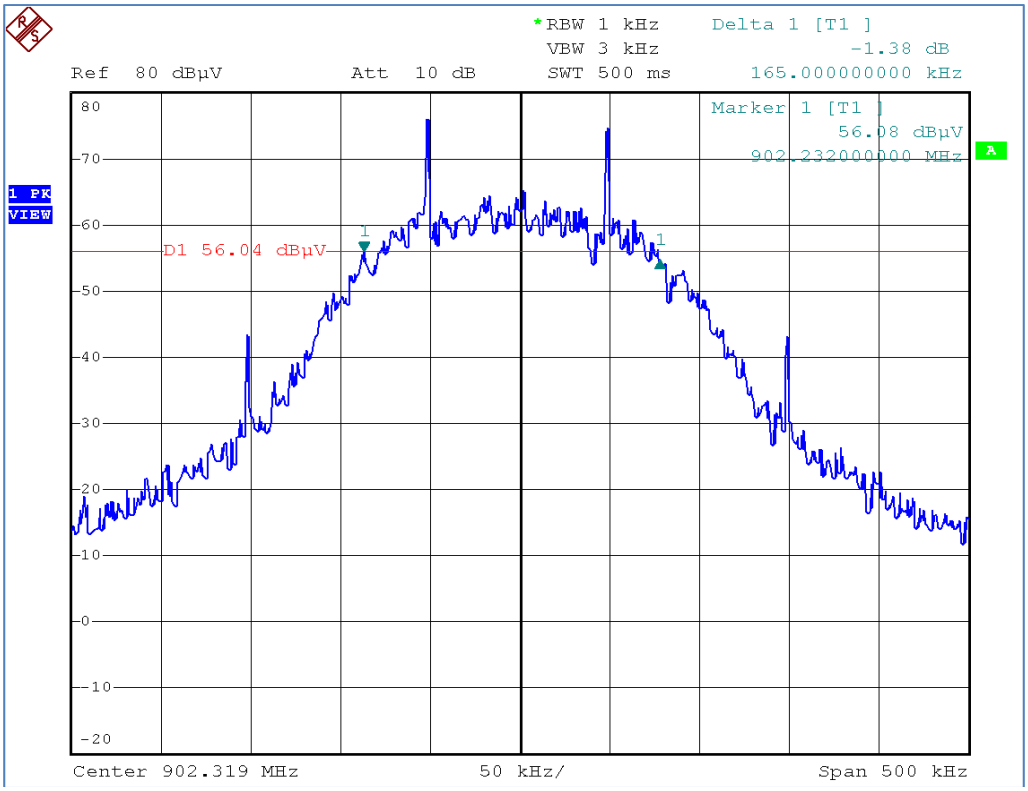


Figure 3.3.1: Measured BW (Channel L)

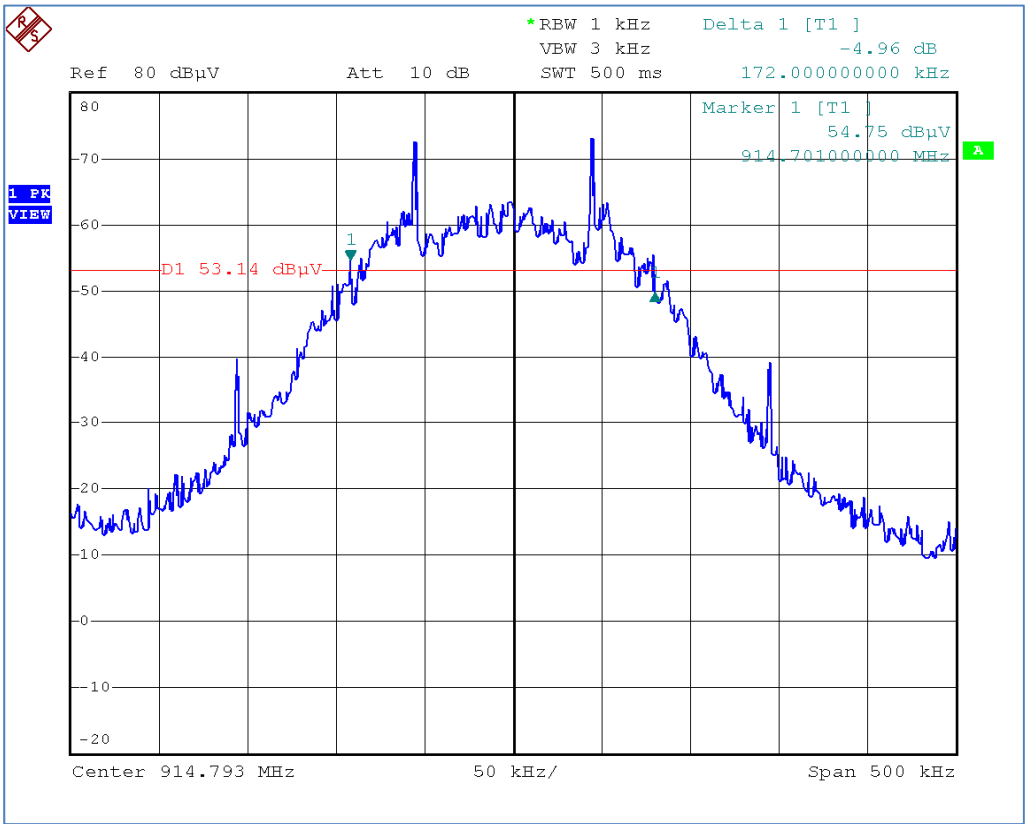


Figure 3.3.2: Measured BW (Channel M)

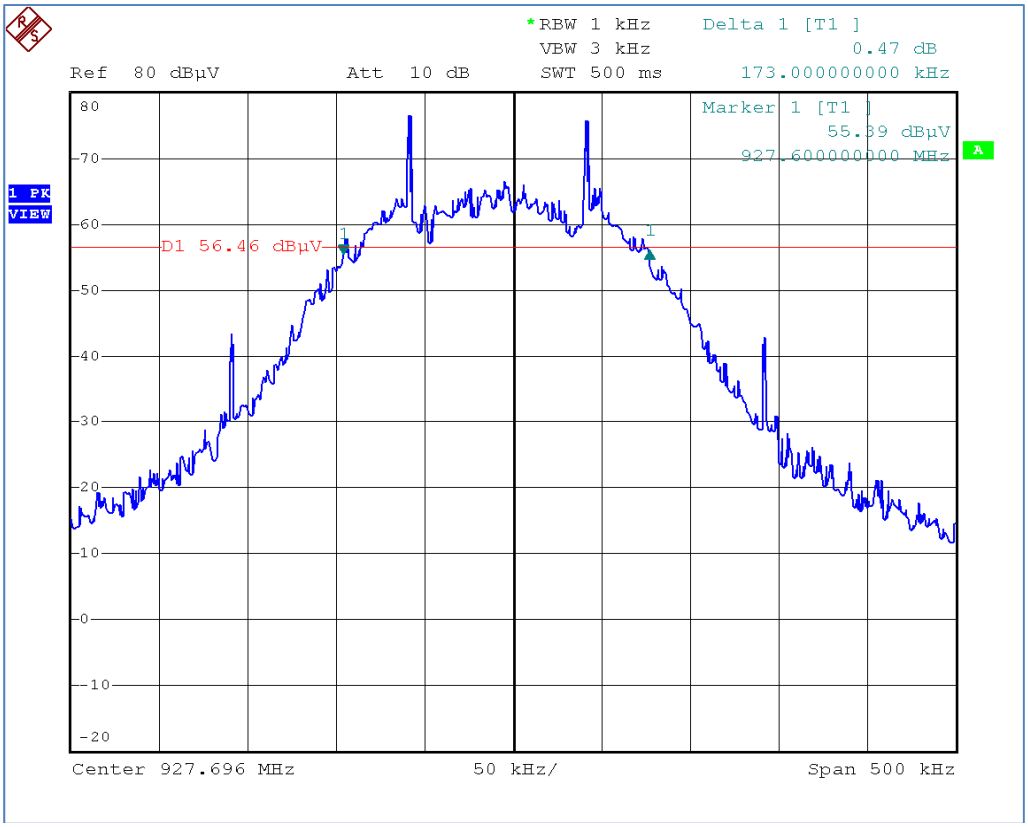


Figure 3.3.3: Measured BW (Channel H)

4.0 Band Edge Spurious Emissions Conducted

Band edge spurious emissions measurements were performed on the EUT.

4.1 Test Procedure

The spectrum analyzer was set for peak detection using a 100 kHz resolution bandwidth. The span is set to show the band edge at the center of the screen and include the peak of the in-band fundamental emission in the applicable half of the screen. Measurement is made at the band edge using the marker delta method.

The EUT was placed into maximum power and hopping mode. The spectrum analyzer trace was held in max-hold acquisition mode until a stable result was obtained.

4.2 Test Criteria

Clause Subject	Section Number	Date
Out of Band Spurious/Harmonic Emissions, -20 dBc*	15.247(d), 15.209	2013-08-30

*In restricted bands the limits of 15.209 apply. No restricted bands are found adjacent to the 902 to 928 MHz band.

4.3 Test Results

This test was performed on the antenna port utilizing power attenuator asset A105. The band edge emissions were found to be below -40 dBc.

The EUT was found to be in compliance with applicable requirements. Plotted results appear below.

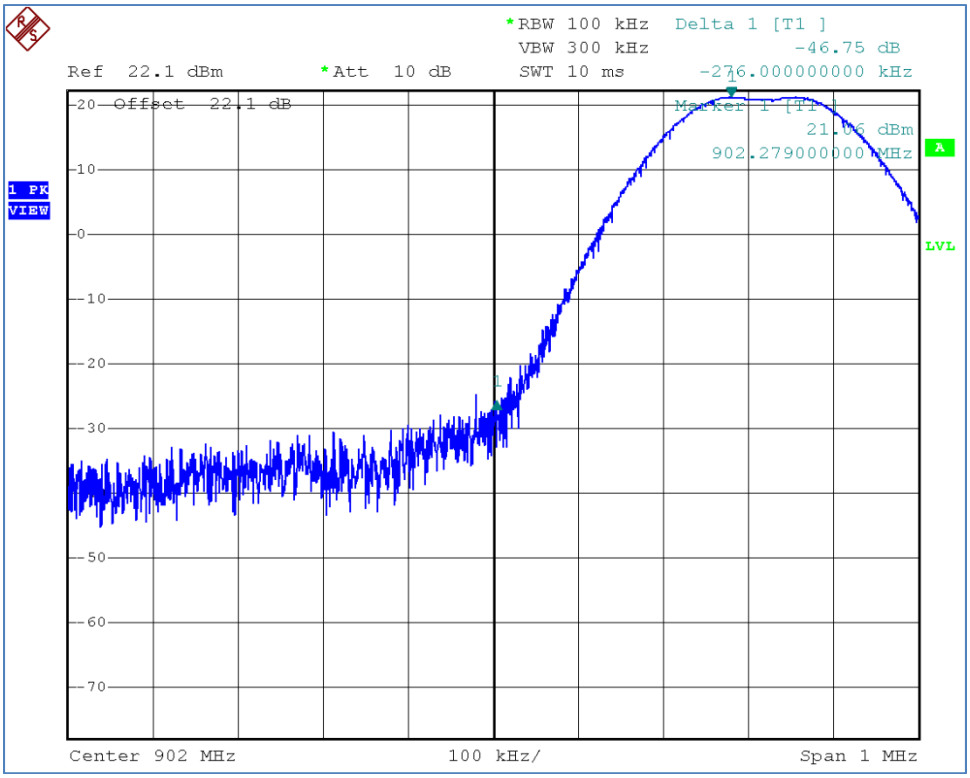


Figure 5.4.1: Band Edge, 902 MHz Edge

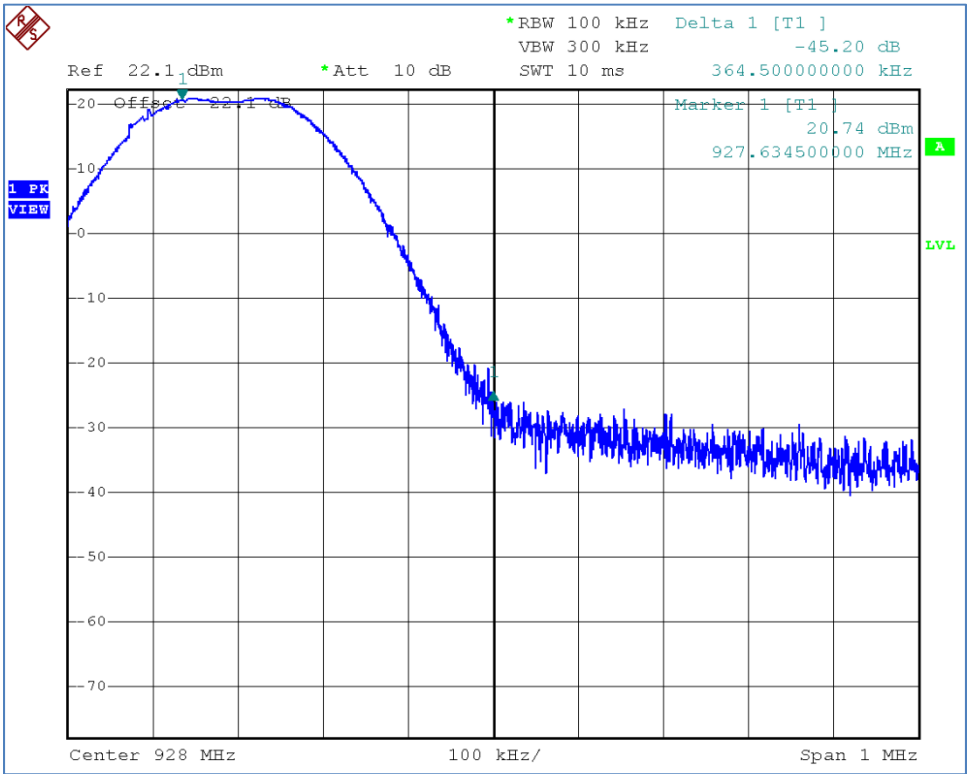


Figure 5.4.2: Band Edge, 928 MHz Edge

5.0 Radiated Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Part 15.

5.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 10 meters from the measurement antenna.

Spurious/harmonic emissions below 1 GHz were measured with peak detection using a resolution bandwidth of 120 kHz and measured at a distance of 10 meters. Quasi-peak detection was used to determine compliance if a peak did not meet the limit.

Harmonic emissions above 1 GHz peak were measured with peak detection, a resolution bandwidth of 1 MHz, and at a distance of 1 meter. If peak measurements exceeded average limits, the peak limit was applicable and duty cycle factor was then applied for average level calculation. Emissions were investigated up to the 10th harmonic of the transmitter fundamental.

Non-harmonic spurious emissions must satisfy the average limit and the peak limit (20 dB above average). A diagram showing the test setup is given as Figure 5.1.1.

