FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

Urban Active Vehicle Module

MODEL NUMBER: 561076

FCC ID: 2AJFG561076
IC: 21819-561076

REPORT NUMBER: 11385860B

ISSUE DATE:December 1, 2016

Prepared for
Vast Production Services
307 Robbins Drive
Troy, MI, 48083

Prepared by
UL LLC
333 Pfingsten Rd.
Northbrook, IL 60062
TEL: (847) 272-8800

NVLAP Lab code: 100414-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	October 3, 2016	Initial Issue	V Sabalvaro
REV	December 1, 2016	Editorial Changes	V Sabalvaro

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Vast Production Services
307 Robbins Drive
Troy, MI, 48083

EUT DESCRIPTION: Urban Active Vehicle Module

MODEL: 561076

SERIAL NUMBER: 0059753

DATE TESTED: August 8 – September 29, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex A1.1	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL LLC By:

Bart Mucha
Staff Engineer

UL LLC

Tested By:

Vincent Sabalvaro
EMC WISE Engineer
Consumer Technology
UL LLC

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at http://ts.nist.gov

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:
Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

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4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test	Range	Equipment	Uncertainty k=2
Conducted Emissions	150k-30MHz	LISN	3.65dB
Radiated Emissions	9k-30MHz	H-Field Loop	3.15dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.64dB
Radiated Emissions	30-200MHz	Bicon 3m Vert	5.10dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	4.00dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	5.36dB
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.48dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.49dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.79dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.84dB
Radiated Emissions	1-18GHz	Horn	4.32dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 314.9MHz periodic transmitter. It is powered by a DC vehicle battery. The transmitter is used for electronic acess and authorization system of a vehicle. The radio wave signals of ASK and FSK are not transmitted simultaneously. The key fob transmits radio wave signals of ASK and FSK modulations. Either one of ASK or FSK are transmitted by operator's actions. End user cannot control which of ASK and FSK modulation are to be transmitted. The device is manufactured by Vast Production Services

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output AV E-field Strength (dBuV/m)
314.9	TX - ASK	70.53
314.9	TX - FSK	67.27

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB trace antenna.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was set in worst axis as found in preliminary testing. The Z-axis was determined to be the worst axis.

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List					
Use	**Description**	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
EUT	CAN/LIN Interface	Vector	VN1630A	-	-
SIM	Laptop	DELL	E6410	82563381124	-
SIM	Power Supply	Leader	LPS-164A	9070286	-
SIM	Tablet	Samsung	SM-T560NU	RS2H60LF76W	A3LSMT560NU
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)					

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
0	Enclosure	-	Non-Electrical	-	-	None
1	DC	2	Wire	DC	<3m	None
2	CAN	1	Wire	I/O	<3m	None
3	USB	1	Wire	I/O	<3m	Service port only. Not accessible to the end user

TEST SETUP

The EUT is programmed for continuous TX mode for Radiated and Bandwidth measurements. For timing tests, the EUT is programmed for manual TX operation. The EUT was programmed through the USB port. The USB port was left unpopulated during testing, since it is only used for factory programming and the USB port will remain inaccessible by the user after it is installed into the vehicle.

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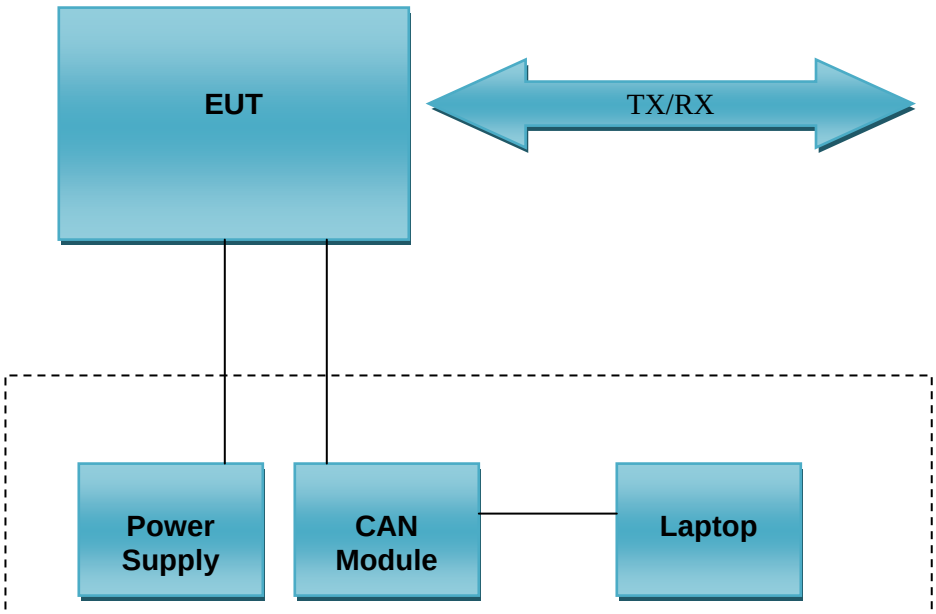
SETUP DIAGRAM FOR TESTS



