FCC PART 15 SUBPART B and C
TEST REPORT

for

TI BLE MODULE

Model: SRD521

Prepared for

BELWITH PRODUCTS, LLC
3100 BROADWAY AV SW
GRANDVILLE, MICHIGAN 49418

Prepared by:_____

KYLE FUJIMOTO

Approved by:_____

JAMES ROSS

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: JULY 14, 2013

	REPORT	APPENDICES					TOTAL
	BODY	***A***	***B***	***C***	***D***	***E***	
PAGES	17	2	2	2	17	36	**76**

TABLE OF CONTENTS

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagram, Charts, and Photos • Test Setup Diagram • Antenna and Amplifier Factors • Radiated Emissions Photos
E	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of the Radiated Test Site

GENERAL REPORT SUMMARY

Compatible Electronics Inc. generates this electromagnetic emission test report, which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested:	TI BLE Module Model: SRD521 S/N: N/A
Product Description:	See Expository Statement
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	Belwith Products, LLC 3100 Broadway AV SW Grandville, Michigan 49418
Test Date(s):	June 24, 25, and 27, 2013
Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B and Subpart C, Sections 15.205, 15.207, 15.209, and 15.249
Test Procedure:	ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions 150 kHz to 30 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, section 15.207.
2	Radiated RF Emissions 10 kHz to 25000 MHz (Transmitter and Digital Portion)	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.249.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the TI BLE Module, Model: SRD521 (EUT). The Emissions measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205, 15.207, 15.209, and 15.249 for the transmitter portion.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The Emissions tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Belwith Products, LLC

Thomas Guido	General Manager and CFO

Compatible Electronics Inc.

Alex Benitez	Test Technician
Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on the initial test date of June 24, 2013.

2.5 Disposition of the Test Sample

The test sample has not been returned to Belwith Products, LLC as of the date of the test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

FCC	Federal Communications Commission
RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
N/A	Not Applicable
Ltd.	Limited
Inc.	Incorporated
NCR	No Calibration Required

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Emissions Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4: 2009	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

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The TI BLE Module, Model: SRD521 (EUT) was connected to a test board via 10-centimeter cables. The test board was also connected to a power supply via its power port. The EUT had a special test program that allowed the low, middle, or high channels, to be tested and to also select the data rate and bandwidth. The EUT was tested in three orthogonal axis.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The final emissions data was taken in this mode of operation and any cables were maximized. All initial investigations were performed with the measurement receiver in manual mode scanning the frequency range continuously. Photographs of the test setup are in Appendix D of this report.

4.1.1 Cable Construction and Termination

Cable 1 There is a 1-meter unshielded cable connecting the test board to the Universal AC/DC Adaptor. The cables are hard wired at each end.

Cables 2-28 These are 10-centimeter unshielded cables connecting the test board to the EUT. The cables are hard wired at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
TI BLE MODULE (EUT)	BELWITH PRODUCTS, LLC	SRD521	N/A	2AAJWSRD521
UNIVERSAL AC/DC ADAPTOR	X1	PST-1200UF	N/A	N/A
TEST BOARD	N/A	N/A	N/A	N/A

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION CYCLE
GENERAL TEST EQUIPMENT USED IN LAB B					
Computer	Compaq	CQ5210F	CNX9360CF9	N/A	N/A
Monitor	Hewlett Packard	HPs2031a	3CQ046N3MD	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100194	November 19, 2012	2 Years
GENERAL TEST EQUIPMENT USED IN LAB A					
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
Monitor	Hewlett Packard	HPs2031a	3CQ046N3MG	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	2637A03618	May 6, 2013	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A13404	May 6, 2013	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	May 29, 2013	1 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
Combilog Antenna	Com Power	AC-220	61027	May 29, 2013	1 Year
Preamplifier	Com-Power	PA-103	1582	December 28, 2012	1 Year
Preamplifier	Com-Power	PA-118	181656	December 27, 2012	1 Year
Preamplifier	Com-Power	PA-840	711013	May 17, 2012	2 Year
Loop Antenna	Com-Power	AL-130	17089	January 29, 2013	2 Years
Horn Antenna	Com-Power	AH-118	071175	February 29, 2012	2 Years
Horn Antenna	Com-Power	AH-826	0071957	N/A	N/A
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
VARIATION OF THE INPUT POWER TEST EQUIPMENT					
Variable Auto Transformer	Staco Energy Products	3PN1010	N/A	N/A	N/A
Multimeter	Wavetek	DM25XT	40209875	May 30, 2012	2 Year

5.2 Emissions Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION CYCLE
CONDCUTED EMISSIONS TEST EQUIPMENT					
Emissions Program	Compatible Electronics	2.3 (SR19)	N/A	N/A	N/A
LISN	Com Power	LI-215	12082	June 17, 2013	1 Year
LISN	Com Power	LI-215	12090	June 17, 2013	1 Year
Transient Limiter	Seward	252A910	K39-0220	November 7, 2012	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1.2 of this report for Emissions test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The measurement receiver was used as a measuring meter. The data was collected with the measurement receiver in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the measurement receiver's input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the measurement receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.207.

7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer, along with the quasi-peak adapter, and EMI Receiver were used as a measuring meter. Amplifiers were used to increase the sensitivity of the instrument. The Com-Power Preamplifier Model: PA-103 was used for frequencies from 30 MHz to 1 GHz, the Com-Power Microwave Preamplifier Model: PA-118 was used for frequencies from 1 GHz to 18 GHz, and the Com-Power Microwave Preamplifier Model: PA-840 were used for frequencies above 18 GHz. The spectrum analyzer and EMI Receiver were used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer and EMI receiver records the highest measured reading over the sweeps.

The quasi-peak function was used only for those readings which are marked accordingly on the data sheets.

The frequencies above 1 GHz were adjusted by a “duty cycle correction factor”, derived from 20 log (dwell time / worst case 100 ms period).

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 1 GHz	120 kHz	Combilog Antenna
1 GHz to 25 GHz	1 MHz	Horn Antennas

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT by the Radiated Emission Manual Test software. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gun sight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the vertical axis in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (continued)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3-meter test distance from 30 MHz to 25 GHz and at a 10-meter distance from 10 kHz to 30 MHz to obtain the final test data.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.209 and 15.249.

7.1.3 Variation of the Input Power

The variation of the input power test was performed using the EMI Receiver. The EUT input power was varied between 85% and 115% of the nominal rated supply voltage. The carrier frequency was monitored for any change in amplitude.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15. 31(e).

7.1.4 RF Emissions Test Results

Table 1.0 CONDUCTED EMISSION RESULTS
TI BLE Module, Model: SRD521

Frequency MHz	Emission Level* dBuV	Average Specification Limit dBuV	Delta (Emission – Spec. Limit) dB
0.283 (BL)	47.68	50.72	-3.04
2.077 (WL)	42.54	46.00	-3.46
2.322 (WL)	42.45	46.00	-3.55
1.311 (BL)	42.34	46.00	-3.66
2.554 (BL)	42.07	46.00	-3.93
1.243 (BL)	41.84	46.00	-4.16

Table 2.0 RADIATED EMISSION RESULTS
TI BLE Module, Model: SRD521

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
2400 (V)	44.5 (A)	54.00	-9.5
2400 (H)	43.49 (A)	54.00	-10.51
9608 (H)	41.55 (A)	54.00	-12.45
9920 (V)	38.91 (A)	54.00	-15.09
9760 (V)	38.36 (A)	54.00	-15.64
4880 (V)	36.57 (A)	54.00	-17.43

Notes:

* The complete emissions data is given in Appendix E of this report.
(BL) BLACK LEAD
(WL) WHITE LEAD
(V) VERTICAL
(H) HORIZONTAL
(A) AVERAGE

8. CONCLUSIONS

The TI BLE Module, Model: SRD521 (EUT), as tested, meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205, 15.207, 15.209, and 15.249 for the transmitter portion.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP LAB CODES 200063-0, 200528-0, 200527-0

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025. Please follow the link to the NIST/NVLAP site for each of our facilities' NVLAP certificate and scope of accreditation

NVLAP listing links

Agoura Division / **Brea Division** / **Silverado/Lake Forest Division**

.Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfillment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

ANSI listing CETCB

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).
US/EU MRA list NIST MRA site

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).
APEC MRA list NIST MRA site

We are also listed for IT products by the following country/agency:

