

FCC & Industry Canada Certification Test Report For the Eaton's Cooper Power Systems

RFN SelectComm 1272 (3.3V) MODULE FCC ID: P9X-SCOM1272V3 IC: 6766A-SCOM1272V3

WLL JOB# 15295-01 Rev 1 February 6, 2018

> Re-Issued February 15, 2018

> > Prepared for:

Eaton's Cooper Power Systems 910 Clopper Road, Suite 201 S Gaithersburg MD 20878

Prepared By:



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> > Prepared by:

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John P. Repella Manager, EMC & Wireless Services

Reviewed by:

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Abstract

This report has been prepared on behalf of Eaton's Cooper Power Systems to support the attached Application for Equipment Authorization. The test report and application are submitted for a Frequency Hopping Spread Spectrum Transmitter under Part 15.247 (10/2014) of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-247 Issue 2 of Industry Canada. This Certification Test Report documents the test configuration and test results for the Eaton's Cooper Power Systems RFN SelectComm 1272 (3.3V) Module.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

The Eaton's Cooper Power Systems RFN SelectComm 1272 (3.3V) Module complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.247 and Industry Canada RSS-247.

Revision History	Description of Change	Date
Rev 0	Initial Release	February 6, 2018
Rev 1	Updated to address typographical errors and comments from reviewing engineer	February 15, 2018

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1 Introduction

1.1 Compliance Statement

The Eaton's Cooper Power Systems RFN SelectComm 1272 (3.3V) Module complies with the limits for a Frequency Hopping Spread Spectrum Transmitter device under FCC Part 15.247 (10/2014) and Industry Canada RSS-247 Issue 2.

1.2 Test Scope

Tests for radiated and conducted (at antenna terminal) emissions were performed. All measurements were performed in accordance with C63.10 "ANSI Procedures for Compliance Testing of Unlicensed Wireless Devices". The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

	Customer:	Eaton Cooper Power Systems 910 Clopper Road, Suite 201 S Gaithersburg MD 20878
	Purchase Order Number:	4509195776
	Quotation Number:	70388
1.4	Test Dates	
	Testing was performed on the following date(s):	9/19/2017 to 9/23/2017, 12/14/17
1.5	Test and Support Personnel	
	Washington Laboratories, LTD	John P. Repella, Nikolas Allen
	Customer Representative	Steven Seymour

1.6 Abbreviations

Α	Ampere	
ac	alternating current	
AM	Amplitude Modulation	
Amps	Amperes	
b/s	bits per second	
BW	BandWidth	
CE	Conducted Emission	
cm	Centimeter	
CW	Continuous Wave	
dB	decibel	
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	k ilo - prefix for 10^3 multiplier	
LISN	Line Impedance Stabilization Network	
Μ	Mega - prefix for 10 ⁶ multiplier	
m	Meter	
μ	m icro - prefix for 10^{-6} multiplier	
NB	Narrowband	
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 & Description

The RFN SelectComm 1272 (3.3V) is a radio communications module designed for use in L+G Focus meters. The devices can also be used in Eaton's Cooper Power Systems' Gateways and Relay Nodes. The RFN SelectComm 1272 (3.3V) provides a 902-928 MHz radio interface to an RF mesh network.

This test report covers the 902-928MHz FHSS radio.

ITEM	DESCRIPTION
Manufacturer:	Eaton Cooper Power Systems
FCC ID:	P9X-SCOM1272V3
IC:	6766A-SCOM1272V3
Model:	RFN SelectComm 1272 (3.3V)
FCC Rule Parts:	§15.247
Industry Canada:	RSS-247
Frequency Range:	902.75 – 927.25MHz
Maximum Output Power:	29.560dBm (895.4mW)
Modulation:	FSK
Occupied Bandwidth(20dB):	472.8kHz(153.6kbps), 295.7 kHz(76.8kbps), 273.8kHz(38.4kbps),
	300.7kHz(19.2kbps), 290.1kHz(9.6kbps)
Occupied Bandwidth (99%):	448.0kHz(153.6kbps), 300.1kHz(76.8kbps),271.0 kHz(38.4kbps),
	313.5kHz(19.2kbps), 304.8kHz(9.6kbps)
Keying:	Automatic
Type of Information:	Data
Number of Channels:	50
Power Output Level	Variable from 29.560dBm to -7.78dBm
Antenna Connector	MCX to Type N
Antenna Type	4 antennas:
	On-Board Antenna 1dBi (Wire Antenna)
	Laird TRAB9023P, 3dBi Gain
	Laird B8965CN 5/8 Wave Coil 900MHz Omni Antenna, 5dBi gain
	OD9-5-ANT, 5dBi
Interface Cables:	None (plug in module)
Power Source & Voltage:	3.3 Vdc (Unregulated)
FCC Emission Designator 473KFXD	
ISED Emissions Designator	448KFXD(153.6kbps), 300KFXD(76.8kbps), 271KFXD(38.4kbps),
314KFXD(19.2kbps), 305KFXD(9.6kbps)	
Highest TX Spurious Emission	17.1uV/m@3m-150.44MHz
Highest RX Spurious Emission	61.1uV/m @ 3m, 167.61MHz

Table 1: Device Summary

2.2 Test Configuration

The Eaton's Cooper Power Systems RFN SelectComm 1272 (3.3V), Equipment Under Test (EUT), was operated from a 115Vac power supply. Programming commands were sent from a support laptop via a custom RS232 adaptor board to a header on the EUT module. The measurements were performed on the EUT in a manner which represents the typical installation configuration. A piece of closed cell foam was used to support the EUT and antenna combination.

2.3 Testing Algorithm

The RFN SelectComm 1272 (3.3V) was programmed for operation from a support laptop via a custom RS232 adaptor board to a header on the EUT module. The Hyper-terminal console program was used on the support laptop to enter commands setting the EUT to the desired channel, data rate power or hopping mode.

Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Testing Certificate AT-1448 as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

ANSI C63.10 "Procedures for Compliance Testing of Unlicensed Wireless Devices"

ANSI C63.2 "Specifications for Electromagnetic Noise and Field Strength Instrumentation"

ANSI C63.4 "Methods of Measurement of Radio Noise from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz".

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) 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
	$k{\leq}2$ for 95% coverage (ANSI/NCSL Z540-2 Annex G)
uc	= 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 2 below.

Parameter	Uncertainty	Actual (+/-)	Unit
Radio Frequency	±1 x 10 ⁻⁷	8.64E-08	parts
RF Power conducted (up to 160 W)	±0.75 dB	0.3	dB
Conducted RF Power variations using a test fixture	±0.75 dB	0.3	dB
Radiated RF power	±6 dB	N/A	dB
Average sensitivity (radiated)	$\pm 3 \text{ dB}$	N/A	dB

Table 2: Expanded Uncertainty List

Scope	Standard(s)	
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±4.55 dB

3 Test Equipment

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Test Name:	Conducted Emissions Voltage	Test Date:	12/14/2017
Asset # Manufacturer/Model		Description	Cal. Due
528 AGILENT - E4446A		3Hz- 44GHz ANALYZER SPECTRUM	12/19/2018
125 SOLAR/8028-50-TS-24-BNC		LISN, 150kHz-30MHz	02/16/2018
126 SOLAR/8028-50-TS-24-BNC		LISN, 150kHz-30MHz	02/16/2018

Table 3: Test Equipment List

Test Name:	Radiated Emissions	Test Date:	9/21/2017
Asset #	Manufacturer/Model	Description	Cal. Due
528	AGILENT - E4446A	3HZ - 44GHZ ANALYZER SPECTRUM	10/10/2017
276	ELECTRO-METRICS - BPA-1000	RF PRE-AMPLIFIER	1/18/2018
627	AGILENT - 8449B	AMPLIFIER 1-26GHZ	11/7/2017
280	ITC - 21C-3A1	WAVEGUIDE 3.45-11.0GHZ	11/1/2017
742	PENN ENGINEERING - WR284	2.2-4.15GHZ BANDPASS FILTER	11/11/2017
382	SUNOL SCIENCES CORPORATION - JB1	ANTENNA BICONLOG	10/31/2017
610	WLL - RG-223	BNC COAXIAL CABLE(1.0M)	1/23/2018
425	ARA - DRG-118/A	ANTENNA DRG 1-18GHZ	11/23/2017
281	ITC- 21A-3A1	WAVEGUIDE 4.51-10.0GHZ	11/1/2017

Test Name:	Bench Conducted Emissions	Test Date:	12/14/2017
Asset #	Manufacturer/Model	Description	Cal. Due
528	AGILENT/ E4446A	3Hz - 44GHz SPECTRUM ANALYZER	12/19/2018
823	AGILENT/EXA 9010A	10Hz-26.5GHz SPECTRUM ANALYZER	4/30/2018
879	ETS-LINDGREN/EM Power 7002-006	USB RF POWER METER	6/23/2018

4 Test Summary

The Table Below shows the results of testing for compliance with a Frequency Hopping System in accordance with FCC Part 15.247 10/2014 and RSS-247 Issue 2. Full test results are shown in Section 5.