Simulation Equipment is not subject to testing, therefore isolated from test chamber.

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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List					
Description	**Manufacturer**	**Model**	**T No.**	**Cal Date**	**Cal Due**
Radiated Software	UL	UL EMC	Ver 9.5, Nov, 2015		
Signal Analyzer	Agilent	PXA	EMC4360	1/8/2016	1/31/2017
Test Receiver	Rhode & Schwarz	ESCI	EMC4328	11/18/2015	11/30/2016
Log-P Antenna	Chase	UPA6109	EMC4313	1/22/2016	1/31/2017
Bicon Antenna	Chase	UPA6106A	EMC4078	12/28/2015	12/31/2016
Antenna Array	UL	BOMS	EMC4276	12/1/2015	12/31/2016
Test Receiver	Rhode & Schwarz	ESU	EMC4323	1/2/2016	1/31/2017
Loop Antenna	EMCO	6502/1	EMC4026	7/22/2016	7/31/2017

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7. TEST RESULTS

7.1 Configuration TX 314.9MHz Test Data

7.1.1 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	47 CFR Part 15.231(c), RSS-210 A1.1.3
Occupied Bandwidth Limits	
0.25% of Center Frequency (314.9MHz: 787.25kHz)	

Table 1 Occupied Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Occupied Bandwidth Requirements	
	dBc	% PWR
15kHz	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Result Summary

Center Frequency	Modulation	20dB BW Measured (kHz)	99% BW Measured (kHz)
314.9MHz	ASK	88.46	414.02
314.9MHz	FSK	81.99	83.850

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Figure 1 – Bandwidth Graph 314.9MHz – 20dB (ASK modulation)