VCCI Support member: Please visit http://www.vcci.jp/vcci_e/

FCC Listing, from FCC OET site
FCC test lab search https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm

Industry Canada / Industrie Canada Compatible Electronics IC listing can be found at:
http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.207, FCC 15.249 and/or FCC **Class B** specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

TI BLE Module
Model: SRD521
S/N: N/A

No additional model numbers are approved under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

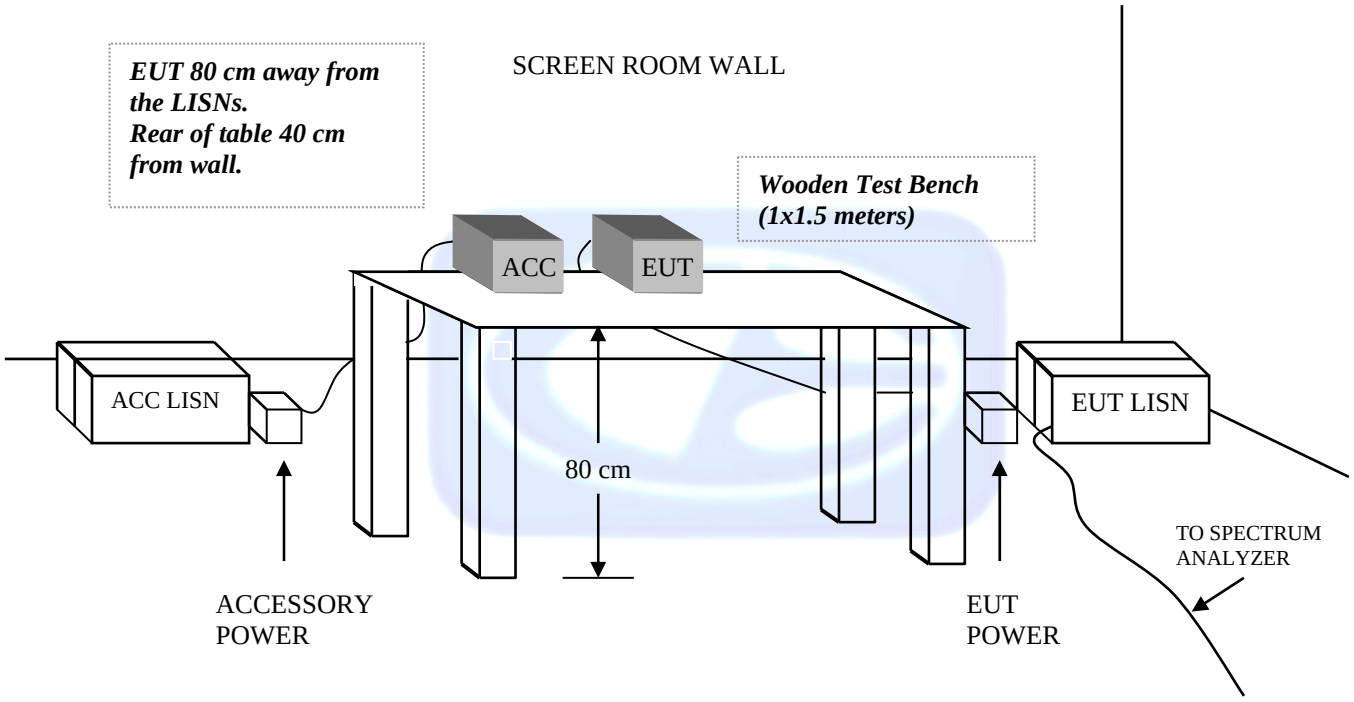
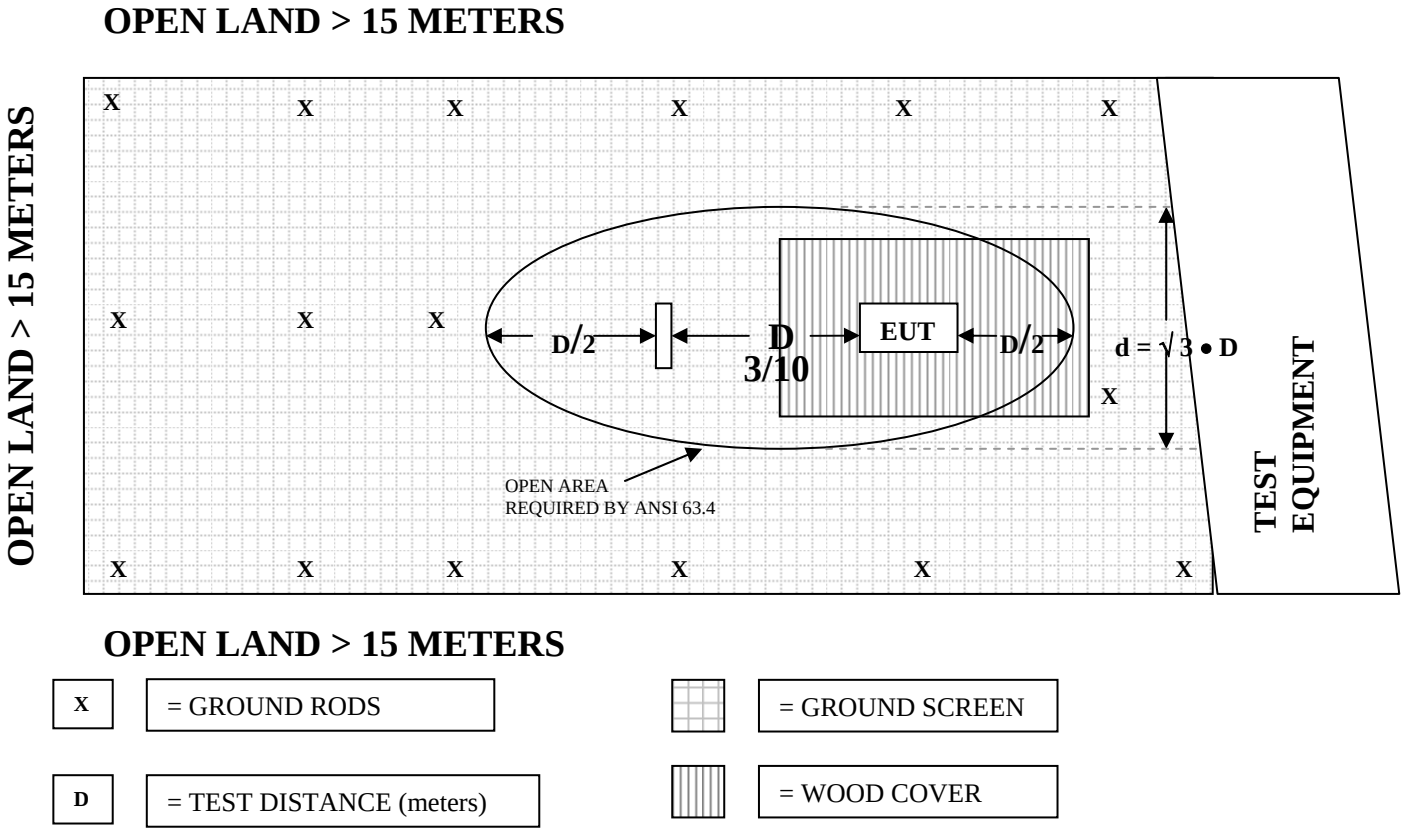


FIGURE 2: PLOT MAP AND LAYOUT OF THE RADIATED TEST SITE



COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: JANUARY 29, 2013

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-42.5	9
0.01	-42.3	9.2
0.02	-42.1	9.4
0.03	-41.4	10.1
0.04	-41.8	9.7
0.05	-42.4	9.1
0.06	-42.3	9.2
0.07	-42.5	9
0.08	-42.4	9.1
0.09	-42.5	9
0.1	-42.5	9
0.2	-42.7	8.8
0.3	-42.6	8.9
0.4	-42.5	9
0.5	-42.7	8.8
0.6	-42.7	8.8
0.7	-42.5	9
0.8	-42.3	9.2
0.9	-42.2	9.3
1	-42.2	9.3
2	-41.8	9.7
3	-41.7	9.8
4	-41.7	9.8
5	-41.5	10
6	-41.6	9.9
7	-41.4	10.1
8	-41	10.5
9	-40.8	10.7
10	-41.3	10.2
15	-41.4	10.1
20	-41.2	10.3
25	-42.6	8.9
30	-41.7	9.8

