DTS EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement:	FCC, IC
Test Requirements:	FCC Part 15, RSS-Gen, RSS-210
-	
Applicant:	Silver Spring Networks
	575 Broadway Street
	Redwood City, CA 94063
	0

FCC ID:	OWS-NIC40
IC:	5975A-NIC40
Model No.:	NIC40

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

The Silver Spring Networks (SSN) model NIC40 is an access point for electric power meter communications use. The radio incorporates a 2.4 GHz DTS radio, as well as a dual band 900 MHz/ 2.4 GHz frequency hopping mesh network radio. Test data for 900 MHz FHSS and 2.4 GHz FHSS operation are provided in separate reports.

III. TEST DATES AND TEST LOCATION

Testing was performed on various dates between 18 April 2011 and 11 June 2012.

Antenna port conducted and AC Line Conducted Emissions: Compliance Certification Services 47173 Benicia Street Fremont, CA 94538

Radiated emissions:

BACL Laboratories 1274 Anvilwood Ave. Sunnyvale, CA 94089

Antenna port conducted emissions tests were performed at Silver Spring Networks.

J.M. Cohen____

T.N. Cokenias EMC Consultant/Agent for Silver Spring Networks

14 December 2012

15.203 Antenna connector requirement

Antenna description	Mfr.	Model No.	Gain
External monopole antenna	SSN		3 dBi at 915 MHz
(omni)			3.6 dBi at 2.4 GHz

TEST PROCEDURES

All tests were performed in accordance with the applicable procedures called out in the following documents, unless otherwise noted:

FCC 47CFR15

RSS-Gen Issue 3: General Requirements and Information for the Certification of Radio Apparatus

KDB 558074 D01 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under 15.247

RSS-210 Issue 8: Low power license exempt radio frequency devices RSS-212: Test Facilities and Test Methods for Radio Equipment

ANSI C63.4 – 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Laboratory Accreditation Information

<u>UL CCS</u> 2.948 FCC: Registration Number: 152170 Industry Canada Test Site: 2324B Accrediting Body: NVLAP

BACL 2.948 FCC Registration Number: 90464 Industry Canada Test Site Registration Number: 3062A Accrediting Body: A2LA

Test Equipment

Compliance Certification Services:

	TEST EQUIPMENT LIST											
Description	Manufacturer	Model	Asset	Cal Date	Cal Due							
PSA	Agilent / HP	E4446A	C01012	9/2/11	12/2/12							
Power Meter	HP	437B	T226	7/25/12	7/25/13							
Power Sensor	HP	HP8481A	T269	7/26/12	7/26/13							
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/15/11	11/15/12							
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	11/16/11	11/16/12							
EMI Test Receiver	R&S	ESC17	10000741	7/2/12	07/02/13							

Silver Spring Networks:

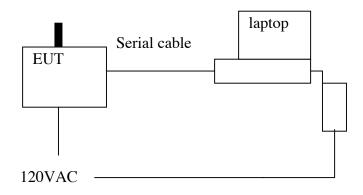
Equipment	Mfr	Model	Serial No.	Cal Due
Spectrum analyzer	Agilent	E4405B	MY45113391	01/23/13
Spectrum analyzer	Agilent	N9030A	MY48030147	01/23/13
Spectrum Analyzer	HP	8652B	2712A00113	9/28/12

BACL

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2012-03-22
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2012-06-29
EMCO	Horn antenna	3115	9511-4627	2011-10-03
Hewlett Packard	Pre amplifier	8447D	2944A06639	2012-06-09
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2012-05-09

