Intentional Radiator Test Report

Application for Grant of Equipment Authorization

FCC Part 15 Subpart C (15.231) and RSS-210 Issue 9

FCC ID:	**SO7-208B0000**
IC ID:	**11009A-208B0000**
Product Name:	**Insynctive Bridge**
Model:	**208B0000**
APPLICANT:	**Pella Corporation 102 Main St Pella, IA 50219**
TEST SITE(S):	**National Technical Systems - Plano 1701 E Plano Pkwy #150 Plano, TX 75074**
REPORT DATE:	**December 13th 2017**
FINAL TEST DATES:	**November 15th 2017**
TOTAL NUMBER OF PAGES:	**27**

Prepared By:

Armando Del Angel
EMI Supervisor

Approved By:

Chelsie Morrow
Quality Assurance Manager

Reviewed By:

Jeffrey Viel
General Manager

REVISION HISTORY

Rev#	Date	Comments	Modified By
0	Dec 13th 2017	Draft	Armando Del Angel
1	Jan 9th 2018	Revisions per customer's comments	Armando Del Angel
2	Feb 28th 2018	Revisions per TCB	Armando Del Angel
3	March 29th 2018	Revisions per the TCB	Armando Del Angel
4	April 30th, 2018	Revisions per the TCB	Armando Del Angel

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SCOPE

Tests have been performed on *Pella Corporation* product Insynctive Bridge Model *208B0000* to demonstrate compliance with:

FCC Part 15 Subpart C (15.231)
RSS-210 Issue 9
RSS-GEN Issue 3

All testing have been performed in accordance with:

ANSI C63.4-2014
RSS-210 Issue 9
RSS-GEN Issue 3

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.

STATEMENT OF COMPLIANCE

Insynctive Bridge Model *208B0000* complied with the applicable requirements listed under the following FCC and IC rules as a transmitter with periodic operation:

FCC Part 15 Subpart C (15.231)
RSS-210 Issue 8

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.

Syed Abdullah 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	IC Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.203	N/A	Antenna connector	Permanently attached antenna. Monopole Copper-Clad antenna	Unique antenna connector, permanently attached antenna, or professionally installed	Complies Note 1
15.207	RSS-Gen 7.2.2	AC Line conducted emissions	Emissions below FCC 15.207 Limits	As specified in 15.207(a)	Complies
15.215(c)	RSS-210	Frequency band of operation	433.92MHz & 908.42MHz	Within 40.66-40.7MHz & >70MHz	Complies
15.35(c)	N/A	Duty Cycle	N/A	Evaluation	
15.231 (a) (1)	N/A	20dB Bandwidth	433.92MHz = 249.093kHz 908.42MHz = 143.387kHz	0.25% fo < 900MHz 0.5% fo > 900MHz	Complies
N/A	RSS-210	99% Bandwidth	433.92MHz = 211.1007kHz 908.42MHz = 126.1340kHz	0.25% fo < 900MHz 0.5% fo > 900MHz	Complies
15.231 (a)(2)	RSS-210	Tx Time	433.92MHz = 2.6225s 908.42MHz = 36.42ms	Cease transmission within 5s	Complies
15.231(b) 15.205	RSS-210	Radiated Spurious Emissions 30MHz – 9084MHz	Emissions below FCC 15.209 and 15.231(b) Limits	15.209(a) in restricted bands, all others 15.231(b)	Complies

Notes:

1. Antenna gain is declared as maximum -5dBi by the manufacturer.
2. 15.231(a) The Insynctive bridge does not transmits data continuously, it transmits packets when requested to do so by a separate controller, such as an app or Home Automation System. For example, if a user integrates the Bridge to a 3rd Party Controller such as Control4, they may issue a command to change the position of the shade (% open) from their Control4 app/account to the Pella Bridge.
3. 15.231(a)(3) The Insynctive Bridge does not poll devices at a periodic frequency. Within the ecosystem, sensors are only transmitters (not transceivers), so the sensors transmit status to the Bridge when they change state (opened/closed, locked/unlocked, tamper) or roughly every 70 minutes (supervisory signal). The bridge does not transmit to sensors, only receives data from them.

Emission Designators			
Frequency (MHz)	**Modulation**	**FCC**	**IC**
433.92	FSK/OOK	249k10F1D	211k10F1D
908.42	FSK/GFSK	143k39F1D	126k13F1D
Note: FCC based on 20dB emission bandwidth; IC based on 99% emission bandwidth.			

EQUIPMENT UNDER TEST (EUT) DETAILS

Pella Corporation product Insynctive Bridge Model *208B0000* is a Wall-mounted Transmitter with indication LED. The EUT connects to AC public mains. EUT operates in two different frequencies (433.92MHz and 908.42MHz).

Two samples were supplied for testing. One for the Radiated Emissions testing and the other sample for the rest of the testing.

EUT OPERATION

During testing, EUT was transmitting continuously at its highest power level at full data rate. Two different frequencies 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

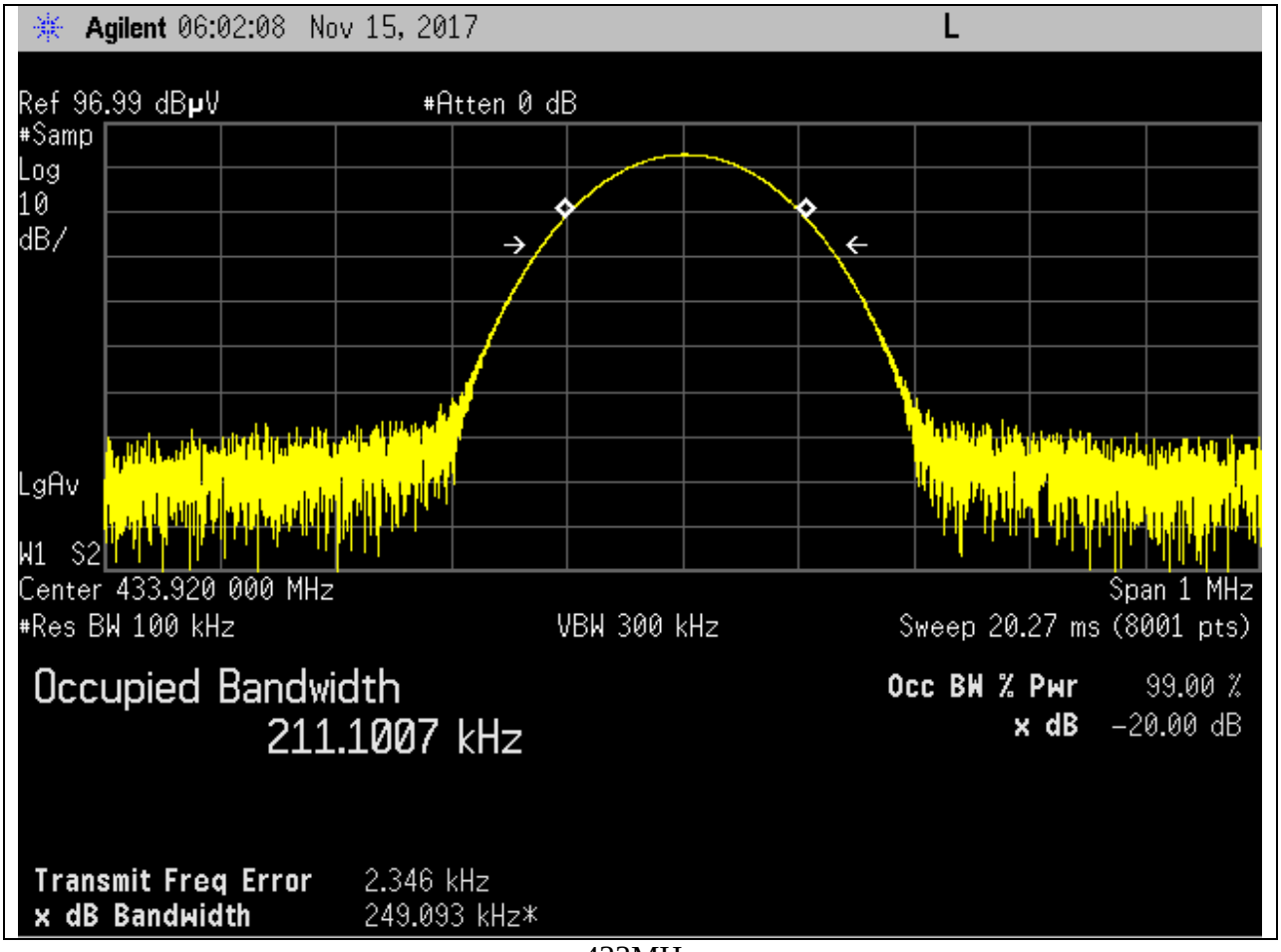
NTS Equipment #	**Description**	**Manufacturer**	**Model**	**Calibration Duration**	**Calibration Due Date**
E1529P	PSA	Agilent	E4446A	12 Months	4/12/2018
E1554P	PreAmp (1GHz-40GHz)	MITEQ	JS32-00104000-62-5P	12 Months	12/27/2017
E1502P	Biconilog Antenna (30MHz-1GHz)	ETS Lindgren	3142D	12 Months	4/16/2018
E1149P	Horn Antenna (1GHz-18GHz)	EMCO	3115	12 Months	12/17/2017
WC020853	Loop Antenna	EMCO	6507	12 Months	12/06/2017
WC021314	LISN	Rohde & Schwarz	Two-Line V Network	12 Months	5/8/2018
WC021350	Transient Limiter	HAMEG	HZ560	12 Months	7/4/2018

