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Put Us To The Test^m

FCC Part 15, Subpart C, Section 15.247 & ISED Canada, RSS-247 and RSS-GEN

Test Report

On

CRD 3000 Control Router FCC ID: IZP76530R IC: 8093A-76530R

Customer Name:	Echelon
Customer P.O:	50901
Date of Report Revision:	July 18, 2017
Test Report No:	R-6201N-1, Rev. A
Test Start Date:	May 16, 2017
Test Finish Date:	May 17, 2017
Test Technician:	M. Seamans
Report Revision Approved By:	T. Hannemann
Report Revision Prepared By:	J. Ramsey

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Technical Information				
Report Number:	R-6201N-1, Rev. A			
Customer:	Echelon			
Address:	2901 Patrick Henry Drive			
_	Santa Clara, CA 95054			
Manufacturer:	Echelon			
Manufacturer Address:	2901 Patrick Henry Drive			
_	Santa Clara, CA 95054			
Test Sample:	CRD 3000 Control Router			
Part Number:	CRD 3000			
Model Number:	76530R			
Serial Numbers:	0503F3C3DB00, 0503F3C14500			
FCC ID:	IZP76530R			
– IC:	8093A-76530R			
 Type:	Digital Transmission – Direct Sequence Spread Spectrum Transmitter			
Power Requirements:	120 VAC, 60 Hz			
Frequency of Operation:	2405.0 to 2475.0 MHz			
Equipment Class:	DTS			
Antenna Type:	Flexible Planer Inverted F Antenna, 2 dBi Flexible Polymer Patch Antenna, 4 dBi			
Equipment Use: _	Wireless Communications Bridge			

Test Specifications:

FCC Rules and Regulations Part 15, Subpart C, Section 15.247 Radio Standards Specification, RSS-247, Issue 2, February 2017 RSS-GEN, Issue 4, November 2014

Test Procedures:

ANSI C63.4: 2014 ANSI C63.10: 2013

FCC 558074 D01 DTS Meas Guidance V04, April 5, 2017



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Test Facility:

Retlif Testing Laboratories 101 New Boston Road Goffstown, NH 03045

FCC Registered Test Site Number: 90899 IC Registered Test Site Number: 2047C-1

FCC Part 15, Subpart C	Industry Canada RSS-GEN	Industry Canada RSS-247	Test Method
15.247(a)(2)	N/A	5.2(1)	Occupied Bandwidth (6dB Bandwidth)
15.247(b)(3)	N/A	5.4	Power Output
15.247(d)	N/A	5.5	Antenna Port, Conducted Emissions
15.247(e)	N/A	5.2(2)	Antenna Port, Power Density
15.247(d)	N/A	5.5	Spurious Radiated Emissions, 30 MHz to 25 GHz
15.109	7.1	N/A	Receiver Spurious Emissions
15.207(a)	8.8	N/A	AC Conducted Emissions

Table 2 – Support Equipment

Description	Manufacturer	Part Number	Model Number	Serial Number
Laptop PC	Lenovo	N/A	Type 1951-C2U	L3-M3375 06/07
V20 Powerline Network Interface	Echelon	75021R	U20	N/A

EUT Operation:

The EUT was operating in two modes. In the first mode, the EUT was transmitting a modulating signal at 2.405 GHz (low channel), 2.440 GHz (mid channel) and 2.475 GHz (high channel). In the second mode, the EUT was in standby.

EUT Description:

The EUT is a bridge between powerline communications and 2.4 GHz radio communications.



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Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.

Sento Wenter

Scott Wentworth Branch Manager NVLAP Approved Signatory

Todd Hannemann EMC Test Engineer iNARTE Certified Technician ATL-0255-T

Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.



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Revision History

Revisions to this document are listed below; the latest revised document supersedes all previous issues of this document:

Revision	Date	Pages Affected
-	July 14, 2017	Original Release
A	July 18, 2017	 Global changes: Document changed from R-6201N-1 to R-6201N-1, Rev. A Revised end point value of Frequency of Operation Revised maximum conducted output power in test results 20-22: Corrected title and note of all Conducted Output Power test data 26-31: Added note to all Out of Band Conducted Emissions data 53: Added Duty Cycle data



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Requirements and Test Results

FCC Section 15.247 (a)(2) and ISED RSS-247, 5.2(1) - Bandwidth

For systems using digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725 – 5850 MHz bands the minimum 6 dB bandwidth shall be at least 500 kHz.

• Results:

The minimum 6dB bandwidth measured while transmitting was 1.633 MHz. The device was found to meet the requirement of 15.247 (a)(2) and RSS-247, 5.2(1).

FCC Section 15.247 (b)(3) and ISED RSS-247, 5.4(4) - Power Output

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g.: alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

• Results:

The maximum conducted output power when transmitting was 151.71 mW. The maximum antenna gain of the antenna is 4.0 dBi. The device was found to meet the power output requirements of 15.247 (b)(3) and RSS-247, 5.4 including de facto EIRP.



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Requirements and Test Results (con't)

FCC Section 15.247(d) and ISED RSS- 247, 5.5 – Unwanted Emissions

Antenna Terminal Out of Band/Band Edge Conducted Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Paragraph (b)(3) of Section 15.247 and RSS-247, 5.4(4) the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) and RSS-GEN is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.209(a) and RSS-GEN must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Results:

All measured out of band/band edge conducted emissions were below the specified limits and the device was found to meet the requirements of 15.247 (d).

FCC Section 15.247(d) and ISED RSS-GEN, 8.9 – Unwanted Emissions

Radiated Spurious Emissions/Restricted Bands/Band Edge

Emissions which fall into restricted bands, as defined in 15.205(a) and RSS-GEN must comply with the radiated emissions limits specified in 15.209(a), RSS-GEN and shown below in Table 3, Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. When conducted measurements are performed in the restricted frequency bands the conducted output power (in dBm) plus the maximum transmit antenna gain (in dBi) must be converted to equivalent electric field strength to be compared to the limits. Emissions emanating from the EUT cabinet and cables must also comply with the radiated emissions limits. Radiated emissions measurements were also performed at the band edges to ensure band edge compliance.

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

Table 3 - Radiated Emission Limits



Requirements and Test Results (con't)

Results:

All spurious emissions were measured and found to be in compliance with the limits specified in 15.209(a) and RSS-GEN. Band edge emissions were also found to be in compliance with the limits specified in 15.209(a).

Conducted Restricted Bands Field Strength Conversion:

The Conducted Restricted Band Emissions were converted to field strength of the emission as follows:

EIRP = CO + AG

Where: CO = Conducted Output Power in dBm AG = Maximum Transmit Antenna Gain in dBi

E = EIRP - 20log D + 104.8

Where:

E = electric field strength in $dB\mu V/m$, EIRP = equivalent isotropic radiated power in dBm D = specified measurement distance in meters.

dBµV/M is converted to uV/M for comparison to the specified limit using the formula:

invLog dBµV/M/20



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Requirements and Test Results (con't)

FCC Section 15.247(e) and ISED RSS-247, 5.2(2) - Power Spectral Density

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Results:

The power spectral density conducted from the intentional radiator to the antenna was not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density was determined in accordance with Section 15.247(b)(3) and RSS-247, 5.2(2).

FCC 15.109 and ISED RSS-Gen, Par. 7.1 - Receiver Radiated Spurious Emissions Spurious emissions from receivers must comply with the radiated emissions limits specified in RSS-Gen, Para. 7.1 and as shown above in Table 1.

• Results:

No EUT receiver spurious emissions were observed within 10dB of the specified limit.

FCC 15.207(a) and RSS-GEN, Par. 8.8 – AC Conducted Emissions

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits shown in Table 4, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of the paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Eroquency of Emission (MHz)	Conducted Limi	t (dBµV)
Frequency of Emission (MHZ)	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
*Decreases due to logarithm of the fre	equency	

Table 4 - Conducted Emission Limits

Results:

The conducted emissions observed did not exceed the limits specified in Table 4.