Model No.: NIC40

Test Set-up Diagram

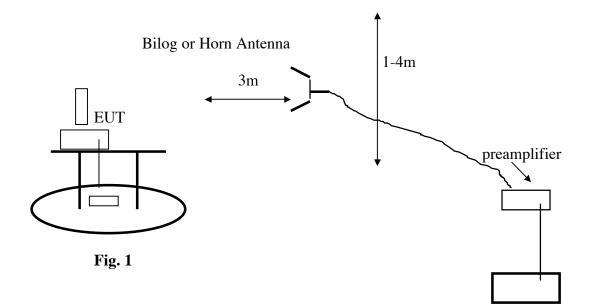


Support Equipment

Equipment	Mfr	Model	Asset No.
DC Power Supply	Agilent	E3610A	2844
Laptop PC	Dell	PP01L	TW-0791UH1280- OC9-6558
AC/DC adapter	CUI Inc.	DSA-60W-20	2607HB

2.4 GHz HAN Radio Emissions Test Results

TEST RESULTS Radiated Test Set-up, 30-25 GHz



Test Procedures

Radiated emissions generated by the transmitter portion of the EUT were measured.

1. The EUT was placed on a wooden table resting on a turntable on the test site. The search antenna was placed 3m from the EUT. The EUT antenna was mounted in the with the EUT TX antenna pointed directly to the search antenna.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Emissions were investigated to the 10^{th} harmonic of the fundamental.

4. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Test Results: Worst-case results are presented. Refer to data sheets below. Restricted band emissions meet 54 dBuV/m. Other undesired emissions from the transmitter meet the -20 dBc requirement in 15.247(d).

15.205 Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505 (1)	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

15.209 General Field Strength Limits

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

2.4 GHz HAN Radiated Spurious



Company: Silver Spring Network Frequency: 2.4 GHz measurement: Radiated emission above 1 GHz Date: 07-26-2012 Tester: Quinn Jiang Site: 5 meter 2 Mode: Zigbee, Modulated: OQSK EUT: Pilc Brea with enclosure and external ant Project number: T1207261

Frequency (MHz)	S.A. Reading	Azimuth (degrees)		Test Antenna		Cable Loss	Pre-Amp. (dB)	Cord. Reading	F	сс	
. ,	(dBµV)	(Height (cm)	Polarity (H/V)	Factor (dB/m)	(dB)		(dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comments
				Lov	v channel 2405 MI	Iz measured at 3 m	neters				
4810	42.41	7	103	V	32.62	5.56	27.78	52.81	74	-21.19	peak
4810	46.16	108	100	Н	32.62	5.56	27.78	56.56	74	-17.44	peak
4810	31.43	7	103	V	32.62	5.56	27.78	41.83	54	-12.17	Ave
4810	36.19	108	100	Н	32.62	5.56	27.78	46.59	54	-7.41	Ave
7215	35.15	55	100	V	35.47	6.84	27.59	49.87	note	-	peak
7215	33.77	41	100	Н	35.47	6.84	27.59	48.49	note	-	peak
7215	22.83	55	100	V	35.47	6.84	27.59	37.55	note	-	Ave
7215	21.95	41	100	Н	35.47	6.84	27.59	36.67	note	-	Ave

note: 3rd harmonic is not in the restricted band

Frequency (MHz)	S.A. Reading	Azimuth (degrees)		Test Antenna		Cable Loss	Pre-Amp. (dB)	Cord. Reading	F	сс		
(1112)	(dBµV)	(degrees)	Height	Polarity	Factor	(dB)	(ub)	(dBµV/m)	Limit	Margin		
	((12)(1))		(cm)	(H/V)	(dB/m)	(02)		(ubµ (/m)	(dBµV/m)	(dB)	Comments	
		-	• • • • •	Midd	le channel 2440 M	Hz measured at 3	meters					
4880	42.2	329	100	V	32.80	5.56	27.67	52.89	74	-21.11	peak	ats
4880	44.30	110	100	Н	32.80	5.56	27.67	54.99	74	-19.01	peak	ats
4880	31.29	329	100	V	32.80	5.56	27.67	41.98	54	-12.02	Ave	ats
4880	33.92	110	100	Н	32.80	5.56	27.67	44.61	54	-9.39	Ave	ats
7320	36.40	282	130	V	36.01	6.90	27.51	51.80	74	-22.20	peak	ats
7320	35.80	33	105	Н	36.01	6.90	27.51	51.20	74	-22.80	peak	ats
7320	24.38	282	130	V	36.01	6.90	27.51	39.78	54	-14.22	Ave	ats
7320	24.30	33	105	Н	36.01	6.90	27.51	39.70	54	-14.30	Ave	ats
2372	53.51	204	118	V	28.2	3.82	27.73	57.80	74	-16.20	peak	ats
2372	43.99	45	108	Н	28.2	3.82	27.73	48.28	74	-25.72	peak	ats
2372	49.50	204	118	V	28.2	3.82	27.73	53.79	54	-0.21	Ave	ats
2372	38.41	45	108	Н	28.2	3.82	27.73	42.70	54	-11.30	Ave	ats