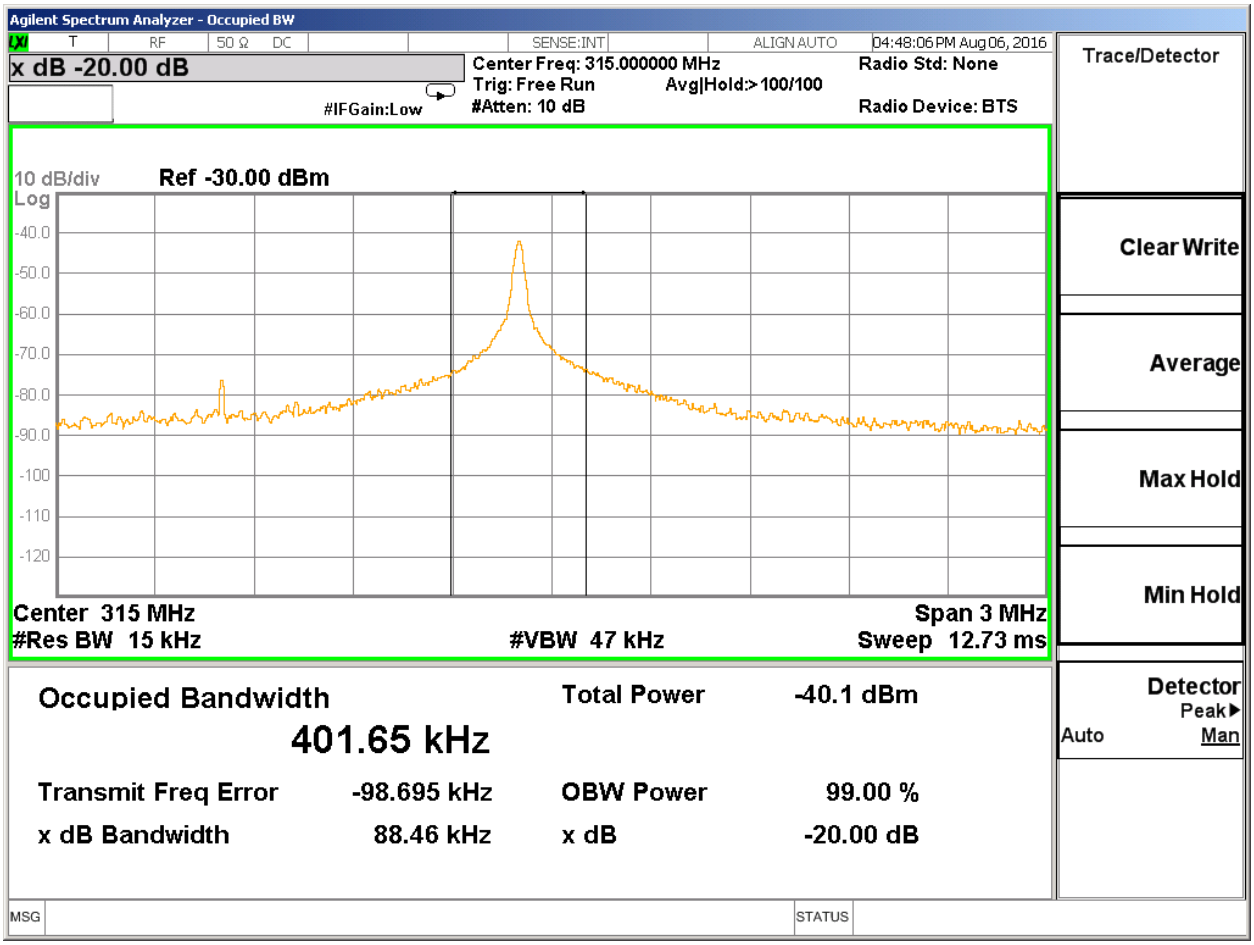

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Figure 2 – Bandwidth Graph 314.9MHz – 20dB (FSK modulation)