Test Results Section

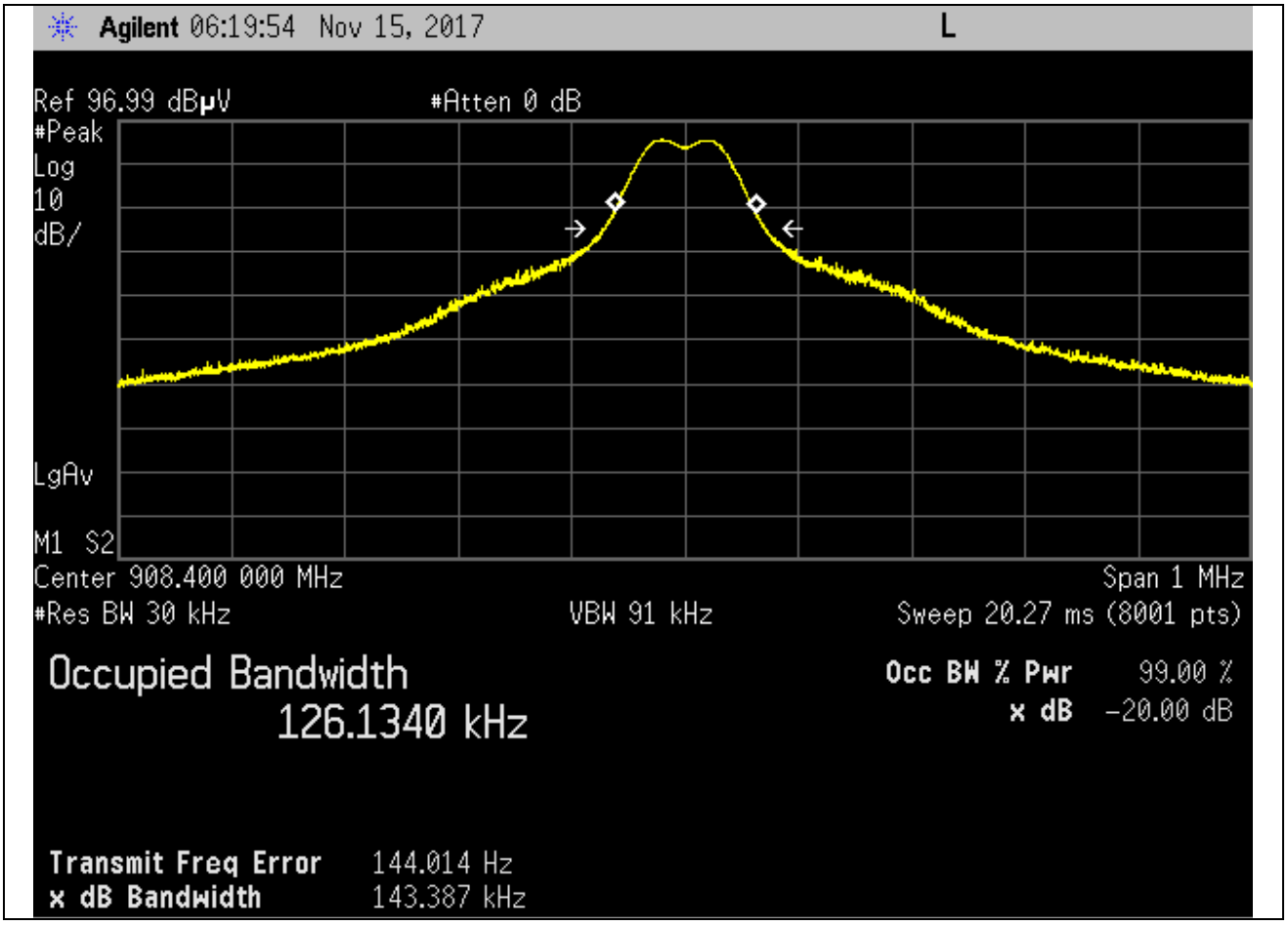
20dB & 99% Bandwidth

Regulatory Rule / Standard	CFR Title 47 §15.231(a)(2) & RSS-2210
Standard / Method of Measurement	ANSI C63.4 and RSS-Gen
Specifications	Minimum 20dB and 99% bandwidth shall be less than 0.25% below 900MHz and 0.5% above 900MHz.
Deviations From Method of Measurement	None – Testing performed through conducted Measurements
Tested By	Armando Del Angel
Date	November 15th 2017
Test Result	Plots included below.

Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)	Verdict
433.92MHz	249.093	211.1007	1082.5	Complies
908.42MHz	143.387	126.1340	4540.0	Complies