Frequency (MHz)	S.A. Reading	Azimuth (degrees)		Test Antenna		Cable Loss	Pre-Amp. (dB)	Cord. Reading	F	сс	
()	(dBµV)	(g)	Height	Polarity	Factor	(dB)		(dBµV/m)	Limit	Margin	
			(cm)	(H/V)	(dB/m)				(dBµV/m)	(dB)	Comments
				Hig	h channel 2480 MI	Hz measured at 3 n	neters				
4960	39.30	11	106	V	33.06	5.36	27.73	49.99	74	-24.01	peak
4960	37.80	122	100	Н	33.06	5.36	27.73	48.49	74	-25.51	peak
4960	28.14	11	106	V	33.06	5.36	27.73	38.83	54	-15.17	Ave
4960	26.75	112	100	Н	33.06	5.36	27.73	37.44	54	-16.56	Ave
2376	45.42	222	100	V	28.2	3.82	27.73	49.71	74	-24.29	peak
2376	37.77	341	126	Н	28.2	3.82	27.73	42.06	74	-31.94	peak
2376	38.50	222	100	V	28.2	3.82	27.73	42.79	54	-11.21	Ave
2376	29.58	341	126	Н	28.2	3.82	27.73	33.87	54	-20.13	Ave

Radiated Bandedge Emissions

Company: Silver Spring Network Frequency: 2.4 GHz measurement: Radiated Band Edge Date: 07-20-2012 Tester: Quinn Jiang Site: 5 meter 3 Mode: Zigbee EUT: Plic Brea with enclosure and external ant Project number: T1207202

Freguncy: 2405 MHz

Frequency	S.A.	Azimuth				Cable	Pre-Amp.	Cord.				
(MHz)	Reading	(degrees)		Test Antenna		Loss	(dB)	Reading	F	CC		
	(dBµV)		Height	Polarity	Factor	(dB)		(dBµV/m)	Limit	Margin		
			(cm)	(H/V)	(dB/m)				(dBµV/m)	(dB)	Comments	
				Low	channel 2405 MI	Iz measured at 3 n	neters					_
2390	34.30	221	100	V	28.2	3.12	0.0	65.62	74	-8.38	peak	ats 1
2390	28.13	325	100	Н	28.2	3.12	0.0	59.45	74	-14.55	peak	ats 1
2390	22.28	221	100	V	28.2	3.12	0.0	53.60	54	-0.40	Ave	ats 1
2345	19.40	221	100	V	28.2	3.12	0.0	50.72	54	-3.28	ave	ats 1
2390	15.39	325	100	Н	28.2	3.12	0.0	46.71	54	-7.29	Ave	ats 1