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Field Strength Calculation/Conversion:

The maximized field strength of the emission was obtained as follows:

CR = MR + CF

Where: CR = Corrected Reading in dBµV/m MR = Uncorrected Meter Reading in dBµV CF = Correction Factor in dB (Antenna Factor, Pre-amp + Cable Loss)

Example:

MR = 15.35 dBµV CF = 16.85 dB CR = 15.35 dBuV + 16.85 = 32.2 dBµV/m

 $dB\mu V/M$ is converted to uV/M for comparison to the specified limit using the formula:

invLog dBµV/M/20

32.2 dBuV/m = 40.74 uV/m

RF Power Conversion:

Power readings in dBm may be converted to mW using the formula:

InvLog dBm/10

Example: 20dBm = 100mW



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FCC Section 15.247 (i) and ISED RSS-102 RF Exposure Limits

Spread Spectrum Transmitters operating under 15.247 and RSS-247 must be operated in a manner that ensures the public is not exposed to RF energy levels in access of the commission's guidelines. Based on the transmitter power and maximum antenna gain (see calculation below) the minimum separation distance was calculated to determine the acceptable MPE power density distance for levels to meet both the Occupational/Controlled Exposure and the General Population/Uncontrolled Exposure requirements of FCC Part 1.1310 and RSS-102. The calculation below uses the more stringent General Population MPE Limits.

$$S = \frac{PG}{4 \prod Dsq}$$

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cmsq

Per 1.1310 For the Frequency of 2400 MHz S = 1 mW/cmsq

Power = Max Power Input to Antenna = 151.71 mW

Gain = Max Power Gain of Antenna = 4.0 dBi = 2.51 numeric

1.0 mW/cmsq = $\frac{151.71x2.51}{4x(3.14)xD^2}$ = $\frac{381.07}{12.56xD^2}$

 $\mathsf{D^{A}2} = \frac{381.07}{12.56x1.0}$

 $D = \overline{)30.33} = 5.51 \text{cm}$



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Equipment List

FCC Section 15.247(a)(2) / RSS-5.2(1) Occupied Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVI	E ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017

FCC Section 15.247(b)(3) / RSS-247 5.4 Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	E ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017

FCC Section 15.247 (d) / RSS-247, 5.5

Antenna Terminal Out of Band/ Band Edge Conducted Emissions, 30 MHz to 25 GHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017

FCC Section 15.247(e) / RSS- 247, 5.2(2) Power Density

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	E ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017

FCC Section 15.247 (d) / RSS-GEN, 8.9 Spurious Radiated Emissions/Restricted Bands, 30 MHz to 25 GHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	6/16/2016	6/30/2017
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	10/13/2016	4/30/2018
3427B	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	2/5/2016	8/31/2017
3430	MCS	ANTENNA, HORN	18 - 26.5 GHz	K-5039	No Calibratio	on Required
4029B	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3 / 10 Meters	RNH	4/13/2016	4/30/2018
443	ELECTRO-METRICS	ANTENNA, LOG PERIODIC	200 MHz - 1000 MHz	LPA-25	10/6/2016	4/30/2018
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	12/1/2016	12/31/2017



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FCC Section 15.109 / RSS-GEN, 7.1 Receiver Radiated Spurious

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	6/16/2016	6/30/2017
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	10/13/2016	4/30/2018
3427B	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	2/5/2016	8/31/2017
3430	MCS	ANTENNA, HORN	18 - 26.5 GHz	K-5039	No Calibrati	on Required
4029B	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3 / 10 Meters	RNH	4/13/2016	4/30/2018
443	ELECTRO-METRICS	ANTENNA, LOG PERIODIC	200 MHz - 1000 MHz	LPA-25	10/6/2016	4/30/2018
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	12/1/2016	12/31/2017

FCC Section 15.207(a) / RSS-GEN, 8.8 AC Conducted Emissions

EN	Manufacturer	Description	F	Range		Model No.	Cal Date	Due Date
1704	SOLAR ELECTRONICS	LISN	50 uH, 150 kHz	- 30 MHz	21106-50-BF	P-25-BNC	11/18/2016	11/30/2017
1705	SOLAR ELECTRONICS	LISN	50 uH, 150 kHz	- 30 MHz	21106-50-BF	P-25-BNC	11/18/2016	11/30/2017
5070	ROHDE & SCHWARZ	RECEIVER, E	EMI	20 Hz - 40 G	θHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	ATTENUATO	R, COAXIAL	10 dB, DC -	12.4 GHz	757C-10	11/23/2016	11/30/2017
5188	Cybertron	COMPUTER,	CONTROL	N/A		TSVQJA2221	No Calibrati	on Required

FCC Section Part 15.247(a)(2) Occupied Bandwidth (6dB Bandwidth)

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	E ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017

FCC Section 15.247(d) / RSS-GEN, 8.9 Antenna Conducted Restricted Bands

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
5135	NARDA MICROWAVE	E ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	11/23/2016	11/30/2017



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FCC Section 15.247(9)(2)/ RSS-247, 5.2(1) Occupied Bandwidth (6 dB Bandwidth) Test Data



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Test Method:	6dB Bandwidth						
Customer	Echelon	Job No.	R-6201N-1				
Test Sample	Control Router Device						
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500				
Operating Mode	Transmitting modulated signal at 2.405 GHz						
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)						
Technician	M. Seamans	Date	May 16 th , 2017				
Climatic Conditions	Temp: 21.6 °C Relative Humidity: 42.1 %						
Notes	Occupied Bandwidth: 1.633266 MHz						



Test Method:	6dB Bandwidth		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)		
Technician	M. Seamans	Date	May 16 th , 2017
Climatic Conditions	Temp:21.6 °CRelative Humidity:42.1 %		
Notes	Occupied Bandwidth: 1.613226 MHz		



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Test Method:	6dB Bandwidth									
Customer	Echelon					Job No.	R-6201N-1			
Test Sample	Control Router I	Device								
Model Number	76530R					Serial No.	0503F3C3D	B00, 0503F3C1	4500	
Operating Mode	Transmitting mo	dulated signal a	t 2.475 GHz							
Test Specification	FCC Part 15, Su	bpart C Parag	raph: 15.247 (a	.)(2)						
Technician	M. Seamans					Date	May 16 th , 20	17		
Climatic Conditions	Temp: 21.6 °C	Relative H	Iumidity: 42.1	%						
Notes	Occupied Bandy	vidth: 1.633266	MHz							
Ref Lv	1	Delta 1	- [T1] -1.	90 dB	RBW VBW	100] 300]	CHZ R	F Att	50 dB	
35 dB:	m	1	.633266	553 MHz	SWT	5 r	ns Ui	nit	dBr	ı
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-40										
-50										
-60										
-65					l	1	1	[l
Center	2.47485	9719 GH:	Z	500	kHz/			Spa	ın 5 MHz	

Test Photographs Power Output



Test Setup



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FCC Section 15.247 (b)(3) / RSS-247, 5.4 Power Output Test Data



Retlif Testing Laboratories

Test Method:	Conducted Output Power						
Customer	Echelon	Job No.	R-6201N-1				
Test Sample	Control Router Device						
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500				
Operating Mode	Transmitting modulated signal at 2.405 GHz						
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)						
Technician	M. Seamans	Date	May 16 th , 2017				
Climatic Conditions	Temp:21.4 °CRelative Humidity:43.6 %						
Notes	KDB AVGSA-3, Output Power: 21.23 dBm						



Test Method:	Conducted Output Power						
Customer	Echelon	Job No.	R-6201N-1				
Test Sample	Control Router Device						
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500				
Operating Mode	Transmitting modulated signal at 2.440 GHz						
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)						
Technician	M. Seamans	Date	May 16 th , 2017				
Climatic Conditions	Temp:21.4 °CRelative Humidity:43.6 %						
Notes	KDB AVGSA-3, Output Power: 21.81dBm						



	RETLIF TESTING 	LABC	DRATOR	RIES	
Test Method:	Conducted Output Power				
Customer	Echelon		Job No.	R-6201N-1	
Test Sample	Control Router Device		<u> </u>		
Model Number	76530R		Serial No.	0503F3C3DB00, 0503F3C14500	
Operating Mode	Transmitting modulated signal at 2.475 GHz		_		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)				
Technician	M. Seamans		Date	May 16 th , 2017	
Climatic Conditions	Temp: 21.4 °C Relative Humidity: 43.6 %				
Notes	KDB AVGSA-3, Output Power: 20.74 dBm				
Ref 35	Marker 1 [T1] Lvl 11.46 dBm dBm 2.47496693 GHz	RBW VBW SWI	7 100 k 7 300 k 7 5	kHz RFAtt 50 dB kHz s Unit dBm	
35					
30	./ dB OIIset		* 1	[T1] 11.46 dBm	
			CH	PWR 20.74 dBm	
20				BW 1.6300000 MIIz	
10		1			
171					IN1 LRM
-10					
-20					
-30					
-40					
-50					
-eo					
-65L Cen ⁻	cer 2.474885772 GHz 300 k	Hz/		Span 3 MHz	

Test Photographs Antenna Terminal Out of Band/Band Edge Conducted Emissions (30 MHz to 25 GHz)



Test Setup



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FCC Section 15.247 (d) / RSS-247, 5.5 Antenna Terminal Out of Band/Band Edge Conducted Emissions (30 MHz to 25 GHz) Test Data