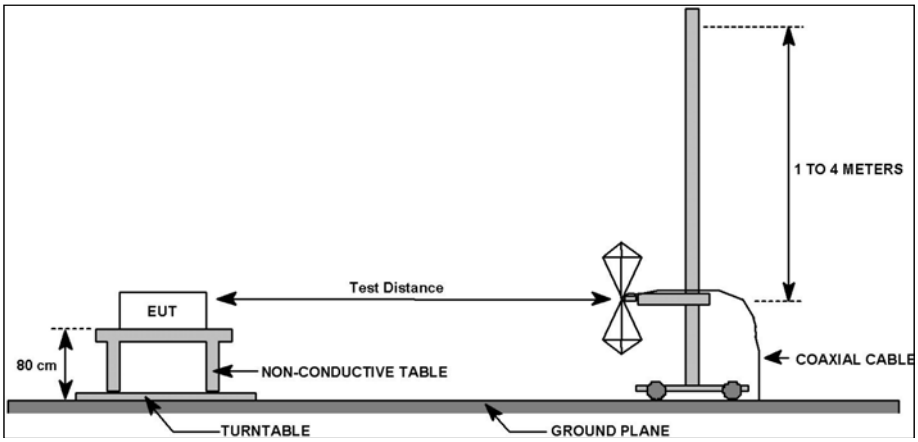


Figure 5.1.1: Field Strength of Spurious Emissions Test Setup

5.2 Test Criteria

Clause Subject	Section Number	Date
Field Strength of Radiated Spurious/Harmonic Emissions	15.205, 15.209, 15.212	2013-08-08, 2013-08-30, 2013-09-30

5.3 Test Results

The application includes modular approval and supplies a selection of antennas for the final use. Each type of antenna were selected for this test and consisting of the following:

Antenna Make, Model	Antenna Type
Kathrein-Scala P/N: TY-900	Yagi 7 elements total
Laird P/N: PA9-12	Flat Panel
Laird P/N: FG9023	Monopole-Long
Laird P/N: Phantom	Monopole-Short
Skywave P/N: 11-1118-A	Monopole-Helical

Radiated emissions were measured for each type antenna. Below 1 GHz, the EUT was operated in hopping mode on all channels. Above 1 GHz, the EUT emissions were measured in non-hopping CW mode on each of the low, middle, and high channels.

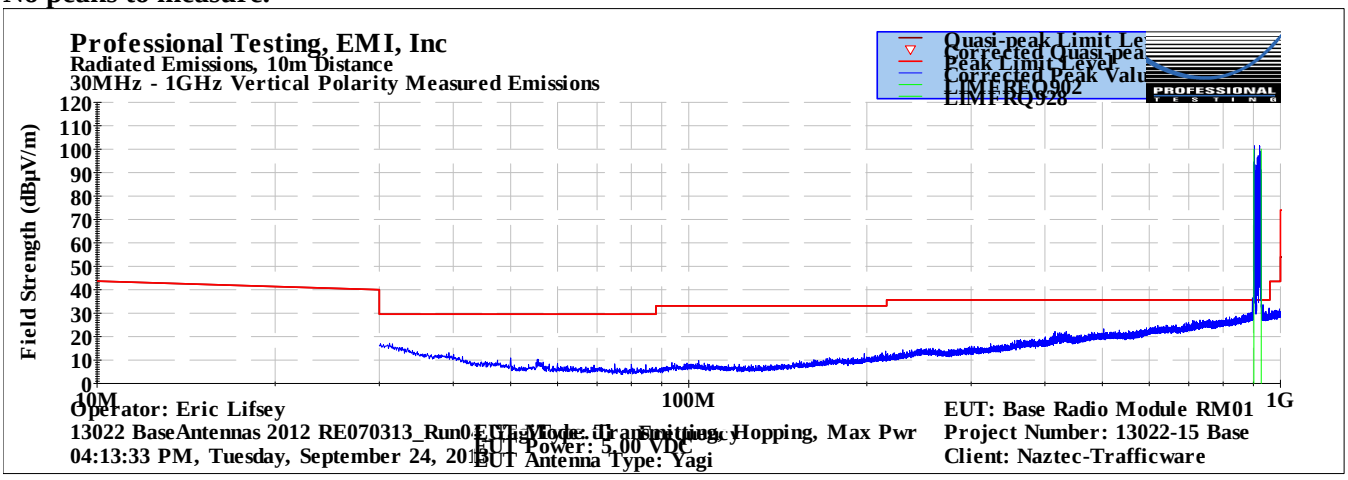
The EUT was found to be in compliance with applicable requirements. Results appear below.

Table 5.3.1: Yagi Type, Radiated Spurious Emissions, Below 1 GHz, Vertical Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet					Page: 1 of 1				
EUT Line Voltage:	5.00 VDC VDC				EUT Power Frequency:	0 N/A			
Antenna Orientation:	Vertical				Frequency Range:	30MHz to 1GHz			
EUT Mode of Operation:					Transmit, Max Pwr, Hopping, Yagi Antenna				
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results

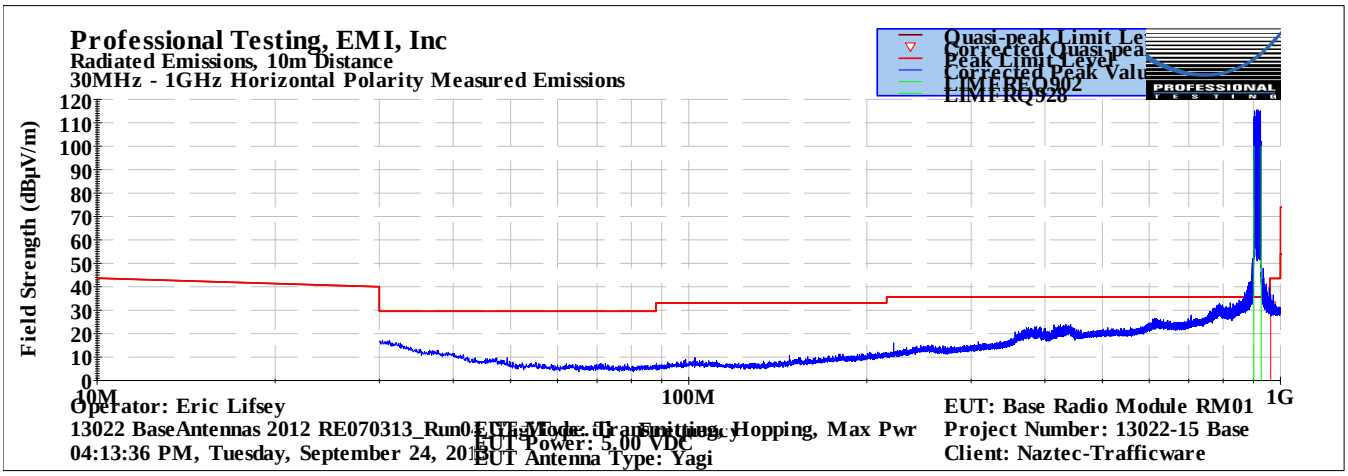
No peaks to measure.



RBW 120 kHz, VBW 120 kHz.

Table 5.3.2: Yagi Type, Radiated Spurious Emissions, Below 1 GHz, Horizontal Polarity

Professional Testing, EMI, Inc.									
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).								
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits								
Section:	15.209								
Test Date(s):	9/24/2013			EUT Serial #:	None				
Customer:	Naztec-Trafficware			EUT Part #:	Model RM01				
Project Number:	13022-15			Test Technician:	Eric Lifsey				
Purchase Order #:	0			Supervisor:	Rob McCollough				
Equip. Under Test:	Base Radio Module with Antennas			Witness' Name:	None				
Radiated Emissions Test Results Data Sheet							Page:	1 of	1
EUT Line Voltage:	5.00 VDC VDC			EUT Power Frequency:	0 N/A				
Antenna Orientation:	Vertical			Frequency Range:	30MHz to 1GHz				
EUT Mode of Operation:				Transmit, Max Pwr, Hopping, Yagi Antenna					
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
962.842	10	7	2.59	Quasi-peak	27.5	32.0	43.5	-11.5	Pass



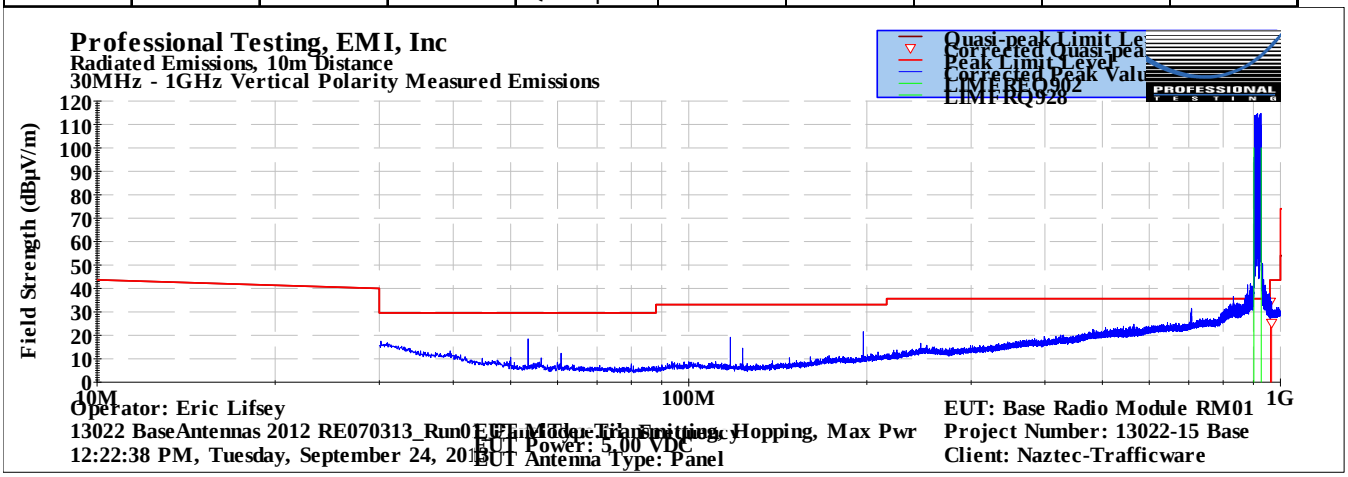
RBW 120 kHz, VBW 120 kHz.

Table 5.3.3: Panel Type, Radiated Spurious Emissions, Below 1 GHz, Vertical Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet			Page: 1 of 1
EUT Line Voltage:	5.00 VDC VDC	EUT Power Frequency:	0 N/A
Antenna Orientation:	Vertical	Frequency Range:	30MHz to 1GHz
EUT Mode of Operation:		Transmit, Max Pwr, Hopping, Panel Antenna	

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
962.092	10	340	3.23	Quasi-peak	29.7	34.24	43.5	-9.3	Pass
966.192	10	44	1.3	Quasi-peak	20.7	25.268	43.5	-18.2	Pass

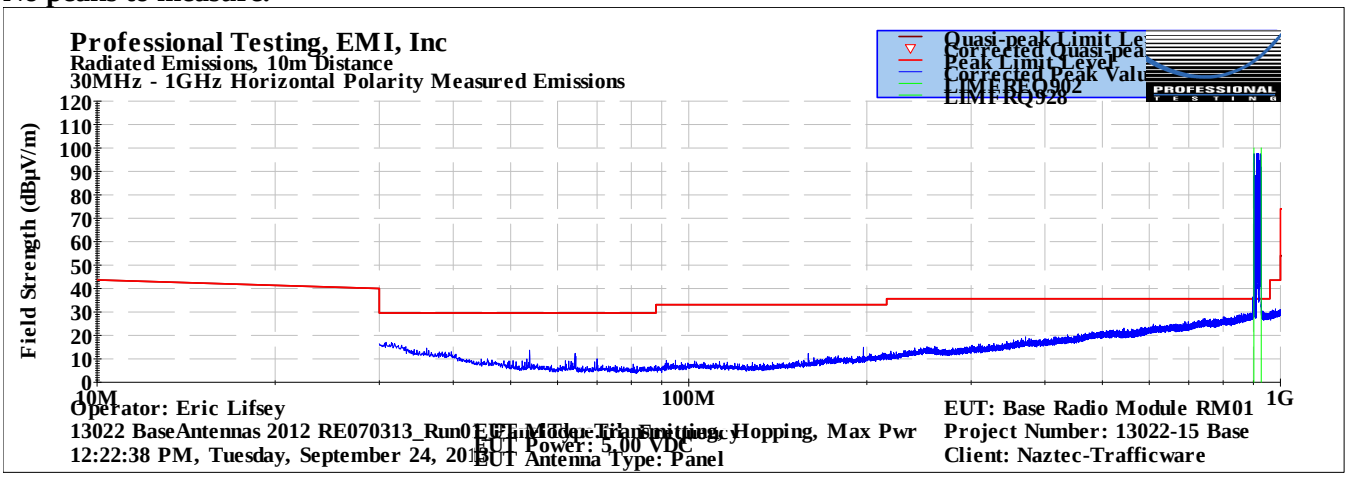


RBW 120 kHz, VBW 120 kHz.

Table 5.3.4: Panel Type, Radiated Spurious Emissions, Below 1 GHz, Horizontal Polarity

Professional Testing, EMI, Inc.									
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).								
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits								
Section:	15.209								
Test Date(s):	9/24/2013			EUT Serial #:	None				
Customer:	Naztec-Trafficware			EUT Part #:	Model RM01				
Project Number:	13022-15			Test Technician:	Eric Lifsey				
Purchase Order #:	0			Supervisor:	Rob McCollough				
Equip. Under Test:	Base Radio Module with Antennas			Witness' Name:	None				
Radiated Emissions Test Results Data Sheet					Page: 1 of 1				
EUT Line Voltage:	5.00 VDC VDC			EUT Power Frequency:	0 N/A				
Antenna Orientation:	Horizontal			Frequency Range:	30MHz to 1GHz				
EUT Mode of Operation:				Transmitting, Max Pwr, Hopping, Panel Antenna					
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results

No peaks to measure.



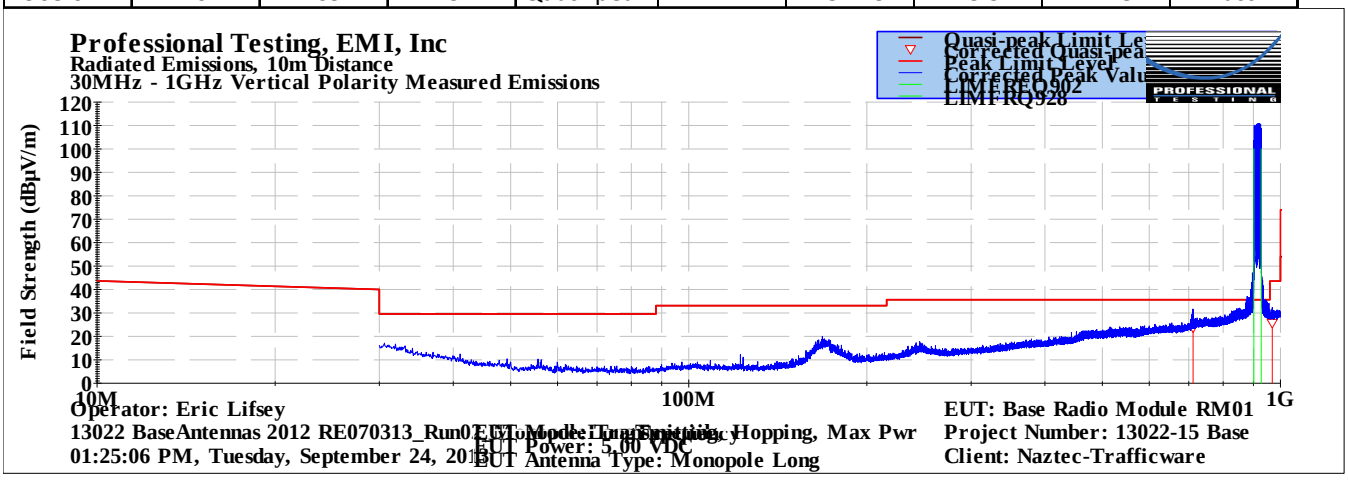
RBW 120 kHz, VBW 120 kHz.