Frequency: 24	80 MHz											-
Frequency	S.A.	Azimuth				Cable	Pre-Amp.	Cord.				
(MHz)	Reading	(degrees)		Test Antenna		Loss	(dB)	Reading	F	CC		
	(dBµV)		Height	Polarity	Factor	(dB)		(dBµV/m)	Limit	Margin		
			(cm)	(H/V)	(dB/m)				(dBµV/m)	(dB)	Comments	
					2480 MHz mea	sured at 3 meters						_
2483.5	32.46	10	138	V	28.4	3.25	0.0	64.11	74	-9.89	peak	ats 112 =5
2483.5	27.60	350	142	Н	28.4	3.25	0.0	59.25	74	-14.75	peak	ats 112 =5
2483.5	21.79	10	138	V	28.4	3.25	0.0	53.44	54	-0.56		ats 112 =5
2483.5	15.19	350	142	Н	28.4	3.25	0.0	46.84	54	-7.16	Ave	ats 112 =5

Radiated Emissions 30-1000 MHz

All transmitter emissions were at least 20 dB below limits

6dB Bandwidth for DTS Test Requirement: FCC: 15.247 (a) 2 IC: RSS-210 Sec. 6.2.2(o)(iv)

Test Set-up



Test Procedures

The transmitter output is connected to a spectrum analyzer via coaxial cable with appropriate attenuation.

RBW = 1- 5% EBW VBW> 3xRBW Detector: PEAK

Test Results. No non-compliance noted. Refer to data sheets below.

Minimum 6 dB BW: 1.399 MHz Minimum Required: 500 kHz

Frequency, MHz	6 dB BW, MHz
2405 (Low)	1.514
2440 (Mid)	1.399
2480 (High)	1.520

Model No.: NIC40

6dB Bandwidth LOW Channel



6 dB BW, MID Channel



6 dB BW, HIGH Channel



Test Procedures

The transmitter output is connected to a spectrum analyzer via coaxial cable with appropriate attenuation.

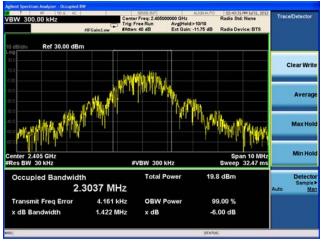
RBW = 1- 5% EBW VBW> 3xRBW Detector: SAMPLE

Test Results. No non-compliance noted. Refer to data sheets below.

Frequency, MHz	99% BW,
	MHz
2405 (Low)	2.304
2440 (Mid)	2.236
2480 (High)	2.235

Model No.: NIC40

99% BW LOW Channel



99% BW MID Channel



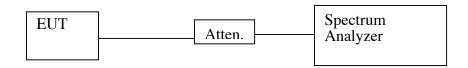
99% BW HIGH Channel



RF Power Output Test Requirement: FCC: 15.247(b)

IC: RSS-210 Sec. 6.2.2(o)(iv)

Test Setup



Test Procedures

Measurement Procedure PK1:

 $RBW \ge EBW$. $VBW \ge 3 \times RBW$. SPAN = zero.Sweep time = auto couple. Detector = peak. Trace mode = max hold. Allow trace to fully stabilize.

Use peak marker function to determine the peak amplitude level within the fundamental emission.

Test Results

Refer to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm
Low	2405	20.109
Mid	2440	24.23
High	2480	5.91

Note:

Low channel power is limited by restricted emissions requirement at 2310-2390 MHz. High channel power is limited by restricted band emissions requirement at 2483.5-2500 MHz.

T # 500 Ad Marker 1 474.000 µs	PNO: Fast	Trig: Free Run Atten: 40 dB	Avg Type: Log-Pwr Avg[Hold>100/100 Ext Gain: -11.75 dB	02:51:35 PM 34/31, 2012 TRACE TO 4 B TVPE	Peak Search
o dB/div Ref 40.00 dBn		Pateric 49 au		Mkr1 474.0 µs 20.109 dBm	Next Peak
30.0					Next Pk Right
20.0		• ¹			
10.0					Next Pk Left
0.00					Marker Delta
0.0					_
0.0					MkrCF
					_
0.0					Mkr-Ref Lv
					-
enter 2.405000000 GHz				Span 0 Hz	More 1 of 2
tes BW 3.0 MHz	#VBW	8.0 MHz	Sweep 1.	000 ms (1001 pts)	1000