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61027

CALIBRATION DATE: MAY 29, 2013

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	16.00	120	10.40
35	17.00	125	10.80
40	18.40	140	9.30
45	17.00	150	8.90
50	16.70	160	9.00
60	13.40	175	10.30
70	8.90	180	8.70
80	4.80	200	9.40
90	8.30	250	11.60
100	8.70	300	12.30

COM-POWER AC-220

COMBILOG ANTENNA

S/N: 61027

CALIBRATION DATE: MAY 29, 2013

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.30	700	20.40
350	14.40	750	21.60
400	18.70	800	21.70
450	17.30	850	21.80
500	17.80	900	22.30
550	16.50	950	22.40
600	18.20	1000	23.10
650	19.30		

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: FEBRUARY 29, 2012

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.6	10.0	37.7
1.5	22.0	10.5	38.4
2.0	28.7	11.0	38.0
2.5	29.3	11.5	38.2
3.0	30.6	12.0	39.0
3.5	30.4	12.5	42.4
4.0	31.1	13.0	40.8
4.5	33.4	13.5	40.0
5.0	35.3	14.0	39.7
5.5	35.1	14.5	43.5
6.0	36.9	15.0	42.7
6.5	37.4	15.5	39.7
7.0	37.6	16.0	39.2
7.5	36.2	16.5	39.7
8.0	38.4	17.0	42.2
8.5	39.3	17.5	47.6
9.0	37.4	18.0	51.2
9.5	38.0		

COM-POWER AH-826

HORN ANTENNA

S/N: 0071957

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.5	22.5	35.5
18.5	33.5	23.0	35.9
19.0	34.0	23.5	35.7
19.5	34.0	24.0	35.6
20.0	34.3	24.5	36.0
20.5	34.9	25.0	36.2
21.0	34.7	25.5	36.1
21.5	35.0	26.0	36.2
22.0	35.0	26.5	35.7

COM-POWER PA-103

PREAMPLIFIER

S/N: 1582

CALIBRATION DATE: DECEMBER 28, 2012

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	32.80	300	32.26
40	33.10	350	32.23
50	33.10	400	32.17
60	33.10	450	32.16
70	33.00	500	32.11
80	33.00	550	32.07
90	33.10	600	32.02
100	33.00	650	31.97
125	33.00	700	31.87
150	33.00	750	31.81
175	32.90	800	31.73
200	32.80	850	31.57
225	32.34	900	31.43
250	32.32	950	31.29
275	32.28	1000	31.14

COM-POWER PA-118

PREAMPLIFIER

S/N: 181656

CALIBRATION DATE: DECEMBER 27, 2012

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.68	6.0	25.75
1.1	25.08	6.5	25.28
1.2	25.70	7.0	24.83
1.3	25.98	7.5	24.49
1.4	26.11	8.0	24.38
1.5	26.23	8.5	25.06
1.6	26.34	9.0	25.55
1.7	26.39	9.5	25.32
1.8	26.44	10.0	25.25
1.9	26.45	11.0	24.99
2.0	26.48	12.0	25.08
2.5	26.59	13.0	24.44
3.0	26.67	14.0	25.02
3.5	26.66	15.0	26.12
4.0	26.82	16.0	25.67
4.5	26.46	17.0	24.33
5.0	26.22	18.0	26.75
5.5	25.98		

COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MAY 17, 2012

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	25.81	31.0	25.77
19.0	24.57	31.5	25.36
20.0	23.46	32.0	25.15
21.0	22.51	32.5	25.13
22.0	23.85	33.0	25.52
23.0	23.31	33.5	25.24
24.0	24.44	34.0	25.08
25.0	25.42	34.5	25.27
26.0	25.71	35.0	23.99
26.5	25.66	35.5	24.67
27.0	25.84	36.5	24.80
27.5	25.29	37.0	26.27
28.0	25.46	37.5	24.86
28.5	25.58	38.0	24.64
29.0	26.16	38.5	23.46
29.5	26.14	39.0	21.29
30.0	26.01	39.5	20.83
30.5	25.67	40.0	19.96

FRONT VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 30 MHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 30 MHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 30 MHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 30 MHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