Table 5.3.5: Monopole-Long Type, Radiated Spurious Emissions, Below 1 GHz, Vertical Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet			Page: 1 of 1
EUT Line Voltage:	5.00 VDC VDC	EUT Power Frequency:	0 N/A
Antenna Orientation:	Vertical	Frequency Range:	30MHz to 1GHz
EUT Mode of Operation:		Transmit, Max Pwr, Hopping, Monopole Long Ant	

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
711.853	10	118	4.12	Quasi-peak	24.6	23.75	35.6	-11.8	Pass
968.611	10	109	2.51	Quasi-peak	21.1	25.715	43.5	-17.8	Pass

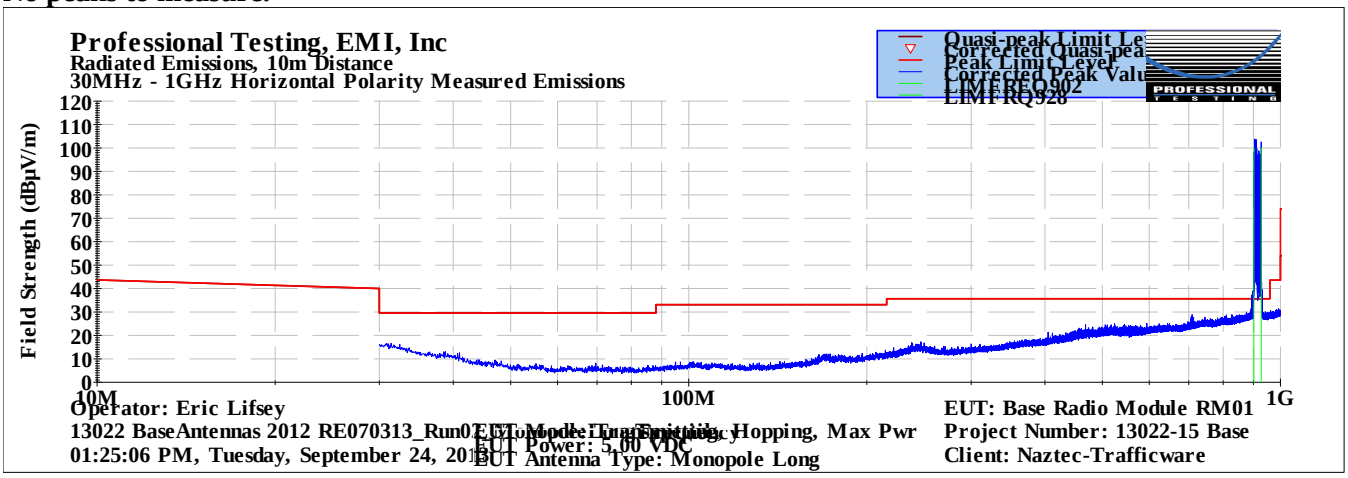


RBW 120 kHz, VBW 120 kHz.

Table 5.3.6: Monopole-Long Type, Radiated Spurious Emissions, Below 1 GHz, Horizontal Polarity

Professional Testing, EMI, Inc.									
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).								
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits								
Section:	15.209								
Test Date(s):	9/24/2013			EUT Serial #:	None				
Customer:	Naztec-Trafficware			EUT Part #:	Model RM01				
Project Number:	13022-15			Test Technician:	Eric Lifsey				
Purchase Order #:	0			Supervisor:	Rob McCollough				
Equip. Under Test:	Base Radio Module with Antennas			Witness' Name:	None				
Radiated Emissions Test Results Data Sheet					Page: 1 of 1				
EUT Line Voltage:	5.00 VDC VDC			EUT Power Frequency:	0 N/A				
Antenna Orientation:	Horizontal			Frequency Range:	30MHz to 1GHz				
EUT Mode of Operation:				Transmitting, Max Pwr, Hopping, Monopole Long Ant					
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results

No peaks to measure.



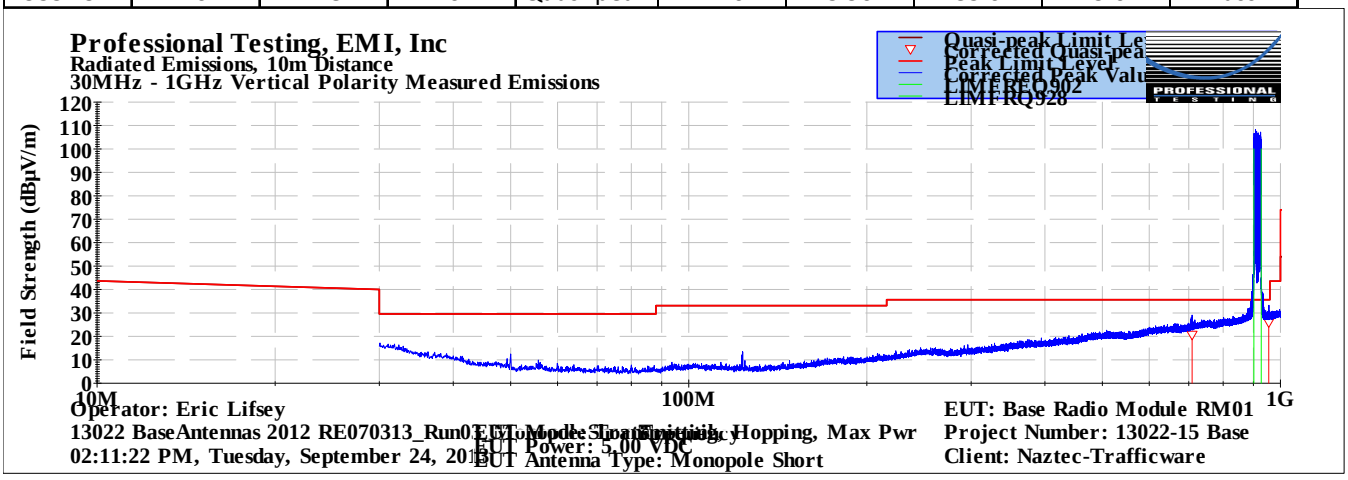
RBW 120 kHz, VBW 120 kHz.

Table 5.3.7: Monopole-Short Type, Radiated Spurious Emissions, Below 1 GHz, Vertical Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet			Page: 1 of 1
EUT Line Voltage:	5.00 VDC VDC	EUT Power Frequency:	0 N/A
Antenna Orientation:	Vertical	Frequency Range:	30MHz to 1GHz
EUT Mode of Operation:		Transmit, Max Pwr, Hopping, Monopole Short Ant	

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
709.041	10	343	2.27	Quasi-peak	21.6	20.63	35.6	-15.0	Pass
955.791	10	128	2.01	Quasi-peak	21.6	25.962	35.6	-9.6	Pass

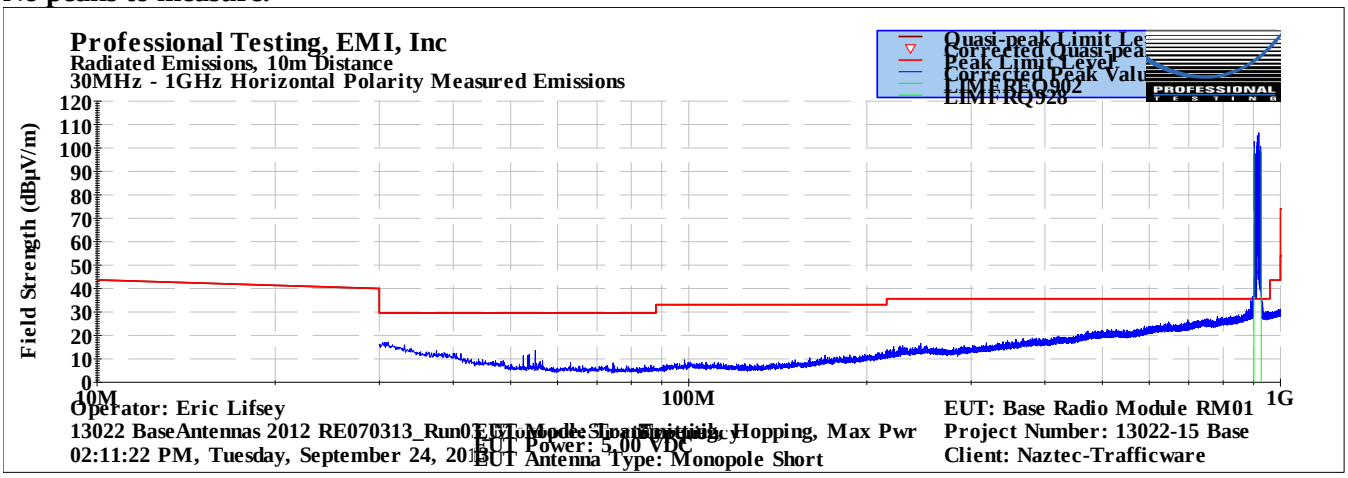


RBW 120 kHz, VBW 120 kHz.

Table 5.3.8: Monopole-Short Type, Radiated Spurious Emissions, Below 1 GHz, Horizontal Polarity

Professional Testing, EMI, Inc.									
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).								
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits								
Section:	15.209								
Test Date(s):	9/24/2013	EUT Serial #:	None						
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01						
Project Number:	13022-15	Test Technician:	Eric Lifsey						
Purchase Order #:	0	Supervisor:	Rob McCollough						
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None						
Radiated Emissions Test Results Data Sheet							Page:	1 of	1
EUT Line Voltage:	5.00 VDC VDC			EUT Power Frequency:	0 N/A				
Antenna Orientation:	Horizontal			Frequency Range:	30MHz to 1GHz				
EUT Mode of Operation:				Transmitting, Max Pwr, Hopping, Monopole Short Ant					
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results

No peaks to measure.



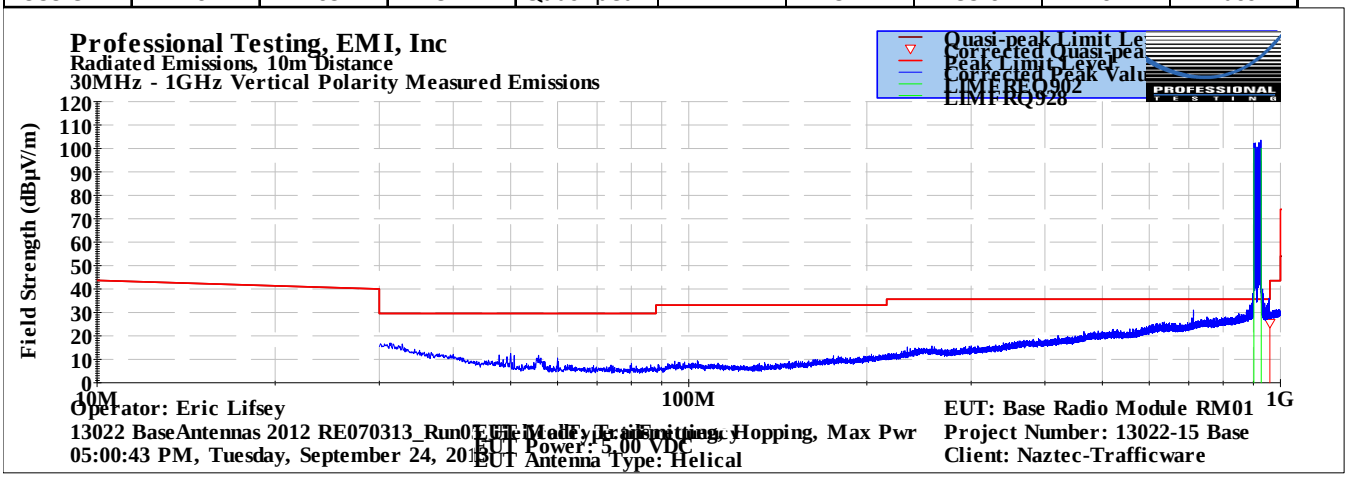
RBW 120 kHz, VBW 120 kHz.

Table 5.3.9: Monopole-Helical Type, Radiated Spurious Emissions, Below 1 GHz, Vertical Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet					Page: 1 of 1
EUT Line Voltage:	5.00 VDC VDC		EUT Power Frequency:	0 N/A	
Antenna Orientation:	Vertical		Frequency Range:	30MHz to 1GHz	
EUT Mode of Operation:			Transmit, Max Pwr, Hopping, Monopole Helical Ant		

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
959.841	10	169	3.1	Quasi-peak	21	25.47	35.6	-10.1	Pass



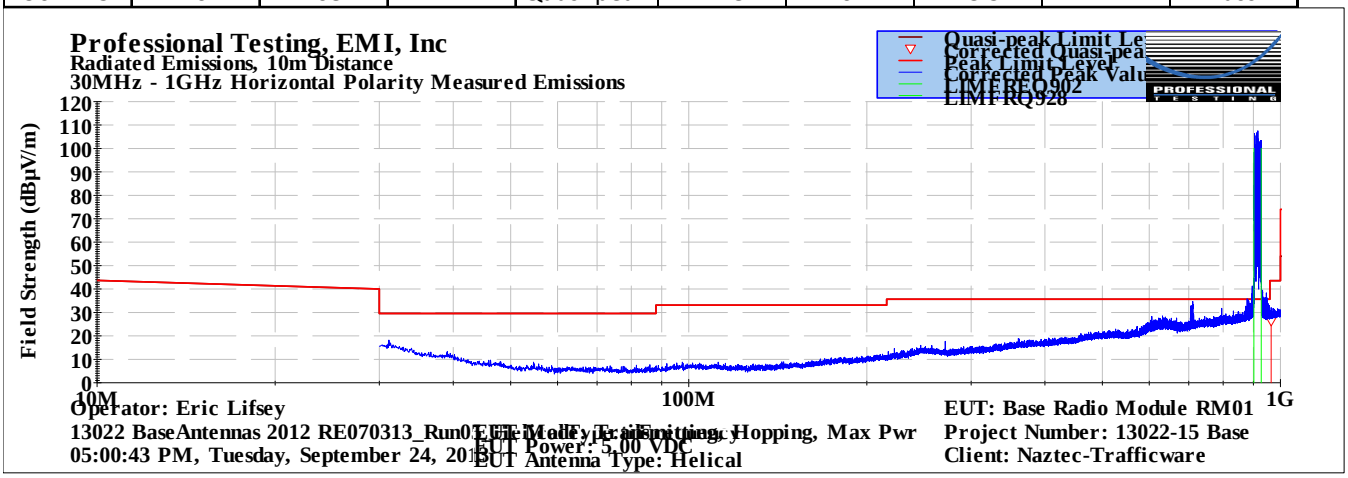
RBW 120 kHz, VBW 120 kHz.