Peak Output Power LOW Channel

Peak Output Power MID Channel

Peak Search	02:50:52 PM 3J/31, 2012	ALXINAUTO	SENCE:INT	AC.	RF 50.0 AC	T
	THACE TO BE A REAL TYPE NOTIFIC NOTIFICANE NOTIFIC	Avg Type: Log-Pwr Avg[Hold>100/100 Ext Gain: -11.75 dB	Trig: Free Run Atten: 40 dB	PNO: Fast 😱 IFGalicLow	1 39.0000 µs	arker 1
Next Pea	Mkr1 39.00 µs 24.232 dBm			im	Ref 40.00 dBm	dB/div
Next Pk Righ					1	00
Next Pk Le						0.0
Marker Del						
MkrC						10
Mkr→RefL						10
Mor 1 of	Span 0 Hz .000 ms (1001 pts)	Swaap 1		z #VBW 8	.440000000 GHz 3.0 MHz	enter 2.4

Peak Output Power HIGH Channel

larker 1	MF 50.0 AC 13.0000 µs	PNO: Fast	Trig: Free Run Atten: 20 dB	Avg Type: Log-Pwr Avg[Hold>100/100 Ext Gain: -11.75 dB	02:49:21 PM 3d 31, 2012 19ACE 2:24 4 TV95 MUMMAN Det P 3/11 N.1321	Save
0 dB/div	Ref 20.00 dBm				Mkr1 13.00 µs 5.908 dBm	State
uro o 1						Trace (+ State)
0.0						
0.0						Dat (Export) Trace 1
0.0 0.0						Screen Image
0.0						
	480000000 GHz				Span 0 Hz	
es BW 3	.0 MHz	#VBW	8.0 MHz	Sweep 1	1.000 ms (1001 pts)	

Spurious Emissions, Conducted Test Requirement: FCC: 15.247(d) IC: RSS-210 Sec. 6.2.2(o)(e1)

Test Setup



Test Procedure

1. The EUT was configured on a test bench. The cable was connected between the EUT antenna port and the spectrum analyzer input port.

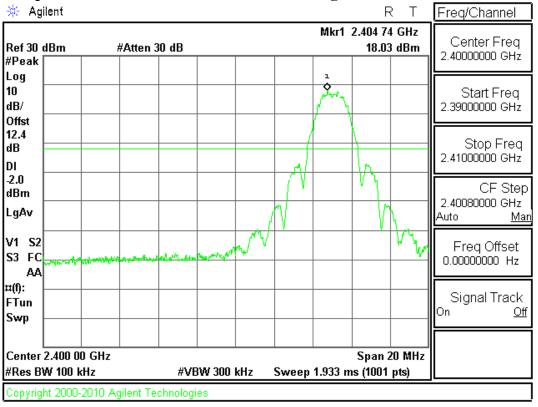
Spectrum analyzer RES BW was set to 100 kHz. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Readings were taken out to 10fo.

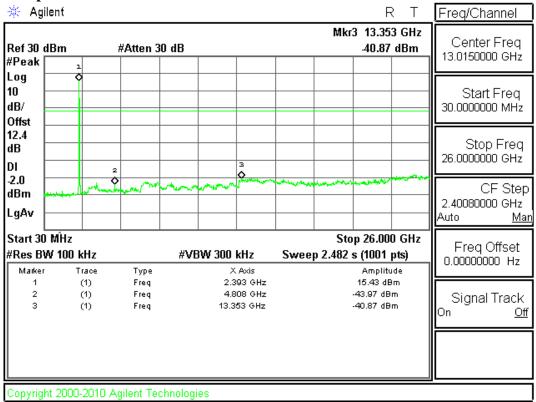
Test Results

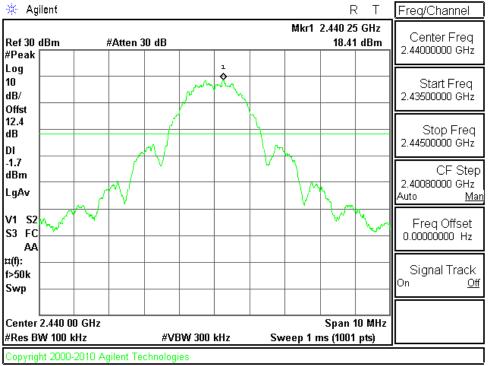
Refer to spectrum analyzer plots. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