433MHz

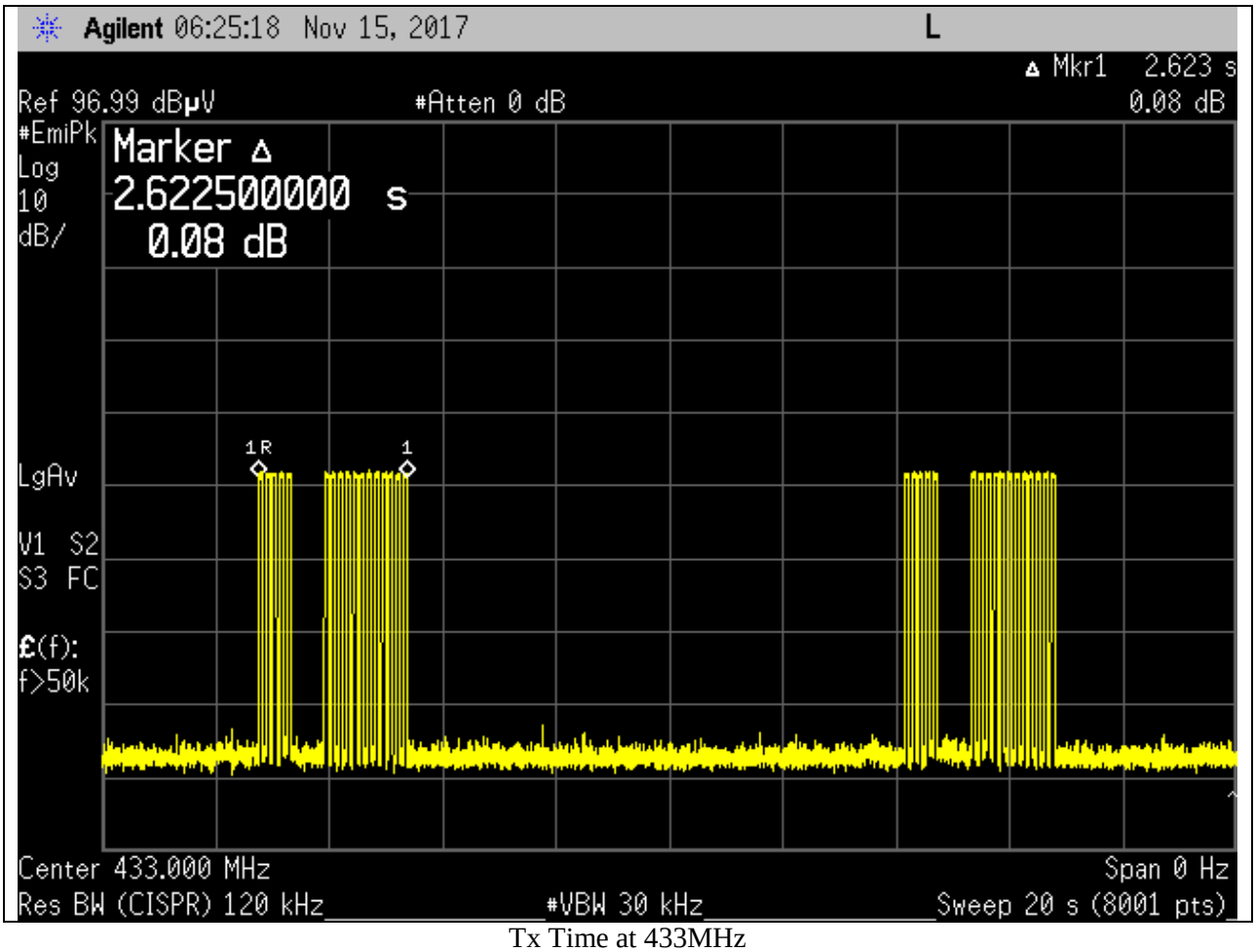

Agilent 06:19:54 Nov 15, 2017
L
Ref 96.99 dBµV
#Atten 0 dB
#Peak
Log
10
dB/
LgAv
M1 S2
Center 908.400 000 MHz
Span 1 MHz
#Res BW 30 kHz
VBW 91 kHz
Sweep 20.27 ms (8001 pts)
Occupied Bandwidth
126.1340 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error 144.014 Hz
x dB Bandwidth 143.387 kHz

908MHz

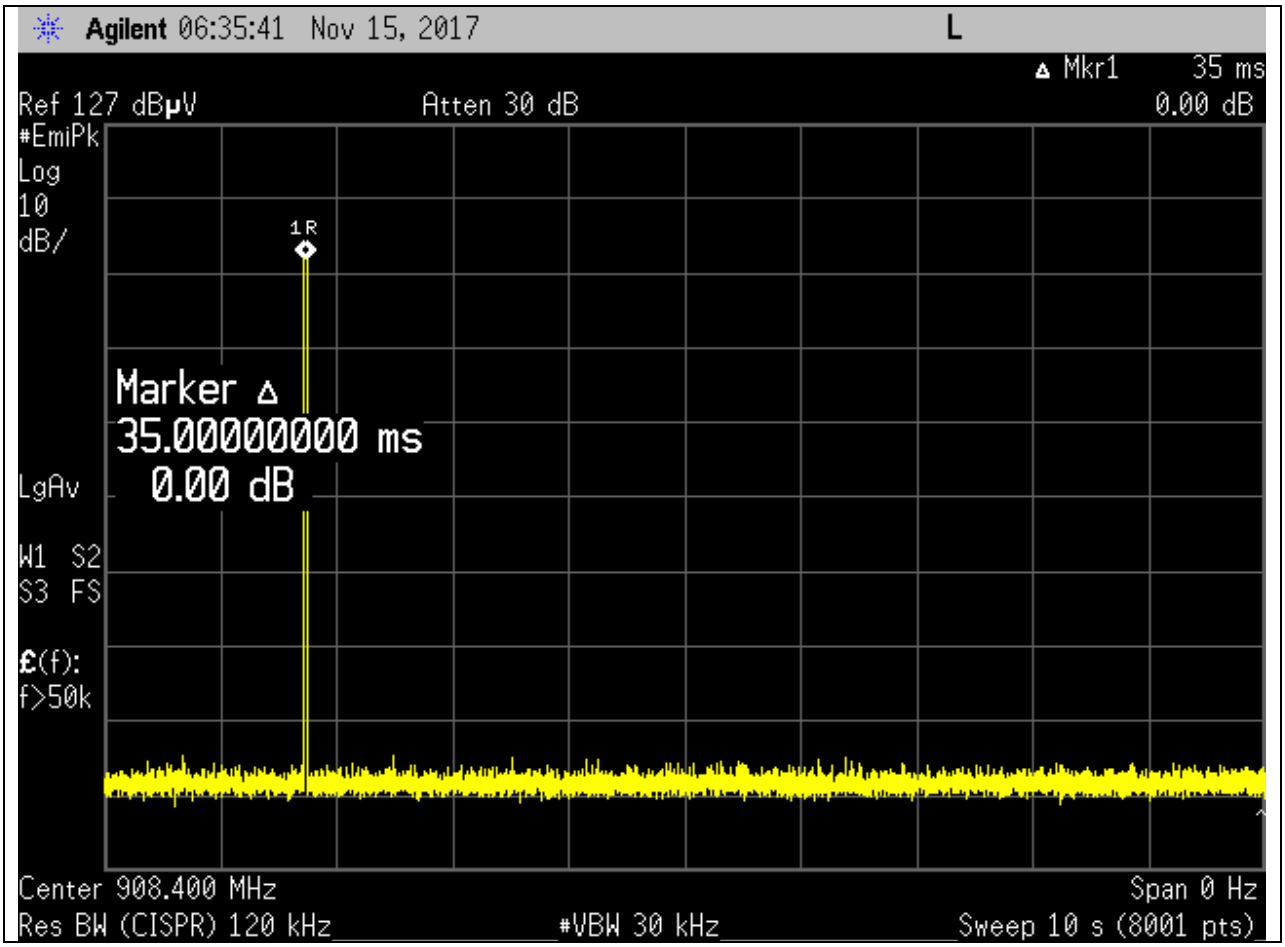
TX Time

Regulatory Rule / Standard	CFR Title 47 §15.231(a)(2)
Standard / Method of Measurement	ANSI C63.4 and RSS-Gen
Specifications	A transmitter activated automatically shall cease transmission within 5 Seconds after activation.
Deviations From Method of Measurement	None – Testing performed through Conducted Measurements
Tested By	Armando Del Angel
Date	November 15th 2017
Test Result	Corresponding plots shown below for bandedge frequencies at 2400MHz and 2483.5MHz.