TX Test Summary						
	(Frequency Hopping	Spread Spectrum)				
FCC Rule Part	IC Rule Part	Description	Result			
15.247 (a)(1)(i)	RSS-247	20dB Bandwidth	Pass			
	Section 5.1 (1)					
15.247 (b)(2)	RSS-247	Transmit Output Power	Pass			
	Section 5.4 (1)					
15.247 (a)(1)	RSS-247	Channel Separation	Pass			
	Section 5.1 (2)					
15.247 (a)(1)(i)	RSS-247	Number of Channels =50	Pass			
	Section 5.1 (3)	minimum				
15.247 (a)(1)(i)	RSS-247	Time of Occupancy	Pass			
	Section 5.1 (3)					
15.247 (d)	RSS-247	Occupied BW / Out-of-	Pass			
	Section 5.5	Band Emissions (Band				
		Edge @ 20dB below)				
15.205	RSS-247	General Field Strength	Pass			
15.209	Section 5.5	Limits (Restricted Bands				
		& RE Limits)				
15.207	RSS-Gen	AC Conducted Emissions	Pass			
	RX/Digital Tes	st Summary				
(Frequency Hopping Spread Spectrum)						
FCC Rule Part	IC Rule Part	Description	Result			
15.207	RSS-Gen	AC Conducted Emissions	Pass			
15.209	RSS-Gen	General Field Strength	Pass			
		Limits				

Table 4: Test Summary Table

5 Test Results

5.1 Duty Cycle Correction and Time of Occupancy

In accordance with the FCC Public Notice the average spurious radiated emissions measurements may be further adjusted using a duty cycle correction factor if the dwell time per channel of the hopping signal is less than 100 ms. In addition, the transmitter shall have a time of occupancy for systems having a 20dB bandwidth greater than 250 kHz of no more than 0.4seconds in any 10 second period.

The duty cycle correction factor is calculated by:

20*log (dwell time/100 ms)

The following table and figures show the data for the occupancy time for the transmitter. Based on this plot, the occupancy time per hop is 20.1332ms. The maximum total occupancy time per 100ms is 40.2306ms. This corresponds to a duty cycle correction of -7.908dB for radiated spurious emissions.

These tests were conducted with the RF output connected through appropriate attenuators to the input of a spectrum analyzer set to zero span mode. The unit was set to hopping mode with the spectrum analyzer set to 902.75MHz. The results are shown in the plots below.

Data	Medium				Max. Sequence
Rate	Utilization	Duty Cycle	Min. Gap Time	Max. Sequence	Time (100ms)
(kbps)	(%)	(%)	(ms)	Time (ms)	
9.6	0.683	46.094	22.686	19.400	38.800
19.2	0.642	47.796	21.952	20.1332	40.2306
38.4	0.692	46.767	16.288	19.682	39.396
76.8	0.579	46.077	18.547	19.391	38.785
153.6	0.582	41.768	11.005	9.209	36.831

Table 5: Duty Cycle Data Rate Summary

Table 6: Duty Cycle/Tim	e of Occupancy Results
-------------------------	------------------------

Test	Result	Limit	Pass/Fail
Dwell time per Hop	20.1332ms	NA	NA
Dwell time per 100ms	40.2306ms	NA	NA
	7.908dB Correction		
Time of Occupancy	0.2415s/10 sec	0.4s/10 sec	Pass

Calculations assume a maximum occupancy for each hop to produce 0.242s of total occupancy.

Data Rate: 19.2kbps (Worst Case)

Medium Utilization (%)	Duty Cycle (%)	Max. Sequence Time (ms)
0.642	47.796	20.1332

Burst #	Start Time (ms)	Stop Time (ms)	On Time (ms)	Off Time (ms)
1	8.3102	28.4076	20.0974	21.9880
2	50.3956	70.5288	20.1332	21.9522
Total			40.2306	



Figure 1: Occupancy Single Hop



Figure 2: Occupancy per 100ms



Figure 3: Time of Occupancy

5.2 **RF Power Output: (FCC Part §2.1046)**

To measure the output power the hopping sequence was stopped while the frequency dwelled on a low, high and Center channel. 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. The EUT has an adjustable output range. The highest and lowest power available is shown below.

Frequency	Power Setting	Level (dBm)	Limit (dBm)	Pass/Fail
Low Channel: 902.75MHz	High	29.560	30	Pass
Center Channel: 914.75MHz	High	29.540	30	Pass
High Channel: 927.25MHz	High	29.380	30	Pass
Low Channel: 902.75MHz	Low	-7.780	30	Pass
Center Channel: 914.75MHz	Low	-8.210	30	Pass
High Channel: 927.25MHz	Low	-8.680	30	Pass

Table 7: RF Power Output

🔆 Agilent 03:09	36 Sep 18, 2017		R	Т
				Mkr1 902.678 MHz
Ref 33_dBm	Atten	40 dB		29.56 dBm
Peak		♦		
Log		1		
10				
dB/				
dB				
LaAv				
M1 S2				
S3 FC				
AA				
£ (f):				
FTun				
Swp				
Center 902.750 M	IHz			Span 2 MHz
#Res BW 1 MHz		₩VBW 3 MHz	Sweep) 1.092 ms (8192 pts)

Figure 4: RF Peak Power, High Power, Low Channel

🔆 Agilent 03:1	.9 : 37 Se	p 18, 201	.7			R T		
							Mkr1	914.576 MHz
Ref 33_dBm		Att	en 40 d:	В				29.54 dBm
Peak				0				
Log				1				
10								
dB/								
Offst								
3								
LgHV								
M1 00								
MI 32								
r (f)								
ETup								
Sup								
2mh								
Center 914.750	MHz							Span 2 MHz
#Res BW 1 MHz_				<u>#VBW 3 M</u>	Hz	 òweep_	1.092 m	<u>s (8192 pts)</u>

Figure 5: RF Peak Power, High Power, Center Channel

🔆 Agilent 03:26:	41 Sep 18, 2017		R	Т		
				Ν	1kr1 927	.150 MHz
Ref 33_dBm	Atten 40 d	B			29	.38 dBm
Peak						
Log		1				
aB/						
dB						
LaAv						
M1 S2						
S3 FC						
AA						
£ (f):						
FTun						
Swp						
Center 927.250 MH	łz				Spa	an 2 MHz
#Res BW 1 MHz		#VBW 3 MHz_	<u>Sw</u>	eep 1.0	92 ms (81	.92 pts)_

Figure 6: RF Peak Power, High Power, High Channel

🔆 Agiler	nt 03:36:22 S	ep 18, 2017			R	? T		
Ref 3 dBm		Atten	10 dB				Mkr1 902 :	2.567 MHz 7.78 dBm
Peak Log								
dB/ Offst								
3 dB								
LgAv								
M1 52								
£(f): FTun								
Смр								
Center 902 "Dec BL 1	2.750 MHz			MU-	<u>.</u>		Sp 202	an 2 MHz
#Nes DM I			₩VDW 3	rinz	<u></u> >₩	eeb T.G	997 WR (0	197 hts)

Figure 7: RF Peak Power, Low Power, Low Channel

🔆 Agilent 03:33:48 Sep 18, 2	017	RT	
Ref3dBm A	tten 10 dB	Mkr1	914.608 MHz -8.21 dBm
Peak Log	1		
dB/			
3 dB			
LgAv			
M1 S2			
EC(f): FTun			
2Mb			
Center 914.750 MHz #Res RW 1 MHz	₩URW 3 MH≂	Sween 1 092 m	Span 2 MHz s (8192 pts)

Figure 8: RF Peak Power, Low Power, Center Channel



Figure 9: RF Peak Power, Low Power, High Channel

5.3 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer. For Frequency Hopping Spread Spectrum Systems, FCC Part 15.247 requires the maximum 20 dB bandwidth not exceed 500 kHz.

The automatic bandwidth measurement capability was employed using the X dB bandwidth mode with X set to 6 dB, (i.e., RBW = 10 kHz, VBW \ge 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. Care was taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \ge 6dB. At full modulation, the occupied bandwidth was measured and is summarized in Table 8 for the available data rates. Figures 10-12 provide a sample of the occupied bandwidth measurements for the highest data rate

Data Rate: 153.6kbps	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	472.8	448.00	500	Pass
Center Channel: 914.75MHz	471.4	444.79	500	Pass
High Channel: 927.25MHz	470.0	443.6	500	Pass

Table 8: Occupied Bandwidth Results

Data Rate: 76.8kbps	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	295.7	300.05	500	Pass
Center Channel: 914.75MHz	274.8	279.93	500	Pass
High Channel: 927.25MHz	291.7	290.04	500	Pass

Data Rate: 38.4kbps	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	273.8	271.01	500	Pass
Center Channel: 914.75MHz	257.9	269.26	500	Pass
High Channel: 927.25MHz	255.9	267.2	500	Pass

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Data Rate: 19.2kbps	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	300.7	313.5	500	Pass
Center Channel: 914.75MHz	299.4	310.84	500	Pass
High Channel: 927.25MHz	291.0	307.36	500	Pass

Data Rate: 9.6kbps	20dB Bandwidth (kHz)	99% Power Bandwidth(kHz)	Limit (kHz)	Pass/Fail
Low Channel: 902.75MHz	290.1	300.29	500	Pass
Center Channel: 914.75MHz	288.3	298.99	500	Pass
High Channel: 927.25MHz	288.9	304.84	500	Pass



Figure 10: Occupied Bandwidth, Low Channel



Figure 11: Occupied Bandwidth, Center Channel



Figure 12: Occupied Bandwidth, High Channel

5.4 Channel Spacing and Number of Hop Channels (FCC Part §15.247(a)(1))

Per the FCC requirements, frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth, whichever is greater. The maximum 20dB bandwidth measured is 472.8 kHz so the channel spacing must be more than 472.8 kHz. In addition, for a 902-928MHz transmitter with an occupied bandwidth greater than 250 kHz the minimum number of hopping channels shall be 25.