TX Spurious Emissions: LOW Channel Bandedge



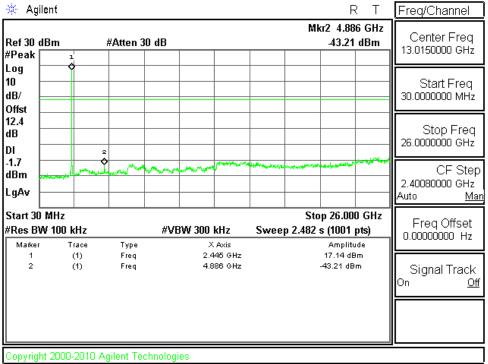
TX Spurious Emissions: LOW Channel

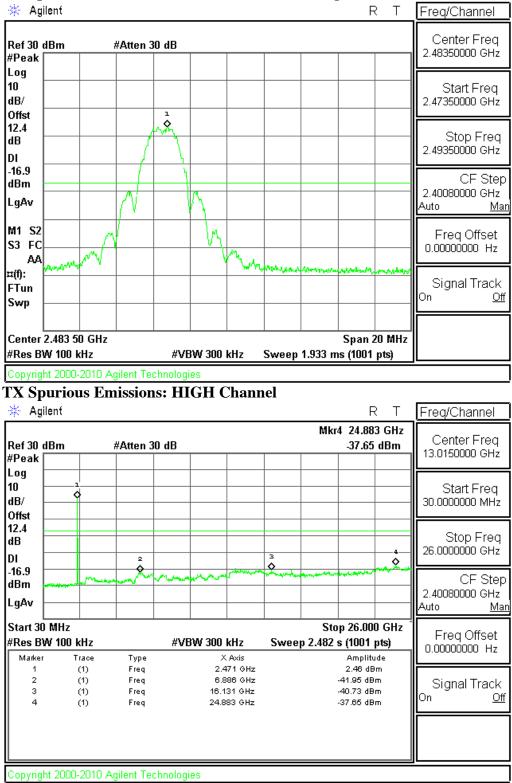




TX Spurious Emissions: Reference MID Channel

TX Spurious Emissions:MID Channel





TX Spurious Emissions: HIGH Channel Bandedge

Power Spectral Density Test Requirement: 15.247(e) RSS-210 Sec. 6.2.2(o)(iv)

Test Setup



Test Procedure Measurement Procedure PKPSD:

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

- 2. Set the RBW = 100 kHz.
- 3. Set the VBW \geq 300 kHz.
- 4. Set the span to 5-30 % greater than the EBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.

9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = $10\log (3 \text{ kHz}/100 \text{ kHz} = -15.2 \text{ dB})$.

11. The resulting peak PSD level must be ≤ 8 dBm.

Test Results

PASS.

Maximum PSD is for MID channel: $(21.74 - 15.2) \text{ dBm} = 6.52 \text{ dBm} (\leq 8 \text{ dBm}).$

Refer to attached spectrum analyzer plots.