Table 5.3.10: Monopole-Helical Type, Radiated Spurious Emissions, Below 1 GHz, Horizontal Polarity

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see §15.38).		
In accordance with:	FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits		
Section:	15.209		
Test Date(s):	9/24/2013	EUT Serial #:	None
Customer:	Naztec-Trafficware	EUT Part #:	Model RM01
Project Number:	13022-15	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base Radio Module with Antennas	Witness' Name:	None

Radiated Emissions Test Results Data Sheet				Page:	1	of	1
EUT Line Voltage:	5.00 VDC	VDC	EUT Power Frequency:	0	N/A		
Antenna Orientation:	Horizontal		Frequency Range:	30MHz to 1GHz			
EUT Mode of Operation:			Transmitting, Max Pwr, Hopping, Monopole Helical Ant				

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
964.715	10	108	2.44	Quasi-peak	21.8	26.4	43.5	-17.1	Pass



RBW 120 kHz, VBW 120 kHz.

Table 5.3.11: Yagi Type, Radiated Spurious Emissions, Above 1 GHz, Vertical Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Vertical	Distance:	1	meter	
Test Date:	October 3, 2013	EUT:	RM01 + Yagi Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	0	1	57.30	34.3	27.3	0.92	51.3	63.5	-12.2	-27.2	Peak
2.707	132	1	79.27	33.9	29.1	1.18	75.6	63.5	12.1	-2.9	Peak
3.609	100	1	62.67	33.9	32.6	1.54	62.8	63.5	-0.7	-15.7	Peak
4.512	144	1	68.64	33.9	33.3	1.80	69.9	63.5	6.4	-8.6	Peak
5.414	107	1	63.44	34.1	35.3	1.97	66.7	63.5	3.2	-11.8	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	220	1	59.90	35.0	37.1	2.39	64.4	63.5	0.9	-14.1	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	57	1	53.42	35.5	38.0	2.80	58.7	63.5	-4.8	-19.8	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	327	1	61.27	34.2	27.4	0.93	55.4	63.5	-8.1	-23.1	Peak
2.744	182	1	75.14	34.0	29.3	1.20	71.7	63.5	8.2	-6.8	Peak
3.659	82	1	59.92	33.9	32.7	1.56	60.2	63.5	-3.3	-18.3	Peak
4.574	176	1	69.81	33.9	33.5	1.80	71.2	63.5	7.7	-7.3	Peak
5.489	100	1	60.39	34.1	35.5	2.00	63.7	63.5	0.2	-14.8	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	195	1	58.80	35.1	37.2	2.40	63.3	63.5	-0.2	-15.2	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	57	1	53.35	35.4	38.0	2.80	58.7	63.5	-4.8	-19.8	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	0	1	64.66	34.1	27.6	0.94	59.0	63.5	-4.5	-19.5	Peak
2.783	176	1	76.03	34.0	29.5	1.21	72.7	63.5	9.2	-5.8	Peak
3.711	100	1	59.93	33.9	32.8	1.58	60.4	63.5	-3.1	-18.1	Peak
4.638	188	1	68.31	33.9	33.7	1.80	69.9	63.5	6.4	-8.6	Peak
5.566	220	1	59.77	34.1	35.4	2.00	63.1	63.5	-0.4	-15.4	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	276	1	56.33	35.2	37.2	2.40	60.8	63.5	-2.7	-17.7	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	295	1	54.66	35.3	37.9	2.80	60.0	63.5	-3.5	-18.5	Peak

Table 5.3.12: Yagi Type, Radiated Spurious Emissions, Above 1 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Horizontal	Distance:	1 meter
Test Date:	October 3, 2013	EUT:	RM01 + Yagi Antenna	Limit Distance Factor dB	
Voltage:	5 VDC	Serial #:	None	9.5	
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	57	1	53.34	34.3	27.3	0.92	47.3	63.5	-16.2	-31.2	Peak
2.707	138	1	68.52	33.9	29.1	1.18	64.9	63.5	1.4	-13.6	Peak
3.609	264	1	62.42	33.9	32.6	1.54	62.6	63.5	-0.9	-15.9	Peak
4.512	157	1	65.55	33.9	33.3	1.80	66.8	63.5	3.3	-11.7	Peak
5.414	94	1	59.60	34.1	35.3	1.97	62.8	63.5	-0.7	-15.7	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	113	1	54.24	35.0	37.1	2.39	58.7	63.5	-4.8	-19.8	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	0	1	51.49	35.5	38.0	2.80	56.8	63.5	-6.7	-21.7	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	295	1	54.13	34.2	27.4	0.93	48.3	63.5	-15.2	-30.2	Peak
2.744	201	1	68.02	34.0	29.3	1.20	64.5	63.5	1.0	-14.0	Peak
3.659	276	1	57.80	33.9	32.7	1.56	58.1	63.5	-5.4	-20.4	Peak
4.574	220	1	66.44	33.9	33.5	1.80	67.8	63.5	4.3	-10.7	Peak
5.489	151	1	60.35	34.1	35.5	2.00	63.7	63.5	0.2	-14.8	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	113	1	54.52	35.1	37.2	2.40	59.0	63.5	-4.5	-19.5	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	NF	1		35.4	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	339	1	58.24	34.1	27.6	0.94	52.6	63.5	-10.9	-25.9	Peak
2.783	201	1	68.12	34.0	29.5	1.21	64.8	63.5	1.3	-13.7	Peak
3.711	163	1	56.33	33.9	32.8	1.58	56.8	63.5	-6.7	-21.7	Peak
4.638	207	1	64.98	33.9	33.7	1.80	66.5	63.5	3.0	-12.0	Peak
5.566	151	1	59.47	34.1	35.4	2.00	62.8	63.5	-0.7	-15.7	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	144	1	55.22	35.2	37.2	2.40	59.7	63.5	-3.8	-18.8	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	NF	1		35.3	37.9	2.80		63.5			Peak

Table 5.3.13: Panel Type, Radiated Spurious Emissions, Above 1 GHz, Vertical Polarity

Professional Testing (EMI), Inc.
Radiated Emissions Measured Indoors
V 3.0

Client:	Naztec-Trafficware	Polarity:	Vertical	Distance:	1	meter	
Test Date:	October 2, 2013	EUT:	RM01 + Panel Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	176	1	62.03	34.3	27.3	0.92	56.0	63.5	-7.5	-22.5	Peak
2.707	176	1	74.41	33.9	29.1	1.18	70.8	63.5	7.3	-7.7	Peak
3.609	119	1	60.48	33.9	32.6	1.54	60.7	63.5	-2.8	-17.8	Peak
4.512	201	1	68.30	33.9	33.3	1.80	69.5	63.5	6.0	-9.0	Peak
5.414	195	1	64.54	34.1	35.3	1.97	67.8	63.5	4.3	-10.7	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	220	1	59.82	35.0	37.1	2.39	64.3	63.5	0.8	-14.2	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	214	1	55.31	35.5	38.0	2.80	60.6	63.5	-2.9	-17.9	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	295	1	56.72	34.2	27.4	0.93	50.9	63.5	-12.6	-27.6	Peak
2.744	176	1	76.36	34.0	29.3	1.20	72.9	63.5	9.4	-5.6	Peak
3.659	82	1	60.62	33.9	32.7	1.56	60.9	63.5	-2.6	-17.6	Peak
4.574	144	1	69.24	33.9	33.5	1.80	70.6	63.5	7.1	-7.9	Peak
5.489	100	1	60.85	34.1	35.5	2.00	64.2	63.5	0.7	-14.3	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	201	1	59.85	35.1	37.2	2.40	64.3	63.5	0.8	-14.2	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	207	1	55.55	35.4	38.0	2.80	60.9	63.5	-2.6	-17.6	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	345	1	60.56	34.1	27.6	0.94	54.9	63.5	-8.6	-23.6	Peak
2.783	188	1	75.59	34.0	29.5	1.21	72.3	63.5	8.8	-6.2	Peak
3.711	126	1	61.65	33.9	32.8	1.58	62.1	63.5	-1.4	-16.4	Peak
4.638	220	1	67.46	33.9	33.7	1.80	69.0	63.5	5.5	-9.5	Peak
5.566	100	1	61.58	34.1	35.4	2.00	64.9	63.5	1.4	-13.6	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	188	1	57.17	35.2	37.2	2.40	61.6	63.5	-1.9	-16.9	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	195	1	55.38	35.3	37.9	2.80	60.8	63.5	-2.7	-17.7	Peak

Table 5.3.14: Panel Type, Radiated Spurious Emissions, Above 1 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Horizontal	Distance:	1	meter	
Test Date:	October 2, 2013	EUT:	RM01 + Panel Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	44	1	64.92	34.3	27.3	0.92	58.9	63.5	-4.6	-19.6	Peak
2.707	138	1	66.76	33.9	29.1	1.18	63.1	63.5	-0.4	-15.4	Peak
3.609	75	1	57.43	33.9	32.6	1.54	57.6	63.5	-5.9	-20.9	Peak
4.512	157	1	68.53	33.9	33.3	1.80	69.8	63.5	6.3	-8.7	Peak
5.414	138	1	62.87	34.1	35.3	1.97	66.1	63.5	2.6	-12.4	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	182	1	56.25	35.0	37.1	2.39	60.7	63.5	-2.8	-17.8	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	220	1	52.57	35.5	38.0	2.80	57.9	63.5	-5.6	-20.6	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	314	1	61.24	34.2	27.4	0.93	55.4	63.5	-8.1	-23.1	Peak
2.744	132	1	69.06	34.0	29.3	1.20	65.6	63.5	2.1	-12.9	Peak
3.659	207	1	57.05	33.9	32.7	1.56	57.4	63.5	-6.1	-21.1	Peak
4.574	151	1	69.71	33.9	33.5	1.80	71.1	63.5	7.6	-7.4	Peak
5.489	100	1	62.29	34.1	35.5	2.00	65.6	63.5	2.1	-12.9	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	132	1	57.73	35.1	37.2	2.40	62.2	63.5	-1.3	-16.3	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	257	1	52.36	35.4	38.0	2.80	57.7	63.5	-5.8	-20.8	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	50	1	57.67	34.1	27.6	0.94	52.0	63.5	-11.5	-26.5	Peak
2.783	138	1	67.07	34.0	29.5	1.21	63.8	63.5	0.3	-14.7	Peak
3.711	283	1	57.63	33.9	32.8	1.58	58.1	63.5	-5.4	-20.4	Peak
4.638	144	1	67.17	33.9	33.7	1.80	68.7	63.5	5.2	-9.8	Peak
5.566	195	1	60.09	34.1	35.4	2.00	63.4	63.5	-0.1	-15.1	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	132	1	57.74	35.2	37.2	2.40	62.2	63.5	-1.3	-16.3	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	320	1	53.37	35.3	37.9	2.80	58.8	63.5	-4.7	-19.7	Peak

Table 5.3.15: Monopole-Long Type, Radiated Spurious Emissions, Above 1 GHz, Vertical Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Vertical	Distance:	1	meter	
Test Date:	October 1, 2013	EUT:	RM01 + Long Monopole Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	320	1	55.96	34.3	27.3	0.92	49.9	63.5	-13.6	-28.6	Peak
2.707	176	1	70.01	33.9	29.1	1.18	66.4	63.5	2.9	-12.1	Peak
3.609	295	1	56.72	33.9	32.6	1.54	56.9	63.5	-6.6	-21.6	Peak
4.512	182	1	66.65	33.9	33.3	1.80	67.9	63.5	4.4	-10.6	Peak
5.414	75	1	61.02	34.1	35.3	1.97	64.2	63.5	0.7	-14.3	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	245	1	57.10	35.0	37.1	2.39	61.6	63.5	-1.9	-16.9	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	NF	1		35.5	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	63	1	60.43	34.2	27.4	0.93	54.6	63.5	-8.9	-23.9	Peak
2.744	132	1	68.98	34.0	29.3	1.20	65.5	63.5	2.0	-13.0	Peak
3.659	295	1	55.69	33.9	32.7	1.56	56.0	63.5	-7.5	-22.5	Peak
4.574	176	1	67.88	33.9	33.5	1.80	69.3	63.5	5.8	-9.2	Peak
5.489	82	1	58.74	34.1	35.5	2.00	62.1	63.5	-1.4	-16.4	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	295	1	55.58	35.1	37.2	2.40	60.1	63.5	-3.4	-18.4	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	NF	1		35.4	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	63	1	60.68	34.1	27.6	0.94	55.1	63.5	-8.4	-23.4	Peak
2.783	132	1	69.40	34.0	29.5	1.21	66.1	63.5	2.6	-12.4	Peak
3.711	201	1	56.66	33.9	32.8	1.58	57.1	63.5	-6.4	-21.4	Peak
4.638	176	1	64.24	33.9	33.7	1.80	65.8	63.5	2.3	-12.7	Peak
5.566	113	1	58.97	34.1	35.4	2.00	62.3	63.5	-1.2	-16.2	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	132	1	54.42	35.2	37.2	2.40	58.9	63.5	-4.6	-19.6	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	NF	1		35.3	37.9	2.80		63.5			Peak

Table 5.3.16: Monopole-Long Type, Radiated Spurious Emissions, Above 1 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Horizontal	Distance:	1	meter	
Test Date:	October 1, 2013	EUT:	RM01 + Long Monopole Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	69	1	51.28	34.3	27.3	0.92	45.2	63.5	-18.3	-33.3	Peak
2.707	94	1	59.21	33.9	29.1	1.18	55.6	63.5	-7.9	-22.9	Peak
3.609	69	1	53.61	33.9	32.6	1.54	53.8	63.5	-9.7	-24.7	Peak
4.512	19	1	60.36	33.9	33.3	1.80	61.6	63.5	-1.9	-16.9	Peak
5.414	31	1	55.73	34.1	35.3	1.97	58.9	63.5	-4.6	-19.6	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	320	1	53.01	35.0	37.1	2.39	57.5	63.5	-6.0	-21.0	Peak
8.118	NF	1		35.2	38.5	2.50		63.5			Peak
9.024	NF	1		35.5	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	50	1	53.06	34.2	27.4	0.93	47.2	63.5	-16.3	-31.3	Peak
2.744	100	1	60.29	34.0	29.3	1.20	56.8	63.5	-6.7	-21.7	Peak
3.659	69	1	53.15	33.9	32.7	1.56	53.5	63.5	-10.0	-25.0	Peak
4.574	19	1	62.06	33.9	33.5	1.80	63.4	63.5	-0.1	-15.1	Peak
5.489	69	1	55.98	34.1	35.5	2.00	59.3	63.5	-4.2	-19.2	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	327	1	52.86	35.1	37.2	2.40	57.3	63.5	-6.2	-21.2	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	NF	1		35.4	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	295	1	52.21	34.1	27.6	0.94	46.6	63.5	-16.9	-31.9	Peak
2.783	107	1	60.91	34.0	29.5	1.21	57.6	63.5	-5.9	-20.9	Peak
3.711	276	1	54.56	33.9	32.8	1.58	55.0	63.5	-8.5	-23.5	Peak
4.638	38	1	59.61	33.9	33.7	1.80	61.2	63.5	-2.3	-17.3	Peak
5.566	320	1	56.01	34.1	35.4	2.00	59.3	63.5	-4.2	-19.2	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	NF	1		35.2	37.2	2.40		63.5			Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	NF	1		35.3	37.9	2.80		63.5			Peak