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 20 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 30 kHz and the video bandwidth was set to 100 kHz. The channel spacing of 2 adjacent channels was measured using a spectrum analyzer span setting of 100 kHz. Also, the number of hopping channels was measured from 902-928MHz using a RBW/VBW setting of 30/100 kHz.

The following are plots of the channel spacing and number of hopping channels data. The channel spacing was measured to be 492.4 kHz and the number of channels used is 100.

Note: In the following plots each channel is composed of 2 distinct peaks.

Frequency	Result	Limit	Pass/Fail
Channel Spacing	492.4kHz	472.8kHz Minimum	Pass
Number of channels	50 channels	25 Channels Minimum	Pass

Table 9: Channel Spacing and Number of Channels Results



Figure 13: Channel Spacing



Figure 14: Number of Hopping Channels

5.5 Conducted Spurious Emissions at Antenna Terminals (FCC Part §2.1051)

The EUT must comply with requirements for spurious emissions at antenna terminals. Per \$15.247(c) all spurious emissions in any 100 kHz bandwidth outside the frequency band in which the spread spectrum device is operating shall be attenuated 20 dB below the highest power level in a 100 kHz bandwidth within the band containing the highest level of the desired power.

The EUT antenna was bypassed and the cable was connected directly into a spectrum analyzer through a 3 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 300 kHz. The amplitude of the EUT carrier frequency was measured to determine the emissions limit (20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier.



The following are plots of the conducted spurious emissions data.

Figure 15: Conducted Spurious Emissions, High Power, Low Channel 30 - 900MHz

₩ A	.gilent 09:1	18 : 31 Se	p 18,	20	17				RT		
Ref 20	dBm			#Ati	ten 40 dE	3					
Norm Log											*
10 dB/											
LgAv											
V1 S2											
S3 FC AA											
£ (f): FTun	uilly many and	all all and the second s	***	-	Manhamm	and the pro-	-	-	-	will an interview	,
Swp											
Center	Center 915.00 MHz Span 50 MHz										
#Res BW 100 kHz#VBW 300 kHz#Sweep 5.461 ms (8192 pts)_											

Figure 16: Conducted Spurious Emissions, High Power, Low Channel 900 – 930MHz
∦к А	gilent 09:2	22 : 24 Se	p 18, 20	17				RT		
Ref 20	dBm		#At	ten 40 di	3					
Peak Log										
10 dB/										
LaAv										
M1 S2										
S3 FC AA						dimento di const				
£ (f): FTun		a dana ang kata a								
Swp										
Start S	30 MHz								Stop 5.	000 GHz
#Res B	W 100 kH	Z		#	VBW 300	kHz	<u>#</u> \$	weep 433	3.6 ms (81	.92 pts)_

Figure 17: Conducted Spurious Emissions, High Power, Low Channel 930-5000MHz

∦к А	gilent 09:3	2 4: 37 Se	ep 18, 20	17				RT		
Ref 20	dBm		#At	ten 40 di	3					
Peak Log										
10 dB/										
L = 0										
LgHV M1 co										
MI 32 S3 FC							test of test			lan bla
нн £(f): f>50k										
Swp										
Center	9.500 00	00 000 GI	Ηz						Spa	an 10 Hz
#Res B	W 100 <u>kH</u>	z		#	VBW 300	kHz	# S	weep 433	3.6 ms (81	92 pts)

Figure 18: Conducted Spurious Emissions, High Power, Low Channel 5-9.5GHz

*	Agilent (9:30:49	Sep 18, 20	17				RT		
									Mkr1 5	43.3 MHz
Ref_2	0 dBm		#At	ten 40 dl	В				-50	.13 dBm
Peak										
Log										
10 dB/										
						•				
LgAv										
M1 S	2									
S3 E	č –									
Â	Ă					1				
£ (f):	والمحاد بالقرم	a na an an Al House	http://www.holes.com.t.	and the state of the		the state of the state of the		أراد واللغويه والرجا	أخلف والبلغارات	
FTun										
Swp										
Start	30.0 M	łz	1		1	1	1	1	Stop 9	00.0 MHz
#Res	BW 100	kHz		#	VBW 300	kHz	S	weep 83.	55 ms (8	192 pts)_

Figure 19: Conducted Spurious Emissions, High Power, Center Channel 30 - 900MHz

∦к А	.gilent 09:0	32 : 32 Se	ep 18, 20	17				RT		
									Mkr1 91	4.59 MHz
Ref 20	dBm		#At	ten 40 di	3				7	'.04 dBm
Norm										
Log					1					*
10					5	>				
dB/										
LaAv										
Lighte										
V1 S2										
\$3 FC										
AA						1				
£ (f):	والعام ومربقته التعا	and that the same state has	ويستعجب فالمطرعة		-Louis -	Madaudaha	and selections	an a walled	يلي معرفيه بالهاي	و يعمد المارية الم
FTun		a na an	an an a sublice	a ta	al na set de c	Contraction of the second	, and Mondaulan all	and of the state of the		an la partir ante pre-
Swp										
Center	915.00 N	1Hz							Spai	n 50 MHz
#Res B	W 100 kH	z		#	VBW 300	kHz	S	weep 4.9	915 ms (8	192 pts)_

Figure 20: Conducted Spurious Emissions, High Power, Center Channel 900 – 930MHz

🔆 🗛	gilent 09:3	4:19 Se	p 18,20	17					R	Т		
											Mkr1 2	.744 GHz
Ref 20	dBm		#At	ten 40 di	3						-35	50 dBm
Norm												Ψ
Log												*
10 487												
uD7												
LgAv						1						
					İ	\$						
V1 S2 62 EC												
53 FU 00												
пп £ (£)•	uliu . Jaar Itariya	والمرود والمراجع	المريقة والمعالي	un bitan bitan da	ار الم	lin din dal	Advantation.		l, trans		الغرور ومطرط	and the standard of the
FTun	and had the second second	helensign dyna	a settle settle settle s	and the second	1960 and	er et la subjection		a second seco		in the second	entellitetenen terit	and a straight straig
Swp												
Start 9	30 MHz						1	1			Stop 5	.020 GHz
#Res B	W 100 kHz			₩VBW 300 kHz					Sweep 391 ms (8192 pts)			

Figure 21: Conducted Spurious Emissions, High Power, Center Channel 930-5000MHz

₩ A	gilent 09:	37 : 45 Se	ep 18, 20	17				RT		
									Mkr1 7	.148 GHz
Ref 20	dBm		#At	ten 40 dl	B				44	.71 dBm
Norm										Ψ
Log										*
10										
aB/										
LaAv										
- 3										
V1 S2										
S3 FC										
AA				المليسا ر	i la jelektra kaje. La sectora kaje de	فالبادي الإحداد	des bis bis set as a	والالتعاد والمارول	I Bull tool, but also	الديونية العديدين
£ (f):				and the second		and the second se	in the second seco	and the second sec	Contraction of the	and the Association of the
FTun										
Swp										
Start 5	5.000 GHz	Z							Stop 9.	.500 GHz
#Res B	W 100 kH	lz		#	VBW 300	kHz	S	weep 43	0.3 ms (8)	192 pts)_

Figure 22: Conducted Spurious Emissions, High Power, Center Channel 5-9.5GHz

₩ А	gilent 09:	48:01 Se	p 18, 20	17				RT		
Ref 20	dBm		#At	ten 40 di	3				Mkr1 1 –49	67.1 MHz 1.48 dBm
Norm Log										*
10 dB/										
LgAv										
V1 S2										
S3 FC AA										
£(†): FTun					an a					
Swp										
Start 3	30.0 MHz				1		1		Stop 9	00.0 MHz
#Res B	3W 100 kH	Z		#	VBW 300	kHz	S	weep 83.	55 ms (81	l92 pts)_

Figure 23: Conducted Spurious Emissions, High Power, High Channel 30 - 900MHz

Ж А	gilent 09:4	45:35 Se	ep 18, 20	17				R	Т			
										Mkr1	927	'.15 MHz
Ref 20	dBm		#At	ten 40 di	В						5.	81 dBm
Peak												
Log												
10												
dB/								ľ				
								(1			
l aAv												
- 3												
M1 S2)			
S3 FC												
AA									1			
£ (f):		منا أخطة المصدي	When we are a start at	and the shale	Annuna	فليلغ وتعلي ألياد وعا	the second second		"WHEN	التود فالجغراف		مرسما <u>ما مامم</u>
FTun												
Swp												
Center	915.00 N	1Hz								S	pan	50 MHz
#Res B	W 100 kH	z		#	VBW 300	kHz	S	weep	o 4.9	15 ms	(81)	92 pts)_