Power Spectral Density LOW Channel



Power Spectral Density MID Channel

gilent Spectrum Ar							
Marker 1 2.4	4024800000	O GHZ	Trig: Free Run	Avg Type: Lo Avg Hold>10	0/100	02:54:32 PM 3431, 2012 TRACE 1 2 14 5 TYPE MUNICIPAL	Peak Search
0 dB/div Re	f 40.00 dBm	IFGain:Low	Atten: 40 dB	Ext Gain: -11.		2.440 248 GHz 21.739 dBm	NextPeak
10.0				<u>_1</u>			Next Pk Right
20.0 10.0	man			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~	Next Pk Left
10.0							Marker Delta
20.0							Mkr→CF
40.0							Mkr→RefLv
Center 2.4400 Res BW 100		#VBV	V 300 kHz	Sv	veep	Span 2.000 MHz 1.00 ms (1001 pts)	More 1 of 2
50					STATUS		

Power Spectral Density HIGH Channel

T RF 50.9 AC		SENSE:3NT	ALISNAUTO	02:55:19 PM 3431, 2012	Peak Search
arker 1 2.48023800000	DNO: Ear	Trig: Free Run Atten: 40 dB	Avg Type: Log-Pwr Avg Hold>100/100 Ext Gain: -11.75 dB	TRACE 2 3 4 5 TYPE MUMANNA DET PINNINN	Peak Search
dB/div Ref 40.00 dBm	H Galineau		Mkr1	2.480 238 GHz 2.812 dBm	NextPea
00					Next Pk Rigi
00			▲ ¹		Next Pk Le
0.0 mm	nyina mina	man	- to - more -	m	Marker Del
					Mkr→C
					Mkr→RefL
enter 2,480000 GHz Res BW 100 kHz	#VBW 3	00 kHz	Sweep	Span 2.000 MHz 1.00 ms (1001 pts)	Mor 1 of

Model No.: NIC40

RF Exposure (MPE) Calculations

Silver Spring	Networks									
FCC ID: OWS										
IC: 5975A- N	IC714									
Dual 900 MHz	/2.4 GHz FHSS	and 2.4 GHz	DTS radio			Calculate mW/cm2	2 here. Enter fr	equency in MHz		
RF Hazard Dis	tance Calculati	on				Calculation of Limit	ts from 1.1310 T	able 1		
									Controlled	Uncontrolled
									Ave 6 min	Ave 30 min
mW/cm2 from	n Table1:	1.00	(E: 61 V/m)			F(MHz)	Actual F, MHz		Occ, mW/c2	Gen, mW/cm2
						0.3-3	0.5		100.0	100.0
Max RF Power		MPE distance		Comment		3.0 - 30.0	5		180.0	36.0
P, dBm	G, dBi	cm	at 20 cm			30.0-300	55		1.0	0.2
						300-1500	902		3.0	0.60
24.2	3.6	6.9	0.12			1500-100000	5555		5.0	1.0
						Enter P(mW)	Equivalent dBm	Entor dBm	Equivalent Watt	
								Enter ubm	Equivalent wat	.5
Basis of Calcu	lations:					64	18.1	18.1	64.6	
24010 01 04.00						•			0.110	
E^2/3770 = S	mW/cm2									
	tts*Ggain*30)^	.5/d, meters								
d = ((Pwatts*0))	G*30)/3770*S))^0.5	Pwatts*Ggain = 1	0^(PdBm-30+Gc	Bi)/10)					
S@20cm = 20	log (MPE dist/2	20cm)	0							
			tters, minimum se	eparation distanc	e is for FCC o	compliance is 20 cr	n,			
	if calculations									

4.4 POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, 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 in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this 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.

Frequency of Emission (MHz)	Conducted I	.imit (dBuV)
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

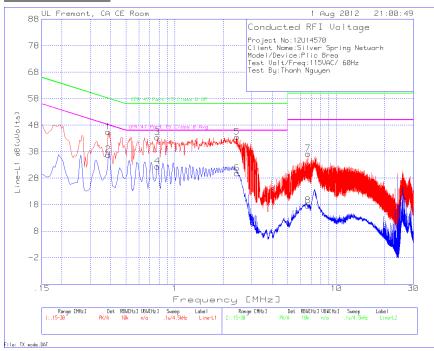
The transmitter was configured to simultaneously transmit FHSS mode in the 902 MHz and 2.4 GHz bands simultaneously, since this is the worst case operation (maximum output power) for simultaneous operation.

