Intentional Radiator Test Report

Application for Grant of Equipment Authorization

FCC Part 15 Subpart C (15.247)

FCC ID:	**2AB6OTX3B25A**
Product Name:	**Table Genie**
Model:	**TX-3B25A**
APPLICANT:	**Long Range Systems, LLC 4550 Excel Parkway Suite 200 Addison TX, 75001**
TEST SITE(S):	**National Technical Systems - Plano 1701 E Plano Pkwy #150 Plano, TX 75074**
REPORT DATE:	**Aug. 12, 2014**
FINAL TEST DATES:	**Aug 1-5, 2014**
TOTAL NUMBER OF PAGES:	**28**

Prepared By:

Yunus E. Faziloglu
Wireless Manager

Approved By:

Kimberly Zavala
Quality Assurance Manager

Reviewed By:

John Ngo
General Manager

REVISION HISTORY

Rev#	Date	Comments	Modified By
0	Aug. 12, 2014	Initial Release	Yunus Faziloglu

TABLE OF CONTENTS

SCOPE

Tests have been performed on *Long Range Systems LLC* product *Table Genie* Model *TX-3B25A* to demonstrate compliance with:

FCC Part 15 Subpart C (15.247)

All testing have been performed in accordance with:

ANSI C63.4-2003
FCC KDB 558074 D01 v03r01

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is to demonstrate compliance with the regulations outlined in the previous section. This report is intended to support an original grant of equipment authorization application for *Table Genie* Model *TX-3B25A*.

STATEMENT OF COMPLIANCE

Table Genie Model *TX-3B25A* complied with the applicable requirements listed under the following FCC rules as a 2.4GHz DTS transmitter:

FCC Part 15 Subpart C (15.247)

No additional model variations or configurations were specified by the manufacturer.

Maintenance of compliance is the responsibility of the manufacturer. Any modification to the product should be assessed to ensure compliance has been maintained.

Mike Williams was present during all testing to represent the manufacturer.

DEVIATIONS FROM THE STANDARDS

During testing there were no deviations from the regulatory rules and test procedures listed above.

MODIFICATIONS

None

MEASUREMENT UNCERTAINTIES

The measurement of uncertainty is not included with the data in this test report.

TEST RESULTS SUMMARY

FCC Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.203	Antenna connector	SMD chip on PCB	Unique antenna connector or permanently attached antenna	Complies
15.207	AC Line conducted emissions	Powered by a single AA battery	As specified in 15.207(a)	N/A
15.215(c)	Frequency band of operation	2405MHz - 2480MHz	Within 2400MHz – 2483.5MHz	Complies
15.247(a)(2)	6dB Bandwidth	1586kHz	> 500kHz	Complies
15.247(b)(3)	Conducted Output Power	0.00009W EIRP = 0.00016W	Conducted < 1.0W EIRP < 4.0W	Complies
15.247(e)	Power Spectral Density	-13.55dBm	< 8dBm	Complies
15.247(d)	Antenna Port Conducted Spurious Emissions 30MHz – 25 GHz	-26.05dBc	< -20dBc	Complies
15.247(d) 15.209	Radiated Spurious Emissions 30MHz – 25 GHz	50.2dBuV/m at 3m	15.209(a) in restricted bands, all others < -20dBc	Complies

Notes:

- Antenna is an SMD chip on PCB with a declared typical peak gain of 2.5dBi. For tests at the RF output port, a sample fitted with a suitable connector was provided by the manufacturer for direct measurements.
- Unit has no provisions for a direct or indirect connection to the AC power lines in normal operation. During tests that required continuous transmission at full output power, an external power supply was connected to provide the necessary voltage for a consistent test mode. Battery power option was not practical as the battery voltage level was being depleted fairly quickly during continuous transmission.
- 15.247(i) RF exposure requirements are addressed in a separate exhibit.
- A separate test report has been issued to demonstrate compliance with FCC 15B unintentional emissions requirements.

EQUIPMENT UNDER TEST (EUT) DETAILS

Long Range Systems LLC product *Table Genie* Model *TX-3B25A* is an IEEE 802.15.4 standard based ZigBee transceiver with the following details,

ZigBee push for service transceiver. It is based on IEEE 802.15.4 standard and employs OQPSK modulation with 250kbps data rate. It operates within 2405MHz-2480MHz frequency range. It has

Product Name	Table Genie
Model	TX-3B25A
FCC ID	2AB6OTX3B25A
Description	Push for service transceiver
Modulation	OQPSK
Data Rate	250kbps
Channels and Frequencies	Ch11 2405MHz Ch19 2445MHz Ch12 2410MHz Ch20 2450MHz Ch13 2415MHz Ch21 2455MHz Ch14 2420MHz Ch22 2460MHz Ch15 2425MHz Ch23 2465MHz Ch16 2430MHz Ch24 2470MHz Ch17 2435MHz Ch25 2475MHz Ch18 2440MHz Ch26 2480MHz
Antenna Type and Gain (dBi)	Type: SMD chip on board Declared Gain: 2.5dBi peak typical
Hardware Rev level	Rev B
Firmware Rev Level	Version 4.4.11

Two samples were supplied for testing. One for all radiated tests and another for antenna port conducted tests with a fitted suitable antenna connector for direct measurements.

Support equipment used during testing:

Company	Model	Description	Serial Number	FCC ID
Topward	6303D-10	DC Power Supply	737138	N/A

EUT OPERATION

During testing, EUT was transmitting continuously at its highest power level at full data rate. Three different channels (low, middle and top) could be selected for continuous transmission as needed.

TEST SITE

Final test measurements were taken at the test sites listed below.

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 1	A2LA Accredited Designation Number US1077	IC 4319A	1701 E Plano Pkwy #150 Plano, TX 75074.

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

TEST EQUIPMENT

NTS Equipment #	**Description**	**Manufacturer**	**Model**	**Calibration Duration**	**Calibration Due Date**
E1529P	PSA	Agilent	E4446A	12 Months	2/14/2015
E1554P	PreAmp (1GHz-40GHz)	MITEQ	JS32-00104000-62-5P	12 Months	5/14/2015
E1524P	Biconilog Antenna (30MHz-1GHz)	ETS Lindgren	3142D	12 Months	3/19/2015
E1149P	Horn Antenna (1GHz-18GHz)	EMCO	3115	12 Months	11/25/2014
E1068P	Horn Antenna (18GHz-40GHz)	EMCO	3116	12 Months	5/15/2015

Test Results Section

6dB Bandwidth

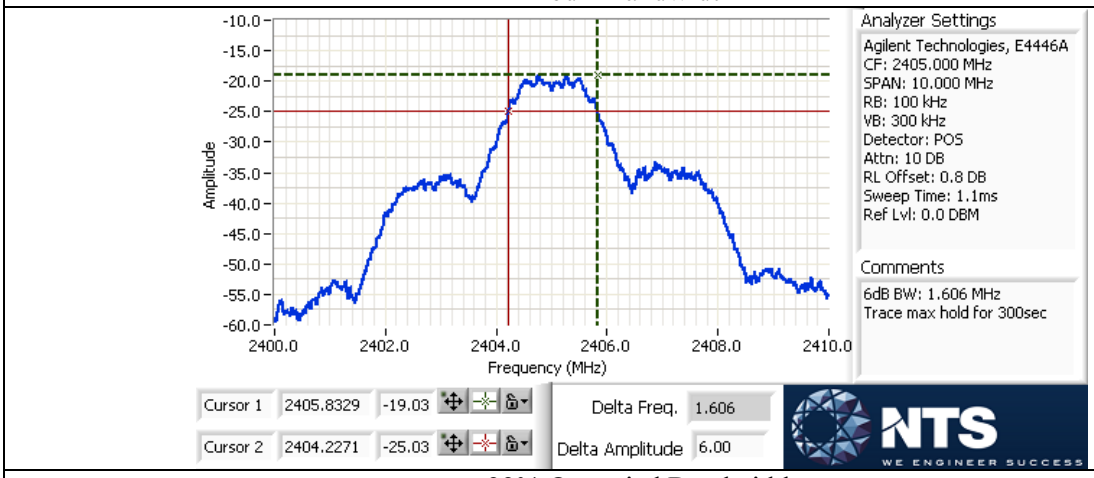
Regulatory Rule / Standard	CFR Title 47 §15.247(a)(2)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	Minimum 6dB bandwidth shall be at least 500kHz
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-5-2014
Test Result	See table below

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Verdict
Low	2405	1606	> 500kHz	Complies
Middle	2440	1621	> 500kHz	Complies
High	2480	1586	> 500kHz	Complies