Figure 24: Conducted Spurious Emissions, High Power, High Channel 900 – 930MHz

兼	Agilent 09:4	3:39 Se	p 18, 20	17				R	Т		
			_		_					Mkr1 2	.781 GHz
Ref 2	0_dBm		#At	ten 40 d	В					-35	.35 dBm
Norm											ste
Log											ж
10											
dB7											
								_			
								-			
LgAv					1						
					∳						
V1 S2	2										
S3 F0											
AF.	A F					يعير الأرباب		مقد (دفر) (و.	واستستلمه		
£ (f):							and the second se	all the second	- Nove-14		and the other party
Flun											
Swp											
Start	930 MHz			1	1	I	I			Stop 5.	.000 GHz
#Res	BW 100 kHz	2		#	VBW 30	0 kHz		Swee	p 389	9.3 ms (81	92 pts)

Figure 25: Conducted Spurious Emissions, High Power, High Channel 930-5000MHz

₩ А	gilent 09:	41:17 Se	p 18, 20	17				RT		
									Mkr1 7	.148 GHz
Ref 20	dBm		#At	ten 40 di	В				-47	'.80 dBm
Norm										
Log										*
10										
aR/										
LgAv										
Ū										
V1 S2										
S3 FC					1					
AA				الال الم	All a local design of the second s			. Islander		المجاوية والمساوية
£ (f):	Produce Protocols		and the state of the state of the					CALMER CO.	and the second second	
Flun										
Swp										
Start 5	5.000 GHz	2					_		Stop 9	500 GHz
#Res B	W 100 kH	Ζ		#	VBW 300	kHz	S	weep 43	30.3 ms (83	192 pts)_

Figure 26: Conducted Spurious Emissions, High Power, High Channel 5-9.5GHz

Ж А	gilent 09:	59 : 27 Se	p 18, 20	17				RT		
Ref_20	dBm		#At	ten 40 di	3				Mkr1 1 -53	67.1 MHz 3.98 dBm
Peak										
LU9 10										
đ₿∕										
							•			
LaAv										
Lain										
M1 S2										
S3 FC AA										
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Ѕพр										
Start 3	30.0 MHz								Stop 9	00.0 MHz
#Res B	W 100 kH	z		#	VBW 300	kHz	S	weep 83.	55 ms (8:	192 pts)_

Figure 27: Conducted Spurious Emissions, Low Power, Low Channel 30 - 900MHz

∦к А	gilent 10:	02:18 Se	p 18,	, 20	17				RT		
	ID				. 40 1	<u>_</u>				Mkr1 S	02.59 MHz
Ket 20 Norm	dBm			#Ht	ten 40 dt	5	1				.0.05 dBm
Log											*
dB/											
			1								
LgAv											
V1 S2											
S3 FC AA											
£ (f):	Marken Mary	الماريد المناجعة	mul	-	den de la	a hay had gold an hope	مراد والمعو بداره	when the states		hul man had	nintersex address of the
riun Swp											
Center	915.00 N	1Hz								Sp	an 50 MHz
#Res B	W 100 kH	z			#!	VBW 300	kHz	S	weep 4.9	15 ms (8192 pts)

Figure 28: Conducted Spurious Emissions, Low Power, Low Channel 900 – 930MHz

∰ A	gilent 10:0	04:20 Se	p 18, 20	17				R T		
									Mkr1 3	3.198 GHz
Ref 20	∣dBm		#At	ten 40 di	3				-47	7.01 dBm
Peak										
Log										
10										
dB/										
LaAv										
-0										
M1 S2										
\$3 FC						1				
ÂÂ						, Ý				
£ (f):	الالمعالية المحا	lants, and the discussion of the	of an all decisions		a him in dia at			italiya faya di. Manazarta		
FTun										
Swn										
0.10										
_										
Start 🤅	930 MHz								Stop 5	.000 GHz
#Res B	3W 100 kH	Z		#	VBW 300	kHz	S	жеер З	89.3 ms (8)	192 pts)_

Figure 29: Conducted Spurious Emissions, Low Power, Low Channel 930-5000MHz

Ж А	gilent 10:	06:57 Se	ep 18, 20	17				R ⁻	Г		
										Mkr1 7	.061 GHz
Ref 20	dBm		#At	ten 40 dl	В					-44	.43 dBm
Peak											
Log											
10											
dB/											
LaAv											
LALIA											
M1 S2											
\$3 FC					1						
ÂÂ					a thur lines.	A BARRIER AND	Hard Harden		الاربعاد	the first of the state	
£ (f):			particul de la particul.	and the second sec		and the local sector is a sector in	a far a f			and a design of	
FTun											
Swp											
Start 5	5.000 GHz	2	1	1	1	1	1	1		Stop 9.	500 GHz
#Res B	3W 100 kH	z		#	VBW 300	kHz	S	weep	430	.3 ms (81	92 pts)

Figure 30: Conducted Spurious Emissions, Low Power, Low Channel 5-9.5GHz

₩ P	Agilent 10:	:09:19 Se	ep 18,20	17				RT		
									Mkr1 6	22.0 MHz
Ref 20	∂dBm		#At	ten 40 dl	В				-50).19 dBm
Peak										
Log										
10										
dB/										
	<u> </u>									
LgHV	<u> </u>									
м1 со										
MI 32 02 FC	<u>.</u>									
33 FC 00	í.						1			
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Swn	<u> </u>									
0 II P										
o										
Start .	30.0 MHZ						~	~~~	Stop 9	00.0 MHz
#Kes b	3W 100 kH	1Z		#	ARM 200	KHZ	S	wеер ४3.	55 ms (8	192 pts)_

Figure 31: Conducted Spurious Emissions, Low Power, Center Channel 30 - 900MHz

\ ₩ A	gilent 10:	12 : 17 Se	ep 18, 20	17				RT		
									Mkr1 91	4.56 MHz
Ref 20	dBm		#At	ten 40 di	3				-10).45 dBm
Peak										
Log										
10										
dB/										
					1					
					۲ ۲					
LaAv										
Laina										
M1 S2						ļ				
S3 FC										
AA										
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FTun										
Swp										
Center	915.00 N	MHz							Spar	n 50 MHz
#Res B	W 100 kH	z		#	VBW 300	kHz	S	weep 4.9	15 ms (8	192 pts)

Figure 32: Conducted Spurious Emissions, Low Power, Center Channel 900 – 930MHz

₩ 4	\gilent 10:13:	57 Sep 18, 20	17				RT		
								Mkr1 3	.187 GHz
Ref 20)dBm	#At	ten 40 dl	3				-47	.91 dBm
Peak									
Log									
10									
dB/									
LaOu									
LGHA									
M1 S2									
53 FC									
AF	á l				\$				
£(f):	المربية فالمربية مراجع	ويقعب الأربان ورود الاعتان وروده	المراجل والمراج					in the state prove the	
FTun		or and the second s							
Swp									
Start	930 MHz							Stop 5	000 GHz
#Res F	3W 100 kH⁊		#	VRW ЗЙЙ	kHz	S	ween 38	93 ms (81	92 nts)

Figure 33: Conducted Spurious Emissions, Low Power, Center Channel 930-5000MHz

₩ A	gilent 10::	15:38 Se	p 18, 20	17				R T		
									Mkr1 7	7.051 GHz
Ref 20	dBm		#At	ten 40 di	В				-44	4.70 dBm
Peak										
Log										
10										
dB/										
LGHV										
M1 60										
91 32 83 EC					1					
				المربانين		and the barry of the state	terleten konstant in		un ului a	Land Laboration
f (f)	والترويين وبالتعم	an a	and the second diverse	all spin the second		And the second second	and an	and a second second		
FTun										
Swn										
,p										
Contor	7.250 CL]-,							 Shore	
HDAA P	ט שכב.7 ען 100 נע	12 7		ш	UBU 200	LU→	0	HAAR	opar ، ۱۵۵۶ ۱۹۵۵ مر ۱۹۵۷	192 ptc)
#Ke2 D	м төө кн	۷		#	000 M 300	KNZ		weeh	430.3 MS (0	192 pts)_

Figure 34: Conducted Spurious Emissions, Low Power, Center Channel 5-9.5GHz

₩ А	gilent 10:1	19 : 55 Se	ep 18, 20	17				RT		
D (00	10								Mkr1 4	49.1 MHz
Ket 20 Deel	dBm		#Ht	ten 40 di	5				-43	9.95 dBm
геак										
LOG										
10 dB/										
LgAv										
- 										
MI 52										
53 FC AA					1					
£ (f)∙	بال فرو بدار بر م	والارم والالأمر فكالمراس	nilian de tre mail e	and a provide state and	a ale tra d'ha	a de thi an armini	al petitel technical ber	And the state of the state	n a bank kireta dah kan	and dependences in a
FTun		a da a la secola de								
Swn										
oub.										
Start 3	0.0 MHz								Stop 9	00.0 MHz
#Res B	W 100 kH	z		#	VBW 300	kHz	S	weep 83.	.55 ms (8:	192 pts)_