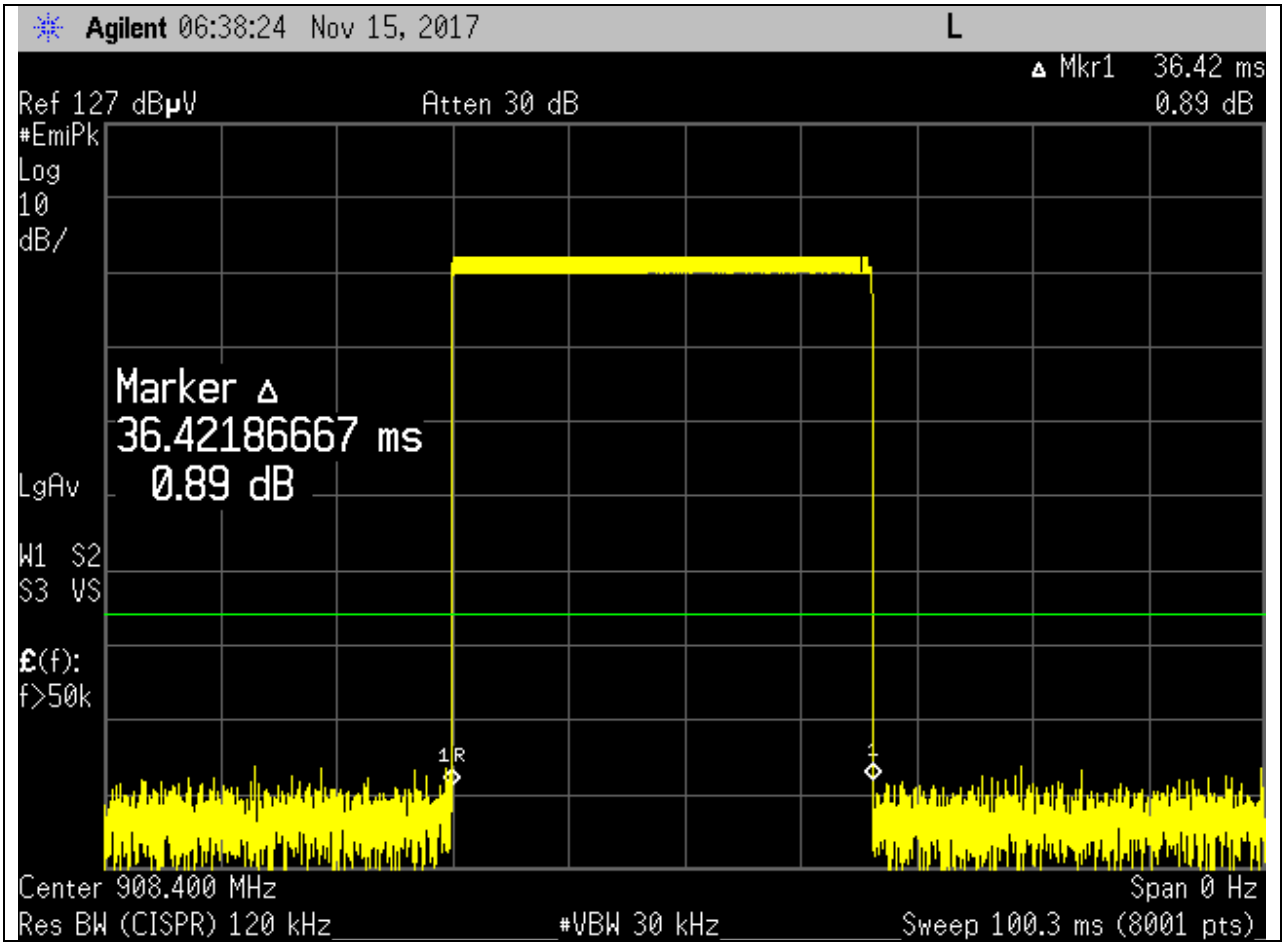
Frequency	Deactivation Time (s)	Limit	Verdict
433.92MHz	2.6225	5s	Complies
908.42MHz	0.03642	5s	Complies



Tx Time at 433MHz



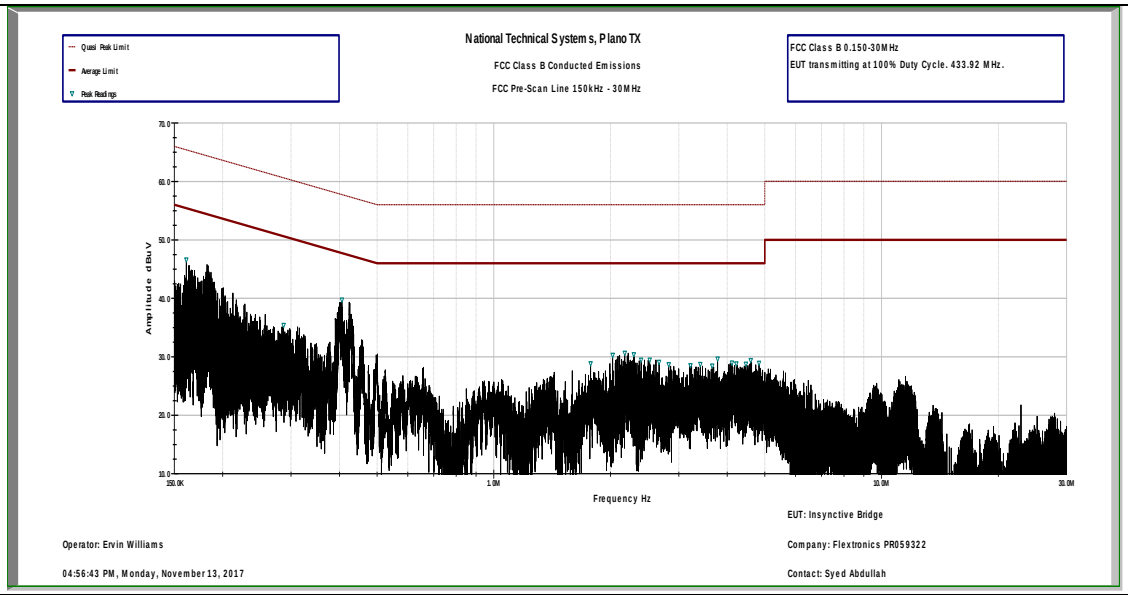
Tx Time at 908MHz – 10s Window



Tx Time at 908MHz – 100ms Window

AC Line Conducted Emissions

Regulatory Rule / Standard	CFR Title 47 §15.207 RSS-GEN 7.2.2
Standard / Method of Measurement	ANSI C63.4
Specifications	FCC 15.207 Limits
Deviations From Method of Measurement	None
Tested By	Armando Del Angel
Date	November 13th 2017
Test Result	Compliant



National Technical Systems, Plano TX
FCC Class B Conducted Emissions
FCC Final Line 150kHz-30MHz

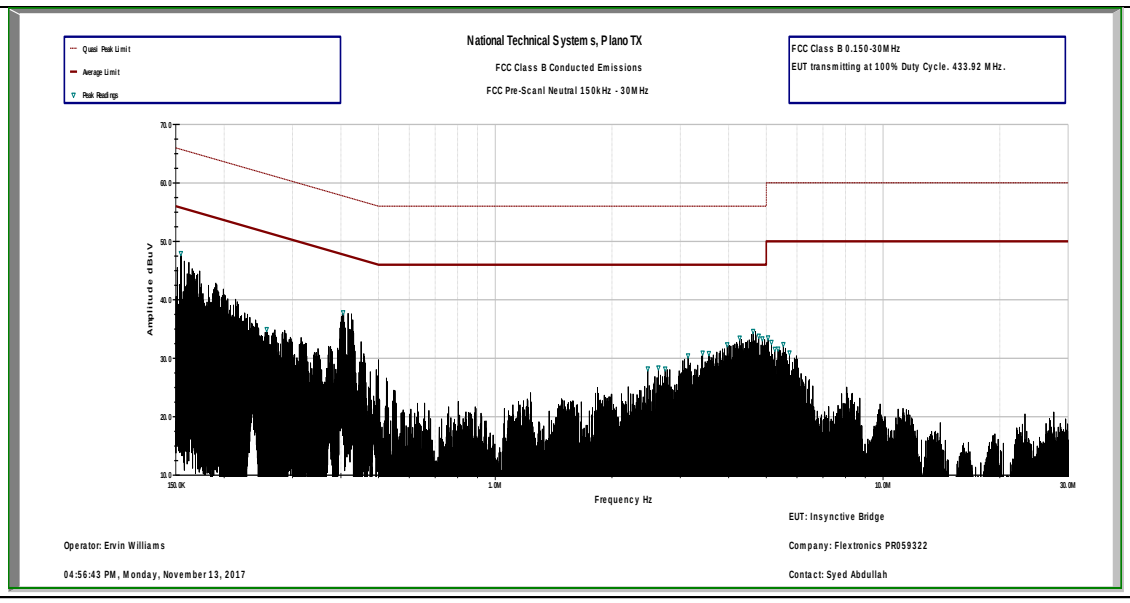
Operator: Ervin Williams

04:56:43 PM, Monday, November 13, 2017

EUT: Insynctive Bridge
Company: Flextronics PR059322
Contact: Syed Abdullah

	1	2	3	4	5	6	
Frequency	QP Limit	AVE Limit	AVE Readings	AVE Margin	QP Readings	QP Margin	
MHz	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.161 MHz	65.683	55.683	27.380	-28.303	42.782	-22.900	
0.406 MHz	58.691	48.691	31.736	-16.955	37.663	-21.028	
2.026 MHz	56.000	46.000	15.571	-30.429	24.670	-31.330	
2.177 MHz	56.000	46.000	19.404	-26.596	27.791	-28.209	
2.296 MHz	56.000	46.000	16.706	-29.294	26.165	-29.835	
3.777 MHz	56.000	46.000	18.320	-27.680	25.076	-30.924	
FCC Class B 0.150-30MHz							
EUT transmitting at 100% Duty Cycle. 433.92 MHz.							