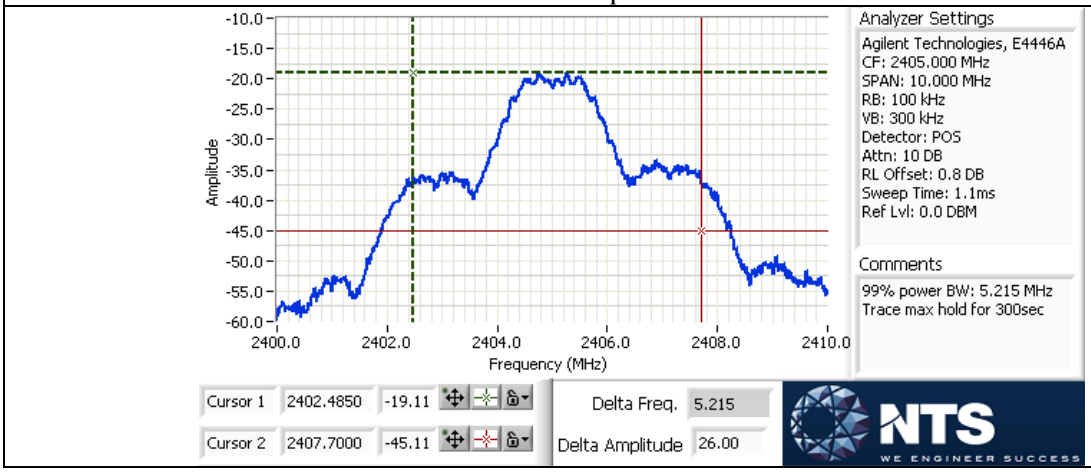
6dB bandwidth plots included below.
99% occupied bandwidth plots are included for informational purposes only.