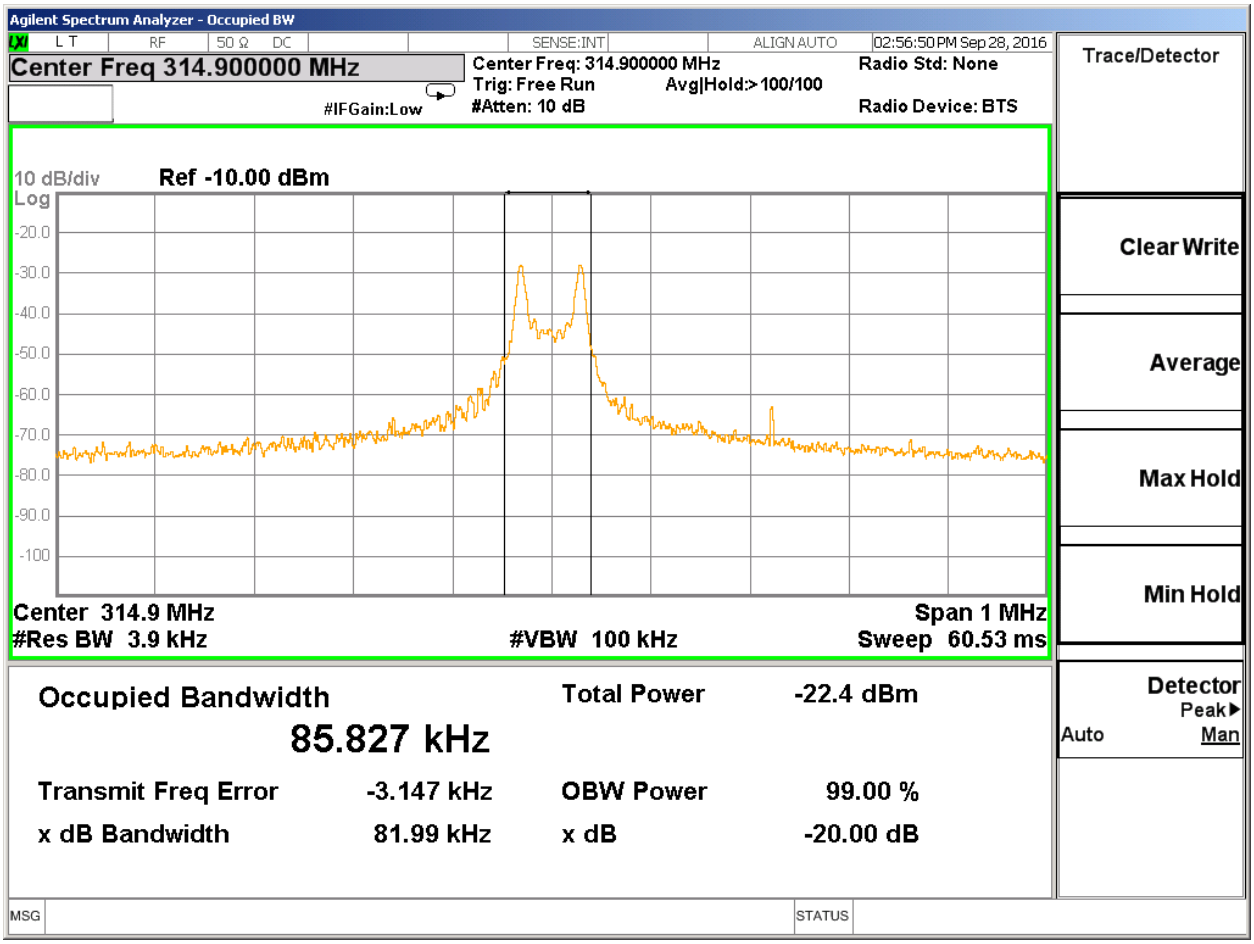

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Figure 3 – Bandwidth Graph 314.9MHz – 99% (ASK modulation)