Retlif Testing Laboratories

Out of Band Conducted Emissions Test Data



Retlif Testing Laboratories

Test Method:	Out of Band Conducted Emissions 25 MHz to 25 GHz							
Customer	Echelon	Job No.	R-6201N-1					
Test Sample	Control Router Device							
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500					
Operating Mode	Transmitting modulated signal at 2.405 GHz							
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)							
Technician	M. Seamans	Date	May 17 th , 2017					
Climatic Conditions	Temp: 21.0 °CRelative Humidity: 45.8 %							
Notes	Limit: -9.42 dBm (30 dB below the maximum in-band PSD level)							



RETLIF TESTING LABORATORIES Test Method: Out of Band Conducted Emissions 25 MHz to 25 GHz Job No. Echelon R-6201N-1 Customer **Control Router Device Test Sample Model Number** 76530R Serial No. 0503F3C3DB00, 0503F3C14500 Transmitting modulated signal at 2.405 GHz **Operating Mode** FCC Part 15, Subpart C Paragraph: 15.247 (d) **Test Specification** May 17th, 2017 Technician M. Seamans Date **Climatic Conditions** Temp: 21.0 °C Relative Humidity: 45.8 % Notes Limit: -9.42 dBm (30 dB below the maximum in-band PSD level) 100 kHz 20 dB Marker 3 [T1] RBW RF Att 300 kHz Ref Lvl -50.44 dBm VBW 0 dBm 22.11422846 GHz SWT 6 s Unit dBm 11.7 dB Offset ‴ з [T1] -50.44 dBn #7.W GHz 22.11422 846 42 dBm 0 -10 -D1 <u>~1</u> dBn [TT] -34 50 4.79959920 GHz ‴≈2 [T1]42 dBn -4 C -20 2.01402806 GHz -30 INI 1 1MA **IVIEW** 2 -40 З PO -50 ΑÅ ۸N (۱ s Markara مربع adjur and Varan. -60 -70 -80 -90 -100 2.4 GHz/ Stop 25 GHz Start 1 GHz

Test Method:	Out of Band Conducted Emissions 25 MHz to 25 GHz						
Customer	Echelon	Job No.	R-6201N-1				
Test Sample	Control Router Device						
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500				
Operating Mode	Transmitting modulated signal at 2.440 GHz						
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)						
Technician	M. Seamans	Date	May 17 th , 2017				
Climatic Conditions	Temp: 21.0 °C Relative Humidity: 45.8 %						
Notes	Limit: -9.42 dBm (30 dB below the maximum in-band PSD level)						



Test Method:	Out of Band Conducted Emissions 25 MHz to 25 GHz								
Customer	Echelon	Job No.	R-6201N-1						
Test Sample	Control Router Device								
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500						
Operating Mode	Transmitting modulated signal at 2.440 GHz								
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)								
Technician	M. Seamans	Date	May 17 th , 2017						
Climatic Conditions	Temp: 21.0 °C Relative Humidity: 45.8 %								
Notes	Limit: -9.42 dBm (30 dB below the maximum in-band PSD level)								



Test Method:	Out of Band Conducted Emissions 25 MHz to 25 GHz		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.475 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	Date	May 17 th , 2017
Climatic Conditions	Temp: 21.0 °C Relative Humidity: 45.8 %		
Notes	Limit: -9.42 dBm (30 dB below the maximum in-band PSD level)		



Page 5 of 6



Band Edge Conducted Test Data



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Test Method:	Band Edge Conducted		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.405 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	Date	May 17 th , 2017
Climatic Conditions	Temp: 21.0 °C Relative Humidity: 45.8 %		
Notes	Limit: -9.42 dBm		





Test Method:	Band Edge Conducted								
Customer	Echelon	Job No.	R-6201N-1						
Test Sample	Control Router Device								
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500						
Operating Mode	Transmitting modulated signal at 2.475 GHz								
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)								
Technician	M. Seamans	Date	May 17 th , 2017						
Climatic Conditions	Temp: 21.0 °CRelative Humidity: 45.8 %								
Notes	Limit: -9.42 dBm								



Test Photographs Power Density



Test Configuration



Retlif Testing Laboratories

FCC Section 15.247(e) / RSS-247, 5.2(2) Power Density Test Data



Retlif Testing Laboratories

Test Method:	Power Spectral Density		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.405 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	Date	May 17 th , 2017
Climatic Conditions	Temp:22.3 °CRelative Humidity:44.3 %		
Notes	KDB 10.7 AVGPSD-3, Power Spectral Density: 3.44 dBm Limit: 8 dBm		



		MAION	
Test Method:	Power Spectral Density		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.44 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	Date	May 17 th , 2017
Climatic Conditions	Temp:22.3 °CRelative Humidity:44.3 %		
Notes	KDB 10.7 AVGPSD-3, Power Spectral Density: 3.33 dBm Limit: 8 dBm		



		JNAION	
Test Method:	Power Spectral Density		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.475 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	Date	May 17 th , 2017
Climatic Conditions	Temp: 22.3 °C Relative Humidity: 44.3 %		
Notes	KDB 10.7 AVGPSD-3, Power Spectral Density: 2.94 dBm Limit: 8 dBm		



Test Photographs Antenna Conducted Restricted Bands



Test Setup



Retlif Testing Laboratories

FCC Section 15.247(d) / RSS-GEN, 8.9 Antenna Conducted Restricted Bands Test Data



Retlif Testing Laboratories

RETLIF TESTING LABORATORIES						
	EMISSIONS TEST DATA SHEET					
Test Method	Unwanted Emissions into Restricted Frequency Bands					
Customer	Echelon					
Job Number	R-6201N-1					
Test Sample	Control Router Device					
Model Number	76530R					
Serial Number	0503F3C3DB00, 0503F3C14500					
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)				
Operating Mode	Transmitting modulated signal at 2405 MHz, 2440 MHz and 2475 MHz consecu	itively.				
Technician	M. Seamans					
Date	May 16 th , 2017					

Notes: Detector: Quasi-Peak <1GHz, Average >1GHz X=0.5158

	TEST PARAMETERS								
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m
37.50	-	-	-	-	-	-	-	-	100.00
	38.00*	-78.61	-	-	-	-78.61	16.647	6.797	Ι
38.25	-	-	-	-	-	-	-	-	100.00
		ļ							
73.00	-	-	-	-	-	-	-	-	100.00
	74.00*	-77.47	-	-	-	-77.47	17.787	7.751	Ι
74.60	-	-	-	-	-	-	-	-	100.00
74.80	-	_	-	-	-	-	-	-	100.00
	75.00*	77.47	-	-	-	77.47	17.787	7.751	
75.20	-	-	-	-	-	-	-	-	100.00
108.00	-	-	-	-	-	-	-	-	100.00
	115.00*	-77.22	-	-	-	-77.22	18.037	7.977	
121.94	-		-	-	-	-	-	-	100.00
123.00				_	_	_			100.00
123.00	130.00*	-77.06	_	_	_	-77.06	18 107	8 126	100.00
128.00	150.00*	-77.00	-	-	-	-77.00	10.197	0.120	100.00
158.00	-	-	-	-	-	-	-	-	100.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 1 of 11

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Retlif Testing Laboratories

	RETLIF TESTING LABORATORIES	
	EMISSIONS TEST DATA SHEET	
Test Method	Unwanted Emissions into Restricted Frequency Bands	
Customer	Echelon	
Job Number	R-6201N-1	
Test Sample	Control Router Device	
Model Number	76530R	
Serial Number	0503F3C3DB00, 0503F3C14500	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated signal at 2405 MHz, 2440 MHz and 2475 MHz consec	cutively.
Technician	M. Seamans	
Date	May 16 th , 2017	
Notes: Detector: Quasi-Pe	eak <1GHz, Average >1GHz X=0.5158	

	TEST PARAMETERS								
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m
149.90	-	-	-	-	-	-	-	-	100.00
	150.00*	-74.84	-	-	-	-74.84	20.417	10.492	Ι
150.05	-	-	-	-	-	-	-	-	100.00
156.52	-	-	-	-	-	-	-	-	100.00
	156.52*	-76.72	-	-	-	-76.72	18.537	8.450	Ι
156.52	-	-	-	-	-	-	-	-	100.00
156.70	-	-	-	-	-	-	-	-	100.00
	156.80*	-76.72	-	-	-	-76.72	18.537	8.450	
156.90	-	-	-	-	-	-	-	-	100.00
162.01	-	-	-	-	-	-	-	-	150.00
	165.00*	-76.84	-	-	-	-76.84	18.417	8.334	
167.17	-	-	-	-	-	-	-	-	150.00
167.72	-	-	-	-	-	-	-	-	150.00
	170.00*	-76.72	-	-	-	-76.72	18.537	8.450	
173.20	-	-	-	-	-	-	-	-	150.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 2 of 11