Low channel

6dB Bandwidth

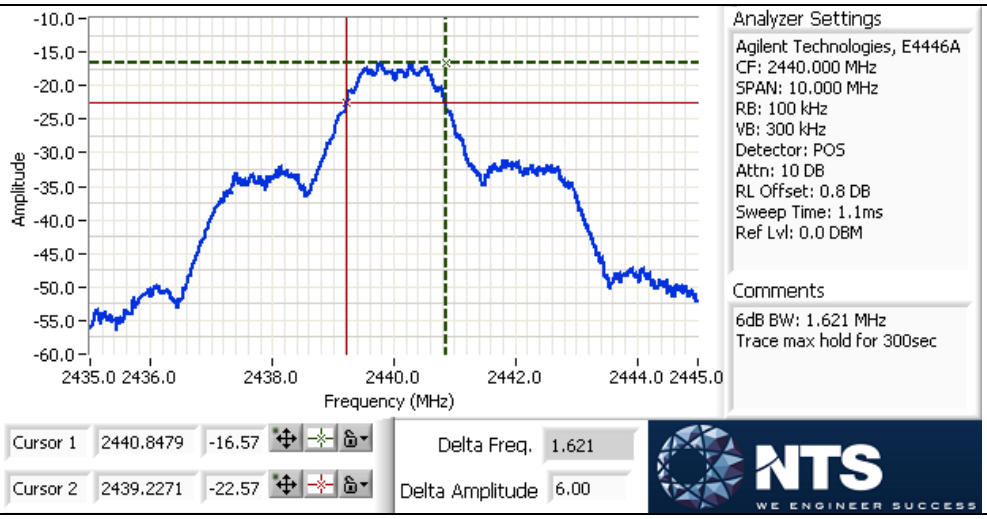


99% Occupied Bandwidth

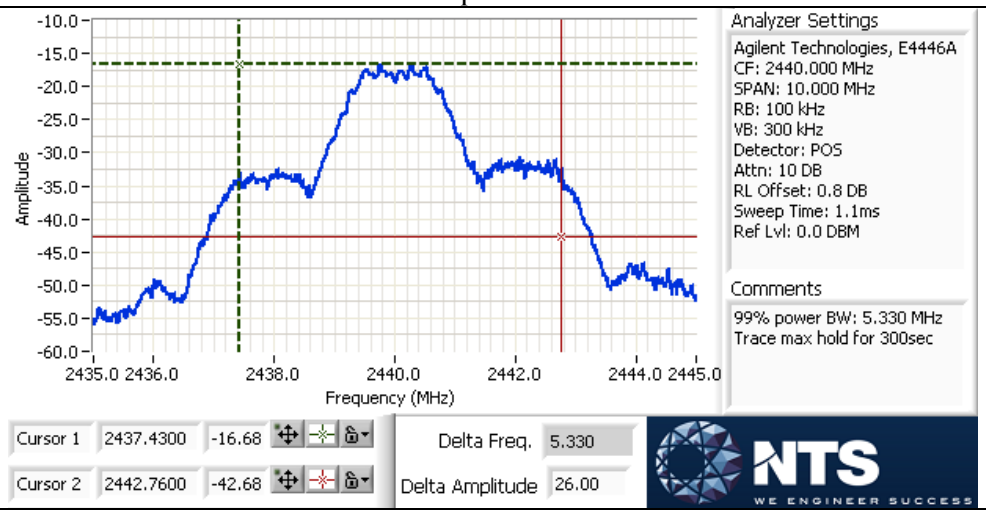


Middle channel

6dB Bandwidth

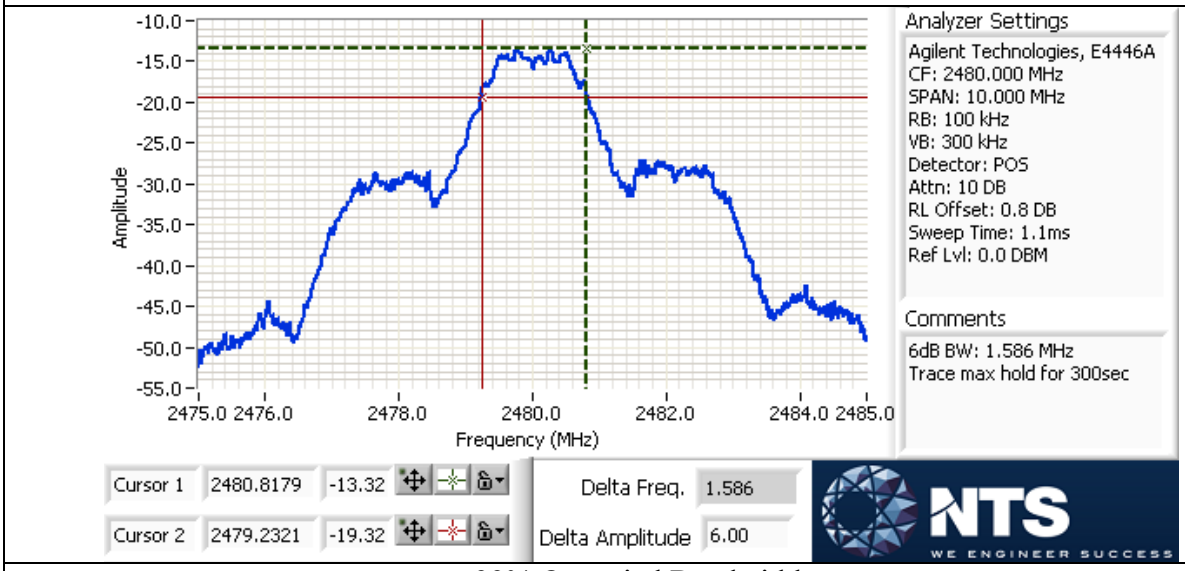


99% Occupied Bandwidth

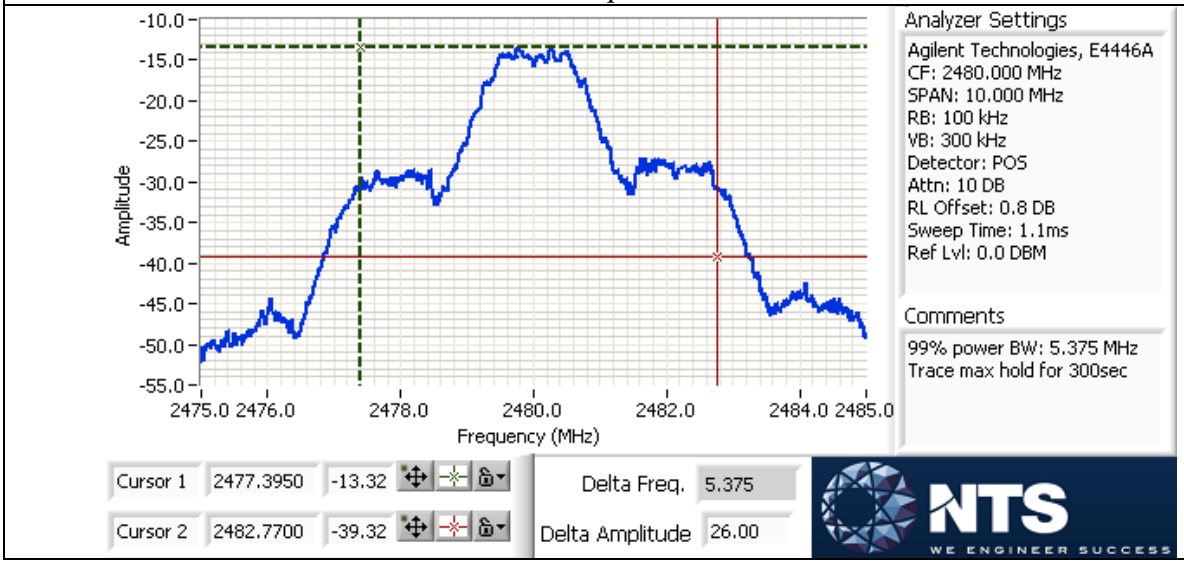


High channel

6dB Bandwidth



99% Occupied Bandwidth



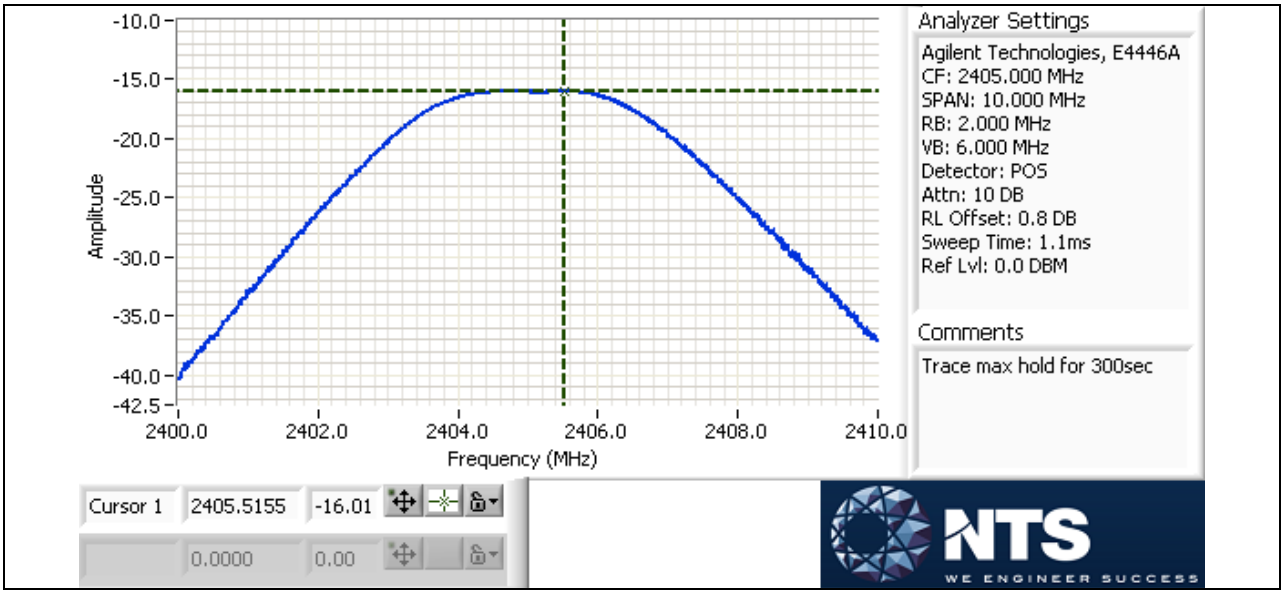
Peak Conducted Output Power

Regulatory Rule / Standard	CFR Title 47 §15.247(b)(3)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	1.0W (30dBm) Peak Conducted and 4.0W (36dBm) EIRP
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-5-2014
Test Result	Included in tabular form below

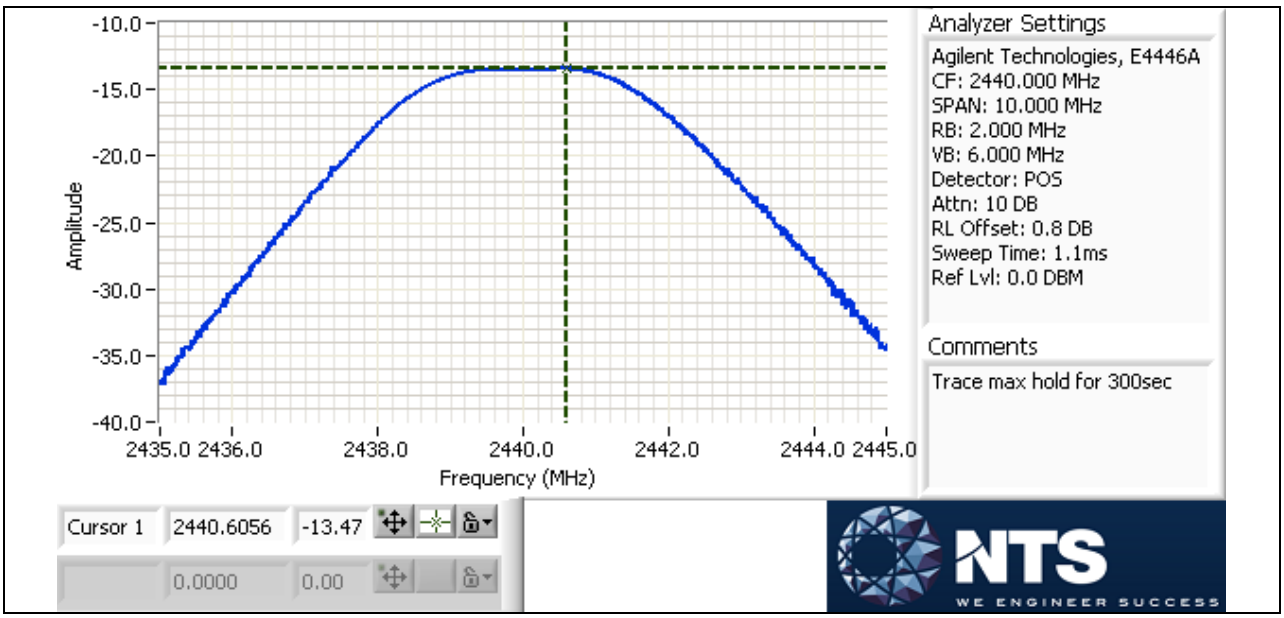
Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)	Peak Conducted Output Power (W)	EIRP (dBm)	EIRP (W)	Limit Conducted | EIRP (dBm)	Verdict
Low	2405	-16.01	0.000025	-13.51	0.000045	30 | 36	Complies
Middle	2440	-13.47	0.000045	-10.97	0.00008	30 | 36	Complies
High	2480	-10.45	0.00009	-7.95	0.00016	30 | 36	Complies

Peak output power plots included below
EIRP is based on 2.5dBi declared peak antenna gain
EIRP (dBm) = Peak Conducted Output Power (dBm) + Declared Antenna Gain (dBi)
W = [10 ^ (dBm / 10)] / 1000
External attenuator was not needed due to low fundamental level
Cable loss is entered as reference level offset to the spectrum analyzer to allow direct corrected measurements