Table 5.3.17: Monopole-Short Type, Radiated Spurious Emissions, Above 1 GHz, Vertical Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Vertical	Distance:	1	meter	
Test Date:	October 1, 2013	EUT:	RM01 + Short Monopole Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	251	1	60.15	34.3	27.3	0.92	54.1	63.5	-9.4	-24.4	Peak
2.707	170	1	71.07	33.9	29.1	1.18	67.4	63.5	3.9	-11.1	Peak
3.609	113	1	63.23	33.9	32.6	1.54	63.4	63.5	-0.1	-15.1	Peak
4.512	170	1	67.47	33.9	33.3	1.80	68.7	63.5	5.2	-9.8	Peak
5.414	82	1	64.30	34.1	35.3	1.97	67.5	63.5	4.0	-11.0	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	220	1	59.56	35.0	37.1	2.39	64.0	63.5	0.5	-14.5	Peak
8.118	0	1	53.26	35.2	38.5	2.50	59.0	63.5	-4.5	-19.5	Peak
9.024	251	1	52.69	35.5	38.0	2.80	58.0	63.5	-5.5	-20.5	Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	295	1	52.49	34.2	27.4	0.93	46.7	63.5	-16.8	-31.8	Peak
2.744	182	1	71.29	34.0	29.3	1.20	67.8	63.5	4.3	-10.7	Peak
3.659	232	1	61.39	33.9	32.7	1.56	61.7	63.5	-1.8	-16.8	Peak
4.574	176	1	68.13	33.9	33.5	1.80	69.5	63.5	6.0	-9.0	Peak
5.489	75	1	60.85	34.1	35.5	2.00	64.2	63.5	0.7	-14.3	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	220	1	56.45	35.1	37.2	2.40	60.9	63.5	-2.6	-17.6	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	NF	1		35.4	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	295	1	54.78	34.1	27.6	0.94	49.2	63.5	-14.3	-29.3	Peak
2.783	176	1	71.36	34.0	29.5	1.21	68.0	63.5	4.5	-10.5	Peak
3.711	170	1	59.98	33.9	32.8	1.58	60.4	63.5	-3.1	-18.1	Peak
4.638	163	1	65.72	33.9	33.7	1.80	67.3	63.5	3.8	-11.2	Peak
5.566	94	1	58.71	34.1	35.4	2.00	62.0	63.5	-1.5	-16.5	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	283	1	55.46	35.2	37.2	2.40	59.9	63.5	-3.6	-18.6	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	295	1	54.77	35.3	37.9	2.80	60.2	63.5	-3.3	-18.3	Peak

Table 5.3.18: Monopole-Short Type, Radiated Spurious Emissions, Above 1 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Horizontal	Distance:	1	meter	
Test Date:	October 1, 2013	EUT:	RM01 + Short Monopole Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.805	157	1	54.16	34.3	27.3	0.92	48.1	63.5	-15.4	-30.4	Peak
2.707	126	1	64.22	33.9	29.1	1.18	60.6	63.5	-2.9	-17.9	Peak
3.609	75	1	59.71	33.9	32.6	1.54	59.9	63.5	-3.6	-18.6	Peak
4.512	25	1	65.63	33.9	33.3	1.80	66.9	63.5	3.4	-11.6	Peak
5.414	132	1	60.20	34.1	35.3	1.97	63.4	63.5	-0.1	-15.1	Peak
6.314	NF	1		34.5	35.2	2.20		63.5			Peak
7.219	138	1	55.29	35.0	37.1	2.39	59.8	63.5	-3.7	-18.7	Peak
8.118	327	1	52.67	35.2	38.5	2.50	58.4	63.5	-5.1	-20.1	Peak
9.024	NF	1		35.5	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	0	1	50.00	34.2	27.4	0.93	44.2	63.5	-19.3	-34.3	Peak
2.744	113	1	64.83	34.0	29.3	1.20	61.3	63.5	-2.2	-17.2	Peak
3.659	82	1	58.50	33.9	32.7	1.56	58.8	63.5	-4.7	-19.7	Peak
4.574	31	1	66.51	33.9	33.5	1.80	67.9	63.5	4.4	-10.6	Peak
5.489	138	1	59.72	34.1	35.5	2.00	63.1	63.5	-0.4	-15.4	Peak
6.403	NF	1		34.6	35.3	2.20		63.5			Peak
7.318	132	1	56.68	35.1	37.2	2.40	61.2	63.5	-2.3	-17.3	Peak
8.233	NF	1		35.4	38.4	2.50		63.5			Peak
9.148	NF	1		35.4	38.0	2.80		63.5			Peak

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	0	1	48.75	34.1	27.6	0.94	43.1	63.5	-20.4	-35.4	Peak
2.783	107	1	65.85	34.0	29.5	1.21	62.5	63.5	-1.0	-16.0	Peak
3.711	295	1	57.17	33.9	32.8	1.58	57.6	63.5	-5.9	-20.9	Peak
4.638	31	1	64.09	33.9	33.7	1.80	65.6	63.5	2.1	-12.9	Peak
5.566	132	1	58.04	34.1	35.4	2.00	61.3	63.5	-2.2	-17.2	Peak
6.494	NF	1		34.7	35.3	2.20		63.5			Peak
7.421	132	1	55.33	35.2	37.2	2.40	59.8	63.5	-3.7	-18.7	Peak
8.350	NF	1		35.2	38.3	2.54		63.5			Peak
9.277	NF	1		35.3	37.9	2.80		63.5			Peak

Table 5.3.19: Monopole-Helical Type, Radiated Spurious Emissions, Above 1 GHz, Vertical Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Vertical	Distance:	1	meter	
Test Date:	September 30, 2013	EUT:	RM01 + Helical Antenna		Limit Distance Factor dB		
Voltage:	5 VDC	Serial #:	None		9.5		
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00		
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B		

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.804	163	1	69.49	34.3	27.3	0.92	63.4	63.5	-0.1	-15.1	Peak
2.706	176	1	71.10	33.9	29.1	1.18	67.5	63.5	4.0	-11.0	Peak
3.608	82	1	54.99	33.9	32.6	1.54	55.2	63.5	-8.3	-23.3	Peak
4.510	100	1	71.87	33.9	33.3	1.80	73.1	63.5	9.6	-5.4	Peak
5.412	100	1	60.09	34.1	35.3	1.96	63.3	63.5	-0.2	-15.2	Peak
6.314	245	1	53.22	34.5	35.2	2.20	56.2	63.5	-7.3	-22.3	Peak
7.216	245	1	59.37	35.0	37.1	2.39	63.8	63.5	0.3	-14.7	Peak
8.118	245	1	53.90	35.2	38.5	2.50	59.6	63.5	-3.9	-18.9	Peak
9.020	220	1	53.00	35.5	38.0	2.80	58.3	63.5	-5.2	-20.2	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	170	1	67.33	34.2	27.4	0.93	61.5	63.5	-2.0	-17.0	Peak
2.744	182	1	69.80	34.0	29.3	1.20	66.3	63.5	2.8	-12.2	Peak
3.659	88	1	58.03	33.9	32.7	1.56	58.3	63.5	-5.2	-20.2	Peak
4.574	188	1	73.63	33.9	33.5	1.80	75.0	63.5	11.5	-3.5	Peak
5.489	220	1	59.26	34.1	35.5	2.00	62.6	63.5	-0.9	-15.9	Peak
6.403	257	1	54.02	34.6	35.3	2.20	56.9	63.5	-6.6	-21.6	Peak
7.318	214	1	58.31	35.1	37.2	2.40	62.8	63.5	-0.7	-15.7	Peak
8.233	126	1	54.18	35.4	38.4	2.50	59.7	63.5	-3.8	-18.8	Peak
9.148	289	1	54.43	35.4	38.0	2.80	59.8	63.5	-3.7	-18.7	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	176	1	63.92	34.1	27.6	0.94	58.3	63.5	-5.2	-20.2	Peak
2.783	176	1	70.84	34.0	29.5	1.21	67.5	63.5	4.0	-11.0	Peak
3.711	107	1	58.26	33.9	32.8	1.58	58.7	63.5	-4.8	-19.8	Peak
4.638	170	1	71.55	33.9	33.7	1.80	73.1	63.5	9.6	-5.4	Peak
5.566	107	1	59.08	34.1	35.4	2.00	62.4	63.5	-1.1	-16.1	Peak
6.494	257	1	53.82	34.7	35.3	2.20	56.6	63.5	-6.9	-21.9	Peak
7.421	295	1	57.46	35.2	37.2	2.40	61.9	63.5	-1.6	-16.6	Peak
8.350	214	1	54.18	35.2	38.3	2.54	59.8	63.5	-3.7	-18.7	Peak
9.277	283	1	55.37	35.3	37.9	2.80	60.8	63.5	-2.7	-17.7	Peak

Table 5.3.20: Monopole-Helical Type, Radiated Spurious Emissions, Above 1 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.

Radiated Emissions Measured Indoors

V 3.0

Client:	Naztec-Trafficware	Polarity:	Horizontal	Distance:	1 meter
Test Date:	September 30, 2013	EUT:	RM01 + Helical Antenna	Limit Distance Factor dB	
Voltage:	5 VDC	Serial #:	None	9.5	
Frequency:	n/a	Project #:	13022-15	Duty Cycle Factor dB:	-15.00
Technician:	Eric Lifsey	Test Type:	15.247	Class:	B

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.804	283	1	69.42	34.3	27.3	0.92	63.4	63.5	-0.1	-15.1	Peak
2.706	126	1	63.13	33.9	29.1	1.18	59.5	63.5	-4.0	-19.0	Peak
3.608	63	1	53.61	33.9	32.6	1.54	53.8	63.5	-9.7	-24.7	Peak
4.510	25	1	64.78	33.9	33.3	1.80	66.0	63.5	2.5	-12.5	Peak
5.412	44	1	59.62	34.1	35.3	1.96	62.8	63.5	-0.7	-15.7	Peak
6.314	38	1	52.01	34.5	35.2	2.20	54.9	63.5	-8.6	-23.6	Peak
7.216	314	1	56.78	35.0	37.1	2.39	61.2	63.5	-2.3	-17.3	Peak
8.118	119	1	55.42	35.2	38.5	2.50	61.2	63.5	-2.3	-17.3	Peak
9.020	314	1	53.35	35.5	38.0	2.80	58.7	63.5	-4.8	-19.8	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.830	276	1	65.33	34.2	27.4	0.93	59.5	63.5	-4.0	-19.0	Peak
2.744	113	1	64.41	34.0	29.3	1.20	60.9	63.5	-2.6	-17.6	Peak
3.659	100	1	55.40	33.9	32.7	1.56	55.7	63.5	-7.8	-22.8	Peak
4.574	25	1	66.98	33.9	33.5	1.80	68.4	63.5	4.9	-10.1	Peak
5.489	132	1	59.20	34.1	35.5	2.00	62.5	63.5	-1.0	-16.0	Peak
6.403	314	1	52.03	34.6	35.3	2.20	54.9	63.5	-8.6	-23.6	Peak
7.318	126	1	57.91	35.1	37.2	2.40	62.4	63.5	-1.1	-16.1	Peak
8.233	138	1	54.89	35.4	38.4	2.50	60.4	63.5	-3.1	-18.1	Peak
9.148	314	1	54.24	35.4	38.0	2.80	59.6	63.5	-3.9	-18.9	Peak
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit at Distance (dBuV/m)	Margin (dB)	Margin With Duty Cycle Factor	Detector Function
1.855	94	1	60.12	34.1	27.6	0.94	54.5	63.5	-9.0	-24.0	Peak
2.783	107	1	67.04	34.0	29.5	1.21	63.7	63.5	0.2	-14.8	Peak
3.711	295	1	56.57	33.9	32.8	1.58	57.0	63.5	-6.5	-21.5	Peak
4.638	201	1	64.74	33.9	33.7	1.80	66.3	63.5	2.8	-12.2	Peak
5.566	131	1	58.24	34.1	35.4	2.00	61.5	63.5	-2.0	-17.0	Peak
6.494	131	1	52.24	34.7	35.3	2.20	55.1	63.5	-8.4	-23.4	Peak
7.421	126	1	57.19	35.2	37.2	2.40	61.7	63.5	-1.8	-16.8	Peak
8.350	126	1	54.15	35.2	38.3	2.54	59.8	63.5	-3.7	-18.7	Peak
9.277	320	1	54.08	35.3	37.9	2.80	59.5	63.5	-4.0	-19.0	Peak

6.0 Conducted Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT.

6.1 Test Procedure

The EUT was connected to a spectrum analyzer through an attenuator. The spectrum was investigated outside the operating band in 100 kHz RBW up to the 10th harmonic. Detected signals were compared to the -20 dBc criteria.

6.2 Test Criteria

Clause Subject	Section Number	Date
Conducted Strength of Spurious/Harmonic Emissions	15.247(d), 15.209	2013-08-30

6.3 Test Results

Plotted results are presented below. Power was attenuated using an external step attenuator set to 20 dB, reference asset 0856. The EUT was configured to eliminate cables and associated losses.