BELWITH PRODUCTS, LLC
TI BLE MODULE
MODEL: SRD521
FCC SUBPART B AND C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	91.85	V	114	-22.15	Peak	1.25	155	
2402	71.85	V	94	-22.15	Avg	1.25	155	
4804	47.31	V	74	-26.69	Peak	1.35	165	
4804	27.31	V	54	-26.69	Avg	1.35	165	
7206	46.45	V	74	-27.55	Peak	1.25	185	
7206	26.45	V	54	-27.55	Avg	1.25	185	
9608	52.12	V	74	-21.88	Peak	1.35	195	
9608	32.12	V	54	-21.88	Avg	1.35	195	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	88.21	H	114	-25.79	Peak	1.25	165	
2402	68.21	H	94	-25.79	Avg	1.25	165	
4804	46.85	H	74	-27.15	Peak	1.35	175	
4804	26.85	H	54	-27.15	Avg	1.35	175	
7206	53.71	H	74	-20.29	Peak	1.45	185	
7206	33.71	H	54	-20.29	Avg	1.45	185	
9608	52.01	H	74	-21.99	Peak	1.65	195	
9608	32.01	H	54	-21.99	Avg	1.65	195	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	90.79	V	114	-23.21	Peak	1.25	165	
2402	70.79	V	94	-23.21	Avg	1.25	165	
4804	45.58	V	74	-28.42	Peak	1.35	175	
4804	25.58	V	54	-28.42	Avg	1.35	175	
7206	46.25	V	74	-27.75	Peak	1.15	185	
7206	26.25	V	54	-27.75	Avg	1.15	185	
9608	53.11	V	74	-20.89	Peak	1.25	195	
9608	33.11	V	54	-20.89	Avg	1.25	195	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	86.01	H	114	-27.99	Peak	1.25	155	
2402	66.01	H	94	-27.99	Avg	1.25	155	
4804	49.22	H	74	-24.78	Peak	1.35	165	
4804	29.22	H	54	-24.78	Avg	1.35	165	
7206	53.83	H	74	-20.17	Peak	1.25	175	
7206	33.83	H	54	-20.17	Avg	1.25	175	
9608	61.55	H	74	-12.45	Peak	1.15	185	
9608	41.55	H	54	-12.45	Avg	1.15	185	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	90.77	V	114	-23.23	Peak	1.25	165	
2402	70.77	V	94	-23.23	Avg	1.25	165	
4804	55.69	V	74	-18.31	Peak	1.35	175	
4804	35.69	V	54	-18.31	Avg	1.35	175	
7206	46.14	V	74	-27.86	Peak	1.25	185	
7206	26.14	V	54	-27.86	Avg	1.25	185	
9608	51.72	V	74	-22.28	Peak	1.25	155	
9608	31.72	V	54	-22.28	Avg	1.25	155	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	89.97	H	114	-24.03	Peak	1.25	315	
2402	69.97	H	94	-24.03	Avg	1.25	315	
4804	47.09	H	74	-26.91	Peak	1.35	225	
4804	27.09	H	54	-26.91	Avg	1.35	225	
7206	52.21	H	74	-21.79	Peak	1.25	165	
7206	32.21	H	54	-21.79	Avg	1.25	165	
9608	51.93	H	74	-22.07	Peak	1.35	175	
9608	31.93	H	54	-22.07	Avg	1.35	175	
12010								No Emission
12010								Detected
14412								No Emission
14412								Detected
16814								No Emission
16814								Detected
19216								No Emission
19216								Detected
21618								No Emission
21618								Detected
24020								No Emission
24020								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	91.26	V	114	-22.74	Peak	1	90	
2440	71.26	V	94	-22.74	Avg	1	90	
4880	48.21	V	74	-25.79	Peak	1.35	165	
4880	28.21	V	54	-25.79	Avg	1.35	165	
7320	47.62	V	74	-26.38	Peak	1.25	185	
7320	27.62	V	54	-26.38	Avg	1.25	185	
9760	58.36	V	74	-15.64	Peak	1.35	195	
9760	38.36	V	54	-15.64	Avg	1.35	195	
12200								No Emission
12200								Detected
14640								No Emission
14640								Detected
17080								No Emission
17080								Detected
19520								No Emission
19520								Detected
21960								No Emission
21960								Detected
24400								No Emission
24400								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	87.26	H	114	-26.74	Peak	1.25	155	
2440	67.26	H	94	-26.74	Avg	1.25	155	
4880	47.55	H	74	-26.45	Peak	1.35	175	
4880	27.55	H	54	-26.45	Avg	1.35	175	
7320	53.21	H	74	-20.79	Peak	1.45	185	
7320	33.21	H	54	-20.79	Avg	1.45	185	
9760	52.27	H	74	-21.73	Peak	1.65	195	
9760	32.27	H	54	-21.73	Avg	1.65	195	
12200								No Emission
12200								Detected
14640								No Emission
14640								Detected
17080								No Emission
17080								Detected
19520								No Emission
19520								Detected
21960								No Emission
21960								Detected
24400								No Emission
24400								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	91.02	V	114	-22.98	Peak	1.25	165	
2440	71.02	V	94	-22.98	Avg	1.25	165	
4880	46.29	V	74	-27.71	Peak	1.35	175	
4880	26.29	V	54	-27.71	Avg	1.35	175	
7320	50.25	V	74	-23.75	Peak	1.15	185	
7320	30.25	V	54	-23.75	Avg	1.15	185	
9760	51.29	V	74	-22.71	Peak	1.25	195	
9760	31.29	V	54	-22.71	Avg	1.25	195	
12200								No Emission
12200								Detected
14640								No Emission
14640								Detected
17080								No Emission
17080								Detected
19520								No Emission
19520								Detected
21960								No Emission
21960								Detected
24400								No Emission
24400								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	87.56	H	114	-26.44	Peak	1.25	225	
2440	67.56	H	94	-26.44	Avg	1.25	225	
4880	50.26	H	74	-23.74	Peak	1.35	165	
4880	30.26	H	54	-23.74	Avg	1.35	165	
7320	51.59	H	74	-22.41	Peak	1.25	175	
7320	31.59	H	54	-22.41	Avg	1.25	175	
9760	55.69	H	74	-18.31	Peak	1.15	185	
9760	35.69	H	54	-18.31	Avg	1.15	185	
12200								No Emission
12200								Detected
14640								No Emission
14640								Detected
17080								No Emission
17080								Detected
19520								No Emission
19520								Detected
21960								No Emission
21960								Detected
24400								No Emission
24400								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	91.28	V	114	-22.72	Peak	1.25	165	
2440	71.28	V	94	-22.72	Avg	1.25	165	
4880	56.57	V	74	-17.43	Peak	1.35	175	
4880	36.57	V	54	-17.43	Avg	1.35	175	
7320	47.51	V	74	-26.49	Peak	1.25	185	
7320	27.51	V	54	-26.49	Avg	1.25	185	
9760	49.51	V	74	-24.49	Peak	1.25	155	
9760	29.51	V	54	-24.49	Avg	1.25	155	
12200								No Emission
12200								Detected
14640								No Emission
14640								Detected
17080								No Emission
17080								Detected
19520								No Emission
19520								Detected
21960								No Emission
21960								Detected
24400								No Emission
24400								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	90.56	H	114	-23.44	Peak	1.25	315	
2440	70.56	H	94	-23.44	Avg	1.25	315	
4880	48.53	H	74	-25.47	Peak	1.35	225	
4880	28.53	H	54	-25.47	Avg	1.35	225	
7320	52.86	H	74	-21.14	Peak	1.25	165	
7320	32.86	H	54	-21.14	Avg	1.25	165	
9760	53.01	H	74	-20.99	Peak	1.35	175	
9760	33.01	H	54	-20.99	Avg	1.35	175	
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	90.22	V	114	-23.78	Peak	1.25	155	
2480	70.22	V	94	-23.78	Avg	1.25	155	
4960	48.28	V	74	-25.72	Peak	1.35	165	
4960	28.28	V	54	-25.72	Avg	1.35	165	
7440	54.04	V	74	-19.96	Peak	1.25	175	
7440	34.04	V	54	-19.96	Avg	1.25	175	
9920	51.65	V	74	-22.35	Peak	1.35	185	
9920	31.65	V	54	-22.35	Avg	1.35	185	
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	90.57	H	114	-23.43	Peak	1.25	225	
2480	70.57	H	94	-23.43	Avg	1.25	225	
4960	46.94	H	74	-27.06	Peak	1.35	215	
4960	26.94	H	54	-27.06	Avg	1.35	215	
7440	54.43	H	74	-19.57	Peak	1.25	245	
7440	34.43	H	54	-19.57	Avg	1.25	245	
9920	52.85	H	74	-21.15	Peak	1.35	275	
9920	32.85	H	54	-21.15	Avg	1.35	275	
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	93.14	V	114	-20.86	Peak	1.35	225	
2480	73.14	V	94	-20.86	Avg	1.35	225	
4960	48.32	V	74	-25.68	Peak	1.25	165	
4960	28.32	V	54	-25.68	Avg	1.25	165	
7440	53.22	V	74	-20.78	Peak	1.35	175	
7440	33.22	V	54	-20.78	Avg	1.35	175	
9920	50.58	V	74	-23.42	Peak	1.45	185	
9920	30.58	V	54	-23.42	Avg	1.45	185	
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	90.71	H	114	-23.29	Peak	1.25	135	
2480	70.71	H	94	-23.29	Avg	1.25	135	
4960	43.74	H	74	-30.26	Peak	1.35	225	
4960	23.74	H	54	-30.26	Avg	1.35	225	
7440	45.19	H	74	-28.81	Peak	1.25	185	
7440	25.19	H	54	-28.81	Avg	1.25	185	
9920	51.26	H	74	-22.74	Peak	1.35	195	
9920	31.26	H	54	-22.74	Avg	1.35	195	
12400								**No Emission**
12400								**Detected**
14880								**No Emission**
14880								**Detected**
17360								**No Emission**
17360								**Detected**
19840								**No Emission**
19840								**Detected**
22320								**No Emission**
22320								**Detected**
24800								**No Emission**
24800								**Detected**

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	92.14	V	114	-21.86	Peak	1.25	155	
2480	72.14	V	94	-21.86	Avg	1.25	155	
4960	50.24	V	74	-23.76	Peak	1.35	165	
4960	30.24	V	54	-23.76	Avg	1.35	165	
7440	54.28	V	74	-19.72	Peak	1.25	175	
7440	34.28	V	54	-19.72	Avg	1.25	175	
9920	58.91	V	74	-15.09	Peak	1.35	185	
9920	38.91	V	54	-15.09	Avg	1.35	185	
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

250 kBit - Worst Case
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	87.64	H	114	-26.36	Peak	1.25	155	
2480	67.64	H	94	-26.36	Avg	1.25	155	
4960	43.33	H	74	-30.67	Peak	1.35	175	
4960	23.33	H	54	-30.67	Avg	1.35	175	
7440	46.47	H	74	-27.53	Peak	1.25	185	
7440	26.47	H	54	-27.53	Avg	1.25	185	
9920	51.32	H	74	-22.68	Peak	1.55	135	
9920	31.32	H	54	-22.68	Avg	1.55	135	
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249

Belwith Products, LLC
TI BLE Module
Model: SRD521

Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

Non Harmonic Emissions from the Tx and Digital Portion 10 kHz to 25 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Found for the
								Digital Portion
								from 10 kHz to 25 GHz
								for both Vertical and Horizontal
								Polarizations
								No Non Harmonic
								Emissions Found
								for the Tx Mode
								from 10 kHz to 25 GHz
								for both Vertical and Horizontal
								Polarizations
								Investigated in the
								X, Y, and Z-Axis

Test Location	:	Compatible Electronics	**Page :**	1/1
Customer	:	Belwith Products, LLC	**Date :**	06 / 27 / 2013
Manufacturer	:	Belwith Products, LLC	**Time:**	09:15:14 AM
Eut name	:	TI BLE Module	**Lab:**	A
Model	:	SRD521	**Test Distance :**	3.00
Serial #	:	N/A		
Specification	:	FCC B		

Distance correction factor (20 * log(test/spec)) : 0.00

Test Type: Spurious Emissions Qualification Scan
Test Range: 10 kHz to 1 GHz (Horizontal and Vertical)
Test Engineer: James Ross