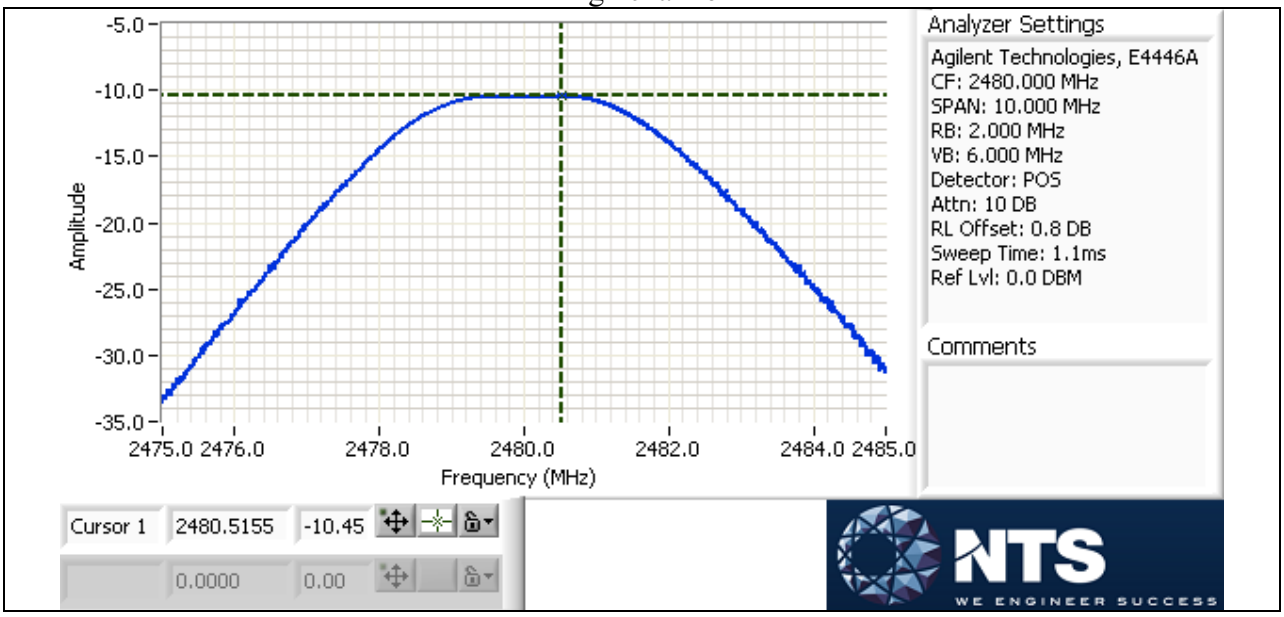
Low channel



Middle channel



High channel



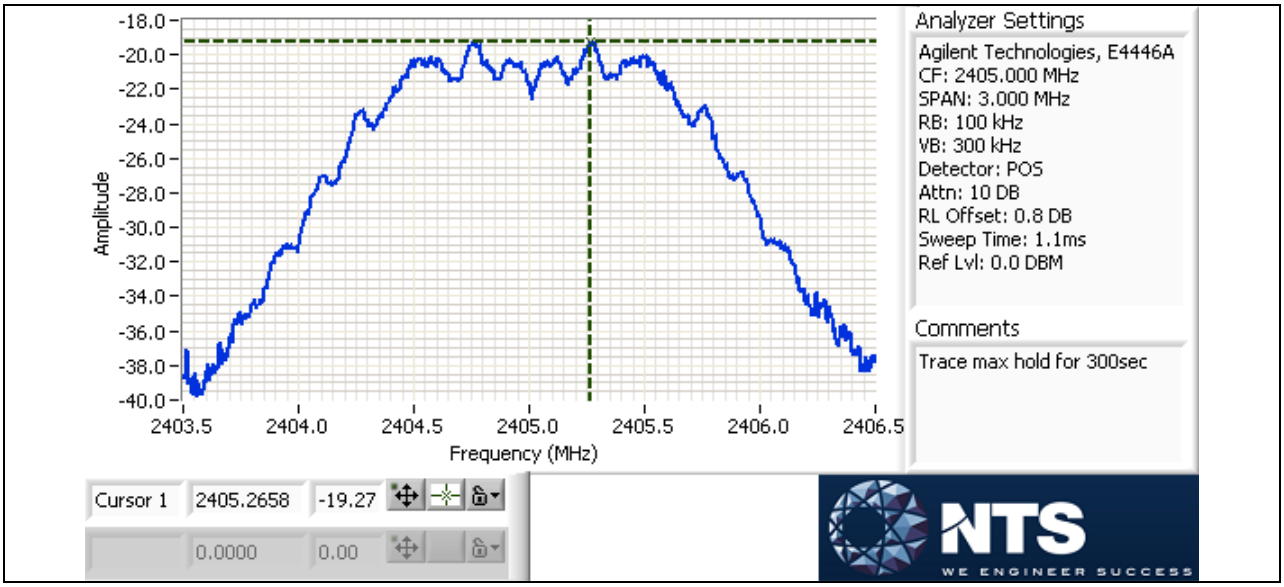
Peak Power Spectral Density

Regulatory Rule / Standard	CFR Title 47 §15.247(e)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	Maximum 8dBm in any 3kHz band
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-5-2014
Test Result	See table below

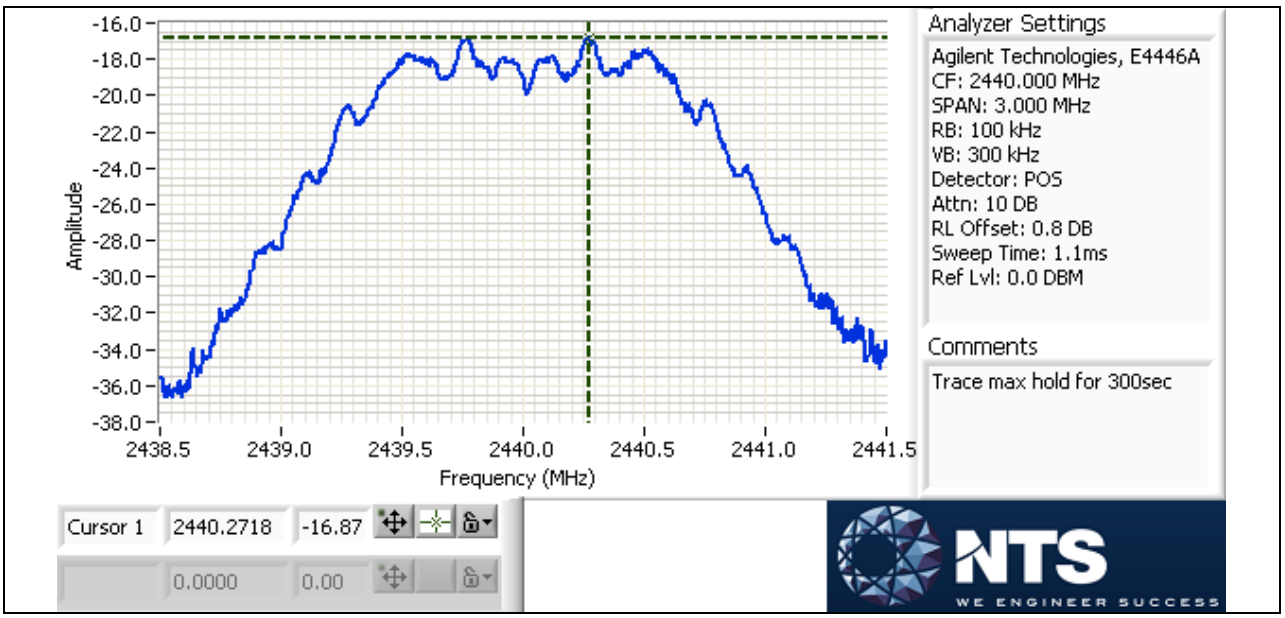
Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Limit (dBm)	Verdict
Low	2405	-19.27	8.0	Complies
Middle	2440	-16.87	8.0	Complies
High	2480	-13.55	8.0	Complies

Plots included below. External attenuator was not needed due to low fundamental level. Cable loss is entered as reference level offset to the spectrum analyzer to allow direct corrected measurements.