Figure 35: Conducted Spurious Emissions, Low Power, High Channel 30 - 900MHz

₩ A	gilent 10:2	21 : 22 Se	p 18, 20	17				R	T		
										Mkr1	927.10 MHz
Ref 20	dBm		#At	ten 40 di	В					-	10.86 dBm
Peak											
Log											
10											
dB/											
								1			
								5	۰		
LaQu								(
LЭПV											
M1 S2									l		
S3 EC											
ÂA											
£(f):	2 h b lan at 19 2	مريد المعينة	الروية أخصت والألك	وربية فرابا ومراقله	والمراجعة والمراجع	والمراجعة والمراجع	and here a	ليع من	L anti	البلجية _ م ي أن	والمتحديد والمتحد المرا
FTun	a fan yn fan ywar yn ywar yn y	Astronom and a star of the		a la principa da sel da da	a de la de la construcción de la co	la manalana (ang ang ang ang ang ang ang ang ang ang	nte (te de la fate preside		T PROPERTY.		description of the second s
Swp											
Center	915.00 M	1Hz								Sr	nan 50 MHz
#Res B	W 100 kHz	z		#	VBW 300	kHz	S	weel	o 4.9	15 ms '	(8192 pts)

Figure 36: Conducted Spurious Emissions, Low Power, High Channel 900 – 930MHz

₩ A	gilent 10:	23 : 14 Se	ep 18, 20	17				RT		
									Mkr1 3	.059 GHz
Ref 20) dBm		#At	ten 40 di	3				-47	.47 dBm
Peak										
Log										
10										
dB/										
LgHv										
M1 00										
MI 32 02 EC										
33 FC 00										
пп •(1)•	an kanlakan ku		وللور الفر مراجر ح	Land the state	- Marine and the first	a file alle alle alle alle alle alle alle a	ويلارو والمرو	a la cale la basilia de la cale		and we take a
ETun	the second second second	ner an chaileand a	un and the first of the	des and his sector in the	a heli se de la chile si f					
Swn										
νuþ										
										000.011
Start S	930 MHz								Stop 5.	.000 GHz
#Res B	3W 100 kH	Z		#	ARM 300	kHz	<u>S</u>	weep 38%	3.3 ms (81	192 pts)_

Figure 37: Conducted Spurious Emissions, Low Power, High Channel 930-5000MHz

∰ A	gilent 10:	2 4: 35 Se	p 18, 20	17				R T		
									Mkr1 (6.976 GHz
Ref 20	dBm		#At	ten 40 di	3				-4	4.62 dBm
Peak										
Log										
10										
dB/										
LaAv										
Lain										
M1 S2										
\$3 FC					1 0					
AA						dille and a start	and the later	ميليس ورو	and the state of the second	الملح ويعدروان
£ (f):	Alter Ar Brand Bashin	and a second		and set and a set of the			a balance in the second	the state of the state of the	And the state of t	
FTun										
Swp										
Start 5	5.000 GHz								Stop S	.500 GHz
#Res B	3W 100 kH	z		#	VBW 300	kHz	S	weep 4	430.3 ms (8	192 pts)_

Figure 38: Conducted Spurious Emissions, Low Power, High Channel 5-9.5GHz

5.5.1 Band Edge Compliance

In accordance with FCC Public Notice DA-00-705 close-up plots of the upper and lower channels in both hopping and non-hopping modes with respect to the nearest authorized band-edges are provided below. The tests were performed in the same manner as the above conducted spurious emissions tests.



Figure 39: Band-edge, Hopping Mode, Lower Edge, High Power Setting



Figure 40: Low Channel, Lower Band-edge, High Power Setting



Figure 41: Band-edge, Hopping Mode, Upper Edge, High Power Setting



Figure 42: High Channel, Upper Band-edge, High Power Setting



Figure 43: Band-edge, Hopping Mode, Lower Band Edge, Low Power Setting

₩ A	gilent 15:	16:31 Se	p 18, 20	17				R	Т		
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Figure 44: Low Channel, Lower Band Edge, Low Power Setting



Figure 45: Band-edge, Hopping Mode, Upper Band-edge, Low Power Setting



Figure 46: High Channel, Upper Band-edge, Low Power Setting

5.6 Radiated Spurious Emissions: (FCC Part §2.1053)

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.209 and §15.35(b) for peak measurements.

5.6.1 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 C63.4-2014. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured. Worst case emissions are represented.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	<10 Hz (Avg.), 1MHz (Peak)

Table 10: Spectrum Analyzer Settings

S	Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)
	52.90	V	180.00	1.00	48.98	-17.0	19.8	100.0	-8.04
	73.48	V	90.00	1.00	43.78	-15.6	25.7	100.0	-11.80
	74.15	V	0.00	1.00	45.12	-15.6	30.0	100.0	-10.47
	118.94	V	0.00	1.00	51.21	-9.2	23.9	150.0	-1.55
	130.00	V	270.00	1.00	45.97	-9.2	16.0	150.0	-6.77
	150.44	V	270.00	1.00	53.85	-10.5	17.1	150.0	-0.17
	264.90	V	90.00	1.50	43.39	-8.8	17.9	200.0	-11.42
	281.90	V	90.00	1.50	34.71	-7.9	21.9	200.0	-19.22
	298.32	V	0.00	1.50	43.81	-7.9	22.5	200.0	-10.11
	325.15	V	0.00	1.50	35.67	-6.9	19.2	200.0	-17.30
	349.00	V	180.00	2.00	43.85	-6.4	40.1	200.0	-8.59
	531.83	V	180.00	2.00	46.14	-1.0	122.1	200.0	-0.88
	612.18	V	90.00	2.00	33.59	-0.3	44.6	200.0	-12.75
	985.00	V	90.00	1.00	41.94	5.7	87.2	500.0	-6.38
	52.90	Н	90.00	1.50	42.09	-17.0	7.1	100.0	-14.93
	73.48	Н	270.00	1.50	38.96	-15.6	11.2	100.0	-16.62
	74.15	Н	270.00	1.50	40.24	-15.6	11.6	100.0	-15.35
	118.94	Н	180.00	1.00	38.85	-9.2	30.2	150.0	-13.91
	130.00	Н	180.00	1.00	37.04	-9.2	20.2	150.0	-15.70
	150.44	Н	90.00	1.50	46.20	-10.5	20.3	150.0	-7.82
	264.90	Н	90.00	1.00	34.92	-8.8	20.3	200.0	-19.89
	281.90	Н	180.00	1.00	36.25	-7.9	23.3	200.0	-17.68
	298.32	Н	180.00	1.00	50.40	-7.9	21.1	200.0	-3.52
	325.15	Н	270.00	1.00	37.18	-6.9	23.9	200.0	-15.79
	349.00	Н	90.00	1.00	42.90	-6.4	29.7	200.0	-9.54
	531.83	Н	90.00	1.00	45.94	-1.0	144.8	200.0	-1.08
	612.18	Н	270.00	1.00	34.72	-0.3	45.3	200.0	-11.62
	985.00	Н	0.00	1.00	46.71	5.7	81.5	500.0	-1.61

Table 11: Radiated Emission Test Data < 1GHz (Covers all antenna configurations)

Table 12: Radiated Emission Test Data >1GHz, Low Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	0.00	1.00	54.12	1.2	581.7	5000.0	-18.7	
4513.75	V	190.00	1.00	49.47	5.3	547.8	5000.0	-19.2	
5416.50	V	290.00	1.00	48.61	8.8	742.6	5000.0	-16.6	
2708.25	V	0.00	1.00	45.01	1.2	203.8	500.0	-7.8	
4513.75	V	190.00	1.00	37.40	5.3	136.5	500.0	-11.3	
5416.50	V	290.00	1.00	36.44	8.8	182.9	500.0	-8.7	
2708.25	Н	90.00	2.20	54.05	1.2	577.0	5000.0	-18.8	
4513.75	Н	180.00	2.20	48.14	5.3	470.1	5000.0	-20.5	
5416.50	Н	270.00	2.20	46.03	8.8	551.8	5000.0	-19.1	
2708.25	Н	90.00	2.20	43.74	1.2	176.1	500.0	-9.1	
4513.75	Н	180.00	2.20	38.10	5.3	148.0	500.0	-10.6	
5416.50	Н	270.00	2.20	35.40	8.8	162.3	500.0	-9.8	

(On Board Antenna)

Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak or Average
1805.20	V	0.0	2.0	46.4	-4.7	121.0	5000.0	-32.3	Peak
2707.84	V	190.0	1.0	42.6	1.2	154.8	5000.0	-30.2	Peak
4513.75	V	90.0	2.2	28.2	5.3	47.1	5000.0	-40.5	Peak
5416.50	V	180.0	3.0	30.3	8.8	90.5	5000.0	-34.8	Peak
8124.75	V	180.0	3.0	30.3	14.9	183.1	5000.0	-28.7	Peak
9027.50	V	160.0	1.0	27.5	17.0	168.2	5000.0	-29.5	Peak
1805.20	V	0.0	2.0	33.3	-4.7	26.8	500.0	-25.4	Ave
2707.84	V	190.0	1.0	27.2	1.2	26.1	500.0	-25.6	Ave
4513.75	V	90.0	2.2	18.9	5.3	16.3	500.0	-29.7	Ave
5416.50	V	180.0	3.0	18.3	8.8	22.7	500.0	-26.9	Ave
8124.75	V	180.0	3.0	18.5	14.9	46.9	500.0	-20.6	Ave
9027.50	V	160.0	1.0	19.7	17.0	68.6	500.0	-17.3	Ave
1805.20	Н	0.0	2.0	51.7	-4.7	223.2	5000.0	-27.0	Peak
2707.84	Н	190.0	1.0	43.1	1.2	163.8	5000.0	-29.7	Peak
4513.75	Н	90.0	2.2	28.9	5.3	51.2	5000.0	-39.8	Peak
5416.50	Н	180.0	3.0	29.8	8.8	85.4	5000.0	-35.4	Peak
8124.75	Н	180.0	3.0	31.2	14.9	202.4	5000.0	-27.9	Peak
9027.50	Н	160.0	1.0	31.0	17.0	250.2	5000.0	-26.0	Peak
1805.20	Н	0.0	2.0	41.6	-4.7	69.6	500.0	-17.1	Ave
2707.84	Н	190.0	1.0	34.4	1.2	60.3	500.0	-18.4	Ave
4513.75	Н	90.0	2.2	18.9	5.3	16.2	500.0	-29.8	Ave
5416.50	Н	180.0	3.0	18.3	8.8	22.8	500.0	-26.8	Ave
8124.75	Н	180.0	3.0	20.4	14.9	58.3	500.0	-18.7	Ave
9027.50	Н	160.0	1.0	20.5	17.0	75.5	500.0	-16.4	Ave

Table 13: Radiated Emission Test Data >1GHz, Low Channel

(Laird TRAB9023P)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.58	V	150.0	1.0	16.1	7.5	15.1	500.0	-30.4	Ave
3611.06	V	270.00	1.50	20.66	11.0	38.2	500.0	-22.3	Ave
4513.70	V	90.00	2.00	17.72	14.3	39.7	500.0	-22.0	Ave
5488.64	V	270.00	2.50	16.97	18.9	61.9	500.0	-18.1	Ave
6319.25	V	180.00	2.50	19.48	21.9	117.1	500.0	-12.6	Ave
2708.58	V	150.00	1.00	37.91	7.5	185.7	5000.0	-28.6	Peak
3611.06	V	270.00	1.50	31.86	11.0	138.8	5000.0	-31.1	Peak
4513.70	V	90.00	2.00	28.93	14.3	144.3	5000.0	-30.8	Peak
5488.64	V	270.00	2.50	28.83	18.9	242.6	5000.0	-26.3	Peak
6319.25	V	180.00	2.50	29.15	21.9	356.4	5000.0	-22.9	Peak
2708.58	Н	0.0	1.0	30.71	7.5	81.1	500.0	-15.8	Ave
3611.06	Н	270.00	2.00	23.19	11.0	51.1	500.0	-19.8	Ave
4513.70	Н	90.00	2.00	19.78	14.3	50.3	500.0	-19.9	Ave
5488.64	Н	270.00	2.50	19.22	18.9	80.2	500.0	-15.9	Ave
6319.25	Н	90.00	2.50	19.50	21.9	117.3	500.0	-12.6	Ave
2708.58	Н	0.00	1.00	37.86	7.5	184.6	5000.0	-28.7	Peak
3611.06	Н	270.00	2.00	31.90	11.0	139.4	5000.0	-31.1	Peak
4513.70	Н	90.00	2.00	30.47	14.3	172.2	5000.0	-29.3	Peak
5488.64	Н	270.00	2.50	30.06	18.9	279.5	5000.0	-25.1	Peak
6319.25	Н	90.00	2.50	31.14	21.9	448.2	5000.0	-21.0	Peak

Table 14: Radiated Emission Test Data >1GHz, Low Channel

(Laird B8965)

(ANT-DS-OD9)										
Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments	
2708.58	V	0.0	1.0	34.2	7.5	121.0	500.0	-12.3	Ave	
3611.06	V	180.00	1.50	29.28	11.0	103.1	500.0	-13.7	Ave	
4513.70	V	90.00	2.00	20.68	14.3	55.8	500.0	-19.0	Ave	
5488.64	V	270.00	2.50	18.80	18.9	76.4	500.0	-16.3	Ave	
6319.25	V	180.00	2.50	19.00	21.9	110.8	500.0	-13.1	Ave	
2708.58	V	0.00	1.00	41.54	7.5	282.0	5000.0	-25.0	Peak	
3611.06	V	180.00	1.50	35.29	11.0	206.0	5000.0	-27.7	Peak	
4513.70	V	90.00	2.00	31.82	14.3	201.2	5000.0	-27.9	Peak	
5488.64	V	270.00	2.50	30.99	18.9	311.1	5000.0	-24.1	Peak	
6319.25	V	180.00	2.50	29.15	21.9	356.4	5000.0	-22.9	Peak	
2708.58	Н	0.0	1.0	26.82	7.5	51.8	500.0	-19.7	Ave	
3611.06	Н	270.00	2.00	24.94	11.0	62.6	500.0	-18.1	Ave	
4513.70	Н	90.00	2.00	19.80	14.3	50.4	500.0	-19.9	Ave	
5488.64	Н	270.00	2.50	19.37	18.9	81.6	500.0	-15.7	Ave	
6319.25	Н	90.00	2.50	19.45	21.9	116.7	500.0	-12.6	Ave	
2708.58	Н	0.00	1.00	37.22	7.5	171.5	5000.0	-29.3	Peak	
3611.06	Н	270.00	2.00	33.13	11.0	160.6	5000.0	-29.9	Peak	
4513.70	Н	90.00	2.00	30.89	14.3	180.8	5000.0	-28.8	Peak	
5488.64	Н	270.00	2.50	32.62	18.9	375.3	5000.0	-22.5	Peak	
6319.25	Н	90.00	2.50	33.04	21.9	557.8	5000.0	-19.1	Peak	

Table 15: Radiated Emission Test Data >1GHz, Low Channel
Table 16: Radiated Emission Test Data >1GHz, Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	180.00	1.00	56.98	1.2	811.7	5000.0	-15.8	
3659.00	V	190.00	1.00	56.15	3.3	935.5	5000.0	-14.6	
4573.75	V	180.00	1.00	51.91	5.5	745.5	5000.0	-16.5	
2744.25	V	180.00	1.00	48.98	1.2	323.1	500.0	-3.8	
3659.00	V	190.00	1.00	45.93	3.3	288.4	500.0	-4.8	
4573.75	V	180.00	1.00	40.00	5.5	189.2	500.0	-8.4	
2744.25	Н	270.00	2.20	56.95	1.2	808.9	5000.0	-15.8	
3659.00	Н	165.00	2.20	55.11	3.3	829.9	5000.0	-15.6	
4573.75	Н	270.00	2.20	50.54	5.5	636.7	5000.0	-17.9	
2744.25	Н	270.00	2.20	47.83	1.2	283.1	500.0	-4.9	
3659.00	Н	165.00	2.20	43.71	3.3	223.4	500.0	-7.0	
4573.75	Н	270.00	2.20	38.07	5.5	151.5	500.0	-10.4	

(On-Board Antenna)

	(Laird TRAB9023P)												
Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments				
2744.25	V	100.0	1.0	15.20	7.6	13.8	500.0	-31.2	Ave				
3659.00	V	0.00	2.00	18.81	11.1	31.3	500.0	-24.1	Ave				
4573.35	V	180.00	2.00	16.76	14.6	36.8	500.0	-22.7	Ave				
7318.00	V	0.00	2.25	19.71	26.2	197.9	500.0	-8.1	Ave				
8232.75	V	270.00	2.30	18.53	28.0	212.7	500.0	-7.4	Ave				
2744.25	V	100.00	1.00	25.30	7.6	44.0	5000.0	-41.1	Peak				
3659.00	V	0.00	2.00	31.78	11.1	139.3	5000.0	-31.1	Peak				
4573.35	V	180.00	2.00	24.67	14.6	91.4	5000.0	-34.8	Peak				
7318.00	V	0.00	2.25	28.86	26.2	567.5	5000.0	-18.9	Peak				
8232.75	V	270.00	2.30	31.64	28.0	962.3	5000.0	-14.3	Peak				
2744.25	Н	100.0	1.0	18.94	7.6	21.2	500.0	-27.5	Ave				
3659.00	Н	0.00	2.00	17.11	11.1	25.7	500.0	-25.8	Ave				
4573.35	Н	180.00	2.00	16.84	14.6	37.1	500.0	-22.6	Ave				
7318.00	Н	0.00	2.25	19.81	26.2	200.2	500.0	-8.0	Ave				
8232.75	Н	270.00	2.30	18.52	28.0	212.5	500.0	-7.4	Ave				
2744.25	Н	100.00	1.00	25.30	7.6	44.0	5000.0	-41.1	Peak				
3659.00	Н	0.00	2.00	31.78	11.1	139.3	5000.0	-31.1	Peak				
4573.35	Н	180.00	2.00	29.82	14.6	165.4	5000.0	-29.6	Peak				
7318.00	Н	0.00	2.25	33.80	26.2	1002.2	5000.0	-14.0	Peak				
8232.75	Н	270.00	2.30	31.39	28.0	935.0	5000.0	-14.6	Peak				