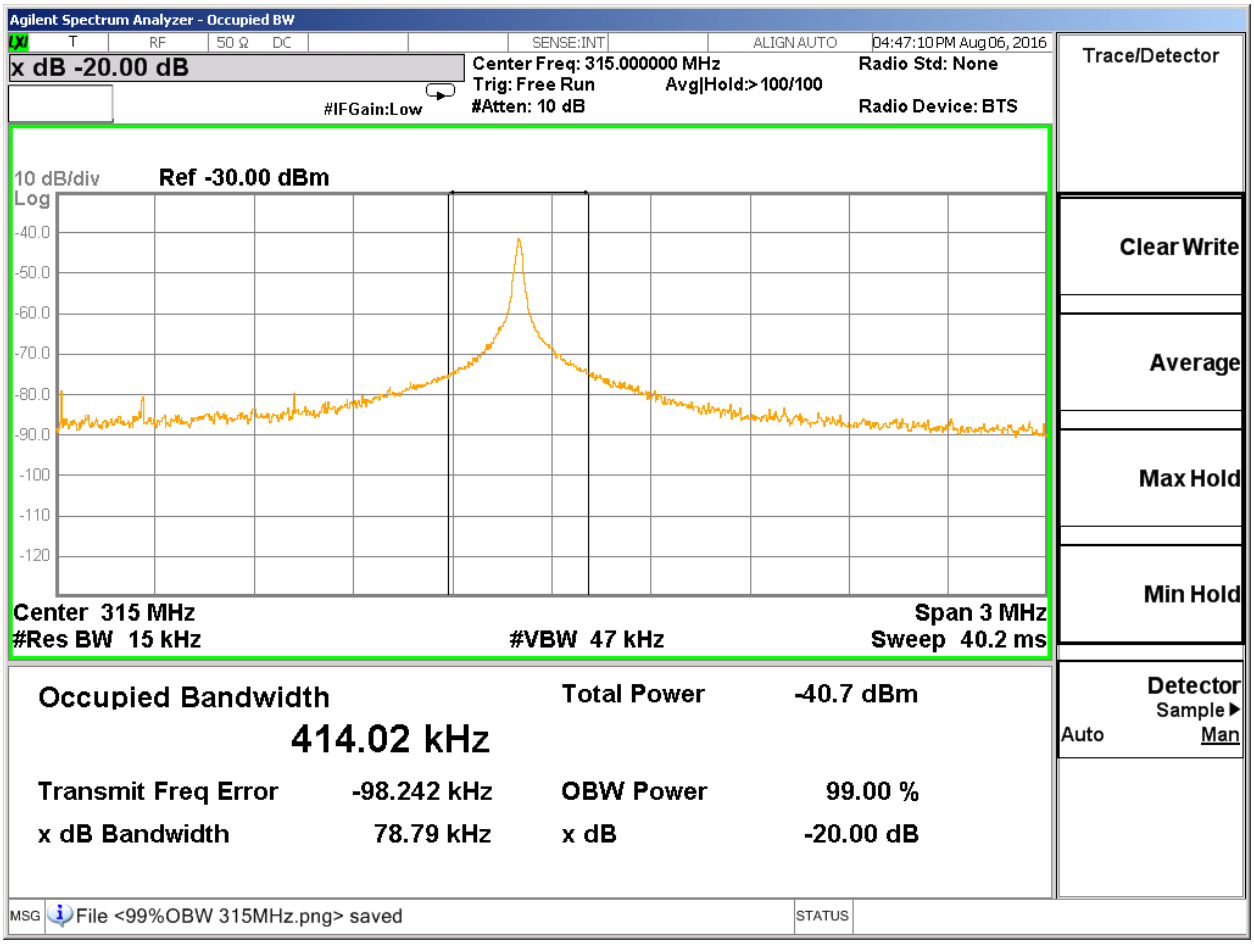

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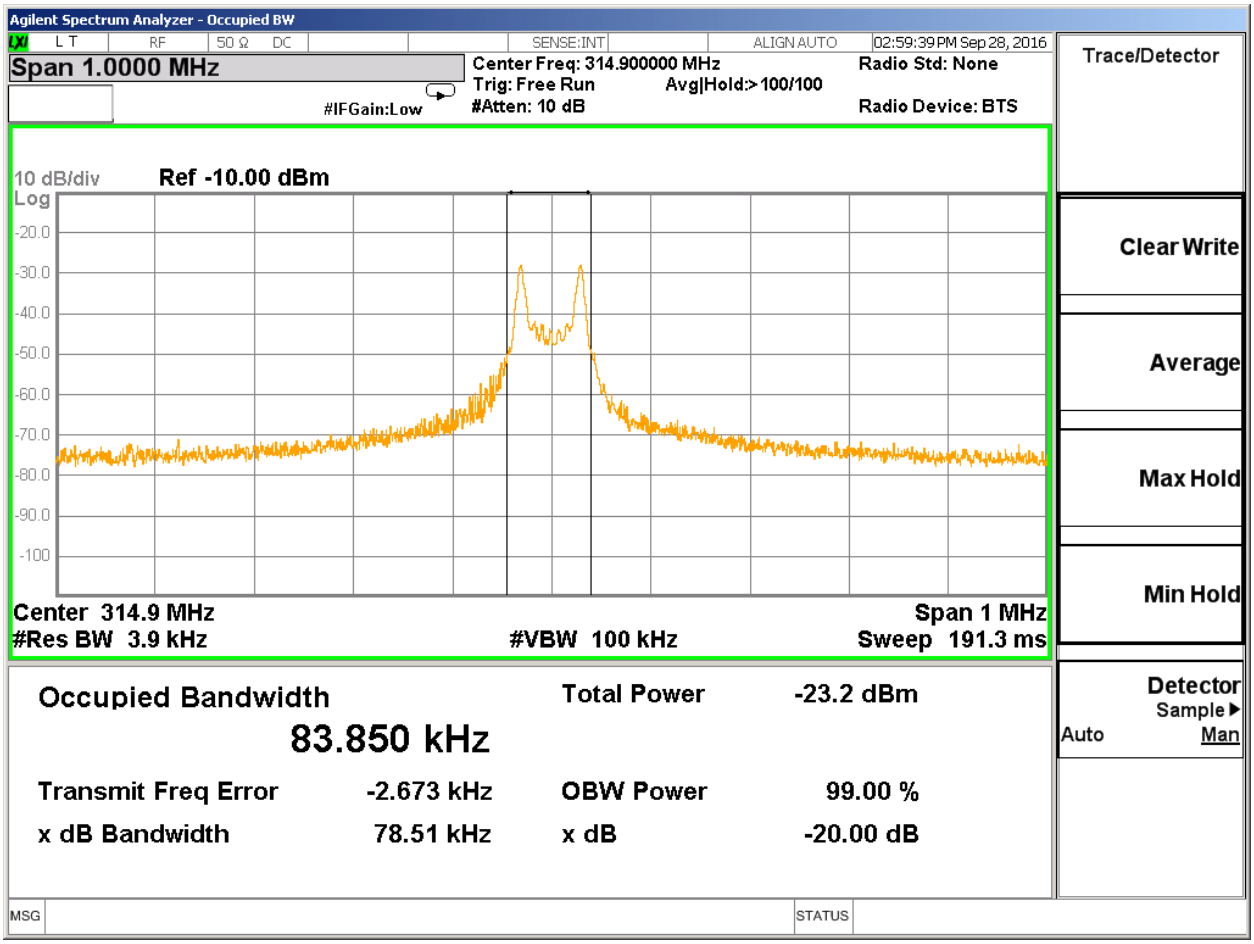
Figure 4 – Bandwidth Graph 314.9MHz – 99% (FSK modulation)