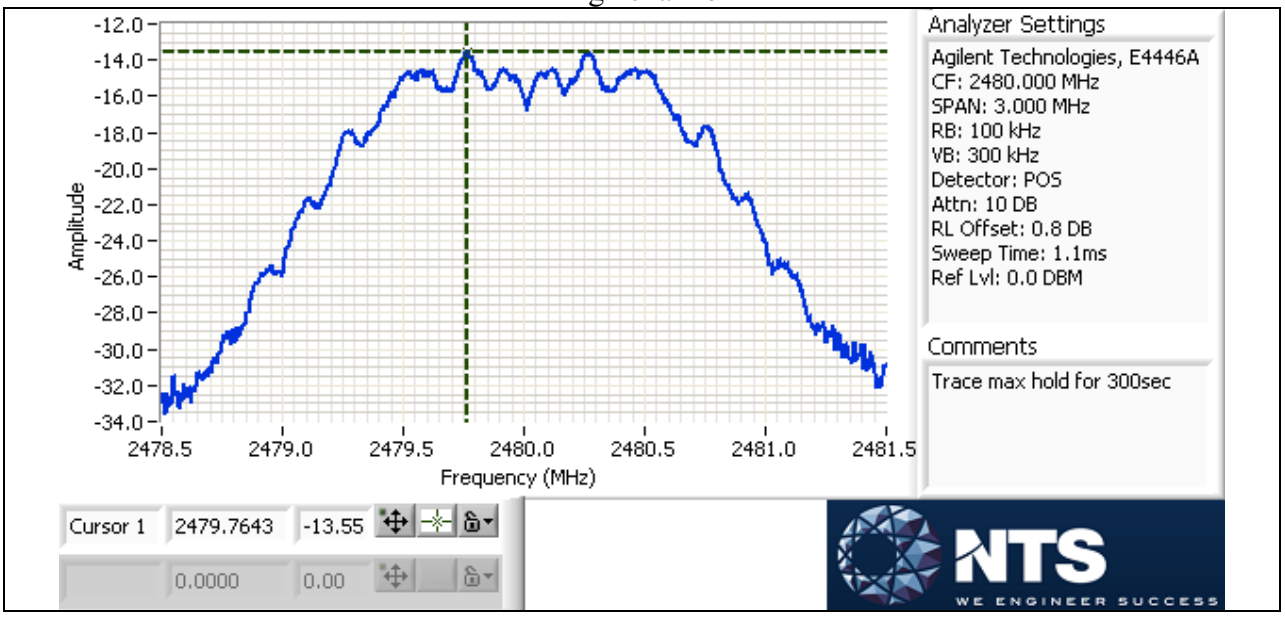
Low channel



Middle channel



High channel



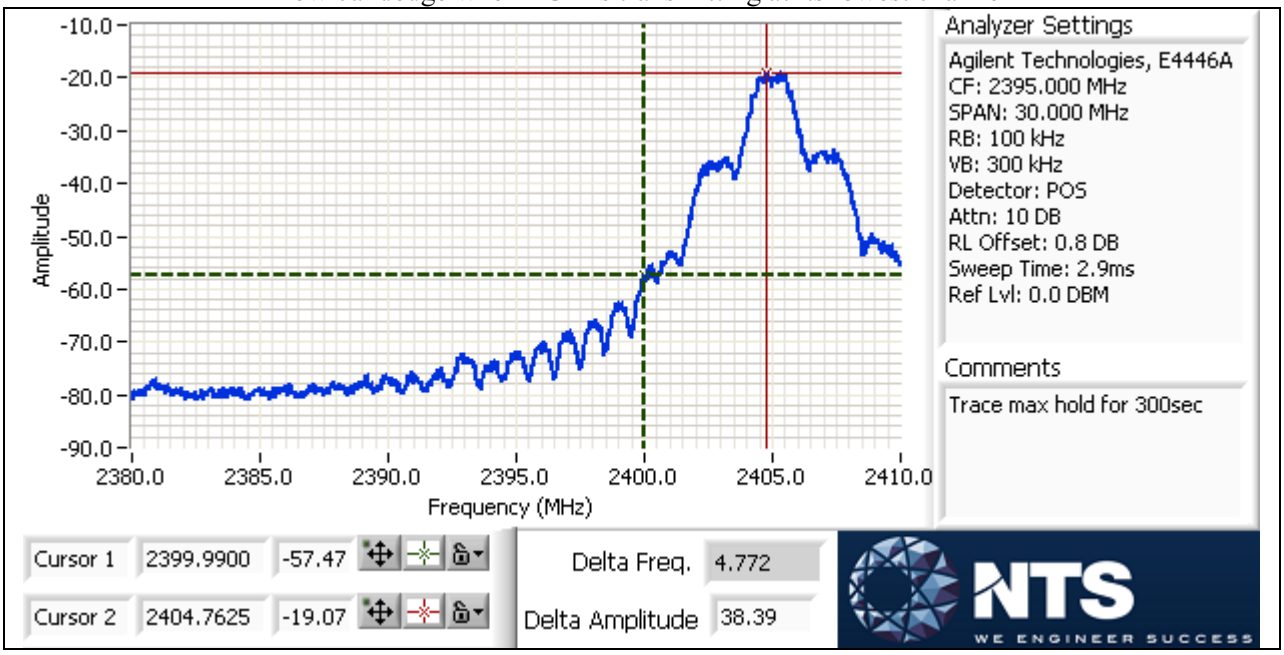
Conducted Bandedge

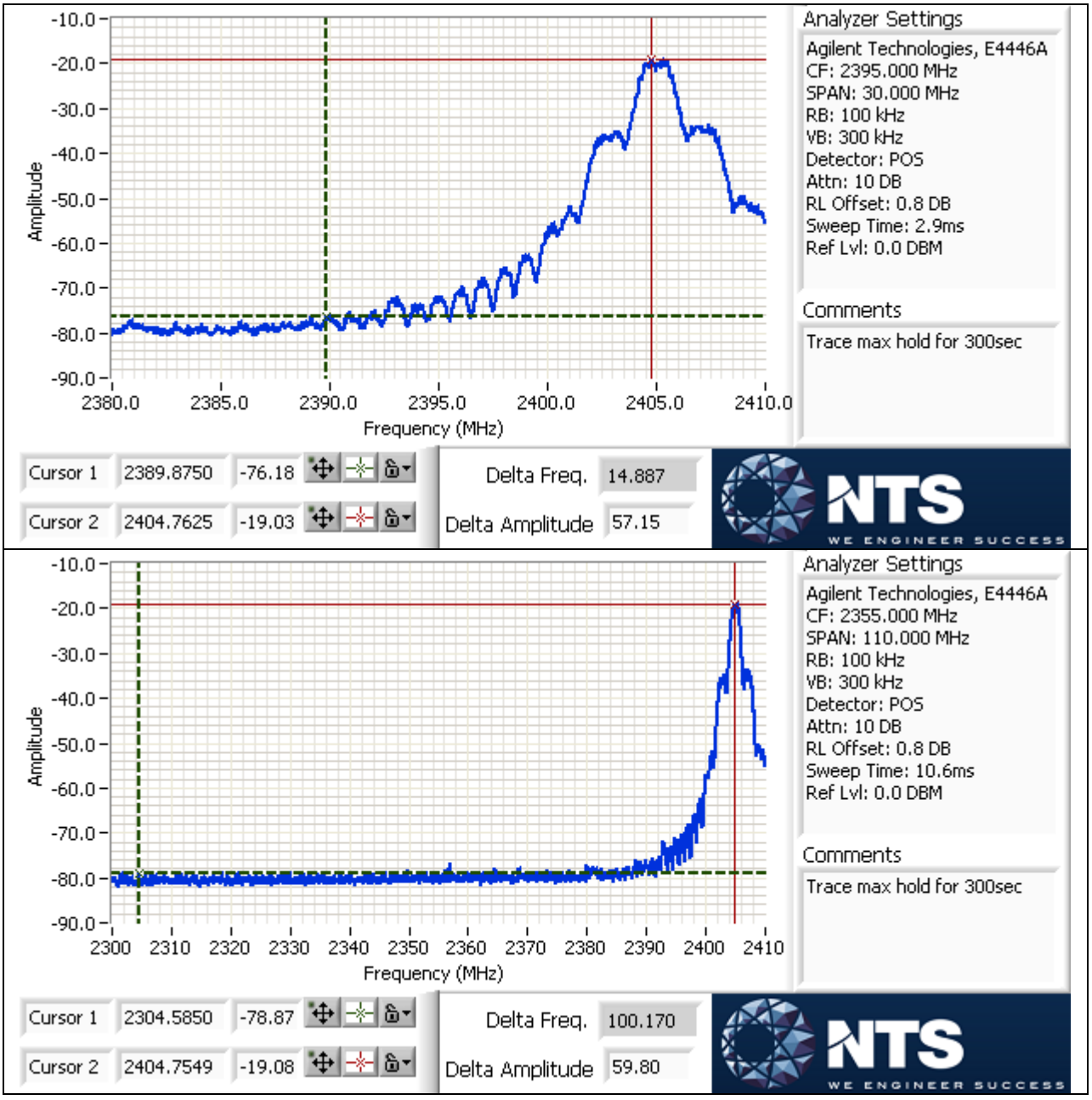
Regulatory Rule / Standard	CFR Title 47 §15.247(d)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	20dB below the fundamental in any 100kHz bandwidth
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-5-2014
Test Result	See table below

Channel	Bandedge Frequency (MHz)	Delta at Bandedge (dBc)	Limit	Verdict
Lowest	2400	-38.4	< -20dBc	Complies
Highest	2483.5	-29.7	< -20dBc	Complies