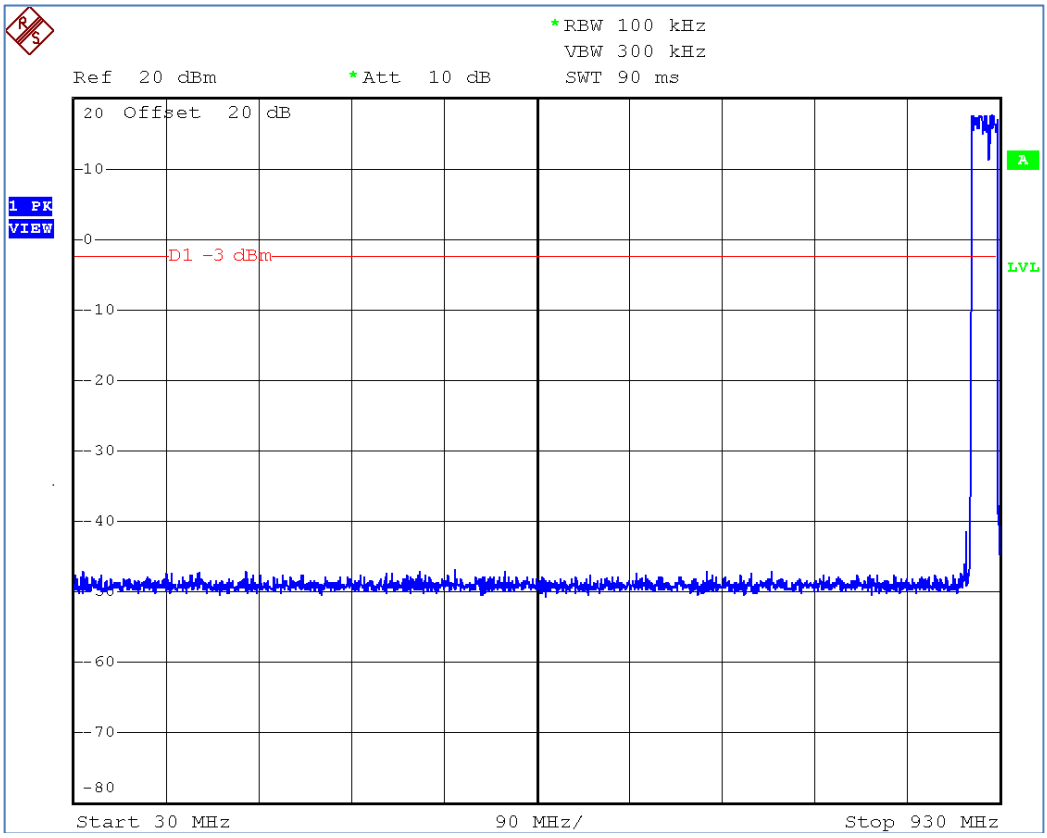


Figure 5.4.1 Conducted Spurious Emissions, 30 MHz to 930 MHz
In Band Signals Present/Verified Transmit Mode and Find Reference for -20 dBc

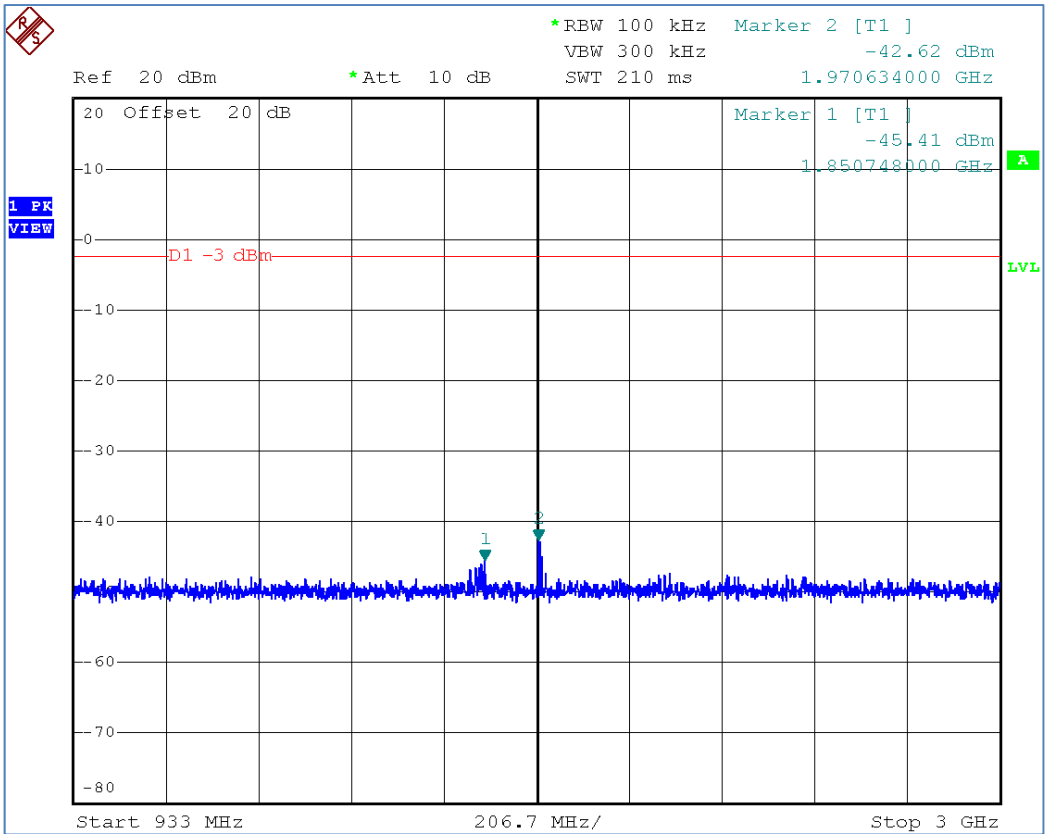


Figure 5.4.2 Conducted Spurious Emissions, 933 MHz to 3 GHz

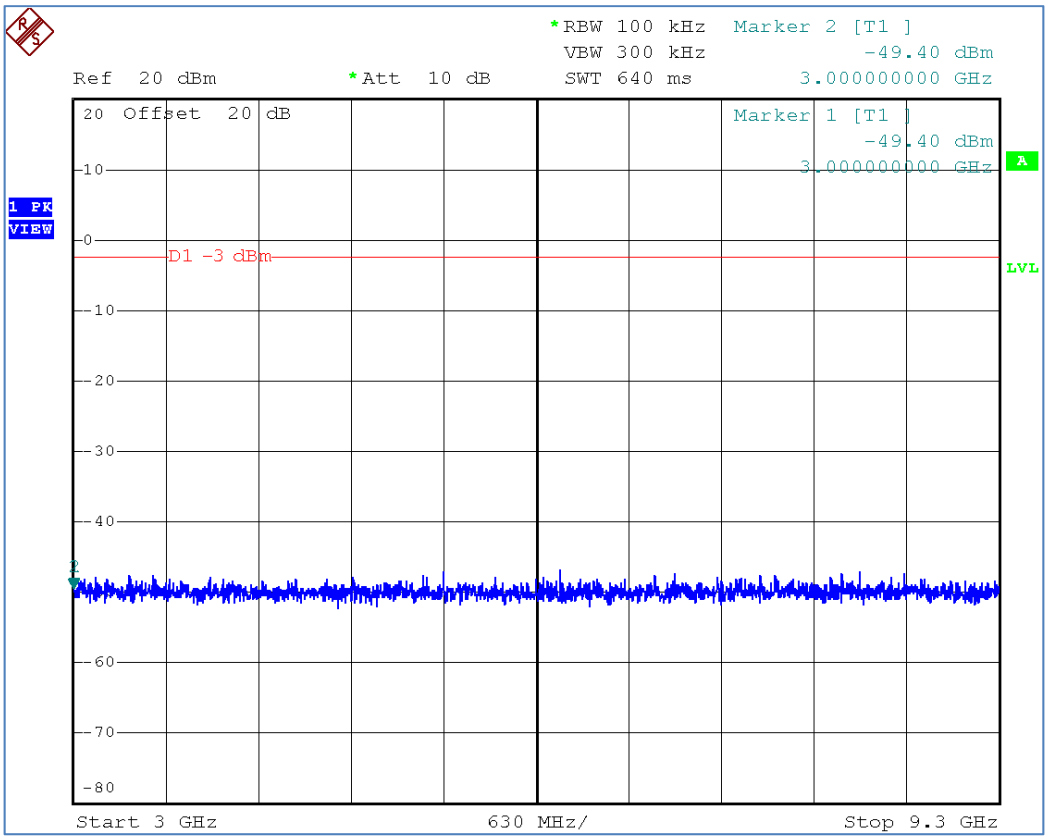


Figure 5.4.3 Conducted Spurious Emissions, 3 GHz to 9.3 GHz

7.0 Frequency Hopping Parameter Measurements

Frequency Hopping measurements were performed on the EUT. FCC Public Notice DA 00-705 is referenced for this procedure.

7.1 Test Procedure

The EUT is configured for best signal/power then the frequency hopping parameters are measured.

Carrier Frequency Separation. This is measured with EUT in hopping mode. The spectrum analyzer is set to a span wide enough to observe at least 2 channels. Resolution bandwidth is set to at least 1% of span. The EUT is then set to hopping mode and max hold acquisition continues until a stable curve is obtained. Markers are used to measure center to center frequency separation.

Number of Hopping Frequencies. This is determined by allowing the EUT to operate in hopping mode while the spectrum analyzer collects the entire band, with some margin, in max-hold mode until a stable result was obtained with clearly discernible channels. The peaks for each hopping channel are then counted. The channel count will be used to determine other criteria.

Time of Occupancy (Dwell Time). This is measured with the spectrum analyzer centered on a hopping channel. The spectrum analyzer is set to 1 MHz resolution bandwidth and put in time domain (zero-span) mode. The transmit events are then observed in max-hold mode and the dwell time measured by placing markers. In addition, a video trigger is employed with a small negative offset to guarantee capture of the leading edge and thus the entire transmit signal. If channel spacing is such that the desired channel cannot be identified, the resolution bandwidth is reduced and the result is observed; this is repeated until a clearly defined result is obtained.

7.2 Test Criteria

Section Reference	Parameter	Date
15.247(a)	Hopping Frequency Separation, Number of Hopping Channels*, Channel Occupancy Time	2013-08-30

*For 902-928 MHz band: Minimum 25 hopping channels. Under 50 channels limits power to 0.25 W, over 50 channels limits power to 1 W.

7.3 Test Results

Measured Carrier Frequency Separation	Measured Number of Hopping Frequencies	Measured Time of Occupancy (Dwell Time)
430 kHz	60 channels	17.775 msec

Measured time of occupancy (dwell time) for one total transmission =	17.775 ms
Time Frame = 0.4 s * 60 hopping channels =	24000 ms
Measured time to return to one channel =	3740 ms
Total transmit events for one channel in the Time Frame, 24000 ms / 3740 ms =	6.417 events
Total time that one channel transmits within the 24 s Time Frame = 6.417 * 17.775 ms =	**114.1 ms***

*Limit 0.4 seconds.

EUT was found to be in compliance with applicable requirements with 60 hopping channels in use. Recorded data is presented below.

