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ENGINEERING TEST REPORT # TR 315202 B
LSR Job #: C-2323

Compliance Testing of:
CSE Cisco Communication Module

Test Date(s):
November-December 2015

Prepared For:
Corporate Systems Engineering, LLC
1215 Brookville Way
Indianapolis, IN 46239

Test Report issued:
Adam Alger, Quality Manger – Test Services

Signature: Date: 3-14-16

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LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

TESTING CERT #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Industrie Canada Industry Canada

Canada

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088-2
On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088-3

U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2).
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.
Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

1.0 Client Information

Manufacturer Name:	Corporate Systems Engineering, LLC
Address:	1215 Brookville Way Indianapolis, IN 46239
Contact Person:	Charles W. Kile

1.1 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	CSE Cisco Communication Module
Model Number:	3130-0117-00A
Serial Number:	Engineering Sample (1 with u.fl port for RF Conducted measurements, 1 with antenna attached)
FCC ID:	0016848673
IC:	20780-3130011700A

1.2 Product Information

900 MHz FHSS with integral antenna

1.3 Modifications Incorporated In the EUT for Compliance Purposes

None noted at time of test

1.4 Deviations & Exclusions from Test Specifications

None noted at time of test

1.5 Additional Information

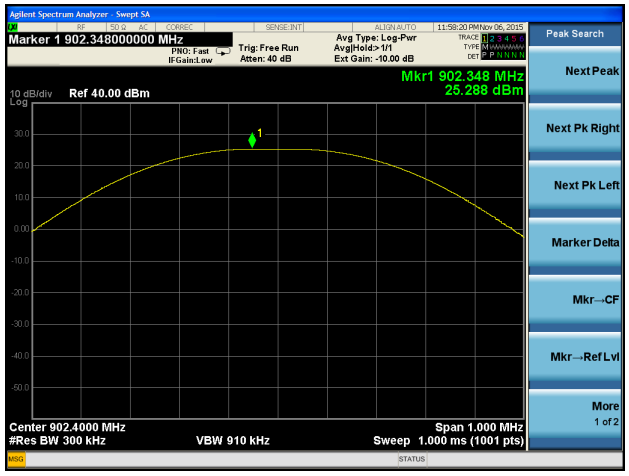
EUT programmed for continuous transmit, normal (hopping) mode transmit, and continuous receive mode via USB cable connected to computer running proprietary software.

2.0 RF Conducted Measurement Data

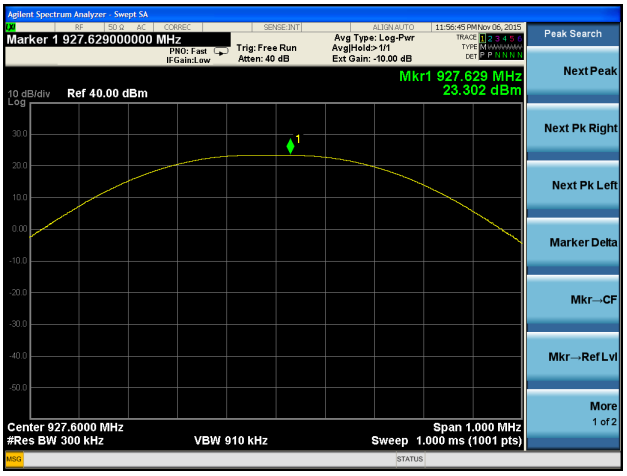
Table

Frequency (MHz)	20 dB OBW (kHz)	99 % BW (kHz)	Power (dBm)	Power Limit (dBm)	Margin (dB)
902.4	157.7	296.9	25.29	30	4.71
914.8	157.7	296.3	24.28	30	5.72
927.6	157.6	296.2	23.30	30	6.70

Plots – Maximum Peak Output Power



902.4 MHz



927.6 MHz

3.0 FCC SAR Test Exclusion Threshold

SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances > 50 mm

1-g SAR test exclusion threshold equation:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)] ≤ 3.0

{[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

3.1 FCC SAR Test Exclusion Calculation

Frequency = 902.4 MHz
Output Power + tolerance = 25.29 dBm + 1.0 dB = 26.29
EIRP = 26.29 dBm = 426 mW

Minimum separation distance for SAR test exclusion (1g tissue) = 100 mm

Appendix B

***SAR Test Exclusion Thresholds* for 100 MHz – 6 GHz and > 50 mm**

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	mW
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

3.2 FCC Conformance Summary

The EUT was found to MEET the 100 mm minimum test separation distance threshold for SAR test exclusion per FCC §2.1091(mobile) and §2.1093(portable) using methods of FCC KDB 447498 D01 General RF Exposure Guidance v06 as a standalone device.

4.0 Industry Canada Low Power Exemption

RSS 102 Issue 5 Section 2.5 states that all transmitters that meet the exemption limits as stated in section 2.5.2 are exempt from routine SAR and RF exposure evaluation.

Output Power Evaluation.

Evaluation Frequency = 2412 MHz

Maximum Effective Isotropic Radiated Power (dBm) = 25.29 dBm + 1.0 dB = 26.29
Maximum Effective Isotropic Radiated Power (mW) = $\log^{-1}$(EIRP (dBm)/10) = 426 mW

1.31 x 10-2 f0.6834 W
f = 902.4 MHz
Exemption limit at 20 cm = 1.37 W > EUT EIRP (0.426 W)

4.1 IC Conformance Summary

The EUT was found to MEET the 20 cm minimum test separation distance threshold for SAR test exclusion per IC RSS-102 Issue 5.

END OF REPORT

Date	Version	Comments	Person
3-14-16	V1	Final	Adam A