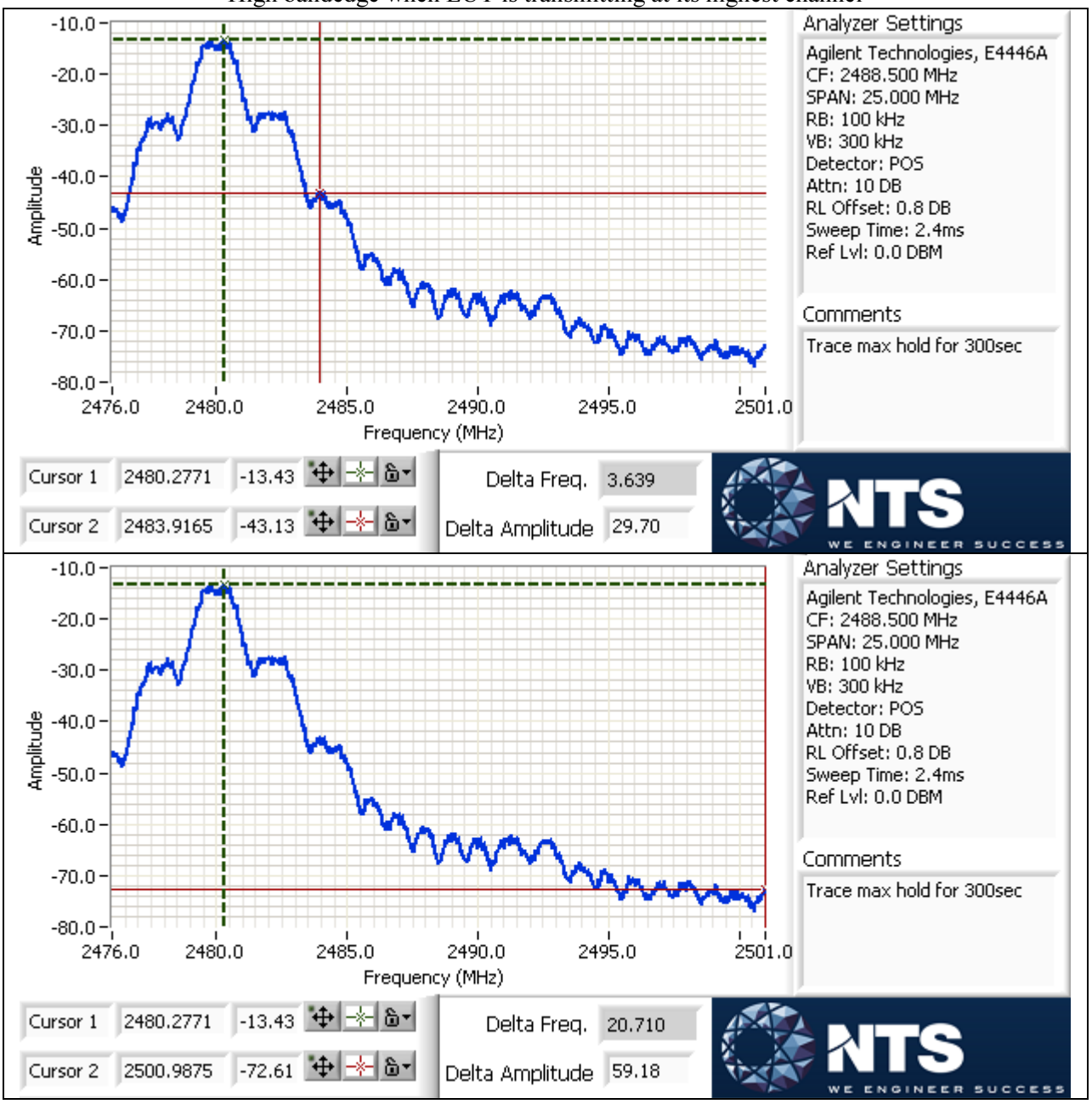
Corresponding plots shown below for bandedge frequencies at 2400MHz and 2483.5MHz as well as extended frequency ranges to cover restricted bands of 2483.5MHz-2500MHz and 2310MHz-2390MHz

Low bandedge when EUT is transmitting at its lowest channel




-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Amplitude
2380.0
2385.0
2390.0
2395.0
2400.0
2405.0
2410.0
Frequency (MHz)
Analyzer Settings
Agilent Technologies, E4446A
CF: 2395.000 MHz
SPAN: 30.000 MHz
RB: 100 kHz
VB: 300 kHz
Detector: POS
Attn: 10 DB
RL Offset: 0.8 DB
Sweep Time: 2.9ms
Ref Lvl: 0.0 DBM
Comments
Trace max hold for 300sec
Cursor 1
2389.8750
-76.18
Cursor 2
2404.7625
-19.03
Delta Freq.
14.887
Delta Amplitude
57.15
NTS
WE ENGINEER SUCCESS
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Amplitude
2300
2310
2320
2330
2340
2350
2360
2370
2380
2390
2400
2410
Frequency (MHz)
Analyzer Settings
Agilent Technologies, E4446A
CF: 2355.000 MHz
SPAN: 110.000 MHz
RB: 100 kHz
VB: 300 kHz
Detector: POS
Attn: 10 DB
RL Offset: 0.8 DB
Sweep Time: 10.6ms
Ref Lvl: 0.0 DBM
Comments
Trace max hold for 300sec
Cursor 1
2304.5850
-78.87
Cursor 2
2404.7549
-19.08
Delta Freq.
100.170
Delta Amplitude
59.80
NTS
WE ENGINEER SUCCESS

High bandedge when EUT is transmitting at its highest channel



Conducted Spurious Emissions

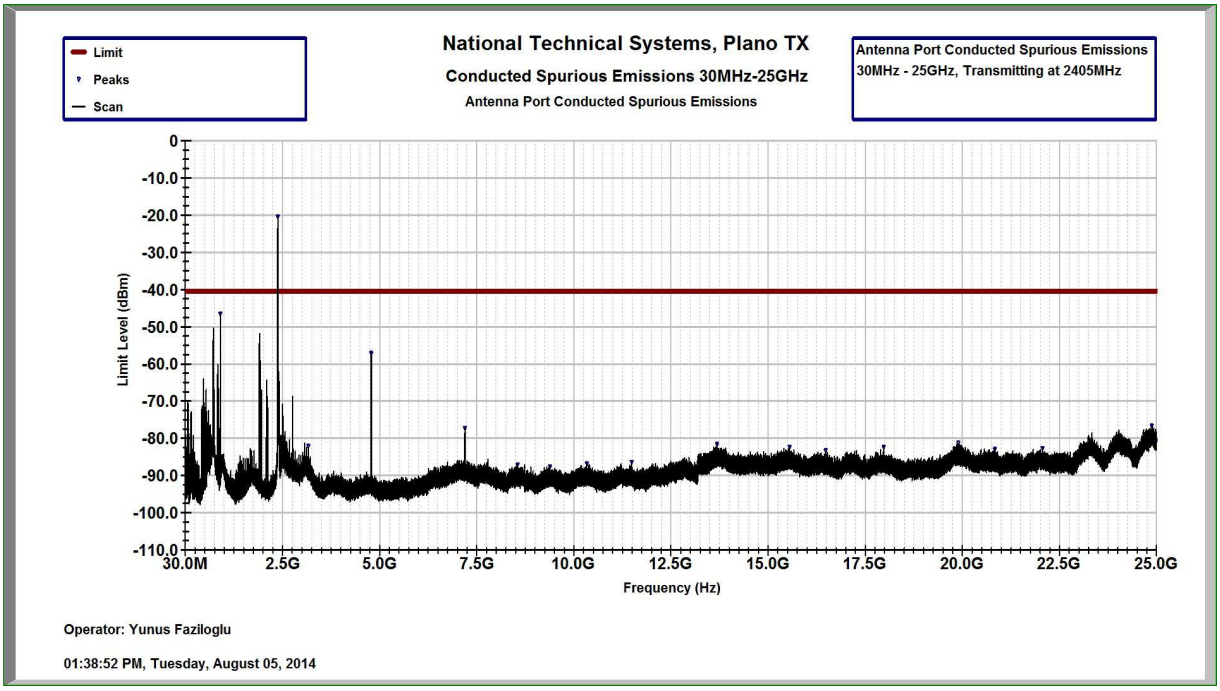
Regulatory Rule / Standard	CFR Title 47 §15.247(d)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	20dB below the fundamental in any 100kHz bandwidth
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-5-2014
Test Result	Tabular data and corresponding plots shown on the following pages

Measurement Systems Settings:

Frequency Range	RBW	VBW	Number of data points	Divided into	Detector	Sweep Time	Max hold over
30MHz-25GHz	100kHz	300kHz	8000	32 segments	Peak	Auto	50 sweeps