Retlif Testing Laboratories

Report No. R-6201N-1, Rev. A

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		RET	LIF TE	STING	LABOI	RATORI	ES ===		
			EMISS	SIONS TEST	T DATA SI	HEET			
Test Method	1	Unwanted	Emissions in	to Restricted 1	Frequency B	ands			
Customer		Echelon							
Job Number	c	R-6201N-1	1						
Test Sample	•	Control Ro	outer Device						
Model Num	ber	76530R							
Serial Numb	oer	0503F3C3	DB00, 0503	F3C14500					
Test Specific	cation	FCC Part 1	15 Subpart C					Paragraph: 1	5.247(d)
Operating N	/lode	Transmitti	ng modulate	d signal at 240	5 MHz. 244	0 MHz and 24'	75 MHz consec	utively.	
Technician		M. Seamar	15	6	- 1			<u> </u>	
Date		May 16 th , 2	2017						
Notes: Detec	ctor: Quasi-Peal	x <1GHz, Av	erage >1GH:	z X=0.5158					
				TEST PARA	METERS				
				Duty	Duty		Convented		<u> </u>
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Cycle Factor 10log(1/x)	Cycle Factor 20log(x)	Corrected Reading	Field Strength	Converted Reading	Limit at 3M
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m
240.00		_			_	_	_		200.00
240.00	260.00*	-79 38	_	_	_	-79 38	15 877	6 221	200.00
285.00	200.00	17.50			_	17.50	15.077	0.221	200.00
285.00	-	-	-	-	-	-	_	-	200.00
222.80									200.00
322.80	-	-	-	-	-	-	-	-	200.00
225.40	330.00*	-80.06	-	-	-	-80.06	15.197	5.752	
335.40	-	-	-	-	-	-	-	-	200.00
2 00.00									-
399.90	-	-	-	-	-	-	-	-	200.00
	405.00*	-79.71	-	-	-	-79.71	15.547	5.989	
410.00	-	-	-	-	-	-	-	-	200.00
608.00									200.00
008.00	-	-	-	-	-	-	-	-	200.00
(14.00)	611.00*	-//.61	-	-	-	-//.01	17.647	/.627	
614.00	-	-	-	-	-	-	-	-	200.00
960.00	_	_	_	-	_	_	_	_	500.00
	975.00*	-74.31	-	-	_	-74.31	20.947	11.152	00000
1240.00	-	-	-	-	_	-			500.00
12.0.00	1								500.00
1300.00	-	-	-	-	_	-	-	-	500.00
	1350.00*	-78.13	-	_	-	-78.13	17 127	7 184	1
1427.00	-			_		-	-	-	500.00
No EUT emiss	sions within 10 dl	B of the specific	ied test limit w	vere observed at	the specified	test distance thr	oughout the give	n frequency spec	trum. *
THIS CHHISSION					system	1 sensitivity (190	гэс 1100г <i>)</i> . Г	Data Sheet 3 of	11
				Г	R				
						Retlif	Testing L	aboratori	es
						Report No	R-6201	N-1 Rev	Α

		ргт		STINC						
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	-	TT 1	EMISS	SIONS TEST	<u>r data si</u>	HEET				
Test Method	1	Unwanted	Emissions in	to Restricted	Frequency B	ands				
Customer	Lustomer Echelon									
Job Number		R-6201N-	l 							
Test Sample	han	Z6520D	buter Device							
Sorial Numb	ber	70330K	DD00 05021	C2C14500						
Serial Nullin	ber	0303F3C3	DB00, 03031	5014300						
Test Specific	cation	FCC Part	15 Subpart C					Paragraph: 1	5.247(d)	
Operating M	Iode	Transmitti	ng modulated	d signal at 240	5 MHz, 244	0 MHz and 247	75 MHz consec	utively.		
Technician		M. Seama	ns							
Date		May 16 th , 2	2017							
Notes: Detec	tor: Quasi-Peak	x <1GHz, Av	erage >1GHz	z X=0.5158						
<u>L</u>										
				TEST PARA	METERS					
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M	
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m	
1435.00	_	-	-	_	-	-	-	_	500.00	
	1500.00*	-76.35	-	-	-	-76.35	18.907	8.818		
1646.50	-	-	-	-	-	-	-	-	500.00	
1660.00	-	-	-	_	-	-	-	-	500.00	
	1680.00*	-76.76	-	_	-	-76.76	18.497	8.411		
1710.00	_	-	-	-	_	-	-	-	500.00	
									200100	
1718.80	-	-	-	-	-	-	-	-	500.00	
	1720.00*	-76.44		_	_	-76.44	18.817	8.727	500.00	
1722.20	-	-	-	_	-	-	-	-	500.00	
1,22.20									500.00	
2200.00	_	-								
1	2250.00*	-76 52	76.52							
2300.00	2230.00	-70.52	-			-70.52	10.757	0.047	500.00	
2300.00	_	-	-	-	-	-	-	-	500.00	
2310.00	_								500.00	
	2280.06	61.20	4.00	2 975		5451	40.747	100 000	500.00	

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4.00

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emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

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EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This

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			EMISS	SIONS TEST	T DATA SI	HEET				
Test Method	1	Unwanted	Emissions in	nto Restricted I	Frequency B	ands				
Customer		Echelon								
Job Number	•	R-6201N-	1							
Test Sample		Control Ro	outer Device							
Model Num	ber	76530R								
Serial Numb	ber	0503F3C3	DB00, 0503	F3C14500						
Test Specific	cation	FCC Part 1	FCC Part 15 Subpart C Paragraph: 15.247(d)							
Operating N	Iode	Transmitti	ng modulate	d signal at 240	5 MHz, 244	0 MHz and 247	75 MHz consec	utively.		
Technician		M. Seama	ıs							
Date		May 16 th , 2	2017							
Notes: Detec	tor: Quasi-Peak	ĸ <1GHz, Av	erage >1GH:	z X=0.5158						
				TEST PARA	METERS				·	
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M	
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m	
2690.00	-	-	-	-	-	-	-	-	500.00	
	2750.00*	-74.25	-	-	-	-74.25	21.007	11.229		
2900.00	_	-	-	-	-	-	-	-	500.00	
3260.00	_	_	-	_	-	_	-	_	500.00	
5200.00	3263.00*	-76.98	_	_	_	-76.98	18 277	8 201	500.00	
3267.00	5205.00	70.50			_	10.90	10.277	0.201	500.00	
5207.00					_	_	_	_	300.00	
3332.00									500.00	
5552.00	2226.00*	76.00		-	-	76.00	19 257	- 9 777	300.00	
2220.00	5550.00*	-76.90	-	-	-	-70.90	18.557	0.277	7 00.00	
3339.00	-	-	-	-	-	-	-	-	500.00	
2245.00										
3345.00	-	-	-	-	-	-	-	-	500.00	
	3350.00*	-76.91	-	-	-	-76.91	18.347	8.267		
3358.00	-	-	-	-	-	-	-	-	500.00	
3600.00									500.00	
3000.00	- 2700.00*	-	-	-	-	- 77.07	-	-	500.00	
1400.00	5700.00*	-//.9/	-	-	-	-//.9/	1/.28/	/.31/		
4400.00	-	-	-	-	-	-	-	-	500.00	
4500.00									500.00	
4300.00	-	-	-	-	-	- 42.10	-	-	500.00	
5150.00	4880.07	-50.06	4.00	2.875	-	-43.19	52.072	401.442		
5150.00	-	-	-	-	- 	-	-		500.00	
emission is not	t from the EUT. I	the specified t	nent of minim	observed at the ium measuremen	specified test nt system sens	sitivity (Noise Fl	hout the given fr	equency spectrur	n. * This	
							E	Data Sheet 5 of	11	
						Retlif	Testing L	aboratori	es	
						Report No	. R-6201I	N-1, Rev.	A	