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7.1.2 Test Conditions and Results – Cease Operation

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	47 CFR Part 15.231(a), RSS-210 Annex A1.1.1
Cease Operation Limits	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

Table 4 Cease Operation Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Figure 5 Cease Operation Graph 314.9MHz (ASK modulation)

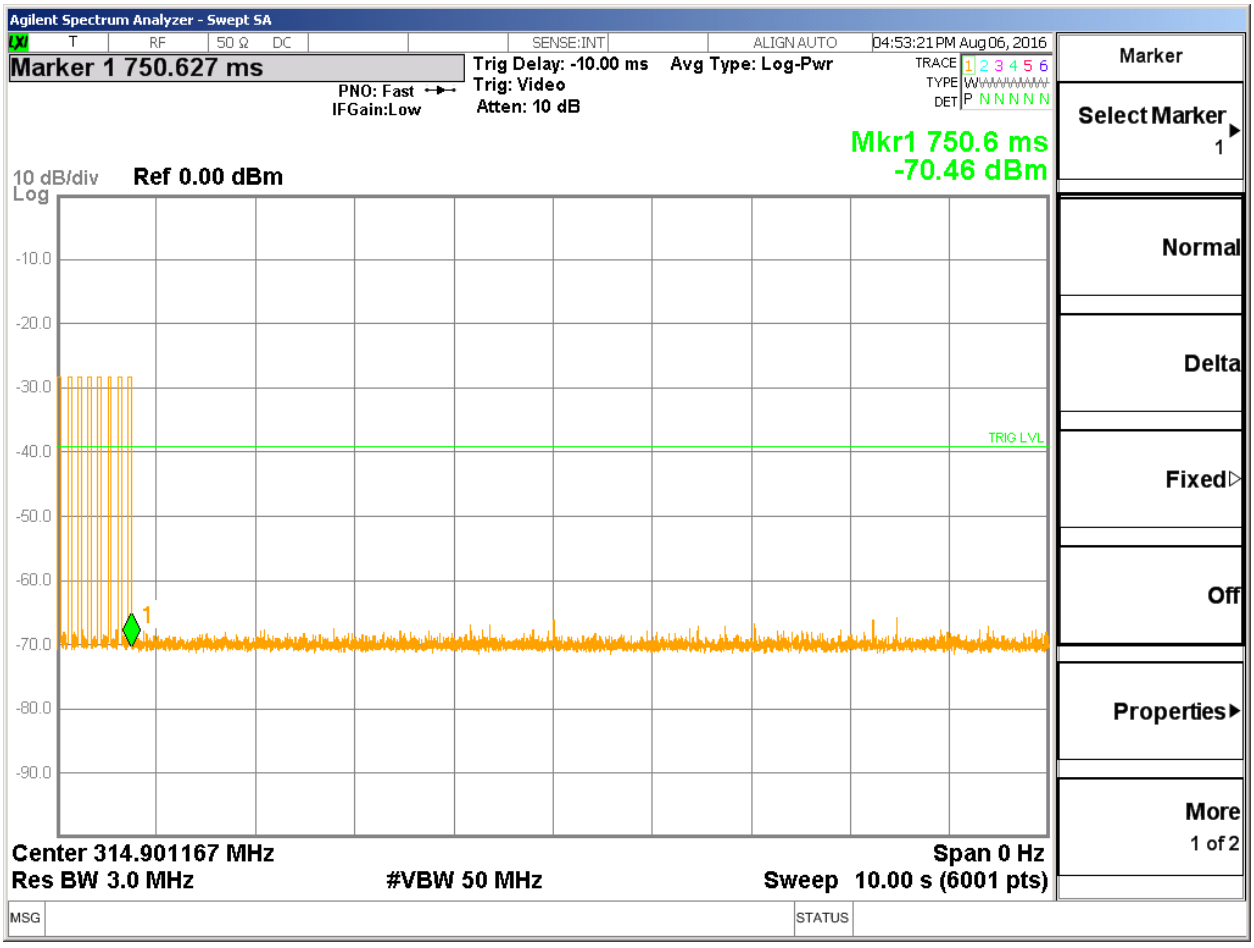

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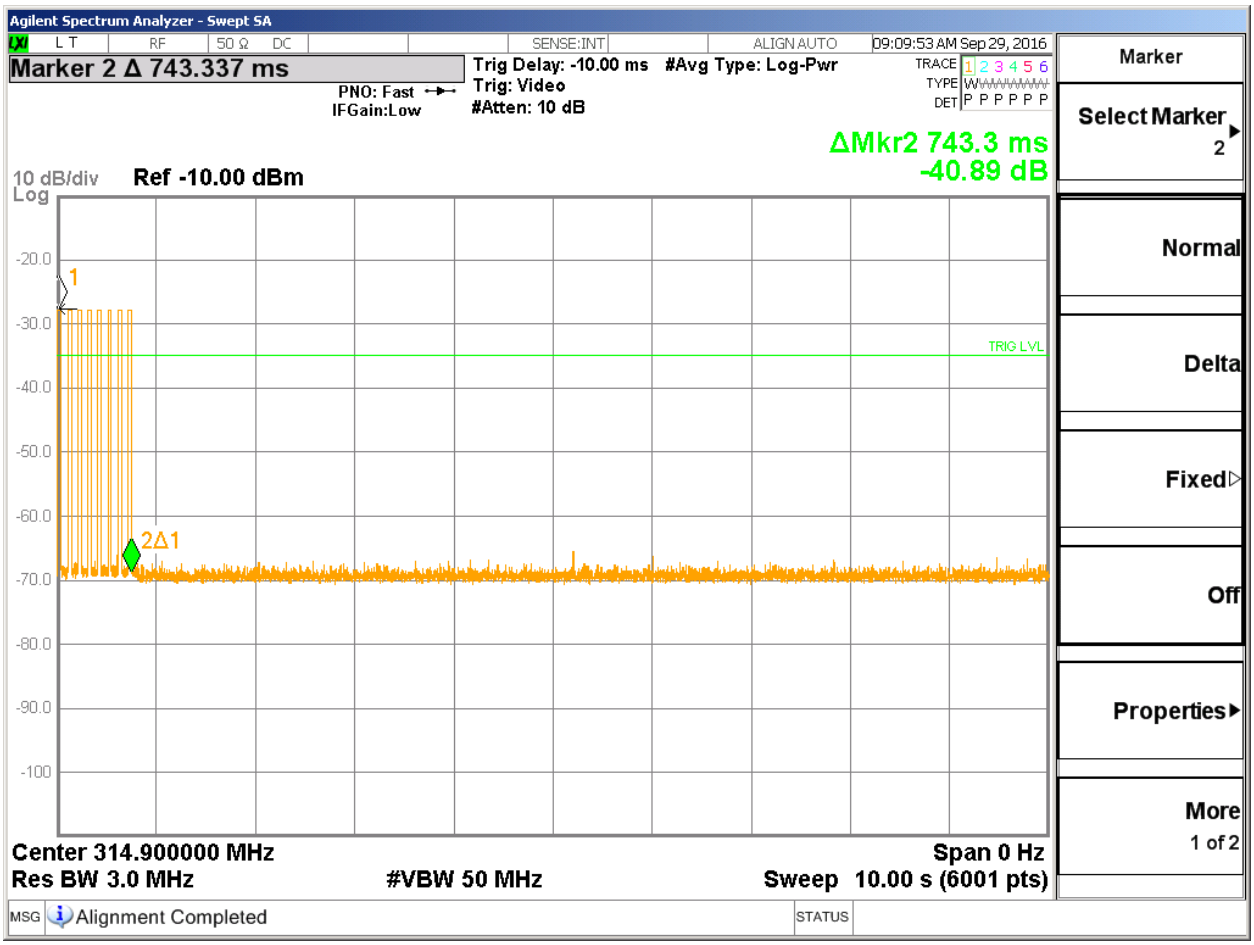
Figure 6 Cease Operation Graph 314.9MHz (FSK modulation)



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7.1.3 Test Conditions and Results – Pulse Train

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A 15.35, RSS-Gen 6.10
Pulse Train Limits	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

Table 5 Pulse Train Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 6 Pulse Train Calculation

TX Frequency	Modulation	Total TX time	Total Transmission period or 100ms whichever is lesser	DC Correction Factor (dB) $20\log\left(\frac{PulseWidth}{Period}\right)$
314.9MHz	ASK	(52 x 0.120) + (45 x 0.240) = 2mS	100mS	-15.37dB
	FSK	34.43	100ms	-9.26
Worst Case Duty Cycle: Worst case duty cycle was calculated over 100mS.				