Table 17: Radiated Emission Test Data >1GHz, Center Channel

	(Laird B8965)												
Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments				
2744.37	V	0.0	1.0	24.40	7.6	39.7	500.0	-22.0	Ave				
3659.00	V	270.00	2.00	18.88	11.1	31.5	500.0	-24.0	Ave				
4573.75	V	90.00	2.00	16.90	14.6	37.4	500.0	-22.5	Ave				
5488.64	V	270.00	2.50	17.58	18.9	66.4	500.0	-17.5	Ave				
6403.25	V	90.00	2.50	17.70	22.2	98.3	500.0	-14.1	Ave				
2744.37	V	0.00	1.00	34.13	7.6	121.6	5000.0	-32.3	Peak				
3659.00	V	270.00	2.00	32.51	11.1	151.5	5000.0	-30.4	Peak				
4573.75	V	90.00	2.00	27.51	14.6	126.8	5000.0	-31.9	Peak				
5488.64	V	270.00	2.50	27.62	18.9	211.0	5000.0	-27.5	Peak				
6403.25	V	90.00	2.50	28.79	22.2	352.4	5000.0	-23.0	Peak				
2744.37	Н	0.0	1.0	27.34	7.6	55.6	500.0	-19.1	Ave				
3659.00	Н	270.00	2.00	18.51	11.1	30.2	500.0	-24.4	Ave				
4573.75	Н	90.00	2.00	17.59	14.6	40.5	500.0	-21.8	Ave				
5488.64	Н	270.00	2.50	17.69	18.9	67.3	500.0	-17.4	Ave				
6403.25	Н	90.00	2.50	17.72	22.2	98.5	500.0	-14.1	Ave				
2744.37	Н	0.00	1.00	33.89	7.6	118.3	5000.0	-32.5	Peak				
3659.00	Н	270.00	2.00	29.19	11.1	103.4	5000.0	-33.7	Peak				
4573.75	Н	90.00	2.00	28.20	14.6	137.3	5000.0	-31.2	Peak				
5488.64	Н	270.00	2.50	28.68	18.9	238.4	5000.0	-26.4	Peak				
6403.25	Н	90.00	2.50	28.36	22.2	335.4	5000.0	-23.5	Peak				

Table 18: Radiated Emission Test Data >1GHz, Center Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2743.94	V	0.0	1.5	37.50	7.6	179.4	500.0	-8.9	Ave
3611.06	V	180.00	1.50	20.18	11.0	36.2	500.0	-22.8	Ave
4573.50	V	90.00	2.00	19.27	14.6	49.1	500.0	-20.2	Ave
5488.50	V	270.00	2.50	19.16	18.9	79.7	500.0	-16.0	Ave
6403.25	V	180.00	2.50	19.79	22.2	125.1	500.0	-12.0	Ave
2708.58	V	0.00	1.5	42.60	7.5	318.6	5000.0	-23.9	Peak
3611.06	V	180.00	1.50	31.17	11.0	128.2	5000.0	-31.8	Peak
4573.50	V	90.00	2.00	30.07	14.6	170.2	5000.0	-29.4	Peak
5488.50	V	270.00	2.50	30.03	18.9	278.5	5000.0	-25.1	Peak
6403.25	V	180.00	2.50	30.27	22.2	417.9	5000.0	-21.6	Peak
2743.94	Н	0.0	1.0	32.78	7.6	104.1	500.0	-13.6	Ave
3611.06	Н	270.00	2.00	20.14	11.0	36.0	500.0	-22.9	Ave
4573.50	Н	90.00	2.00	18.74	14.6	46.2	500.0	-20.7	Ave
5488.50	Н	270.00	2.50	18.90	18.9	77.3	500.0	-16.2	Ave
6403.25	Н	90.00	2.50	19.92	22.2	126.9	500.0	-11.9	Ave
2708.58	Н	0.00	1.00	41.09	7.5	267.8	5000.0	-25.4	Peak
3611.06	Н	270.00	2.00	30.51	11.0	118.8	5000.0	-32.5	Peak
4573.50	Н	90.00	2.00	29.05	14.6	151.4	5000.0	-30.4	Peak
5488.50	Н	270.00	2.50	29.02	18.9	247.9	5000.0	-26.1	Peak
6403.25	Н	90.00	2.50	30.42	22.2	425.2	5000.0	-21.4	Peak

Table 19: Radiated Emission Test Data >1GHz, Center Channel

(ANT-DS-OD9)

Table 20: Radiated Emission Test Data >1GHz, High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.75	V	270.00	1.00	53.92	1.2	572.9	5000.0	-18.8	
3709.00	V	240.00	1.00	50.60	3.3	496.4	5000.0	-20.1	
4636.25	V	90.00	1.00	46.28	6.0	409.0	5000.0	-21.7	
2781.75	V	270.00	1.00	45.80	1.2	225.0	500.0	-6.9	
3709.00	V	240.00	1.00	41.48	3.3	173.7	500.0	-9.2	
4636.25	V	90.00	1.00	34.32	6.0	103.2	500.0	-13.7	
2781.75	Н	290.00	2.20	56.00	1.2	728.0	5000.0	-16.7	
3709.00	Н	90.00	2.20	48.80	3.3	403.4	5000.0	-21.9	
4636.25	Н	180.00	2.20	45.95	6.0	393.8	5000.0	-22.1	
2781.75	Н	290.00	2.20	48.86	1.2	320.0	500.0	-3.9	
3709.00	Н	90.00	2.20	39.33	3.3	135.6	500.0	-11.3	
4636.25	Н	180.00	2.20	32.36	6.0	82.4	500.0	-15.7	

(On-Board Antenna)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2744.25	V	100.0	1.0	27.0	7.6	53.5	500.0	-19.4	Ave
3659.00	V	0.00	2.00	17.06	11.1	25.6	500.0	-25.8	Ave
4573.35	V	180.00	2.00	15.86	14.6	33.2	500.0	-23.6	Ave
7318.00	V	0.00	2.25	10.08	26.2	65.3	500.0	-17.7	Ave
8232.75	V	270.00	2.30	2.92	28.0	35.3	500.0	-23.0	Ave
2744.25	V	100.00	1.00	35.60	7.6	144.0	5000.0	-30.8	Peak
3659.00	V	0.00	2.00	27.45	11.1	84.6	5000.0	-35.4	Peak
4573.35	V	180.00	2.00	23.76	14.6	82.3	5000.0	-35.7	Peak
7318.00	V	0.00	2.25	18.68	26.2	175.8	5000.0	-29.1	Peak
8232.75	V	270.00	2.30	12.86	28.0	110.7	5000.0	-33.1	Peak
2744.25	Н	100.0	1.0	28.20	7.6	61.4	500.0	-18.2	Ave
3659.00	Н	0.00	2.00	18.81	11.1	31.3	500.0	-24.1	Ave
4573.35	Н	180.00	2.00	17.13	14.6	38.4	500.0	-22.3	Ave
7318.00	Н	0.00	2.25	14.60	26.2	109.9	500.0	-13.2	Ave
8232.75	Н	270.00	2.30	12.30	28.0	103.8	500.0	-13.7	Ave
2744.25	Н	100.00	1.00	33.93	7.6	118.8	5000.0	-32.5	Peak
3659.00	Н	0.00	2.00	32.23	11.1	146.7	5000.0	-30.7	Peak
4573.35	Н	180.00	2.00	27.37	14.6	124.7	5000.0	-32.1	Peak
7318.00	Н	0.00	2.25	24.52	26.2	344.3	5000.0	-23.2	Peak
8232.75	Н	270.00	2.30	22.40	28.0	332.1	5000.0	-23.6	Peak

Table 21: Radiated Emission Test Data >1GHz, High Channel

(Laird TRAB9023P)

Table 22: Radiated Emission Test Data >1GHz, High Channel

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2708.25	V	180.0	1.0	19.2	7.5	21.4	500.0	-27.4	Ave
3611.00	V	270.00	2.00	18.24	11.0	28.9	500.0	-24.8	Ave
4513.75	V	180.00	2.00	17.26	14.3	37.6	500.0	-22.5	Ave
6319.25	V	0.00	2.25	17.94	21.9	98.0	500.0	-14.2	Ave
7222.00	V	270.00	2.30	20.40	26.1	212.2	500.0	-7.4	Ave
2708.25	V	180.00	1.00	32.96	7.5	105.0	5000.0	-33.6	Peak
3611.00	V	270.00	2.00	30.43	11.0	117.7	5000.0	-32.6	Peak
4513.75	V	180.00	2.00	30.35	14.3	169.9	5000.0	-29.4	Peak
6319.25	V	0.00	2.25	30.25	21.9	404.5	5000.0	-21.8	Peak
7222.00	V	270.00	2.30	30.77	26.1	700.1	5000.0	-17.1	Peak
2708.25	Н	100.0	1.0	18.80	7.5	20.6	500.0	-27.7	Ave
3611.00	Н	0.00	2.00	18.35	11.0	29.3	500.0	-24.6	Ave
4513.75	Н	180.00	2.00	17.50	14.3	38.7	500.0	-22.2	Ave
6319.25	Н	0.00	2.25	17.79	21.9	96.4	500.0	-14.3	Ave
7222.00	Н	270.00	2.30	18.52	26.1	170.9	500.0	-9.3	Ave
2708.25	Н	100.00	1.00	32.37	7.5	98.1	5000.0	-34.1	Peak
3611.00	Н	0.00	2.00	30.02	11.0	112.3	5000.0	-33.0	Peak
4513.75	Н	180.00	2.00	30.29	14.3	168.7	5000.0	-29.4	Peak
6319.25	Н	0.00	2.25	30.33	21.9	408.3	5000.0	-21.8	Peak
7222.00	Н	270.00	2.30	29.72	26.1	620.4	5000.0	-18.1	Peak