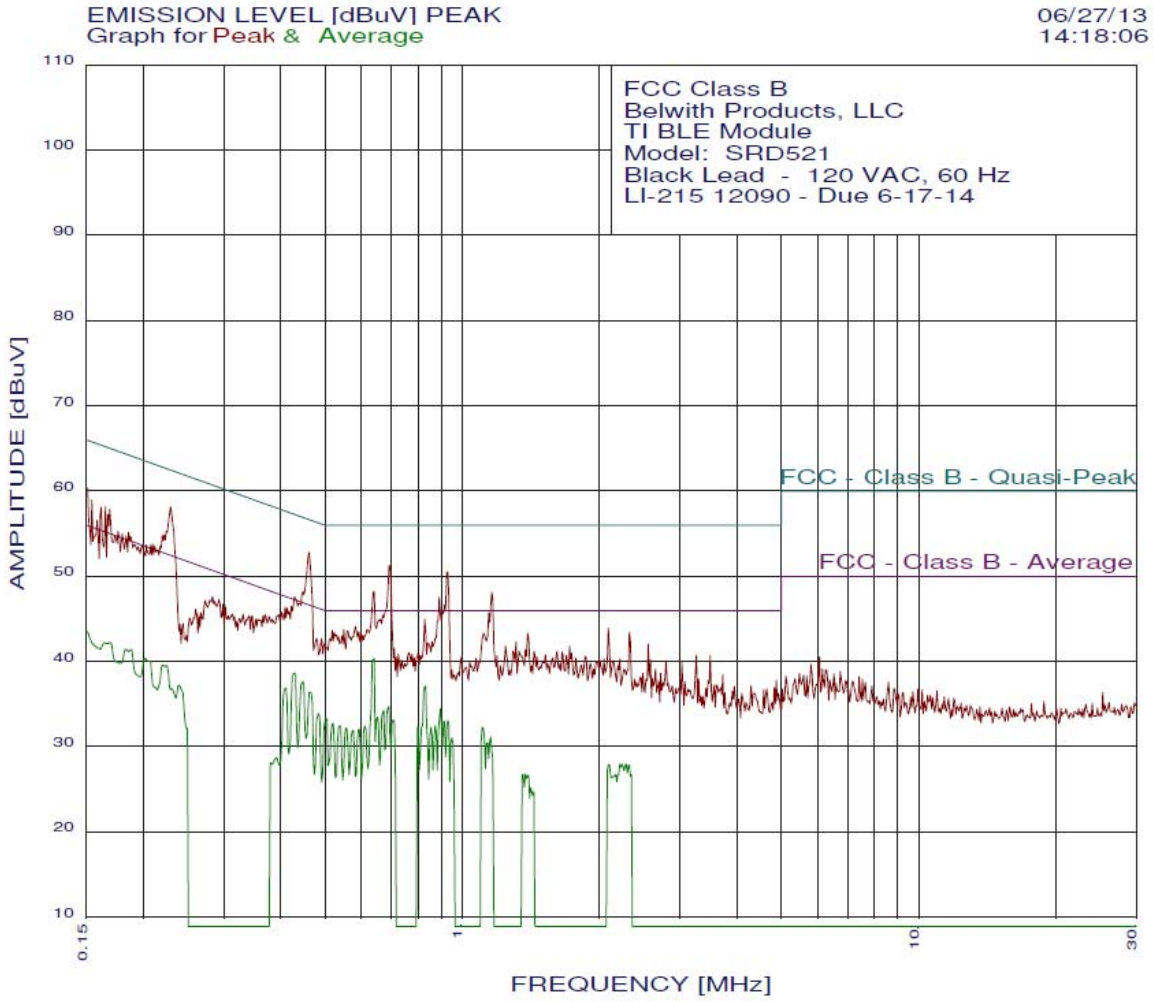
Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	Limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB

Note 1: Spurious emissions from 10 kHz to 30 MHz were tested at 10 meters
Note 2: No spurious emissions were discovered between 10 kHz and 1 GHz

---

CONDUCTED EMISSIONS

DATA SHEETS


EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
06/27/13
14:18:06
FCC Class B
Belwith Products, LLC
TI BLE Module
Model: SRD521
Black Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
FCC - Class B - Quasi-Peak
FCC - Class B - Average
AMPLITUDE [dBuV]
110
100
90
80
70
60
50
40
30
20
10
0.15
1
10
30
FREQUENCY [MHz]

FCC Class B 06/27/13 14:18:06
Belwith Products, LLC
TI BLE Module
Model: SRD521
Black Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
Test Engineer: James Ross

---

35 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.461	52.83	46.67	6.17**
2	0.229	58.17	52.48	5.69**
3	0.690	51.28	46.00	5.28**
4	0.924	50.46	46.00	4.46**
5	0.150	60.39	56.00	4.39**
6	0.154	58.99	55.78	3.21**
7	0.165	58.19	55.20	2.99**
8	0.169	57.89	55.03	2.86**
9	0.162	58.09	55.38	2.71**
10	0.637	48.20	46.00	2.20**
11	1.160	48.13	46.00	2.13**
12	0.826	44.97	46.00	-1.03**
13	2.089	43.95	46.00	-2.05**
14	2.322	43.45	46.00	-2.55**
15	1.389	43.34	46.00	-2.66**
16	0.283	47.68	50.72	-3.04
17	1.311	42.34	46.00	-3.66
18	2.554	42.07	46.00	-3.93
19	1.243	41.84	46.00	-4.16
20	1.717	41.83	46.00	-4.17
21	3.260	40.79	46.00	-5.21
22	3.492	40.69	46.00	-5.31
23	2.796	40.08	46.00	-5.92
24	3.027	39.88	46.00	-6.12
25	2.651	39.17	46.00	-6.83
26	3.722	38.50	46.00	-7.50
27	4.877	37.84	46.00	-8.16
28	4.294	37.22	46.00	-8.78
29	3.945	37.10	46.00	-8.90
30	6.059	40.56	50.00	-9.44
31	5.806	39.66	50.00	-10.34
32	6.736	38.88	50.00	-11.12
33	5.114	38.35	50.00	-11.65
34	8.595	37.60	50.00	-12.40
35	9.967	36.81	50.00	-13.19

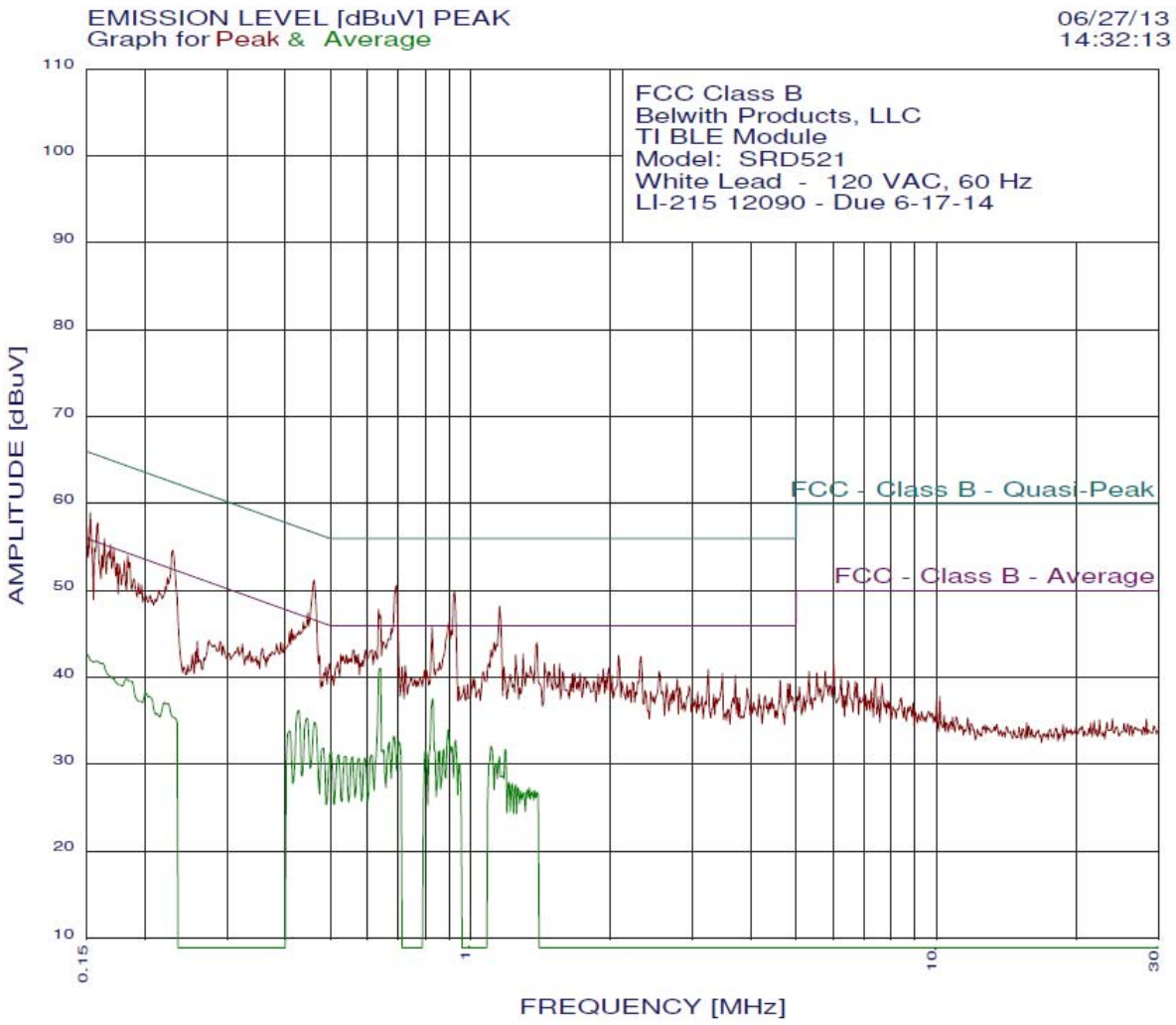
**This reading was averaged; please see the previous graph and following data sheet for the averaged information