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		RET	LIF TE	STING	LABO	KATORI	ES		
			EMISS	SIONS TEST	T DATA SI	HEET			
Test Method		Unwanted	Emissions in	nto Restricted l	Frequency B	ands			
Customer		Echelon							
Job Number		R-6201N-1	1						
Test Sample		Control Ro	outer Device						
Model Numb	ber	76530R							
Serial Number 0503F3C3DB00, 0503F3C14500									
Test Specific	ation	FCC Part 1	15 Subpart C					Paragraph: 1	5.247(d)
Operating M	lode	Transmitti	ng modulated	d signal at 240	5 MHz, 244	0 MHz and 247	75 MHz consec	utively.	
Technician		M. Seama	ns						
Date		May 16 th , 2	2017						
Notes: Detec	tor: Quasi-Peak	x <1GHz, Av	erage >1GH	z X=0.5158					
				TEST PARA	METERS				
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m
5350.00	-	-	-	-	-	-	-	-	500.00
	5400.00*	-73.41	-	-	-	-73.41	21.847	12.370	
5460.00	-	-	-	-	-	-	-	-	500.00
7250.00	_	_	_	_	-	_	-	_	500.00
1200100	7416 33	-61.95	4 00	2 875	_	-55.07	40 182	102 123	500.00
7750.00	-	-	-	-	_	-	-	-	500.00
1150.00									500.00
8025.00									500.00
0025.00	8200.00*	75.40		-	-	75.40	- 10 767	0.725	300.00
8500.00	8300.00*	-73.49	-	-	-	-73.49	19.707	9.735	500.00
8500.00	-	-	-	-	-	-	-	-	500.00
0000.00									
9000.00	-	-	-	-	-	-	-	-	500.00
	9100.00*	-75.90	-	-	-	-75.90	19.357	9.287	
9200.00	-	-	-	-	-	-	-	-	500.00
9300.00	-	-	-	-	-	-	-	-	500.00
	9400.00*	-75.87	-	-	-	-75.87	19.387	9.319	
9500.00	-	-	-	-	-	-	-	-	500.00
				<u> </u>					
10600.00	-	-	-	-	-	-	-	-	500.00
	12201.81	-52.13	4.00	2.875	-	-45.25	50.002	316.317	
12700.00	-	-	-	-	-	-	-	-	500.00
EUT emissions emission is not	within 10 dB of from the EUT. I	the specified t t is a measurer	test limit were nent of minim	observed at the num measuremen	specified test at system sense	distance throug sitivity (Noise Fl	hout the given froor).	equency spectrur	n. * This
L							Γ	Data Sheet 6 of	11
					B	Retlif	Festing L	aboratori	ies
						Report No	o. R-6201I	N-1, Rev.	A

(<u> </u>									
		RET	'LIF TE	STING	LABOI	RATORI	ES ====		
			EMISS	SIONS TEST	T DATA SI	HEET			
Test Method		Unwanted	Emissions in	nto Restricted 1	Frequency B	ands			
Customer		Echelon							
Job Number		R-6201N-	1						
Test Sample		Control Ro	outer Device						
Model Num	ber	76530R							
Serial Numb	er	0503F3C3	DB00, 0503	F3C14500					
Test Specific	cation	FCC Part	15 Subpart C					Paragraph: 1	5.247(d)
Onerating N	Inde	Transmitti	ng modulate	d signal at 240	5 MHz 244	0 MHz and 24'	75 MHz consec	utively	
Technician		M. Seama	n <u>g mounte</u> ns		<u> </u>			aa vorg v	
Date		May 16 th .	2017						
Notes: Detec	tor: Quasi-Peal	x <1GHz, Av	erage >1GH	z X=0.5158					
				TEST PARA	METERS				
						1			
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m
13250.00	_	_	_	-	-	_	_	_	500.00
	15800.00*	-73.90	-	-	-	-73.90	21.357	11.691	
16200.00	_	_	_	_	_	_	_	_	500.00
10200.00									500.00
17700.00									500.00
17700.00	-	72.05	-	-	-	72.05	-	-	500.00
21400.00	19240.00**	-73.93	-	-	-	-75.95	21.507	11.024	7 00.00
21400.00	-	-	-	-	-	-	-	-	500.00
22010.00	-	-	-	-	-	-	-	-	500.00
	22320.00*	-72.65	-	-	-	-72.65	22.607	13.501	
23120.00	-	-	-	-	-	-	-	-	500.00
23000.00	_	_	_	_	_	_	_	_	500.00
	23800.00*	-72.71	_	_	_	-72.71	22.547	13 408	500.00
24000.00	-	-	_	_	_	-	-	-	500.00
24000.00	_		_	_	_	_	_	_	300.00
									-
		-							<u> </u>
									<u> </u>
				ļ					<u> </u>
									<u> </u>
No EUT emiss This emission	ions within 10 dl is not from the E	B of the specif. UT. It is a mea	ied test limit w asurement of n	vere observed at ninimum measur	the specified rement system	test distance thr sensitivity (No	oughout the give ise Floor).	n frequency spec	trum. *
							 I	Data Sheet 7 of	11
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						Retilf	Lesting L	aporatori	62
						Report No	o. R-6201I	N-1, Rev.	A

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			EMIS	SIONS TES	T DATA S	HEET					
Test Metho	d	Unwanted	l Emissions i	nto Restricted	Frequency E	Bands					
Customer		Echelon									
Job Number	r	R-6201N-	R-6201N-1								
Test Sample	e	Control R	outer Device								
Model Num	iber	76530R									
Serial Num	ber	0503F3C3	3DB00, 0503	F3C14500				T			
Test Specifi	cation	FCC Part	FCC Part 15 Subpart C Paragraph: 15.247(d)								
Operating N	Mode	Transmitt	ing modulate	d signal at 240	05 MHz, 244	0 MHz and 24	75 MHz conse	cutively.			
Technician		M. Seama	ins 2017								
Date		May 16 th ,	2017								
Notes: Detec	ctor: Peak X=	=0.5158									
				TECT DAD	METEDS						
		T	1	ILSI PARA	ANETERS						
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M		
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m		
1300.00	-	-	-	-	-	_	-	-	5000.00		
	1350.00*	-65.18	-	-	-	-65.18	30.077	31.906			
1427.00	-	-	-	-	-	-	-	-	5000.00		
1435.00	-	-	-	-	-	-	-	-	5000.00		
	1500.00*	-66.29	-	-	-	-66.29	28.967	28.078			
1646.50	-	-	-	_	-	_	_	-	5000.00		
1660.00	-	-	-	_	-	_	_	-	5000.00		
	1680.00*	-65.30	-	-	_	-65.30	29.957	31.468			
1710.00	-	-	-	-	_	-	-	-	5000.00		
									5000.00		
1718.80	-	-	-	-	_	-	-	-	5000.00		
	1720.00*	-68.33	_	_	_	-68.33	26.927	22.201	5000.00		
1722.20	-	-	_	_	_	-	-	-	5000.00		
1,22.20									5000.00		
2200.00	-	_	_	_	_	_	_	-	5000.00		
	2250.00*	-65.04	-	-	_	-65.04	30.217	32.424			
2300.00	-	-	_	-	-	-	-	-	5000.00		
2000.00									5000.00		
2310.00									5000.00		
2310.00	2389.96	_32.25	4.00	2 875		-25.38	69.882	3119 778	5000.00		
2390.00	2307.70	-52.25	4.00	2.075		-25.50	07.002	5115.776	5000.00		
EUT emissions	s within 10 dB of	the specified	test limit were	observed at the	specified test	distance throug	hout the given fr	equency spectrum	<u>1 5000.00</u> n. * This		
emission is not	t from the EUT. I	t is a measure	ment of minim	um measuremei	nt system sens	sitivity (Noise F	loor).				
]	Data Sheet 8 of	11		
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						Retilf	resung L	apprator	162		
						Report N	o. R-6201	N-1, Rev.	А		

		REJ	TIFT	TSTING	LARO	RATOR	IFS —			
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Test Matha	4	Linwontod	EMIS Emissions i	SIONS TES	T DATA S	HEET Panda				
Customer	<u>u</u>	Echelon	I EIIIISSIOIIS I	nto Restricted	Frequency I	Sanus				
Job Number	r	R-6201N-	.1							
Test Sample	2	Control R	outer Device	•						
Model Num	ber	76530R								
Serial Num	ber	0503F3C3	3DB00, 0503	F3C14500						
Test Specifi	cation	FCC Part	FCC Part 15 Subpart C Paragraph: 15.247(d)							
Operating N	Aode	Transmitt	ing modulate	d signal at 240)5 MHz, 244	0 MHz and 24	75 MHz conse	cutively.		
Technician		M. Seama	ins	<u> </u>				•		
Date		May 16 th ,	2017							
Notes: Detec	ctor: Peak X=	=0.5158								
<u>[</u>				TEST DAD	METEDS					
	1	1		ILSI PAKA	AIVIE I EKS	1	1	1		
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M	
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m	
2483.50	-	-	-	-	-	-	-	-	5000.00	
	2483.57	-29.17	4.00	2.875	-5.749	-28.04	67.213	2294.424		
2500.00	-	-	-	-	-	-	-	-	5000.00	
2690.00	-	-	-	-	-	-	-	-	5000.00	
	2750.00*	-64.02	-	-	-	-64.02	31.237	36.465		
2900.00	-	-	-	-	-	-	-	-	5000.00	
3260.00	-	-	-	-	-	-	-	-	5000.00	
	3263.00*	-64.86	-	-	-	-64.86	30.397	33.103		
3267.00	-	-	-	-	-	-	-	-	5000.00	
3332.00	-	-	-	-	-	-	-	-	5000.00	
	3336.00*	-65.70	-	-	-	-65.70	29.557	30.052		
3339.00	-	-	-	-	-	-	-	-	5000.00	
3345.00	-	-	-	-	-	-	-	-	5000.00	
	3350.00*	-64.95	-	-	-	-64.95	30.307	32.762		
3358.00	-	-	-	-	-	-	-	-	5000.00	
2600.00										
3600.00	- 2700.00*	-	-	-	-	-	-	-	5000.00	
4400.00	3700.00*	-00.02	-	-	-	-00.02	29.257	28.965	5000.00	
4400.00	- within 10 dR of	-	- test limit wara	- observed at the	-	- distance through	- hout the given fr	-	15000.00 n * This	
emission is not	from the EUT. I	t is a measure	ment of minim	um measureme	nt system sens	sitivity (Noise F	loor).	equency specifiul		
							I	Data Sheet 9 of	11	
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						Retiff	resting L	aporator	162	
						Report N	o. R-6201	N-1, Rev.	А	