(Laird B8965)

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
2781.30	V	0.0	1.5	31.8	7.7	93.9	500.0	-14.5	Ave
3709.30	V	180.00	1.50	21.72	11.2	44.4	500.0	-21.0	Ave
4636.05	V	90.00	2.00	18.09	15.0	45.3	500.0	-20.9	Ave
5563.50	V	270.00	2.50	18.27	19.0	72.7	500.0	-16.8	Ave
6403.25	V	180.00	2.50	18.94	22.2	113.4	500.0	-12.9	Ave
2781.30	V	0.00	1.5	42.2	7.7	311.0	5000.0	-24.1	Peak
3709.30	V	180.00	1.50	29.87	11.2	113.4	5000.0	-32.9	Peak
4636.05	V	90.00	2.00	29.33	15.0	165.2	5000.0	-29.6	Peak
5563.50	V	270.00	2.50	30.80	19.0	307.6	5000.0	-24.2	Peak
6403.25	V	180.00	2.50	28.27	22.2	332.0	5000.0	-23.6	Peak
2781.30	Н	0.0	1.0	29.91	7.7	75.7	500.0	-16.4	Ave
3709.30	Н	180.00	2.00	20.20	11.2	37.2	500.0	-22.6	Ave
4636.05	Н	90.00	2.00	19.33	15.0	52.2	500.0	-19.6	Ave
5563.50	Н	270.00	2.50	18.33	19.0	73.2	500.0	-16.7	Ave
6403.25	Н	90.00	2.50	18.90	22.2	112.9	500.0	-12.9	Ave
2781.30	Н	0.00	1.00	41.01	7.7	271.8	5000.0	-25.3	Peak
3709.30	Н	180.00	2.00	32.02	11.2	145.2	5000.0	-30.7	Peak
4636.05	Н	90.00	2.00	26.98	15.0	126.0	5000.0	-32.0	Peak
5563.50	Н	270.00	2.50	26.92	19.0	196.7	5000.0	-28.1	Peak
6403.25	Н	90.00	2.50	28.98	22.2	360.0	5000.0	-22.9	Peak

Table 23: Radiated Emission Test Data >1GHz, High Channel

(ANT-DS-OD9)

5.7 Receiver Radiated Spurious Emissions: (RSS-210 sect 2.6)

The EUT must comply with the requirements for radiated spurious emissions that fall within the restricted bands. These emissions must meet the limits specified in §15.109 for peak measurements.

5.7.1 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 C63.4-2014. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured. Worst case emissions are represented.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	10 Hz (Avg.), 1MHz (Peak)

Table 24: Spectrum Analyzer Settings

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
38.23	V	180.00	1.00	42.85	-11.3	38.0	100.0	-8.4	
42.19	V	180.00	1.00	42.07	-14.2	24.8	100.0	-12.1	
46.99	V	180.00	1.00	43.65	-17.3	20.8	100.0	-13.6	
49.94	V	180.00	1.00	43.02	-18.6	16.7	100.0	-15.5	
52.02	V	180.00	1.00	46.24	-19.1	22.9	100.0	-12.8	
61.02	V	225.00	1.00	43.93	-18.8	18.0	100.0	-14.9	
142.62	V	225.00	1.00	41.35	-12.7	27.0	150.0	-14.9	
143.22	V	225.00	1.00	39.63	-12.8	22.0	150.0	-16.7	
167.61	V	225.00	1.00	42.93	-13.5	29.8	150.0	-14.1	
177.50	V	135.00	1.00	40.50	-13.8	21.5	150.0	-16.9	
192.01	V	135.00	1.00	35.40	-13.7	12.1	150.0	-21.8	
204.40	V	135.00	1.00	42.40	-13.3	28.4	150.0	-14.4	
215.90	V	180.00	1.00	38.10	-14.3	15.5	150.0	-19.7	
240.41	V	180.00	1.30	39.90	-13.1	21.8	200.0	-19.3	
448.20	V	180.00	1.80	38.60	-6.5	40.5	200.0	-13.9	
38.23	Н	180.00	4.00	36.73	-11.3	18.8	100.0	-14.5	
42.19	Н	180.00	4.00	39.84	-14.2	19.2	100.0	-14.3	
46.99	Н	180.00	4.00	47.40	-17.3	32.0	100.0	-9.9	
49.94	Н	180.00	4.00	41.99	-18.6	14.9	100.0	-16.6	
52.02	Н	180.00	4.00	41.37	-19.1	13.1	100.0	-17.7	
61.02	Н	225.00	4.00	35.03	-18.8	6.4	100.0	-23.8	
142.62	Н	135.00	4.00	39.26	-12.7	21.2	150.0	-17.0	
143.22	Н	135.00	4.00	38.77	-12.8	19.9	150.0	-17.5	
167.61	Н	135.00	4.00	49.18	-13.5	61.1	150.0	-7.8	
177.50	Н	180.00	4.00	37.90	-13.8	16.0	150.0	-19.5	
192.01	Н	180.00	4.00	40.50	-13.7	21.8	150.0	-16.7	
204.40	Н	180.00	3.80	41.20	-13.3	24.8	150.0	-15.6	
215.90	Н	180.00	3.80	39.50	-14.3	18.3	150.0	-18.3	
240.41	Н	180.00	3.80	36.10	-13.1	14.1	200.0	-23.1	
448.20	Н	180.00	3.20	37.30	-6.5	34.9	200.0	-15.2	

Table 25: Radiated Emission Test Data, Receiver

No frequencies noted above 1GHz

5.8 AC Conducted Emissions

5.8.1 Requirements

Compliance Standard: FCC Part 15, Class B

FCC Compliance Limits

Erocuoneu Danco	Class B Digital Device					
riequency Kange	Quasi-peak	Average				
0.15-0.5MHz	66 to 56dBµV	56 to 46dBµV				
0.5 to 5MHz	56dBµV	46dBµV				
0.5-30MHz	60dBµV	50dBµV				

5.8.2 Test Procedure

The requirements of FCC Part 15 and ICES-003 call for the EUT to be placed on an 80cm-high 1 X 1.5-meter non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω /50 μ H Line Impedance Stabilization Network bonded to a 3 X 2-meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power was supplied to the peripherals through a second LISN. The peripherals were placed on the table in accordance with ANSI C63.4. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak, peak, or average as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth. For average measurements, the post-detector filter was set to 10 Hz.

These emissions must meet the limits specified in §15.207 for quasi-peak and average measurements. At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed.

5.8.3 Conducted Data Reduction and Reporting

At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed. The Conducted emissions level to be compared to the FCC limit is calculated as shown in the following example.

Example:

Spectrum Analyzer Voltage: $VdB\mu V$ LISN Correction Factor: LISN dB Cable Correction Factor: CF dB Electric Field: $EdB\mu V = V dB\mu V + LISN dB + CF dB$

5.8.4 Test Data

The table below shows AC conducted data for the 3.3V module.

Table 26: Conducted Emissions

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.159	36.7	24.4	10.2	0.2	47.2	34.8	65.5	55.5	-18.4	-20.7
0.195	29.2	16.2	10.2	0.2	39.6	26.6	63.8	53.8	-24.2	-27.2
0.320	28.3	12.1	10.2	0.3	38.7	22.5	59.7	49.7	-21.0	-27.2
0.887	32.5	31.1	10.3	0.2	43.0	41.6	56.0	46.0	-13.0	-4.4
1.774	28.4	25.8	10.2	0.3	38.9	36.3	56.0	46.0	-17.1	-9.7
16.227	20.5	13.0	11.4	0.7	32.7	25.1	60.0	50.0	-27.3	-24.9

NEUTRAL

PHASE

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.191	30.9	20.7	10.2	0.0	41.2	30.9	64.0	54.0	-22.9	-23.1
0.887	32.0	30.8	10.3	0.2	42.4	41.3	56.0	46.0	-13.6	-4.7
1.230	21.1	18.3	10.3	0.3	31.7	28.8	56.0	46.0	-24.3	-17.2
1.774	29.5	27.1	10.2	0.3	39.9	37.6	56.0	46.0	-16.1	-8.4
16.452	19.8	12.8	11.4	0.5	31.7	24.7	60.0	50.0	-28.3	-25.3