Line conducted data is recorded for both NEUTRAL and HOT lines.

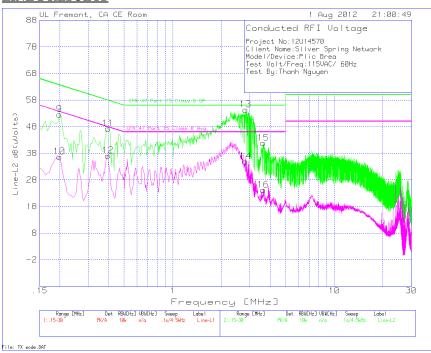
RESULTS

No non-compliance noted:









Project No:12U14570 Client Name:Silver Spring Network Model/Device:Plic Brea, Transmit mode Test Volt/Freq:115VAC/ 60Hz Test By:Thanh Nguyen

Line-L1 .15 -	30MHz								
Test	Meter	Detector	T24 IL	LC Cables	dB(uVolts)	CFR 47	Margin	CFR 47	Margin
Frequency	Reading		L1.TXT	1&3.TXT		Part 15		Part 15	
			(dB)	(dB)		Class B QP		Class B	
								Avg	
0.3885	45.29	РК	0.1	0	45.39	58.1	-12.71	-	-
0.3885	36.74	Av	0.1	0	36.84	-	-	48.1	-11.26
0.78	43.32	РК	0.1	0	43.42	56	-12.58	-	-
0.78	32.28	Av	0.1	0	32.38	-	-	46	-13.62
2.427	43.26	РК	0.1	0.1	43.46	56	-12.54	-	-
2.427	29.7	Av	0.1	0.1	29.9	-	-	46	-16.1
6.6795	36.95	РК	0.1	0.1	37.15	60	-22.85	-	-
6.6795	17.38	Av	0.1	0.1	17.58	-	-	50	-32.42
Line-L2 .15 - 30MHz									
Test	Meter	Detector	T24 IL	LC Cables	dB(uVolts)	CFR 47	Margin	CFR 47	Margin
Frequency	Reading		L1.TXT	1&3.TXT		Part 15		Part 15	
			(dB)	(dB)		Class B QP		Class B	
								Avg	
0.1995	52.48	РК	0.1	0	52.58	63.6	-11.02	-	-
0.1995	36.55	Av	0.1	0	36.65	-	-	53.6	-16.95
0.3975	47.12	РК	0.1	0	47.22	57.9	-10.68	-	-
0.3975	36.98	Av	0.1	0	37.08	-	-	47.9	-10.82
2.823	54.09	РК	0.1	0.1	54.29	56	-1.71	-	-
2.823	34.67	Av	0.1	0.1	34.87	-	-	46	-11.13
3.642	41.48	PK	0.2	0.1	41.78	56	-14.22	-	-
3.642	23.83	Av	0.2	0.1	24.13	-	-	46	-21.87

Project No:12U14570 Client Name:Silver Spring Network Model/Device:Plic Brea Test Volt/Freq:115VAC/ 60Hz Test By:Thanh Nguyen

Project No:12U14570 Client Name:Silver Spring Network Model/Device:Plic Brea Test Volt/Freq:115VAC/ 60Hz Test By:Thanh Nguyen

PK - Peak detector QP - Quasi-Peak detector LnAv - Linear Average detector LgAv - Log Average detector Av - Average detector CAV - CISPR Average detector RMS - RMS detection CRMS - CISPR RMS detection Text File: TX mode.TXT File: TX mode.DAT

END OF REPORT

Report Revision History

Revision	Revision Description	Pages	Revised by	Date
No.		Revised		
-	Original issue		T. Cokenias	15 August 2012
1	Correct test location: 2.4 GHz antenna port conducted and AC line only at CCS		T. Cokenias	14 December 2012
	Correct test location: Radiated only at BACL Update BACL cal to show due date as well as			
	cal date			