433MHz - Line



National Technical Systems, Plano TX
FCC Class B Conducted Emissions
FCC Final Neutral 150kHz-30MHz

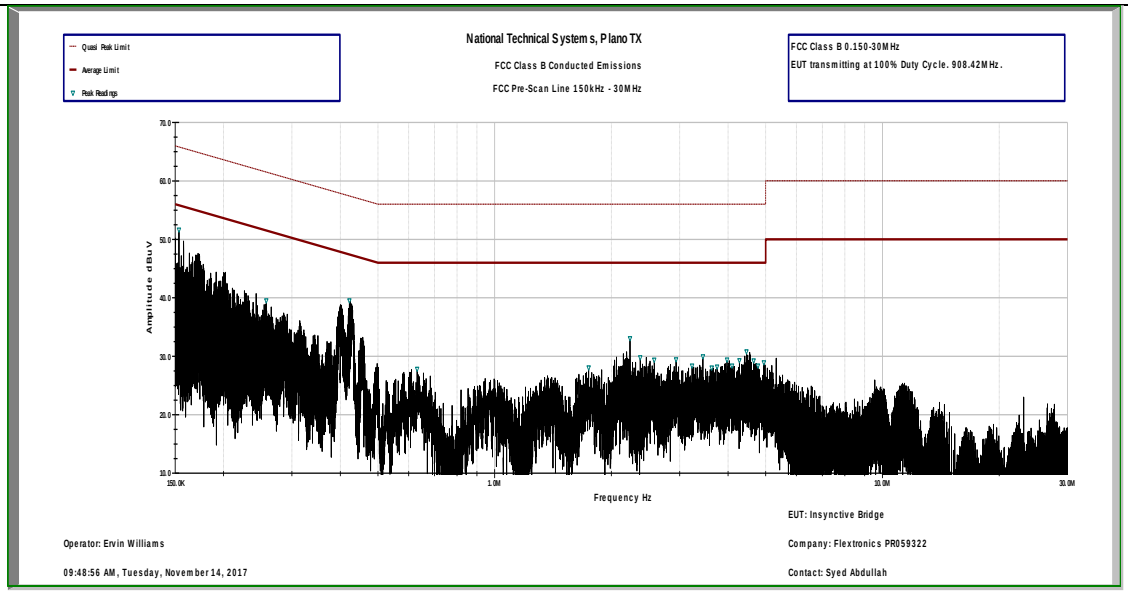
Operator: Ervin Williams

04:56:43 PM, Monday, November 13, 2017

EUT: Insynctive Bridge
Company: Flextronics PR059322
Contact: Syed Abdullah

	1	2	3	4	5	6	
Frequency	QP Limit	AVE Limit	AVE Readings	AVE Margin	QP Readings	QP Margin	
MHz	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.155 MHz	65.869	55.869	21.625	-34.244	40.253	-25.616	
0.405 MHz	58.701	48.701	24.250	-24.452	35.269	-23.432	
4.268 MHz	56.000	46.000	11.868	-34.132	28.647	-27.353	
4.625 MHz	56.000	46.000	12.628	-33.372	28.725	-27.275	
4.781 MHz	56.000	46.000	12.884	-33.116	29.454	-26.546	
4.883 MHz	56.000	46.000	13.318	-32.682	28.953	-27.047	
FCC Class B 0.150-30MHz							
EUT transmitting at 100% Duty Cycle. 433.92 MHz.							

433MHz - Neutral



National Technical Systems, Plano TX
FCC Class B Conducted Emissions
FCC Final Line 150kHz-30MHz

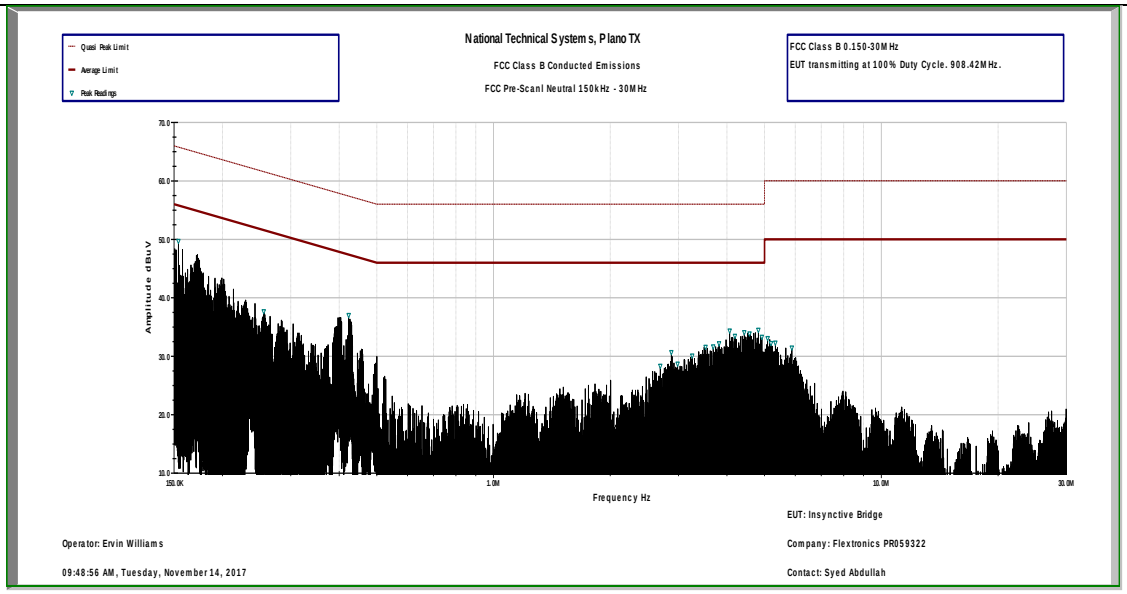
Operator: Ervin Williams

09:48:56 AM, Tuesday, November 14, 2017

EUT: Insynctive Bridge
Company: Flextronics PR059322
Contact: Syed Abdullah

	1	2	3	4	5	6	
Frequency	QP Limit	AVE Limit	AVE Readings	AVE Margin	QP Readings	QP Margin	
MHz	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.153 MHz	65.903	55.903	27.221	-28.681	43.297	-22.606	
0.258 MHz	62.922	52.922	24.870	-28.053	36.369	-26.554	
0.422 MHz	58.230	48.230	28.017	-20.213	37.076	-21.154	
2.234 MHz	56.000	46.000	17.971	-28.029	27.361	-28.639	
3.444 MHz	56.000	46.000	16.403	-29.597	24.161	-31.839	
4.460 MHz	56.000	46.000	18.181	-27.819	25.608	-30.392	
FCC Class B 0.150-30MHz							
EUT transmitting at 100% Duty Cycle. 908.42MHz.							