		RET	T IF TF	ESTING	LARO	RATOR	ES ===				
Tost Motho	4	Unwanted	EMIS Emissions i	SIONS IES	I DAIAS	HEE I					
Customer	<u>u</u>	Echelon									
Job Number	r	R-6201N-	R-6201N-1								
Test Sample	2	Control R	outer Device	;							
Model Num	ber	76530R									
Serial Num	ber	0503F3C3	3DB00, 0503	F3C14500							
Test Specifi	cation	FCC Part	15 Subpart C					Paragraph: 1	5.247(d)		
Operating N	Aode	Transmitt	ing modulate	ed signal at 240	95 MHz, 244	0 MHz and 24	75 MHz conse	cutively.			
Technician		M. Seama	ns 2017								
Date		May 16 th ,	2017								
Notes: Detec	ctor: Peak X=	=0.5158									
				TEST PARA	METERS						
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Duty Cycle Factor 10log(1/x)	Duty Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M		
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m		
4500.00	-	-	-	-	-	-	-	-	5000.00		
	4880.07	-30.50	4.00	2.875	-	-23.62	71.632	3816.135			
5150.00	-	-	-	-	-	-	-	-	5000.00		
5350.00	-	-	-	-	-	-	-	-	5000.00		
	5400.00*	-61.72	-	-	-	-61.72	33.537	47.520			
5460.00	-	-	-	-	-	-	-	-	5000.00		
7250.00	-	-	-	-	-	-	-	-	5000.00		
	7416.33	-53.29	4.00	2.875	-	-46.415	48.842	276.773			
7750.00	-	-	-	-	-	-	-	-	5000.00		
8025.00	-	-	-	-	-	-	-	-	5000.00		
	8300.00*	-64.96	-	-	-	-64.96	30.297	32.724			
8500.00	-	-	-	-	-	-	-	-	5000.00		
9000.00	-	-	-	-	-	-	-	-	5000.00		
	9100.00*	-65.01	-	-	-	-65.01	30.247	32.537			
9200.00	-	-	-	-	-	-	-	-	5000.00		
0300.00	<u> </u>								5000.00		
9300.00	-	61.76	-	-	-	- 61.76	-	-	5000.00		
9500.00	0500.00										
FUT emissions	s within 10 dB of	the specified r	- test limit were	observed at the	- specified test	distance through	hout the given fr	equency spectrum	<u> 5000.00</u> n * This		
emission is not	from the EUT. I	t is a measure	nent of minim	um measuremer	it system sens	sitivity (Noise F	loor).	equency spectrum	1115		
							П	ata Sheet 10 of	11		
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						Ketlif	lesting L	.aborator	Ies		



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			EMIS	SIONS TES	Г DATA S	HEET				
Test Metho	d	Unwanted	l Emissions i	nto Restricted	Frequency H	Bands				
Customer		Echelon								
Job Number	r	R-6201N-	-1							
Test Sample	2	Control R	outer Device	1						
Model Num	ber	76530R								
Serial Num	ber	0503F3C3	3DB00, 0503	F3C14500				1		
Test Specifie	cation	FCC Part	CC Part 15 Subpart C Paragraph: 15.247(d)							
Operating N	Aode	Transmitt	ing modulate	d signal at 240)5 MHz, 244	0 MHz and 24	75 MHz consec	cutively.		
Technician		M. Seama	ins							
Date		May 16 th ,	2017							
Notes: Detec	ctor: Peak X=	=0.5158								
				TEST PARA	METERS					
<u> </u>				Duty	Duty				<u> </u>	
Restricted Band	Measured Frequency	Meter Reading	Antenna Gain	Cycle Factor 10log(1/x)	Cycle Factor 20log(x)	Corrected Reading	Converted Field Strength	Converted Reading	Limit at 3M	
MHz	MHz	dBm	dB	dB	dBm	dBm	dBuV/m	uV/m	uV/m	
10600.00	-	-	-	-	-	-	-	-	5000.00	
	12201.81	-31.59	4.00	2.875	-	-24.715	70.542	3366.075		
12700.00	-	-	-	-	-	-	-	-	5000.00	
13250.00		_	_			_	_	_	5000.00	
13230.00	15800.00*	63 17	_	_	_	63.47	31 787	38.848	5000.00	
16200.00	15600.00	-03.47	_	-	-	-03.47	51.767	30.040	5000.00	
10200.00	-	-	-	-	-	-	-	-	5000.00	
17700.00										
17700.00	-	-	-	-	-	-	-	-	5000.00	
21.400.00	19240.00*	-63.27	-	-	-	-63.27	31.987	39.753		
21400.00	-	-	-	-	-	-	-	-	5000.00	
									-	
22010.00	-	-	-	-	-	-	-	-	5000.00	
	22320.00*	-61.72	-	-	-	-61.72	33.537	47.520		
23120.00	-	-	-	-	-	-	-	-	5000.00	
23000.00	-	-	-	-	-	-	-	-	5000.00	
	23800.00*	-61.72	-	-	-	-61.72	33.537	47.520		
24000.00	-	-	-	-	-	-	-	-	5000.00	
									1	
EUT emissions	within 10 dB of	the specified	test limit were	observed at the	specified test	distance throug	hout the given fre	equency spectrur	n. * This	
emission is not	from the EUT. I	t is a measure	ment of minim	um measuremei	nt system sens	sitivity (Noise F	loor).			
							D	ata Sheet 11 of	11	
						Retlif	Testing L	.aborator	ies	
					r ĭ h		-			
						Report N	o. R-6201	N-1, Rev.	А	

Duty Cycle Determination Test Data



Retlif Testing Laboratories

Test Method:	Duty Cycle Determination		
Customer	Echelon	Job No.	R-6201N-1
Test Sample	Control Router Device		
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500
Operating Mode	Transmitting modulated signal at 2.405 GHz		
Test Specification	FCC part 15.35 / RSS-GEN		
Technician	M. Seamans	Date	May 16 th , 2017
Climatic Conditions	Temp:21.6 °CRelative Humidity:42.1 %		
Notes	Number of Pulses: 26		



Page 1 of 3

<u>RETLIF TESTING LABORATORIES</u>

Test Method:	Duty Cycle Determination						
Customer	Echelon	Job No.	R-6201N-1				
Test Sample	Control Router Device						
Model Number	76530R	Serial No.	0503F3C3DB00, 0503F3C14500				
Operating Mode	Transmitting modulated signal at 2.405 GHz						
Test Specification	FCC part 15.35 / RSS-GEN						
Technician	M. Seamans	Date	May 16 th , 2017				
Climatic Conditions	Temp: 21.6 °C Relative Humidity: 42.1 %						
Notes	Pulse width: 1.983968 ms						



EXAMPLE : RETLIF TESTING LABORATORIES								
EMISSIONS TEST DATA SHEET								
Test Method	Duty Cycle Determination							
Customer	Echelon							
Job Number	R-6201N-1							
Test Sample	Control Router Device							
Model Number	76530R							
Serial Number	0503F3C3DB00, 0503F3C14500							
Test Specification	FCC part 15.35 / RSS-GEN							
Operating Mode	Transmitting modulated signal at 2.405 GHz							
Technician	M. Seamans							
Date	May 16 th , 2017							
Notes:								

	TEST PARAMETERS										
Measured on time	Measured time interval		Result	Duty Cycle Factor							
msec	msec	Duty Cycle Factor Calculation	dB	dB							
51.583168	100	$= 20*Log_{10}(51.583168 \text{ ms}/100 \text{ ms})$	-5.74984	-5.749							
				Data Sheet 3 of 3							