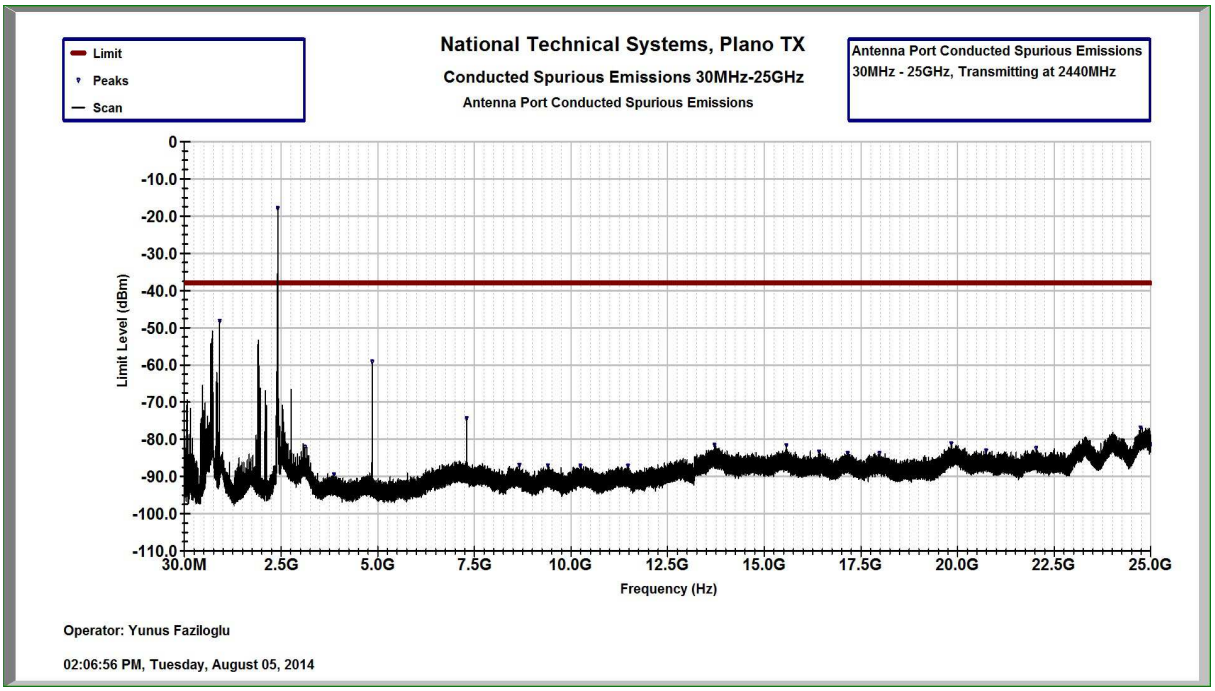
EUT transmitting on 2405MHz channel

Frequency	Peak	Limit	Margin	Verdict
30.0 MHz	-91.92	-40.5	-51.42	Complies
929.7 MHz	-46.55	-40.5	-6.05	Complies
2.4048 GHz	-20.5	Reference	N/A	N/A
3.192 GHz	-82.12	-40.5	-41.62	Complies
4.809 GHz	-57.2	-40.5	-16.7	Complies
7.2165 GHz	-77.28	-40.5	-36.78	Complies
8.5711 GHz	-87.13	-40.5	-46.63	Complies
9.405 GHz	-87.63	-40.5	-47.13	Complies
10.354 GHz	-86.87	-40.5	-46.37	Complies
11.504 GHz	-86.4	-40.5	-45.9	Complies
13.701 GHz	-81.61	-40.5	-41.11	Complies
15.569 GHz	-82.37	-40.5	-41.87	Complies
16.491 GHz	-83.33	-40.5	-42.83	Complies
17.984 GHz	-82.38	-40.5	-41.88	Complies
19.903 GHz	-81.3	-40.5	-40.8	Complies
20.842 GHz	-83	-40.5	-42.5	Complies
22.07 GHz	-82.7	-40.5	-42.2	Complies
24.875 GHz	-76.66	-40.5	-36.16	Complies
25.0 GHz	-80.47	-40.5	-39.97	Complies



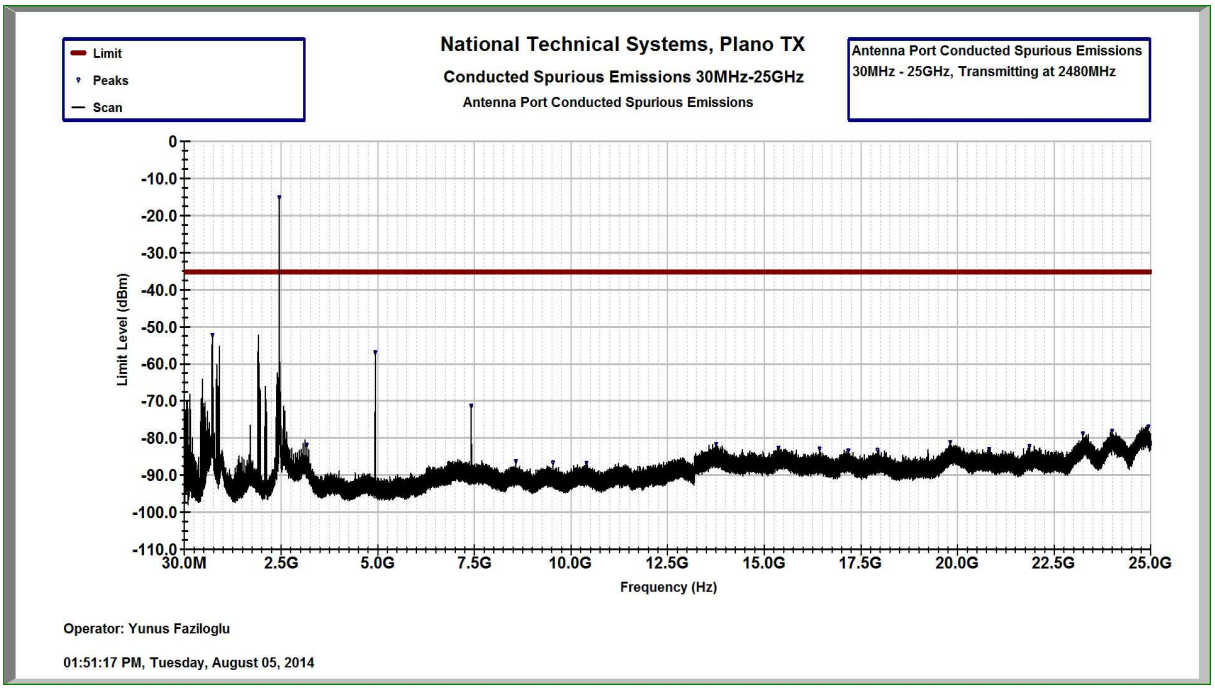
EUT transmitting on 2440MHz channel

Frequency	Peak	Limit	Margin	Verdict
940.82 MHz	-48.32	-37.99	-10.33	Complies
2.4403 GHz	-17.99	Reference	N/A	N/A
3.144 GHz	-82.15	-37.99	-44.16	Complies
3.8932 GHz	-89.5	-37.99	-51.51	Complies
4.881 GHz	-59.23	-37.99	-21.24	Complies
7.3215 GHz	-74.44	-37.99	-36.45	Complies
8.6847 GHz	-86.98	-37.99	-48.99	Complies
9.4193 GHz	-87.08	-37.99	-49.09	Complies
10.259 GHz	-87.25	-37.99	-49.26	Complies
11.491 GHz	-87.17	-37.99	-49.18	Complies
13.724 GHz	-81.58	-37.99	-43.59	Complies
15.584 GHz	-81.66	-37.99	-43.67	Complies
16.428 GHz	-83.44	-37.99	-45.45	Complies
17.167 GHz	-83.79	-37.99	-45.8	Complies
17.987 GHz	-83.79	-37.99	-45.8	Complies
19.844 GHz	-81.18	-37.99	-43.19	Complies
20.744 GHz	-83.12	-37.99	-45.13	Complies
22.037 GHz	-82.46	-37.99	-44.47	Complies
24.736 GHz	-76.93	-37.99	-38.94	Complies
25.0 GHz	-81.33	-37.99	-43.34	Complies