908MHz - Line



National Technical Systems, Plano TX
FCC Class B Conducted Emissions
FCC Final Neutral 150kHz-30MHz

Operator: Ervin Williams

09:48:56 AM, Tuesday, November 14, 2017

EUT: Insynctive Bridge
Company: Flextronics PR059322
Contact: Syed Abdullah

	1	2	3	4	5	6	
Frequency	QP Limit	AVE Limit	AVE Readings	AVE Margin	QP Readings	QP Margin	
MHz	dBuV	dBuV	dBuV	dB	dBuV	dB	
0.154 MHz	65.886	55.886	32.855	-23.032	43.650	-22.237	
0.423 MHz	58.196	48.196	20.807	-27.389	34.355	-23.841	
4.064 MHz	56.000	46.000	11.928	-34.072	28.120	-27.880	
4.432 MHz	56.000	46.000	12.858	-33.142	29.464	-26.536	
4.572 MHz	56.000	46.000	13.244	-32.756	29.238	-26.762	
4.818 MHz	56.000	46.000	13.469	-32.531	29.631	-26.369	
FCC Class B 0.150-30MHz							
EUT transmitting at 100% Duty Cycle. 908.42MHz.							

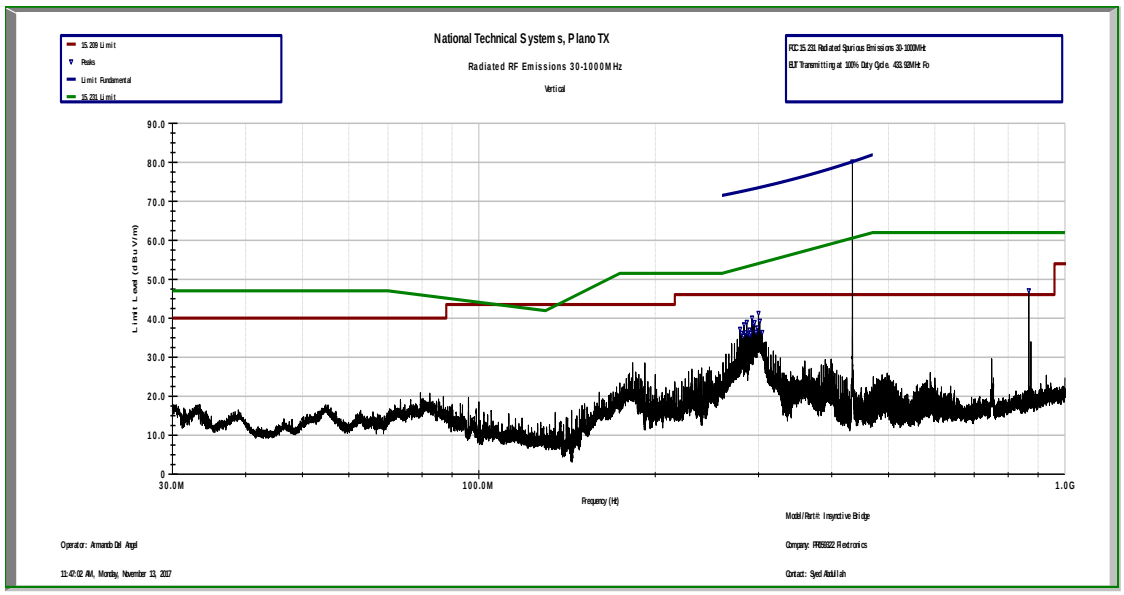
908MHz - Neutral

Radiated Spurious Emissions

Regulatory Rule / Standard	CFR Title 47 §15.231(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) and > -20dBc outside the restricted bands.
Deviations From Method of Measurement	None – Testing performed through Radiated Measurements
Tested By	Armando Del Angel
Date	November 13th 2017
Test Result	Complies - Tabular data shown below

30MHz-1GHz range:

Measurement System Settings: Quasi Peak, RBW = 120kHz
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



National Technical Systems, Plano TX
Radiated RF Emissions 30-1000MHz
Vertical Final

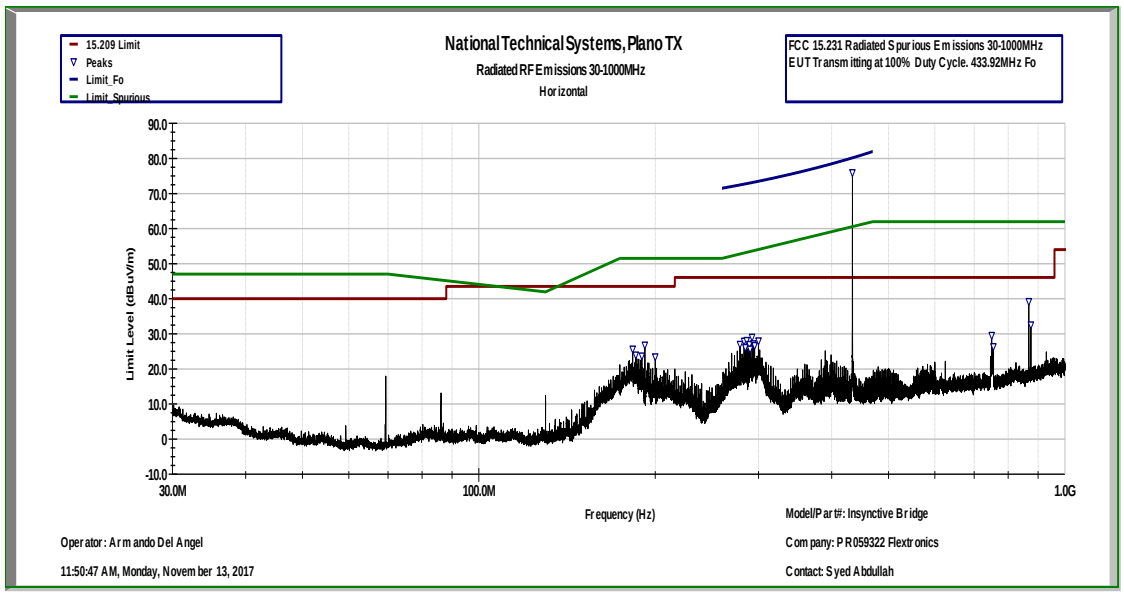
Operator: Armando Del Angel

04:28:42 PM, Monday, April 30, 2018

Model/Part#: Insynctive Bridge
Company: PR059322 Flextronics
Contact: Syed Abdullah

	1	2	3	4	5	
Frequency	Limit	QP	QP Margin	Tower	Turntable	
MHz	dBuV/m	dBuV/m	dB	cm	Degrees	
286.51 MHz	46.030	36.987	-9.043	100.000	44.000	
292.50 MHz	46.030	40.319	-5.711	141.000	28.000	
300.01 MHz	46.030	37.524	-8.506	100.000	1.000	
301.52 MHz	46.030	38.973	-7.057	148.000	25.000	
433.92 MHz	80.800	76.334	-4.466	100.000	351.000	
867.84 MHz	61.939	47.538	-14.401	100.000	155.000	
FCC 15.231 Radiated Spurious Emissions 30-1000MHz						
EUT Transmitting at 100% Duty Cycle. 433.92MHz Fo						

433MHz – Vertical



National Technical Systems, Plano TX
Radiated RF Emissions 30-1000MHz
Horizontal Final