FCC Class B 06/27/13 14:18:06
Belwith Products, LLC
TI BLE Module
Model: SRD521
Black Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
Test Engineer: James Ross

---

28 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.641	40.39	46.00	-5.61
2	0.428	38.70	47.28	-8.58
3	0.831	37.17	46.00	-8.83
4	0.447	37.69	46.93	-9.24
5	0.461	36.43	46.67	-10.23
6	0.411	36.88	47.63	-10.75
7	0.690	34.75	46.00	-11.25
8	0.895	34.49	46.00	-11.51
9	0.672	34.32	46.00	-11.68
10	0.484	33.92	46.27	-12.36
11	0.150	43.57	56.00	-12.43
12	0.505	33.32	46.00	-12.68
13	0.705	33.20	46.00	-12.80
14	0.929	33.14	46.00	-12.86
15	0.521	32.79	46.00	-13.21
16	0.538	32.55	46.00	-13.45
17	0.872	32.53	46.00	-13.47
18	0.611	32.46	46.00	-13.54
19	0.796	32.33	46.00	-13.67
20	1.106	32.33	46.00	-13.67
21	0.853	32.30	46.00	-13.70
22	0.555	32.22	46.00	-13.78
23	0.595	32.10	46.00	-13.90
24	0.577	31.94	46.00	-14.06
25	1.154	31.18	46.00	-14.82
26	0.948	31.09	46.00	-14.91
27	2.286	28.03	46.00	-17.97
28	1.359	26.84	46.00	-19.16


EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
06/27/13
14:32:13
FCC Class B
Belwith Products, LLC
TI BLE Module
Model: SRD521
White Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
FCC - Class B - Quasi-Peak
FCC - Class B - Average
AMPLITUDE [dBuV]
110
100
90
80
70
60
50
40
30
20
10
0.15
1
10
30
FREQUENCY [MHz]

FCC Class B 06/27/13 14:32:13
Belwith Products, LLC
TI BLE Module
Model: SRD521
White Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
Test Engineer: James Ross

---

47 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.694	50.59	46.00	4.59**
2	0.461	51.23	46.67	4.56**
3	0.924	49.95	46.00	3.95**
4	0.152	58.99	55.86	3.12**
5	1.154	48.23	46.00	2.23**
6	0.158	57.79	55.56	2.23**
7	0.229	54.67	52.48	2.19**
8	0.634	47.90	46.00	1.90**
9	0.150	57.19	56.00	1.19**
10	0.163	55.98	55.29	0.69**
11	0.169	55.28	55.03	0.25**
12	0.826	45.86	46.00	-0.14**
13	0.183	54.06	54.33	-0.26**
14	0.181	53.47	54.46	-0.99**
15	1.389	44.03	46.00	-1.97**
16	1.297	42.74	46.00	-3.26**
17	1.249	42.64	46.00	-3.36**
18	2.077	42.54	46.00	-3.46
19	2.322	42.45	46.00	-3.55
20	1.441	41.73	46.00	-4.27
21	0.724	41.39	46.00	-4.61
22	0.713	41.29	46.00	-4.71
23	1.178	41.23	46.00	-4.77**
24	1.981	41.14	46.00	-4.86
25	3.243	40.99	46.00	-5.01
26	2.540	40.76	46.00	-5.24
27	1.577	40.73	46.00	-5.27
28	3.474	40.50	46.00	-5.50
29	3.702	40.31	46.00	-5.69
30	2.781	39.86	46.00	-6.14
31	4.624	39.73	46.00	-6.27
32	2.637	39.36	46.00	-6.64
33	4.851	39.34	46.00	-6.66
34	0.275	44.27	50.98	-6.71
35	2.948	39.07	46.00	-6.93
36	3.924	38.81	46.00	-7.19
37	0.259	44.18	51.47	-7.29
38	6.028	41.67	50.00	-8.33
39	5.335	40.75	50.00	-9.25
40	5.538	40.55	50.00	-9.45
41	6.254	40.18	50.00	-9.82
42	7.411	40.00	50.00	-10.00
43	6.458	39.68	50.00	-10.32
44	6.700	39.58	50.00	-10.42
45	7.648	39.40	50.00	-10.60
46	10.183	37.85	50.00	-12.15
47	10.019	37.44	50.00	-12.56

**This reading was averaged; please see the previous graph and following data sheet for the averaged information

FCC Class B 06/27/13 14:32:13
Belwith Products, LLC
TI BLE Module
Model: SRD521
White Lead - 120 VAC, 60 Hz
LI-215 12090 - Due 6-17-14
Test Engineer: James Ross

---

29 highest peaks above -50.00 dB of FCC - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.641	41.08	46.00	-4.92
2	0.831	37.57	46.00	-8.43
3	0.428	36.24	47.28	-11.05
4	0.445	35.37	46.98	-11.60
5	0.461	34.91	46.67	-11.76
6	0.895	34.01	46.00	-11.99
7	0.686	33.27	46.00	-12.73
8	0.929	32.82	46.00	-13.18
9	0.150	42.71	56.00	-13.29
10	0.701	32.65	46.00	-13.35
11	0.669	32.63	46.00	-13.37
12	0.409	33.94	47.68	-13.74
13	1.106	32.13	46.00	-13.87
14	0.876	31.80	46.00	-14.20
15	0.801	31.74	46.00	-14.26
16	1.184	31.72	46.00	-14.28
17	0.484	31.88	46.27	-14.39
18	0.858	31.59	46.00	-14.41
19	0.502	31.47	46.00	-14.53
20	0.521	31.17	46.00	-14.83
21	0.611	31.12	46.00	-14.88
22	0.538	30.95	46.00	-15.05
23	0.558	30.92	46.00	-15.08
24	0.592	30.75	46.00	-15.25
25	0.573	30.73	46.00	-15.27
26	0.948	30.20	46.00	-15.80
27	1.210	28.01	46.00	-17.99
28	1.230	27.84	46.00	-18.16
29	1.249	27.72	46.00	-18.28