Retlif Testing Laboratories

Test Photographs Spurious Radiated Emissions (30 MHz to 25 GHz)



Test Setup



Retlif Testing Laboratories

Test Photographs Spurious Radiated Emissions (30 MHz to 25 GHz)



Horizontal Antenna Polarization, 30 MHz to 200 MHz, Biconical Antenna



Vertical Antenna Polarization, 30 MHz to 200 MHz, Biconical Antenna



Retlif Testing Laboratories

Test Photographs Spurious Radiated Emissions (30 MHz to 25 GHz)



Horizontal Antenna Polarization, 200 MHz to 1 GHz, Log Periodic



Vertical Antenna Polarization, 200 MHz to 1 GHz, Log Periodic



Retlif Testing Laboratories

Test Photographs Spurious Radiated Emissions (30 MHz to 25 GHz)



Horizontal Antenna Polarization, 1 GHz to 18 GHz, Double Ridge Guide



Vertical Antenna Polarization, 1 GHz to 18 GHz, Double Ridge Guide



Retlif Testing Laboratories

Test Photographs Spurious Radiated Emissions (30 MHz to 25 GHz)



Horizontal Antenna Polarization, 18 GHz to 25 GHz, Horn



Vertical Antenna Polarization, 18 GHz to 25 GHz, Horn



Retlif Testing Laboratories

FCC Section 15.247 (d) / RSS-GEN, 8.9 Spurious Radiated Emissions, 30 MHz to 25 GHz Test Data



Retlif Testing Laboratories

Test Method Customer Job Number Test Sample Model Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Positi MHz (H/V) MHz (H/V) 30.00 - - 35.00 V-1m - 88.00 - 88.00 - 110.00 V-1m 160.00 V 1m	Spurious Emis Echelon R-6201N-1 Control Router 76530R 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters na EUT Orientation / t Degrees - - 0.0 -	EMISSIONS ssions 30 MHz t Device 0, 0503F3C1450 09(a) by Load Detector: Qu TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72 -	Iz; Average > 1G S S Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/m 40.0
Test Method Customer Job Number Test Sample Model Number Serial Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Test Antenna MHz (H/V) MHz (H/V) 30.00 - I - 35.00 V-1m I - 88.00 - 88.00 - 110.00 V-1m 160.00 V 1m	Spurious Emis Echelon R-6201N-1 Control Router 76530R 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters n EUT Orientation / L - 0.0 - 0.0	Device Device 0, 0503F3C145(09(a) y Load Detector: Qi TEST Meter Reading dBuV - - 7.63 -	0 25 GHZ 0 25 GHZ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz *	Limit at 3M dBuV/m 40.0
Customer Job Number Test Sample Model Number Serial Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Colspan="2">Operating Mode Technician Date Notes: EUT Antenna Test Antenna Colspan="2">Operating Mode MHz Anten MHz (H/V) MHz (H/V) MHz (H/V) 88.00 - 88.00 - 88.00 - 110.00 V-Irr 160.00 V-Irr	Echelon R-6201N-1 Control Router 76530R 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters na EUT on Orientation / Degrees - 0.0 - 0.0	Device 0, 0503F3C1450 09(a) ny Load Detector: Qu TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz *	Limit at 3M dBuV/m 40.0
Job Number Test Sample Model Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Frequency Anten Positi MHz (H/V) Heigi 30.00 - - 35.00 V-1r - 88.00 - 88.00 - 110.00 V-1r 160.00 V-1r	R-6201N-1 Control Router 76530R 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters n EUT on / Degrees - 0.0 - 0.0	Device 0, 0503F3C145(09(a) by Load Detector: Que TEST Meter Reading dBuV - - 7.63 -	00 uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz *	Limit at 3M dBuV/n 40.0
Model Number Serial Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Frequency Anten Positi MHz (H/V Heig) 30.00 - - 35.00 V-1r - 88.00 - 88.00 - 110.00 V-1r	Control Rotter 76530R 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters	0, 0503F3C1450 09(a) by Load Detector: Que TEST Meter Reading dBuV - - - 7.63 -	00 uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72 -	Iz; Average > 1G SS Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Anten Serial Number Serial Number Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Frequency Anten Positi MHz (H/V) 30.00 - - 35.00 V-1n - 88.00 - 88.00 - 110.00 V-1n	76330K 0503F3C3DB0 FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters na EUT Orientation / 1 0.0 - 0.0 - - 0.0	0, 0503F3C145(09(a) ny Load Detector: Qu TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Anten Frequency Anten Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Test Antenna Test Antenna Yest MHz (H/V) MHz (H/V) 30.00 - 1 - 35.00 V-1m 88.00 - 88.00 - 110.00 V-1m	FCC Part. 15.20 FCC Part. 15.20 M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters Table EUT Orientation / t Degrees - - 0.0 - - 0.0	09(a)	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72 -	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz *	Limit a 3M dBuV/n 40.0
Test Specification Operating Mode Technician Date Notes: EUT Antenna Test Antenna Technician Mete: EUT Antenna Test Antenna Technician Technician Mete: EUT Antenna Test Antenna Technician Technician Mete: EUT Antenna Test Antenna Mete: Celspan="2">Mete: Celspan="2">Mete: Celspan="2">Mete: Celspan="2">Technician Mete: Celspan="2">Mete: Celspan="2">Mete: Celspan="2">Technician Mete: Celspan="2">Mete: Celspan="2" Mete: Celspan="2"	FCC Part. 15.20 Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters The EUT Orientation / Degrees - - 0.0 - -	09(a) TEST Vertical Detector: Qi TEST Meter Reading dBuV - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/m 40.0
Anten Frequency Anten 7000000000000000000000000000000000000	Standby M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters Distance: 3 met	y Load Detector: Q TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Technician Date Dates: EUT Antenna Test Antenna Frequency Anten Positi MHz (H/V Heigi 30.00 - - 35.00 V-1r - 88.00 - 88.00 - 110.00 V-1r	M. Seamans May 17 th , 2017 replaced with Dumm Distance: 3 meters na EUT Orientation / Degrees - - 0.0 - - 0.0	ny Load Detector: Que TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G SS Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Mate Notes: EUT Antenna Test Antenna Frequency Anten Positi MHz (H/V Heigi 30.00 - - 35.00 V-1n - 88.00 - - 110.00 V-1n	May 17 th , 2017 replaced with Dumm Distance: 3 meters na EUT Orientation / t Degrees - - 0.0 - -	y Load Detector: Qu TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Antenna Test Antenna Test Antenna Frequency Anten Positi MHz (H/V Heigi 30.00 - - 35.00 V-1n - 88.00 - 88.00 - 1 - 10.00 V-1n	replaced with Dumm Distance: 3 meters The EUT Orientation / t Degrees - - 0.0 - - 0.0 - -	y Load Detector: Q TEST Meter Reading dBuV - - - 7.63 -	uasi-Peak < 1GH PARAMETER Correction Factor dB - - 15.72	Iz; Average > 1G S Corrected Reading dBuV/m - - 23.35	Hz	Limit a 3M dBuV/n 40.0
Test Antenna Frequency Anten Positi MHz (H/V Heigi 30.00 - - 35.00 V-1r - 88.00 - 88.00 - - 110.00 V-1r	Distance: 3 meters Table EUT Orientation / Degrees 0.0	Detector: Qi TEST Meter Reading dBuV - - 7.63 -	uasi-Peak < 1GF PARAMETER Correction Factor dB - - - 15.72	Iz; Average > 1G SS Corrected Reading dBuV/m - - 23.35	Hz	Limit at 3M dBuV/n 40.0
Frequency Anter Positi MHz (H/V Heigi 30.00 - - 35.00 V-1r - 88.00 - - 10.00 V-1r	na EUT Orientation / t Degrees - - 0.0 - - - 0.0	TEST Meter Reading dBuV - - - 7.63 -	Correction Factor dB - 15.72	Corrected Reading dBuV/m - - 23.35	*	Limit at 3M dBuV/n 40.0
Frequency Anten Positi MHz (H/V Heigi 30.00 - - 35.00 V-1m - 88.00 - 88.00 - 110.00 V-1m	ha EUT Orientation / t Degrees - - 0.0 - - 0.0 -	Meter Reading dBuV - - 7.63 -	Correction Factor dB - - 15.72	Corrected Reading dBuV/m - - 23.35	*	Limit at 3M dBuV/m 40.0
MHz (H/V Heig 30.00 - - 35.00 V-1r - 88.00 - 88.00 - - 10.00 V-1r	/ Degrees 	dBuV - - 7.63 -	dB - - 15.72	dBuV/m 23.35	*	dBuV/m 40.0
30.00 - - 35.00 V-1r - 88.00 - 88.00 - 110.00 V-1r 160.00 V-1r	- - 0.0 - -	- - 7.63 -	15.72	- 23.35	*	40.0
- 35.00 V-1r - 88.00 - 88.00 - - 110.00 V-1r 160.00 V-1r	- 0.0 - -	- 7.63 -	- 15.72	- 23.35	*	
35.00 V-1r - 88.00 - 88.00 - - 110.00 V-1r 160.00 V-1r	0.0	7.63	15.72	23.35	*	
- 88.00 - 88.00 - 110.00 V-1m 160.00 V-1m		-	-			
88.00 - 88.00 - 1 - 110.00 V-1rr 160.00 V-1rr	-	-		-		
88.00 - - 110.00 V-1n 160.00 V 1n		-	_	-		40.0
	-	_	_	-		43.5
110.00 V-1r	-	_	_	-		
160.00 V 1m	0.0	11.75	10.12	21.87	*	
	0.0	6.96	12.56	19.52	*	
-	-	-	-	-		
216.00 -	-	_				43.5
216.00		_				46.0
210.00						
241.60 H-1.7	m 270.0	1/1/3	15.77	30.20		
241.00 11-1.7	270.0	14.45	15.77	50.20		
960.00						46.0
960.00 -	-	-	-			54.0
	-	_	-			
1050 80 V 2-	0.0	46.00	0.41			
12000 00 V 1	0.0	40.90	7.00	47.31	*	
12000.00 V-III 22000.00 V-III	0.0	41.02	5.71	47.12	*	
22000.00 V-In	0.0	41.70	-3./1	33.99	***	
	-	-	-	-		
25000.00 -	-	-	-	-		54.0