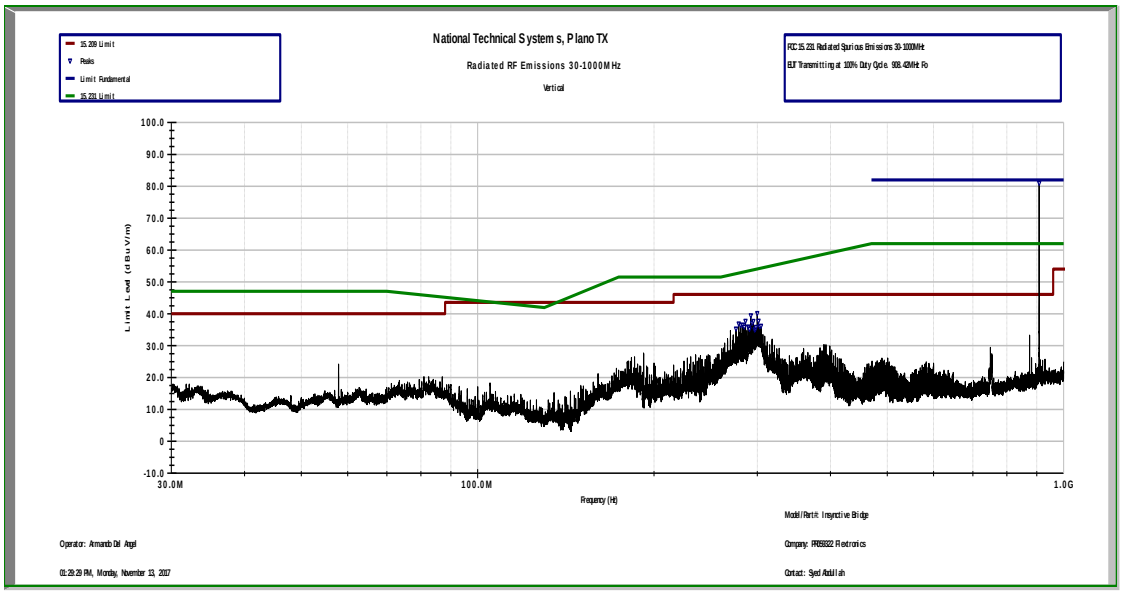
Operator: Armando Del Angel

01:53:41 PM, Thursday, March 29, 2018

Model/Part#: Insynctive Bridge
Company: PR059322 Flextronics
Contact: Syed Abdullah

	1	2	3	4	5
Frequency	Limit	QP	QP Margin	Tower	Turntable
MHz	dBuV/m	dBuV/m	dB	cm	Degrees
191.99 MHz	43.522	26.955	-16.567	163.000	296.000
292.50 MHz	46.030	30.317	-15.713	100.000	321.000
433.92 MHz	80.800	75.468	-5.332	192.000	220.000
750.00 MHz	46.030	33.204	-12.826	113.000	343.000
867.86 MHz	46.030	36.585	-9.445	199.000	225.000
875.01 MHz	46.030	32.863	-13.167	219.000	138.000
FCC 15.231 Radiated Spurious Emissions 30-1000MHz					
EUT Transmitting at 100% Duty Cycle. 433.92MHz Fo					

433MHz – Horizontal



National Technical Systems, Plano TX
Radiated RF Emissions 30-1000MHz
Vertical Final

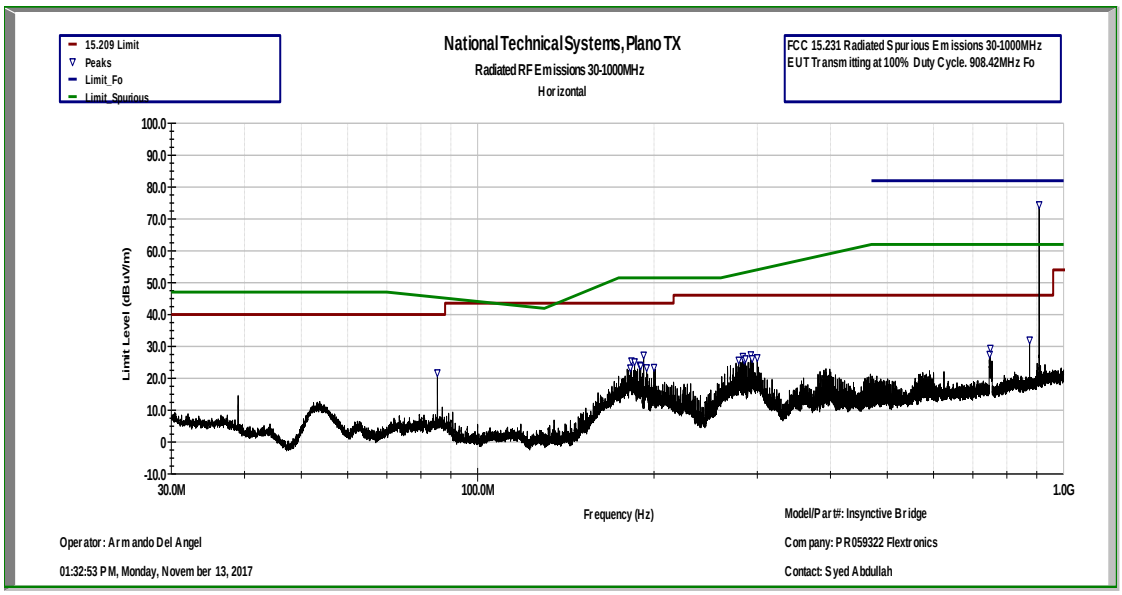
Operator: Armando Del Angel

02:07:34 PM, Thursday, March 29, 2018

Model/Part#: Insynctive Bridge
Company: PR059322 Flextronics
Contact: Syed Abdullah

	1	2	3	4	5
Frequency	Limit	QP	QP Margin	Tower	Turntable
MHz	dBuV/m	dBuV/m	dB	cm	Degrees
286.50 MHz	46.030	37.330	-8.700	129.000	31.000
292.51 MHz	46.030	38.563	-7.467	100.000	38.000
295.49 MHz	46.030	35.553	-10.477	150.000	1.000
299.99 MHz	46.030	39.230	-6.800	142.000	18.000
301.49 MHz	46.030	37.059	-8.971	100.000	34.000
908.42 MHz	82.000	80.385	-1.615	108.000	265.000
FCC 15.231 Radiated Spurious Emissions 30-1000MHz					
EUT Transmitting at 100% Duty Cycle. 908.42MHz Fo					

908MHz - Vertical



National Technical Systems, Plano TX
Radiated RF Emissions 30-1000MHz
Horizontal Final

Operator: Armando Del Angel

02:07:35 PM, Thursday, March 29, 2018

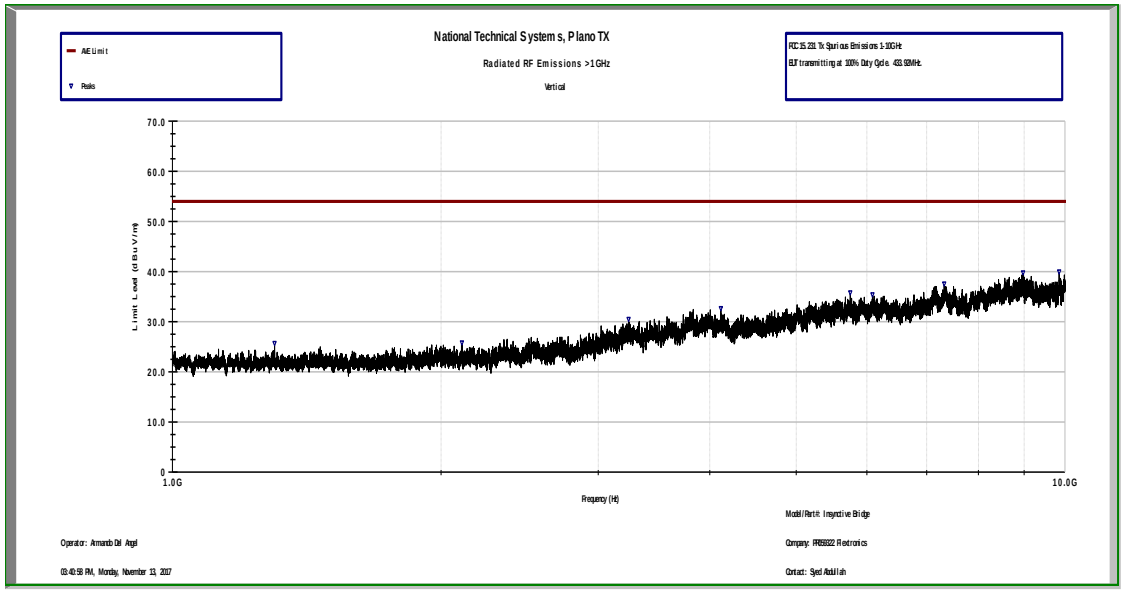
Model/Part#: Insynctive Bridge
Company: PR059322 Flextronics
Contact: Syed Abdullah