BAND EDGES

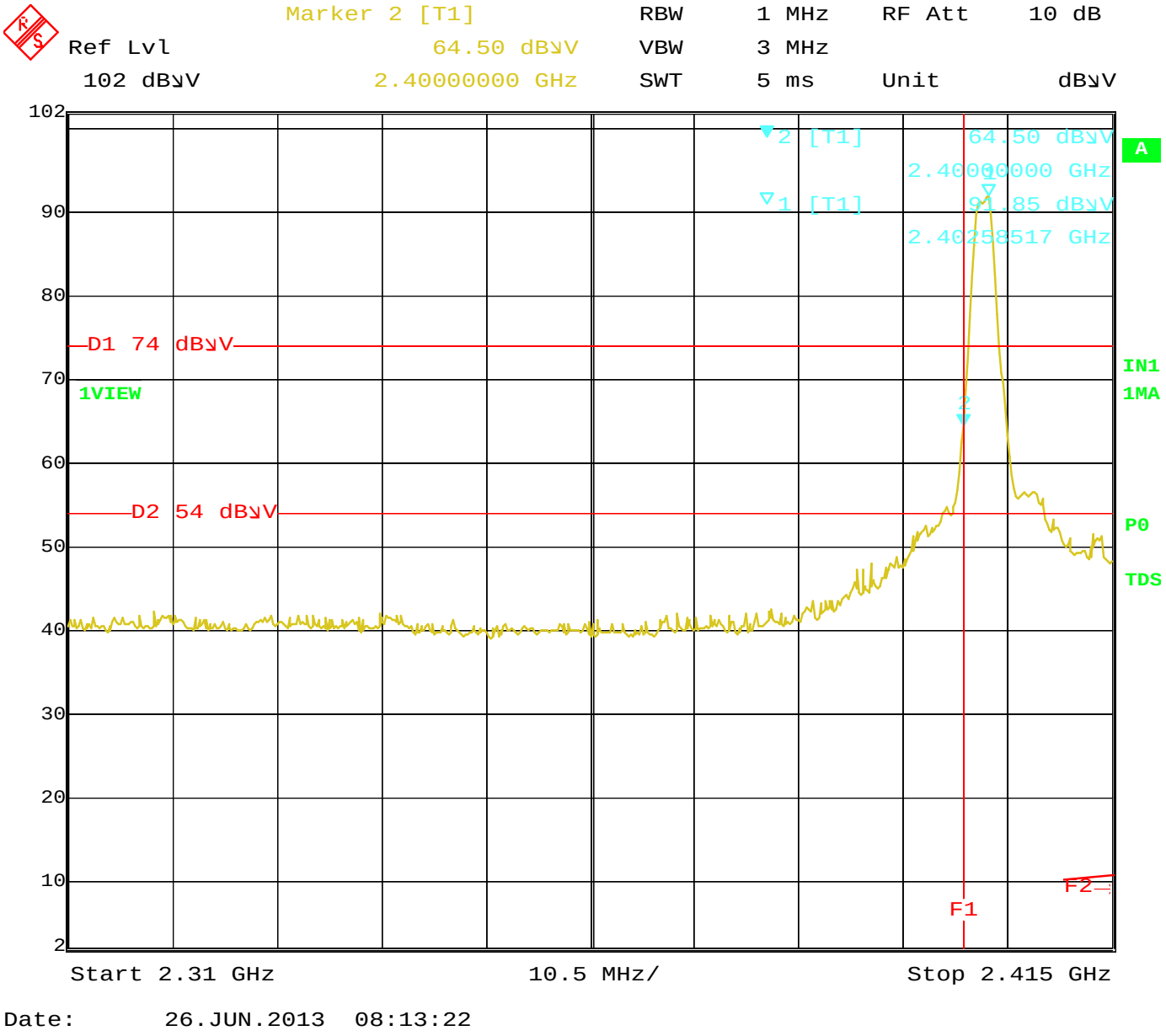
DATA SHEETS

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

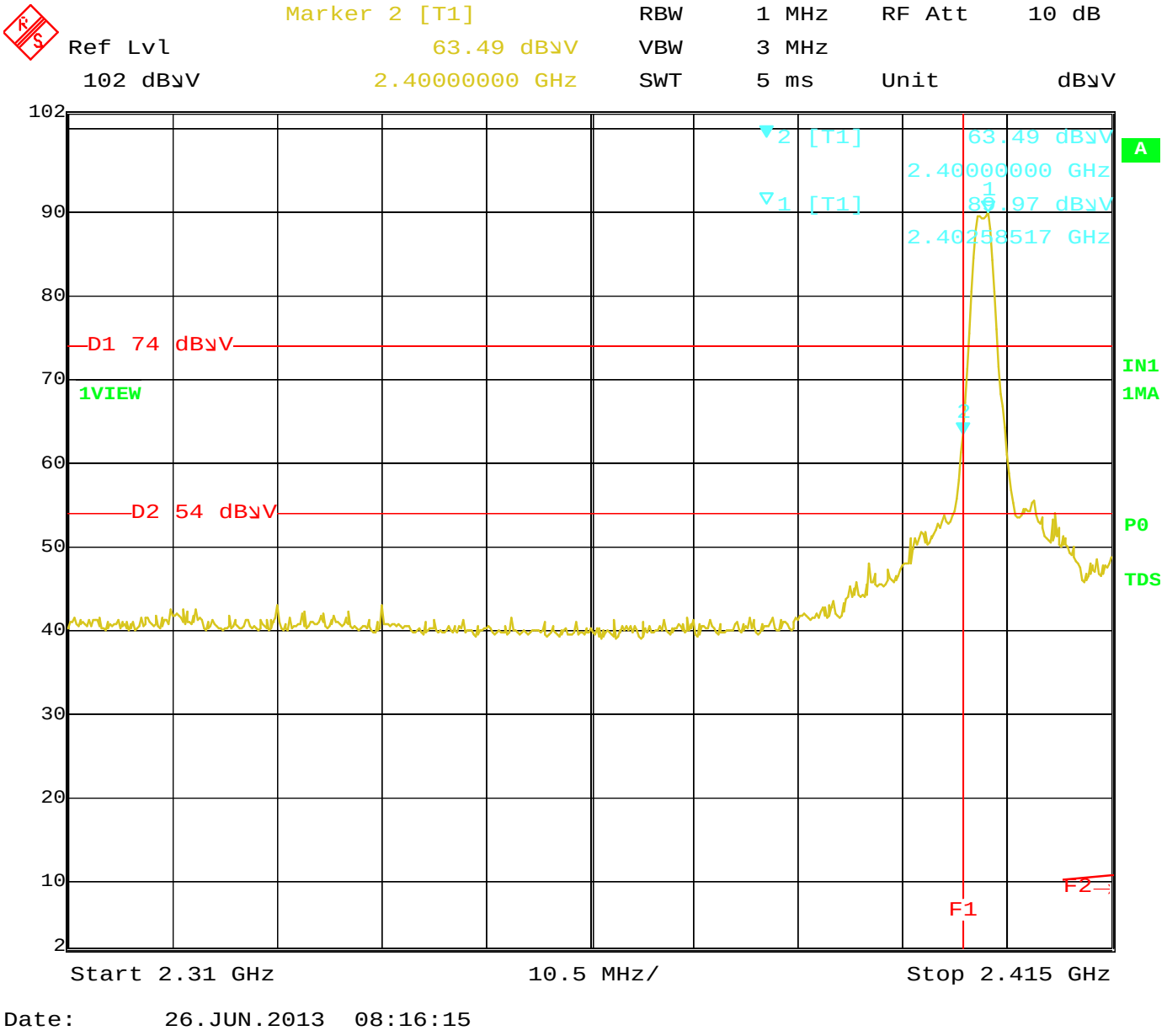
Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

2 MB / 2 MHz Bandwidth (Worst Case)
Band Edges

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	91.85	V	114	-22.15	Peak	1.25	155	**Fundamental**
2402	71.85	V	94	-22.15	Avg	1.25	155	**X-Axis (Worst Case)**
2400	64.5	V	74	-9.5	Peak	1.25	155	**Band Edge**
2400	44.5	V	54	-9.5	Avg	1.25	155	**X-Axis (Worst Case)**
2402	89.97	H	114	-24.03	Peak	1.25	315	**Fundamental**
2402	69.97	H	94	-24.03	Avg	1.25	315	**Z-Axis (Worst Case)**
2400	63.49	H	74	-10.51	Peak	1.25	315	**Band Edge**
2400	43.49	H	54	-10.51	Avg	1.25	315	**Z-Axis (Worst Case)**



Band Edge – Low Channel – Vertical Polarization – 2 MBit Mode (Worst Case)