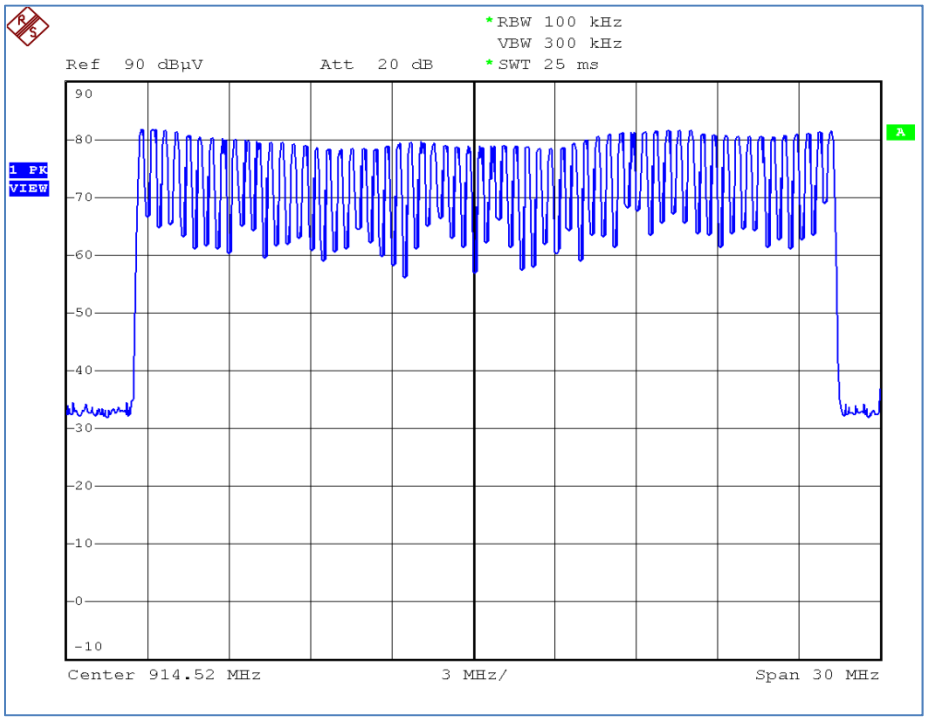


Figure 7.3.1: Number of Hopping Channels

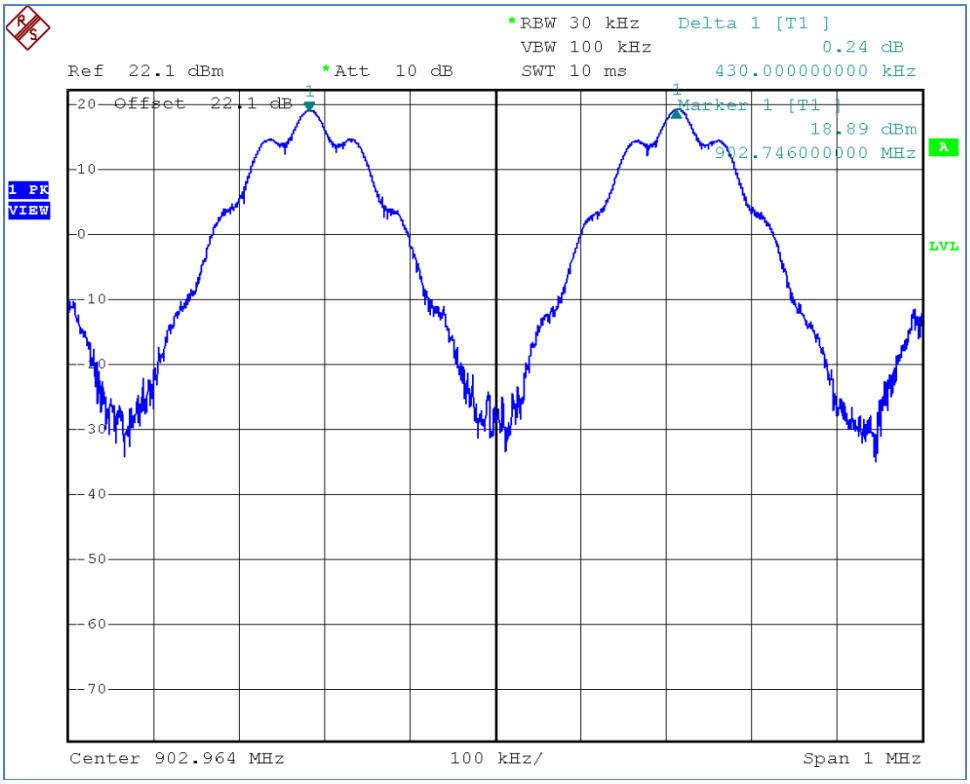


Figure 7.3.2: Hop Channel Separation

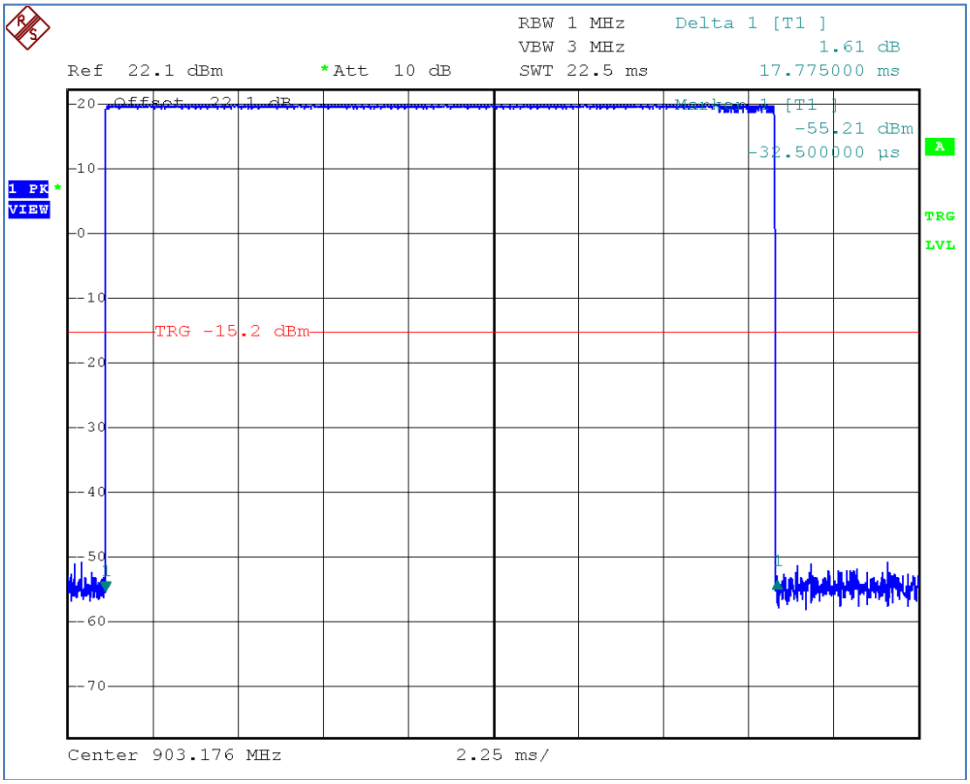


Figure 7.3.3: Hop Dwell Time

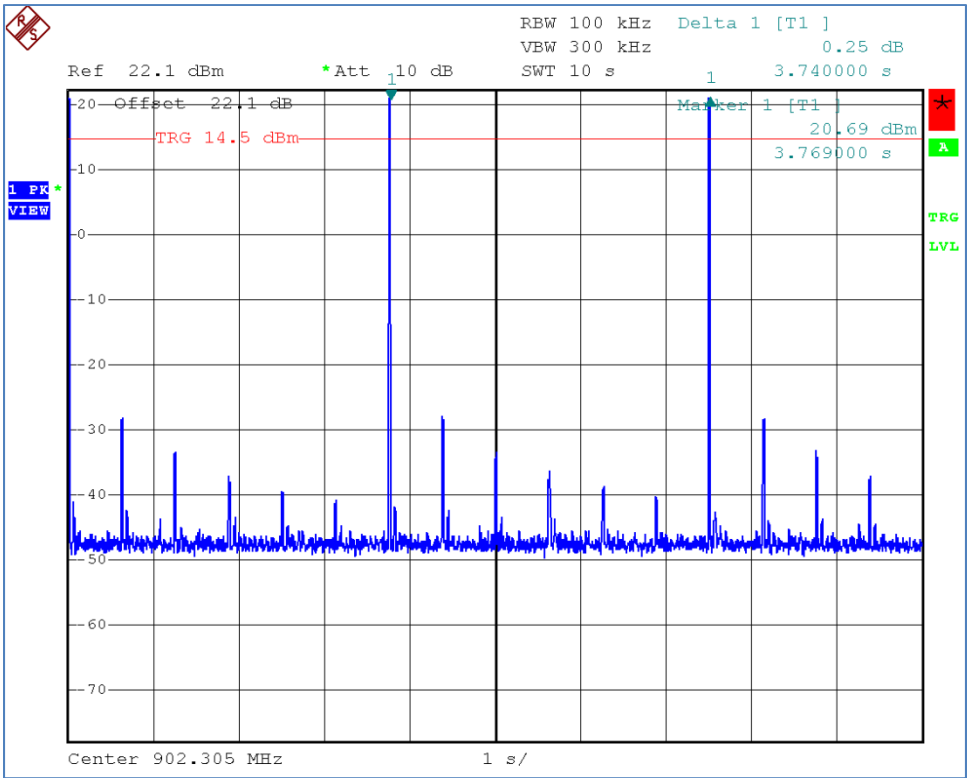


Figure 7.3.4: Hop Return to Channel Time

8.0 Peak Output Power

Output power measurements were made on the EUT.

8.1 Test Procedure

For measurements of the fundamental signal, the antenna port was connected directly to the input of a spectrum analyzer. When necessary or prudent, external attenuation was utilized. A spectrum analyzer with peak detection was used to find the maximum output power. RBW used is recorded.

8.2 Test Criteria

The maximum output power is 1 W for devices operating in the frequency range 902-928 MHz according to FCC 15.247 and when using at least 50 hopping channels.

Per 15.247(b)(4) the power limit is re-calculated when antennas with gain exceeding 6 dBi are used as in this case. The limit is recalculated accordingly:

Maximum Antenna Gain	Calculated Gain Adjustment Factor	Calculated Applicable Power Limit
12 dBi	12 dBi – 6 dB = 6 dB	30 dBm – 6 dB = 24 dBm Restated in linear terms: 251 mW

8.3 Test Results

EUT was found to be in compliance with applicable requirements. The highest recorded power was on the lowest channel or 902.3 MHz. The relevant peak output power criteria were selected based on measured channel count of 60. Field strength is adjusted by applying the maximum bandwidth measured to a bandwidth factor to correct for measurement of a 173 kHz bandwidth signal in 100 kHz resolution bandwidth.

Channel	Measured Power (dBm)	Bandwidth Factor Calculation (dB)	Bandwidth Corrected Power (dBm)	Power Restated in Linear Terms (mW)	Limit (mW)
Low	21.00	$=10*(\text{Log}_{10}(173/100)) = 2.38$	23.38	217.8	251
Mid	20.82	$=10*(\text{Log}_{10}(173/100)) = 2.38$	23.20	208.9	251
High	20.62	$=10*(\text{Log}_{10}(173/100)) = 2.38$	23.00	199.5	251

The power output is below the adjusted limit.

9.0 Transmit Duty Cycle

The transmit duty cycle was measured to be used if needed to determine average power of fundamental/harmonics or to determine the source based power for exposure.

9.1 Test Procedure

Measure the transmit time (dwell time) and measure the time interval between transmit events. Determine the factors that apply using the correct conversion and limitations if any.

9.2 Test Criteria

There is no criteria as this is a factor measurement.

9.3 Test Results

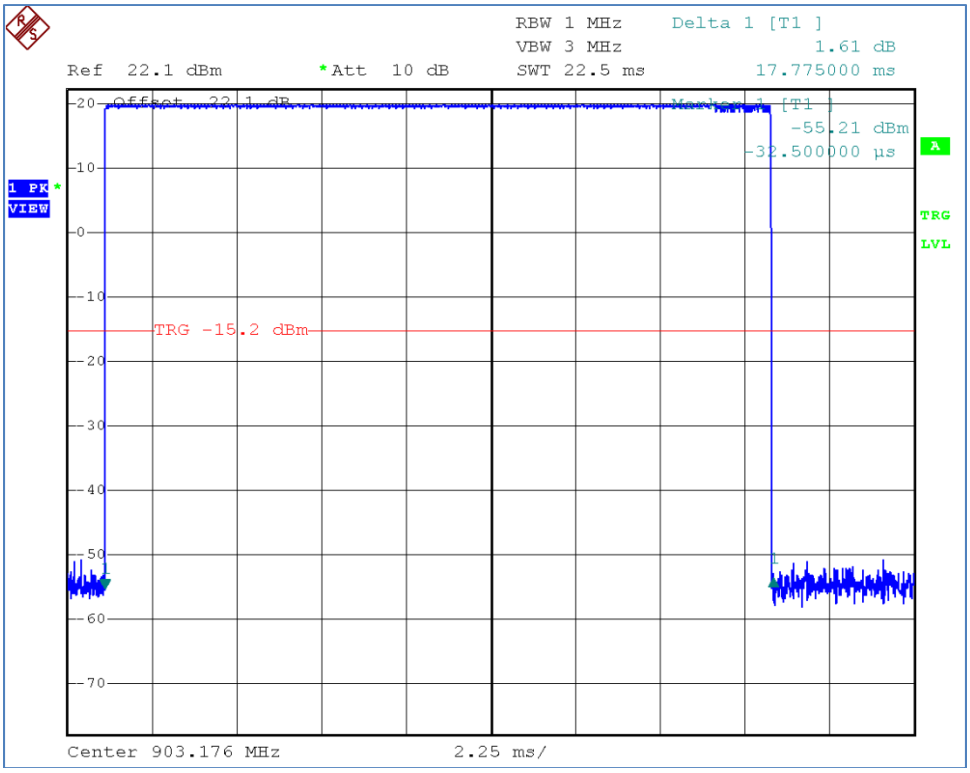
Factor for Average Level Calculation

Transmit Dwell Time	Transmit Time Interval	Limit Imposed on Divisor	Applicable Calculation	Resulting Factor
17.775 ms	3769 ms	100 ms	$20Log_{10}(17.775/100)$	-15.00 dB

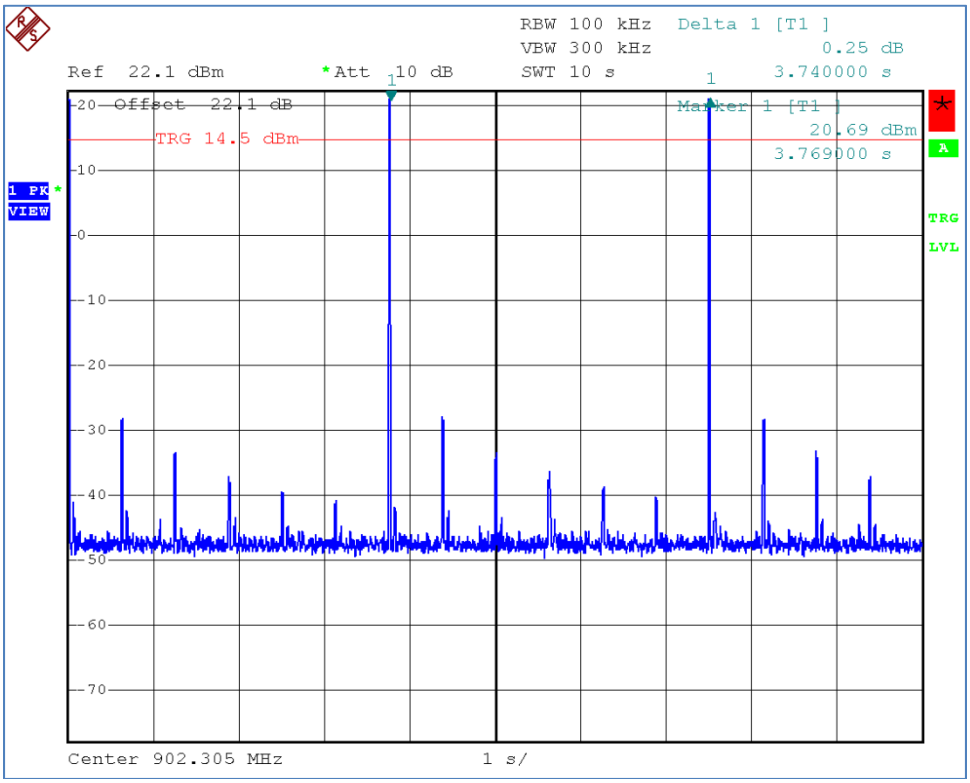
Source-Based Factor for Exposure Calculation

Transmit Dwell Time	Transmit Time Interval	Limit Imposed on Divisor	Applicable Calculation	Resulting Factor
17.775 ms	62.550 ms	Does Not Apply	$10Log_{10}(17.775/62.550)$	-5.464 dB

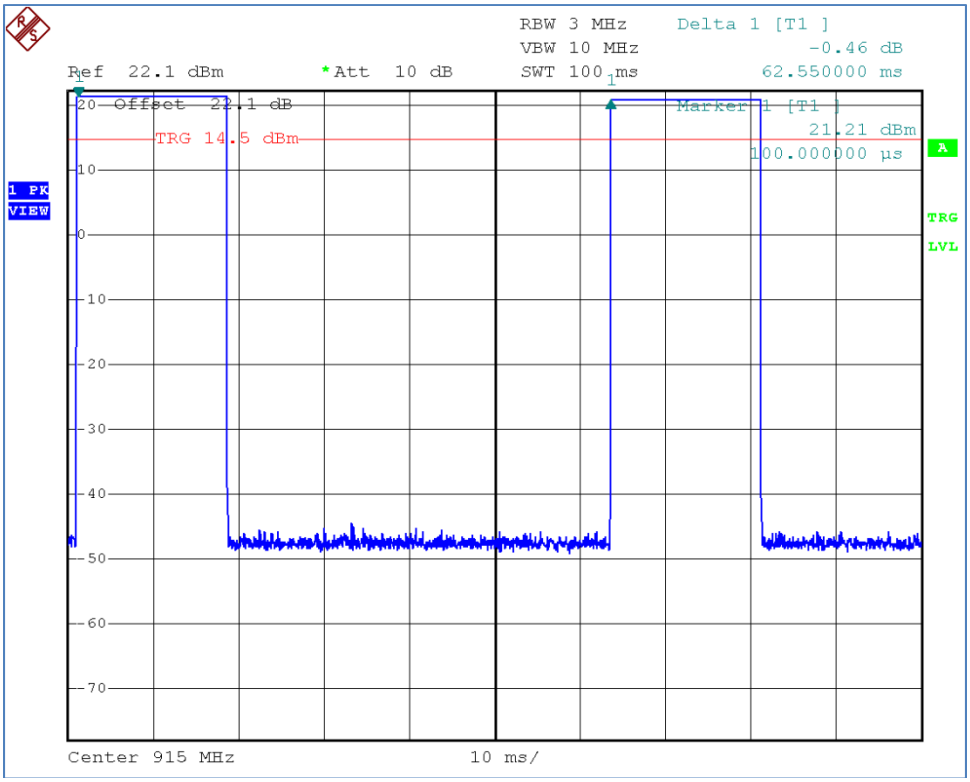
Plots of measurements appear below.



9.3.1 Transmit On (Dwell) Time



9.3.2 Transmit Time Interval – (Return to Channel Time)



9.3.3 Transmit Time Interval – For Exposure

10.0 Power Line Conducted Emissions

10.1 Test Procedure

The EUT was configured and operated in a manner consistent with typical applications. The EUT power cord in excess of one meter was folded back and forth forming a bundle 30 to 40 cm long in the approximate center of the cable. Power supply cords for any peripheral equipment were powered from an auxiliary LISN. Excess interface cable lengths were separately bundled in a non-inductive arrangement at the approximate center of the cable with the bundle 30 to 40 centimeters in length. The conducted emissions were maximized, by varying the operating states and configuration of the EUT.

The tests were performed in an 8' x 8' RayProof modular shielded room. The EUT was placed on a non-metallic table 0.4 meters from a vertical metal reference plane and 0.8 meters from a horizontal metal reference plane. A drawing showing the test setup appears below.

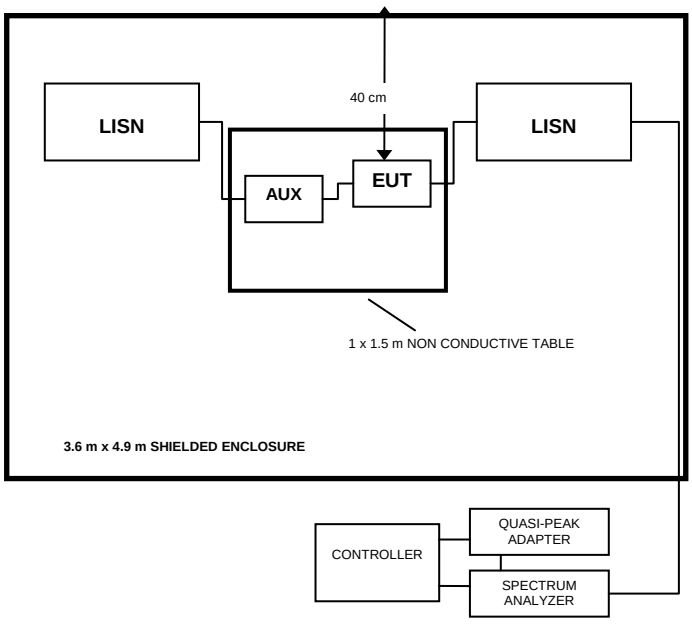


Figure 8.1.1 Power Line Conducted Emissions Test Setup

10.2 Test Criteria

Section Reference	Parameter	Date
15.207	Transmitter Power line Conducted Emissions	2013-02-14

10.3 Test Results

The EUT was found to be in compliance with applicable requirements. Measurement results appear below.