	1	2	3	4	5
Frequency	Limit	QP	QP Margin	Tower	Turntable
MHz	dBuV/m	dBuV/m	dB	cm	Degrees
85.35 MHz	40.000	0.893	-39.107	100.000	78.000
182.99 MHz	43.522	24.897	-18.625	163.000	314.000
192.01 MHz	43.522	27.077	-16.445	100.000	304.000
749.99 MHz	46.030	32.754	-13.276	100.000	359.000
875.01 MHz	46.030	33.157	-12.873	100.000	322.000
908.42 MHz	82.000	76.206	-5.794	107.000	344.000
FCC 15.231 Radiated Spurious Emissions 30-1000MHz					
EUT Transmitting at 100% Duty Cycle. 908.42MHz Fo					

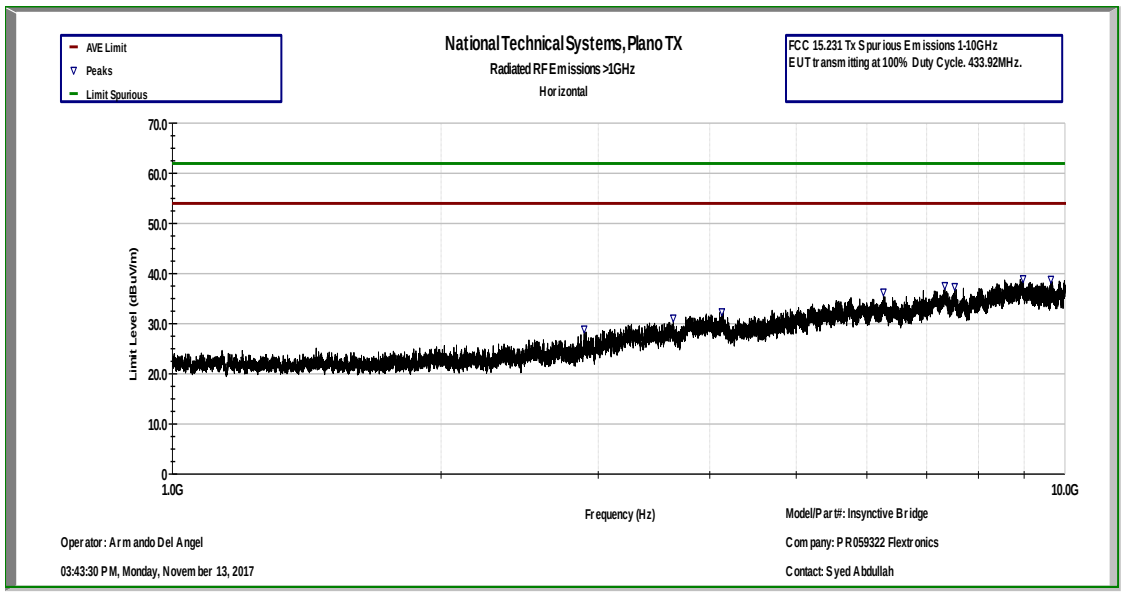
908MHz - Horizontal

1GHz-10GHz range:

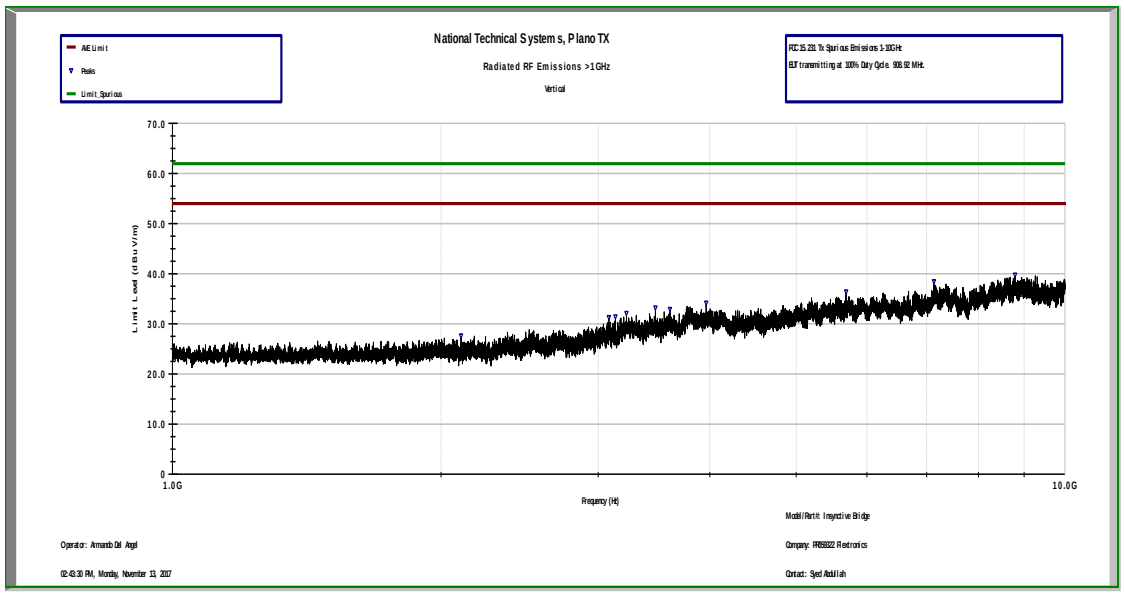
Measurement System Settings:
Peak: RBW = 1MHz, VBW = 3MHz, max-hold
Average: 10Hz video averaging on Peak trace
Corrected Reading (dBuV/m) = Raw Reading (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Preamp Gain (dB) + Filter Loss (dB)
Margin (dB) = Corrected Reading (dBuV/m) – Limit (dBuV/m)
Average measurements were not performed when peak readings met the average limits
Negative margin indicates a passing result



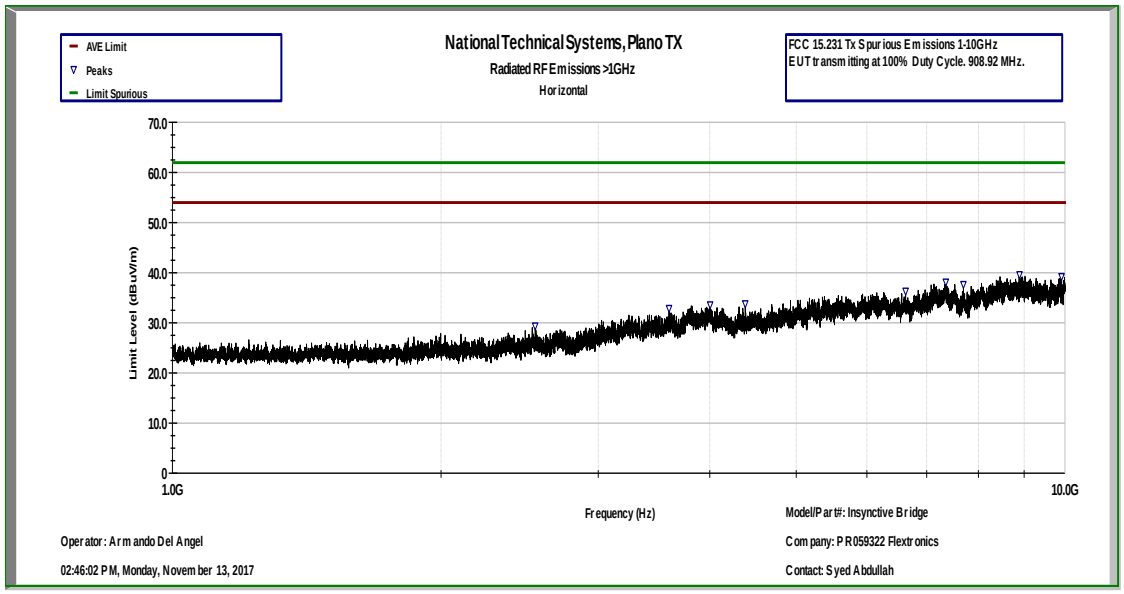
433MHz - Vertical



433MHz - Horizontal



908MHz - Vertical



908MHz - Horizontal

End of Report

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