Retlif Testing Laboratories

Test Photographs AC Conducted Emissions



Configuration



Test Setup



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FCC Section 15.207(a)/ RSS-GEN, 8.8 AC Conducted Emissions Test Data



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RETLIF TESTING LABORATORIES					
EMISSIONS TEST DATA SHEET					
Test Method	Conducted Emissions, Class B 150 kHz to 30 MHz				
Customer	Echelon				
Job Number	R-6201N-1				
Test Sample	Control Router Device				
Model Number	76530R				
Serial Number	0503F3C3DB00, 0503F3C14500				
Test Specification	FCC Part 15 Subpart B Class B	Paragraph: 15.207 (a)			
Operating Mode	Transmitting modulated signal	·			
Technician	M. Seamans				
Date	May 17 th , 2017				
Port Tested	120 VAC 60 Hz				
Notes: Lead Tested: 120 VAC 60 Hz Hot Detector: Quasi-Peak and Average					

TEST PARAMETERS Quasi-Peak Quasi-Peak Quasi-Peak Test Lead Average Average Average Limit Frequency Tested Reading Margin Reading Limit Margin MHz dBuV dBuV dB dBuV dBuV dB 0.150 66.0 56.0 ---------_ 44.4 55.5 0.160 Hot 56.60 65.5 8.89 11.1 54.4 23.8 0.181 Hot 52.80 64.4 11.64 30.6 0.205 Hot 51.40 63.4 12.01 34.7 53.4 18.7 0.236 Hot 50.00 62.2 12.24 29.3 52.2 22.9 12.80 38.8 51.5 12.7 0.258 Hot 48.70 61.5 0.278 Hot 51.80 60.9 9.08 40.7 50.9 10.2 -----0.500 56.0 46.0 -_ ----_ -_ _ 0.572 Hot 39.50 16.50 21.0 25.0 1.247 21.0020.7 25.3 Hot 35.00 -----5.000 _ 46.0 _ _ 56.0 _ _ 5.000 -60.0 --50.0 ---_ -_ -30.000 60.0 50.0 ---_ -

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

Data Sheet 1 of 2

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RETLIF TESTING LABORATORIES					
EMISSIONS TEST DATA SHEET					
Test Method	Conducted Emissions, Class B 150 kHz to 30 MHz				
Customer	Echelon				
Job Number	R-6201N-1				
Test Sample	Control Router Device				
Model Number	76530R				
Serial Number	0503F3C3DB00, 0503F3C14500				
Test Specification	FCC Part 15 Subpart B Class B	Paragraph: 15.207 (a)			
Operating Mode	Transmitting modulated signal				
Technician	M. Seamans				
Date	May 17 th , 2017				
Port Tested	120 VAC 60 Hz				

Notes: Lead Tested: 120 VAC 60 Hz Neutral Detector: Quasi-Peak and Average

Test Frequency Lead Tested Quasi-Peak Reading Quasi-Peak Limit Quasi-Peak Margin Average Reading Average Limit MHz dBuV dBuV dBuV dB dBuV dBuV	TEST PARAMETERS								
MHz dBuV dBuV dB dBuV dB	Le ncy Tes	Test requency	Lead Tested	Quasi-Peak Reading	Quasi-Peak Limit	Quasi-Peak Margin	Average Reading	Average Limit	Average Margin
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$:	MHz		dBuV	dBuV	dB	dBuV	dBuV	dB
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	-	0.150	-	-	66.0	-	-	56.0	-
0.161 Neutral 57.30 65.4 8.14 48.5 55.4 0.220 Neutral 52.60 62.8 10.22 42.5 52.8 0.244 Neutral 48.40 62.0 13.58 27.4 52.0 0.271 Neutral 53.70 61.1 7.39 45.9 51.1 0.276 Neutral 54.00 60.9 6.94 44.4 50.9 0.308 Neutral 48.60 60.0 11.42 32.0 50.0 0.336 Neutral 47.00 59.3 12.30 32.7 49.3 0.436 Neutral 37.80 57.1 19.34 27.8 47.1 - - - - 0.500 - - 56.0 - - 46.0 5.000 - - 56.0 - - 46.0 5.000 -	-		-	-		-	-		-
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Neu	0.161	Neutral	57.30	65.4	8.14	48.5	55.4	6.9
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Neu	0.220	Neutral	52.60	62.8	10.22	42.5	52.8	10.3
0.271 Neutral 53.70 61.1 7.39 45.9 51.1 0.276 Neutral 54.00 60.9 6.94 44.4 50.9 0.308 Neutral 48.60 60.0 11.42 32.0 50.0 0.336 Neutral 47.00 59.3 12.30 32.7 49.3 0.436 Neutral 37.80 57.1 19.34 27.8 47.1 I - - I - - I - 0.500 - - 56.0 - - 46.0 I - - 56.0 - - 46.0 5.000 - - 60.0 - - 50.0 I - - 60.0 - - 50.0 -	Neu	0.244	Neutral	48.40	62.0	13.58	27.4	52.0	24.6
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Neu	0.271	Neutral	53.70	61.1	7.39	45.9	51.1	5.2
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Neu	0.276	Neutral	54.00	60.9	6.94	44.4	50.9	6.5
0.336 Neutral 47.00 59.3 12.30 32.7 49.3 0.436 Neutral 37.80 57.1 19.34 27.8 47.1 - - - - 0.500 - - 56.0 - - 46.0 - - 1 - - 46.0 1 - - 56.0 - - 46.0 5.000 - - 56.0 - - 46.0 5.000 - - 56.0 - - 46.0 5.000 - - 60.0 - - 50.0 - 1 - - 1 - - 1 -	Neu	0.308	Neutral	48.60	60.0	11.42	32.0	50.0	18.0
0.436 Neutral 37.80 57.1 19.34 27.8 47.1 I - - I - - I - I - I - I I - I I - I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I I	Neu	0.336	Neutral	47.00	59.3	12.30	32.7	49.3	16.6
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Neu	0.436	Neutral	37.80	57.1	19.34	27.8	47.1	19.3
0.500 - - 56.0 - - 46.0 - - - - - 5.000 - - 56.0 - - 46.0 5.000 - - 56.0 - - 46.0 5.000 - - 60.0 - - 50.0 - - - - 1	-		-	-		-	-		-
I - I - I 5.000 - - 56.0 - - 46.0 5.000 - - 60.0 - - 50.0 I - - I - - 1	-	0.500	-	-	56.0	-	-	46.0	-
5.000 - - 56.0 - - 46.0 5.000 - - 60.0 - - 50.0 - - 1 - - 50.0	-		-	-		-	-		-
5.000 - - 60.0 - - 50.0 - - - -	-	5.000	-	-	56.0	-	-	46.0	-
	-	5.000	-	-	60.0	-	-	50.0	-
			-	-		-	-		-
30.000 60.0 - 50.0) .	30.000	-	-	60.0	-	-	50.0	-

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

Data Sheet 2 of 2

Retlif Testing Laboratories