EUT transmitting on 2480MHz channel

Frequency	Peak	Limit	Margin	Verdict
752.76 MHz	-52.29	-35.19	-17.1	Complies
2.4798 GHz	-15.19	Reference	N/A	N/A
3.192 GHz	-81.92	-35.19	-46.73	Complies
4.9611 GHz	-56.98	-35.19	-21.79	Complies
7.4415 GHz	-71.46	-35.19	-36.27	Complies
8.5936 GHz	-86.35	-35.19	-51.16	Complies
9.5508 GHz	-86.71	-35.19	-51.52	Complies
10.418 GHz	-86.78	-35.19	-51.59	Complies
13.767 GHz	-81.67	-35.19	-46.48	Complies
15.378 GHz	-82.67	-35.19	-47.48	Complies
16.44 GHz	-82.92	-35.19	-47.73	Complies
17.185 GHz	-83.45	-35.19	-48.26	Complies
17.939 GHz	-83.34	-35.19	-48.15	Complies
19.818 GHz	-81.17	-35.19	-45.98	Complies
20.824 GHz	-83.05	-35.19	-47.86	Complies
21.863 GHz	-82.22	-35.19	-47.03	Complies
23.244 GHz	-78.86	-35.19	-43.67	Complies
23.997 GHz	-78.12	-35.19	-42.93	Complies
24.937 GHz	-77	-35.19	-41.81	Complies
25.0 GHz	-81.45	-35.19	-46.26	Complies



Radiated Bandedge

Regulatory Rule / Standard	CFR Title 47 §15.247(d)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	15.209(a) limits in all restricted bands as specified in 15.205(a)
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-1-2014
Test Result	Complies - Tabular data shown below

Measurement System Settings:
Peak: RBW = 1MHz, VBW = 3MHz, max-hold
Average: 10Hz video averaging on Peak trace and in addition a Duty Cycle Correction Factor (DCCF) of –11.3dB as explained in Appendix A of the report.

Polarity / Detector	Freq (MHz)	Raw (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	DCCF (dB)	Corrected (dBuV/m) at 3m	Limit (dBuV/m) at 3m	Margin (dB)
2483.5MHz-2500MHz restricted band region when EUT transmitting on 2480MHz channel									
V-Peak	2483.5	73.5	28.4	4.8	-48.2	0.0	58.5	74	-15.5
V-Av	2483.5	64.2	28.4	4.8	-48.2	-11.3	37.9	54	-16.1
H-Peak	2483.5	80.8	28.4	4.8	-48.2	0.0	65.8	74	-8.2
H-Av	2483.5	71.4	28.4	4.8	-48.2	-11.3	45.1	54	-8.9
2310MHz-2390MHz restricted band region when EUT transmitting on 2405MHz channel									
V-Peak	2312.6	50.7	27.8	4.6	-48.4	0.0	34.7	54	-19.3
H-Peak	2380.8	50.8	28.1	4.7	-48.3	0.0	35.3	54	-18.7

Corrected Reading (dBuV/m) = Raw Reading (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Preamp Gain (dB) + DCCF (dB)
Margin (dB) = Corrected Reading (dBuV/m) – Limit (dBuV/m)
Average measurements were not performed when peak readings met the average limits
Negative margin indicates a passing result

Radiated Spurious Emissions

Regulatory Rule / Standard	CFR Title 47 §15.247(d)
Standard / Method of Measurement	FCC KDB 558074 D01 v03r01
Specifications	15.209(a) limits in all restricted bands as specified in 15.205(a)
Deviations From Method of Measurement	None
Tested By	Yunus Faziloglu
Date	Aug-4-2014
Test Result	Complies - Tabular data shown below

30MHz-1GHz range:

In 30MHz-1GHz range, transmit channel did not impact emission characteristics based on pre-scan results. Mid channel at 2440MHz was selected for final testing.

Measurement System Settings: Quasi Peak, RBW = 120kHz

Polarity / Detector	Freq (MHz)	Raw (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Corrected (dBuV/m) at 3m	Limit (dBuV/m) at 3m	Margin (dB)
V-QP	191.73	37.1	10.8	1.3	-40.7	8.5	43.5	-35
H-QP	649.93	38.2	21.7	2.5	-40.1	22.3	46	-23.7
H-QP	862.87	30.2	23.7	2.8	-39.8	16.9	46	-29.1
V-QP	866.44	30.7	23.8	2.8	-39.8	17.5	46	-28.5
V-QP	953.66	32	25	3	-39.7	20.3	46	-25.7
H-QP	955.03	30.7	25	3	-39.7	19	46	-27

Corrected Reading (dBuV/m) = Raw Reading (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Preamp Gain (dB)
Margin (dB) = Corrected Reading (dBuV/m) – Limit (dBuV/m)
Negative margin indicates a passing result

1GHz-25GHz range:

In 1GHz-25GHz range only harmonics of the fundamental as listed below were detected. All other emissions were at the noise floor level and the highest noise floor for both Peak and Average were more than 6dB below their corresponding 15.209 limits.

Measurement System Settings:
Peak: RBW = 1MHz, VBW = 3MHz, max-hold
Average: 10Hz video averaging on Peak trace

Polarity / Detector	Freq (MHz)	Raw (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Filter Loss (dB)	Corrected (dBuV/m) at 3m	Limit (dBuV/m) at 3m	Margin (dB)
EUT transmitting on 2405MHz channel									
H-Peak	4810	52.1	32.9	6.5	-46.4	0.8	45.9	54	-8.1
V-Peak	4810	53.3	32.9	6.5	-46.4	0.8	47.1	54	-6.9
EUT transmitting on 2440MHz channel									
H-Peak	4880	53.7	33.0	6.5	-46.2	0.8	47.8	54	-6.2
V-Peak	4880	53.5	33.0	6.5	-46.2	0.8	47.6	54	-6.4
EUT transmitting on 2480MHz channel									
H-Peak	4960	53.1	33.1	6.5	-46.2	0.8	47.3	54	-6.7
V-Peak	4960	56.0	33.1	6.5	-46.2	0.8	50.2	54	-3.8

Corrected Reading (dBuV/m) = Raw Reading (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Preamp Gain (dB) + Filter Loss (dB)
Margin (dB) = Corrected Reading (dBuV/m) – Limit (dBuV/m)
Average measurements were not performed when peak readings met the average limits
Negative margin indicates a passing result

Appendix A – Duty Cycle Correction Factor

Duty Cycle Correction Factor

FCC ID:2AB6OTX3B25A

Transmit Power Duty Cycle

IEEE 802.15.4. 2.4GHz PHY

Data Rate	250 kbps
	31.25 kbytes/sec
Symbols/byte	2 sym/byte
Symbol Timing	62.5 sym/sec
	0.000016 sec/sym
Byte Timing	0.000032 sec/byte
PHY PSDU	6 bytes
Max length	127 bytes
Total Packet Length	133 bytes
Max time TX PKT	0.004256 sec

Long Frame Scenario

1) TX Frame — Assume Frame is Data Frame
2) Wait for ACK
3) Wait for LIFS
4) Repeat

Long InterFrame Spacing Slotted w/ACK		
Long Frame	127	bytes
Data Frame Payload	102	Bytes
ACK Frame	5	Bytes
Tack	12	Sym
LIFS	40	Sym
ACK Frame	11	Bytes
Backoff Period	20	Sym
Max Backoff	7	Random
Backoff Required	2	
Backoff Time	60	Sym

Transmit Time	
TX Time Packet	0.004256
TX Time ACK	0.000352
Total TX Time	0.004608

Off Time	
Backoff Time	0.00192
Tack minimum	0.000192
LIFS	0.00064
Total Off Time	0.002752

Duty Cycle (On Total) 62.61% Represents MAC only performance

Network Based Calculation

Long InterFrame Spacing Slotted w/ACK		
Long Frame	127	bytes
Data Frame Payload	102	Bytes
ACK Frame	5	Bytes
Tack	12	Sym
LIFS	625	Sym
ACK Frame	11	Bytes
Backoff Period	20	Sym
Max Backoff	7	Random
Backoff Required	2	
Backoff Time	60	Sym

Single hop data indicates 10 msec interpacket spacing

Transmit Time	
TX Time Packet	0.004256
TX Time ACK	0.000352
Total TX Time	0.004608

Off Time	
Backoff Time	0.00192
Tack minimum	0.000192
LIFS	0.01
Total Off Time	0.012112

Duty Cycle (On Total) 27.56% Calculated Network performance

Alternative calculation
Max radio throughput 250 kbps
Measured throughput single hop 66.816 kbps

Duty Cycle 26.73%

FCC Calculation **27%**

DCF = 20 * log (.27) = -11.34dB

End of Report

This page is intentionally left blank
And marks the last page of this report