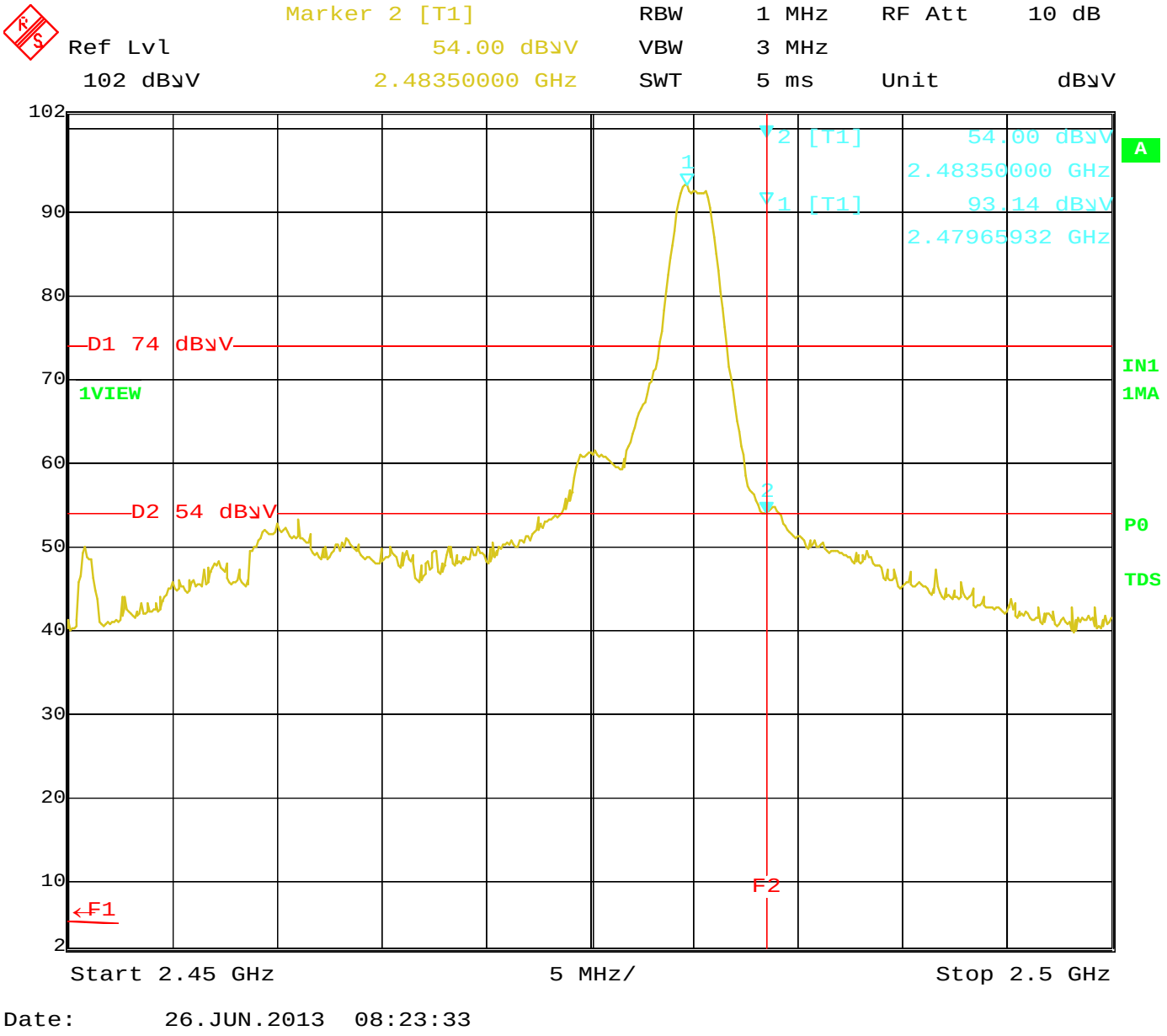
Band Edge – Low Channel – Horizontal Polarization – 2 MBit Mode (Worst Case)

FCC 15.249
Belwith Products, LLC
TI BLE Module
Model: SRD521

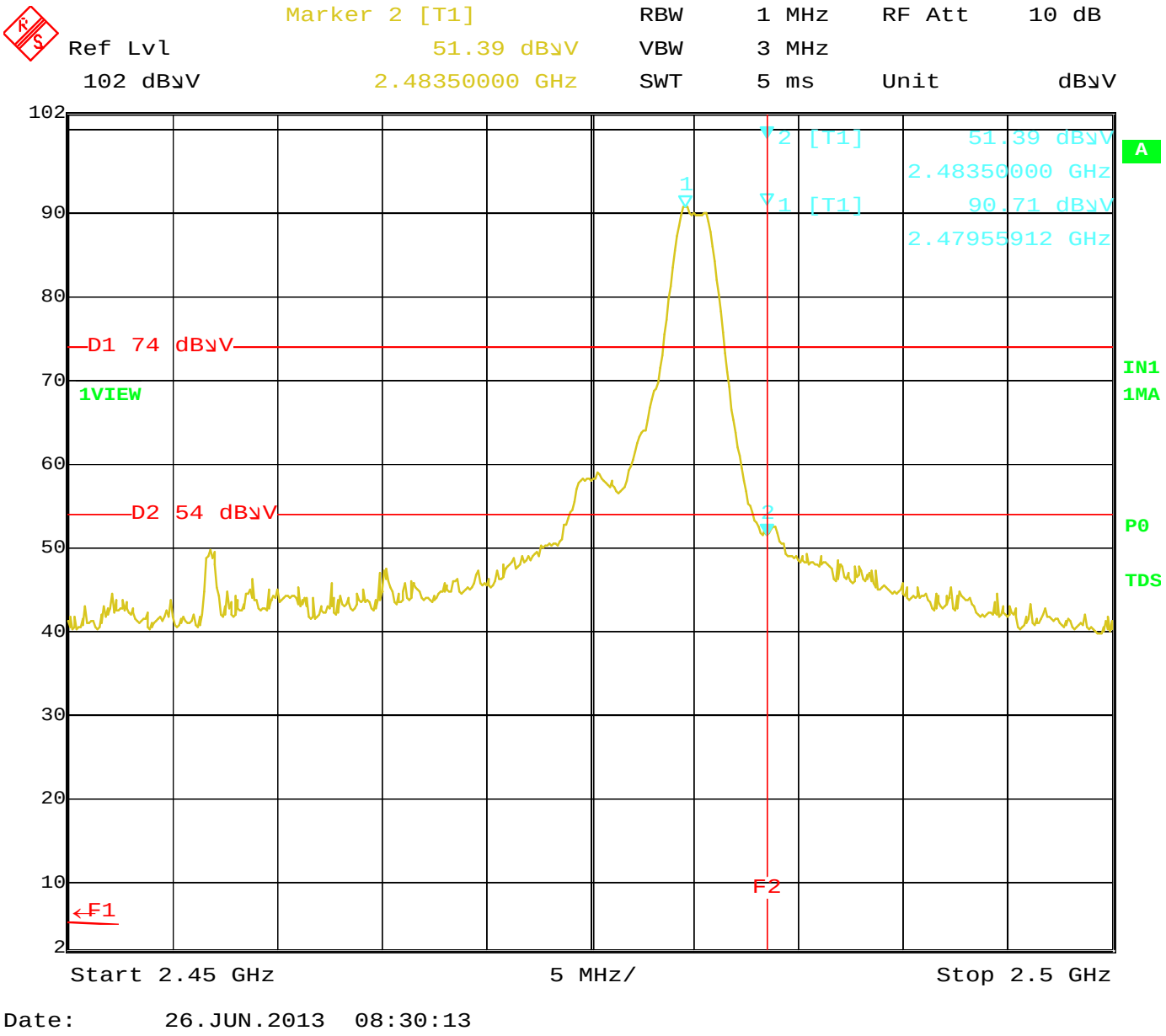
Date:06/24/2013
Lab: B
Tested By: Kyle Fujimoto

2 MB / 2 MHz Bandwidth (Worst Case)
Band Edges

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2480	93.14	V	114	-20.86	Peak	1.35	225	Fundamental
2480	73.14	V	94	-20.86	Avg	1.35	225	Y-Axis (Worst Case)
2483.5	54	V	74	-20	Peak	1.35	225	Band Edge
2483.5	34	V	54	-20	Avg	1.35	225	Y-Axis (Worst Case)
2480	90.71	H	114	-23.29	Peak	1.25	135	Fundamental
2480	70.71	H	94	-23.29	Avg	1.25	135	Y-Axis (Worst Case)
2400	51.39	H	74	-22.61	Peak	1.25	135	Band Edge
2400	31.39	H	54	-22.61	Avg	1.25	135	Y-Axis (Worst Case)



Band Edge – High Channel – Vertical Polarization – 2 MBit Mode (Worst Case)



Band Edge – High Channel – Horizontal Polarization – 2 MBit Mode (Worst Case)