Table 10.3.1 Conducted Emissions Test Results – 120 VAC / 60 Hz Neutral Lead

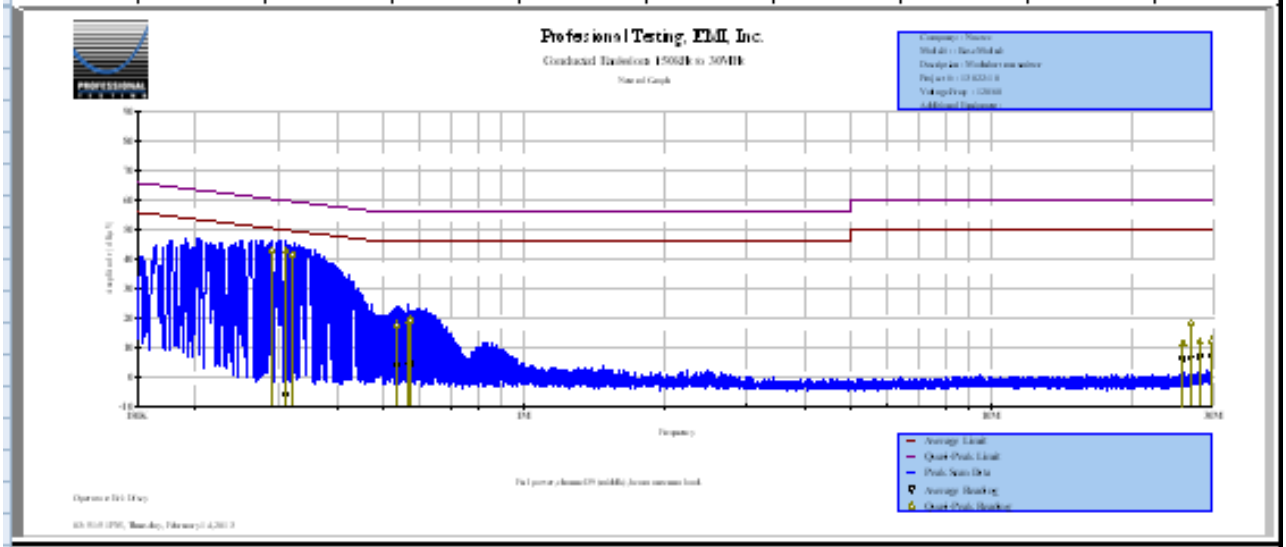
Professional Testing, EMI, Inc.

Test Method:	**ANSI C63.4–2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38).**		
In accordance with:	**FCC Part 15.207 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Conducted Emissions Limits**		
Section:	**15.207**		
Test Date(s):	2/14/2013	EUT Serial #:	33
Customer:	Naztec	EUT Part #:	0
Project Number:	13022-10	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base (Module)	Witness' Name:	0

Conducted Emissions Test Results Data Sheet - Neutral Lead Page: 1 of 2

EUT Line Voltage:	120	VAC	EUT Line Frequency:	60	Hz

Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.29044	48.9	42.9	60.5	-17.6	PASS	-31.1	50.5	-81.6	PASS
0.31111	48.2	42.9	59.9	-17.1	PASS	-6.2	49.9	-56.1	PASS
0.32198	47.6	41.8	59.7	-17.9	PASS	-56.3	49.7	-106	PASS
0.5371	26.9	17.9	56	-38.1	PASS	4.2	46	-41.8	PASS
0.5704	27.2	19.4	56	-36.6	PASS	3.8	46	-42.2	PASS
0.5756	26.1	19.6	56	-36.4	PASS	4.5	46	-41.5	PASS
25.7369	20.2	11.5	60	-48.5	PASS	5.9	50	-44.1	PASS
26.7445	20.9	18.5	60	-41.5	PASS	6.4	50	-43.6	PASS
27.9251	20.4	12.2	60	-47.8	PASS	6.7	50	-43.3	PASS
29.685	20.5	12.7	60	-47.3	PASS	7.2	50	-42.8	PASS



Measured Conducted Emissions - Neutral Lead

Table 10.3.2 Conducted Emissions Test Results – 120 VAC / 60 Hz Phase Lead

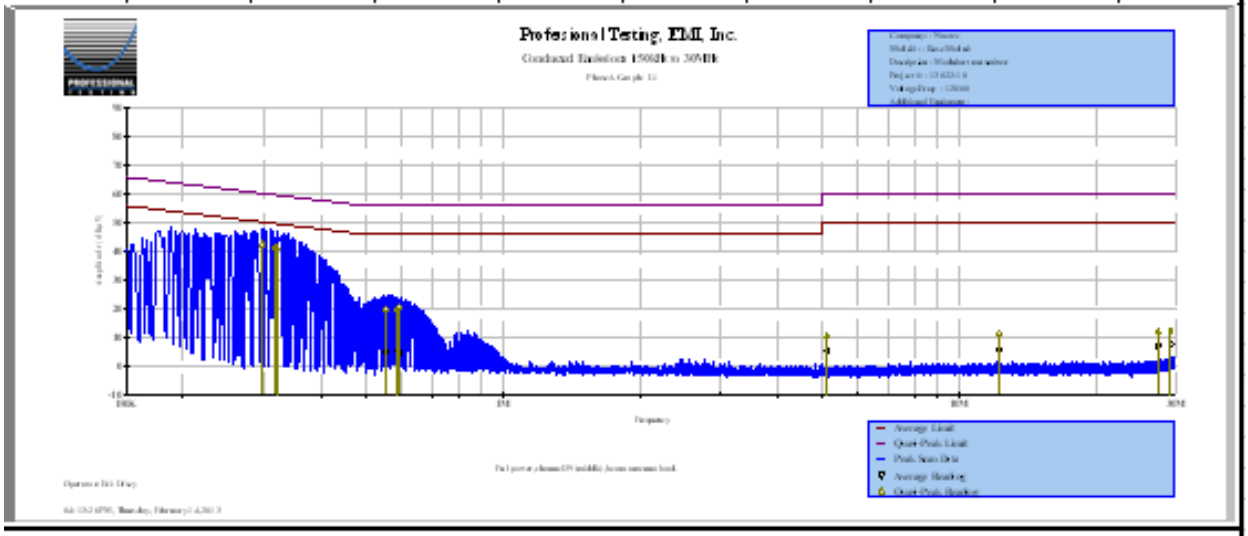
Professional Testing, EMI, Inc.

Test Method:	**ANSI C63.4–2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38).**		
In accordance with:	**FCC Part 15.207 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Conducted Emissions Limits**		
Section:	**15.207**		
Test Date(s):	2/14/2013	EUT Serial #:	33
Customer:	Naztec	EUT Part #:	0
Project Number:	13022-10	Test Technician:	Eric Lifsey
Purchase Order #:	0	Supervisor:	Rob McCollough
Equip. Under Test:	Base (Module)	Witness' Name:	0

Conducted Emissions Test Results Data Sheet - Phase A (Line 1) Page: 2 of 2

EUT Line Voltage:	120	VAC	EUT Line Frequency:	60	Hz

Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.29745	48.5	42.8	60.3	-17.6	PASS	-18.5	50.3	-68.8	PASS
0.31675	48.8	41.5	59.8	-18.3	PASS	-31.2	49.8	-81	PASS
0.31996	48.3	41.5	59.7	-18.2	PASS	-56	49.7	-105.7	PASS
0.5551	26.9	20.1	56	-35.9	PASS	4.8	46	-41.2	PASS
0.5898	27.5	20.3	56	-35.7	PASS	4.7	46	-41.3	PASS
0.5942	27.1	20.7	56	-35.3	PASS	4.2	46	-41.8	PASS
5.1507	18.9	10.6	60	-49.4	PASS	5.1	50	-44.9	PASS
12.2564	19.2	11.3	60	-48.7	PASS	5.8	50	-44.2	PASS
27.3506	20.1	12.1	60	-47.9	PASS	6.8	50	-43.2	PASS
29.1568	20.7	12.7	60	-47.3	PASS	7.4	50	-42.6	PASS



Measured Conducted Emissions - Phase A Lead (Line 1)

11.0 Antenna Construction Requirements

The design was investigated for meeting the antenna construction requirements of the applicable rules. For the modular requirements the examination of four total antennas having gain above 0 dBi will be included.

11.1 Test Procedure

A direct examination of the antenna(s) construction is conducted to gather critical specifications on performance regarding gain.

11.2 Test Criteria

Clause Subject	Section Number	Date
Antenna Construction	15.203	2013-08-30

11.3 Test Results

Antenna specifications for the antennas are referenced here:

Antenna Manufacturer and Model	Specifications	
Laird P/N: PA9-12 Flat Panel Antenna	**Frequency range** **Radiation Pattern** **Peak Gain** **VSWR** **Weight (approx.)** **Dimensions (L x W x H)**	902-928 MHz Directional 12 dBi 1.5:1 1.36 kg 411 x 373 x 36 mm
Source: http://www.lairdtech.com		

Antenna Manufacturer and Model	Specifications	
Kathrein-Scala P/N: TY-900 Yagi Antenna	**Frequency range** **Radiation Pattern** **Peak Gain** **VSWR** **Weight (approx.)** **Impedance** **Dimensions (L x W x H)**	890–960 MHz Directional 12 dBi < 1.5:1 maximum 1.4kg 50 Ω 584 x 178 mm
Source: www.kathrein-scala.com		

Antenna Manufacturer and Model	Specifications	
Laird P/N: FG9023 Fiberglass base station antennas	**Frequency range** **Radiation Pattern** **Peak Gain** **VSWR** **Weight (approx.)** **Impedance** **Height** **Diameter**	902-928 MHz Omnidirectional 5.15dBi < 2:1 Max < 1 lbs 50 Ω 23-3/8” 1.310”
Source: http://www.lairdtech.com		

Antenna Manufacturer and Model	Specifications	
Laird P/N: Phantom Phantom® Antenna	**Frequency range** **Radiation Pattern** **Peak Gain** **VSWR** **Weight (approx.)** **Impedance** **Height** **Diameter**	902-928 MHz Omnidirectional 3 dB-M.E.G. < 2:1 0.173 lb 50 Ω 2¾” 1.438”
Source: http://www.lairdtech.com		

Antenna Manufacturer and Model	Specifications	
Radiotronix P/N: ANT-915-03A	**Frequency range** **Radiation Pattern** **Gain**	902-928 MHz Omnidirectional 0 dBi
Source: http://www.radiotronix.com		

Antenna Manufacturer and Model	Specifications	
Skywave P/N: 11-1118-A Helical	**Frequency range** **Radiation Pattern** **Gain** **VSWR** **Height** **Diameter**	902-928 MHz Omnidirectional 0 dBi 2:1 44 mm 7.6 mm
Source: http://www.skywaveantennas.com		

12.0 Equipment Lists

12.1 Equipment for Spurious Radiated Emissions Below 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference,**		
In accordance with:	**FCC Part 15.209 - Code of Federal Regulations Part 47, Subpart C - Intentional Radiators, Radiated Emissions Limits**		
Section:	**15.209**		
Test Date(s):	**9/24/2013**	**EUT Serial #:**	**None**
Customer:	**Naztec-Trafficware**	**EUT Part #:**	**Model RM01**
Project Number:	**13022-15**	**Test Technician:**	**Eric Lifsey**
Purchase Order #:	**0**	**Supervisor:**	**Rob McCollough**
Equip. Under Test:	**Base Radio Module with Antennas**	**Witness' Name:**	**None**

Radiated Emissions Test Equipment List

Tile! Software Version:	**4.2.A, May 23, 2010, 08:38:52 AM**
Test Profile:	**Radiated Emissions_Profile Version October 12, 2011**

Asset #	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	7/29/2014
1890	HP	8447F	Preamp/Amp, 9kHz-1300MHz, 28/25dB	3313A05298	1/8/2014
1930	Agilent	E4440A-239	Spectrum Analyzer, 3 Hz - 26.5 GHz	MY45304903	7/11/2014
1926	ETS-Lindgren	3142D	Antenna, Biconilog, 26 MHz - 6 GHz	00135454	7/29/2014
C027	N/A	RG214	Cable Coax, N-N, 25m	none	9/26/2014
1327	EMCO	1050	Controller, Antenna Mast	none	N/A
0942	EMCO	11968D	Turntable, 4ft.	9510-1835	N/A
1969	HP	11713A	Attenuator/Switch Driver	3748A04113	N/A
1325	EMCO	1050	Controller, Antenna Mast	9003-1461	N/A
1509B	Braden	N/A	TDK 10M Chamber, VSWR > 1 GHz	DAC-012915-005	7/16/2014
1594	Miteq	AFS44-00102650	Amplifier, 1-26.5GHz, 42dB	none	10/15/2013
2004	Miteq	AFS44-00101800-2S-10P-44	Amplifier, 40dB, .1-18GHz	0	11/26/2013
C030	N/A	0	Cable Coax, N-N, 30m	none	9/26/2014
1780	ETS-Lindgren	3117	Antenna, Double Ridged Guide Horn, 1 - 18 GHz	00110313	1/30/2014

12.2 Equipment for Fundamental and Radiated Spurious Emissions Above 1 GHz

The following equipment was used to measure conducted output power, timings, bandwidth, and spurious emissions.

Asset #	Manufacturer	Model #	Description	Calibration Due
0582	EMCO	3115	Ridge Guide Antenna	2014-02-14
1594	Agilent	83017A	Microwave Preamplifier (preamp 1)	2014-09-24
1342	Rohde & Schwarz	FSP	Spectrum Analyzer	2015-01-29
C059	Pasternack		Cable	2014-02-06
C249	Pasternack		Cable	2014-02-06
C250	Pasternack		Cable	2014-02-06
1542	AH Systems	SAS-572	Horn Antenna, Standard Gain, 20 dB	Not Required
A105	Narda	768A-20	Attenuator, 20 W, 20 dB	2014-02-15
0856	Narda	702-60	Attenuator, Step, 0-60 dB	2014-04-09

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with NIST policy. Since PTI operates in accordance with NIST (NVLAP) Handbook 150-11: 2007, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by NIST Handbook 150-11.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at PTI that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of PTI measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties for Site 45

Type of Measurement	Frequency Range	Meas. Dist.	Expanded Uncertainty U, dB (k=2)
Mains Conducted Emissions	150 kHz to 30 MHz	N/A	2.9
Telecom Conducted Emissions	150 kHz to 30 MHz	N/A	2.8
Radiated Emissions	30 to 1,000 MHz	10 m	4.8
	1 to 18 GHz	3 m	5.7

End of Report

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