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Figure 7 Pulse Train Graphs for 314.9MHz (ASK modulation)

Short pulse duration: 0.120mS
Long pulse duration: 0.240mS

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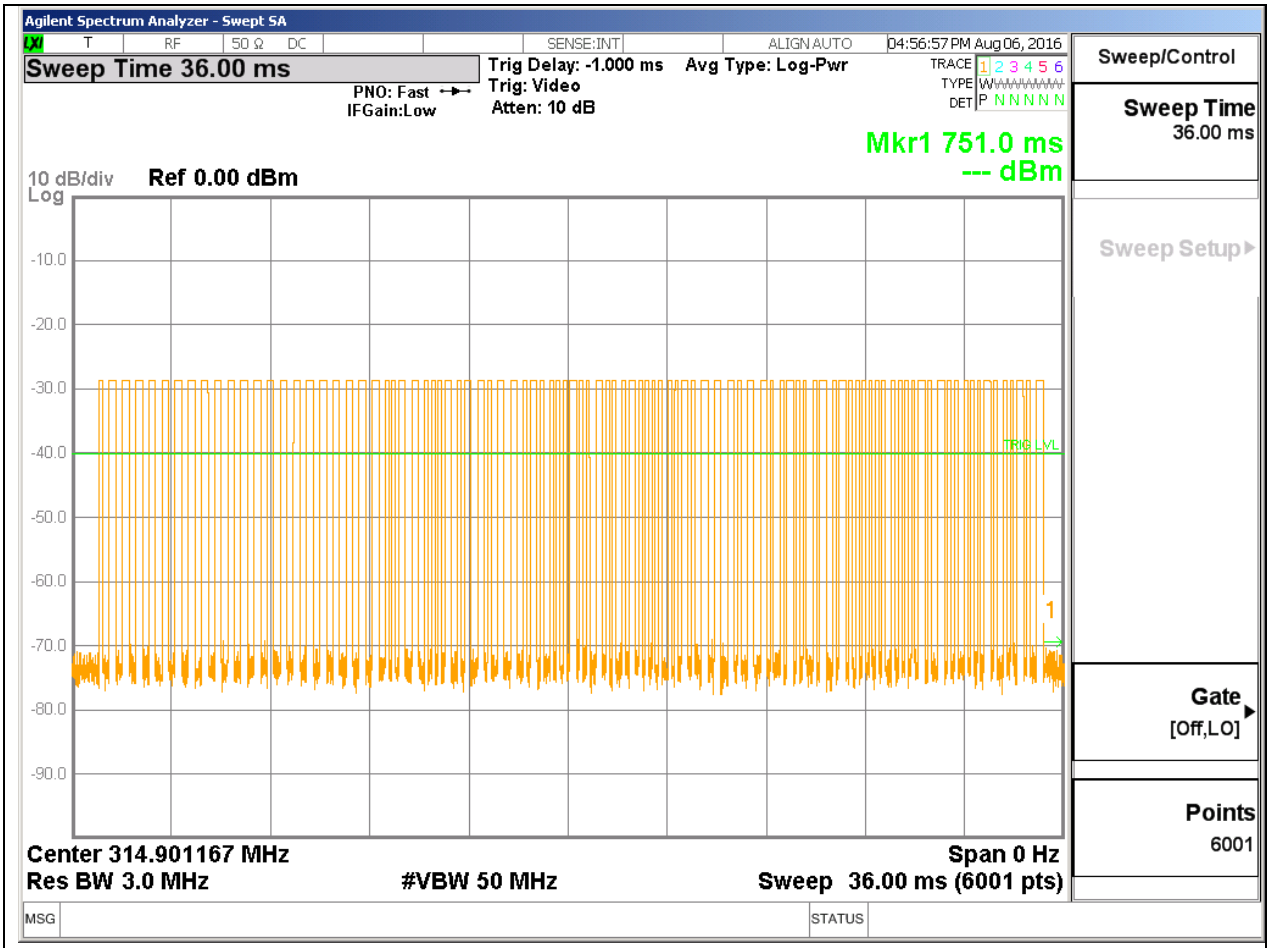

Number of Pulses: 53 Short, 45 Long

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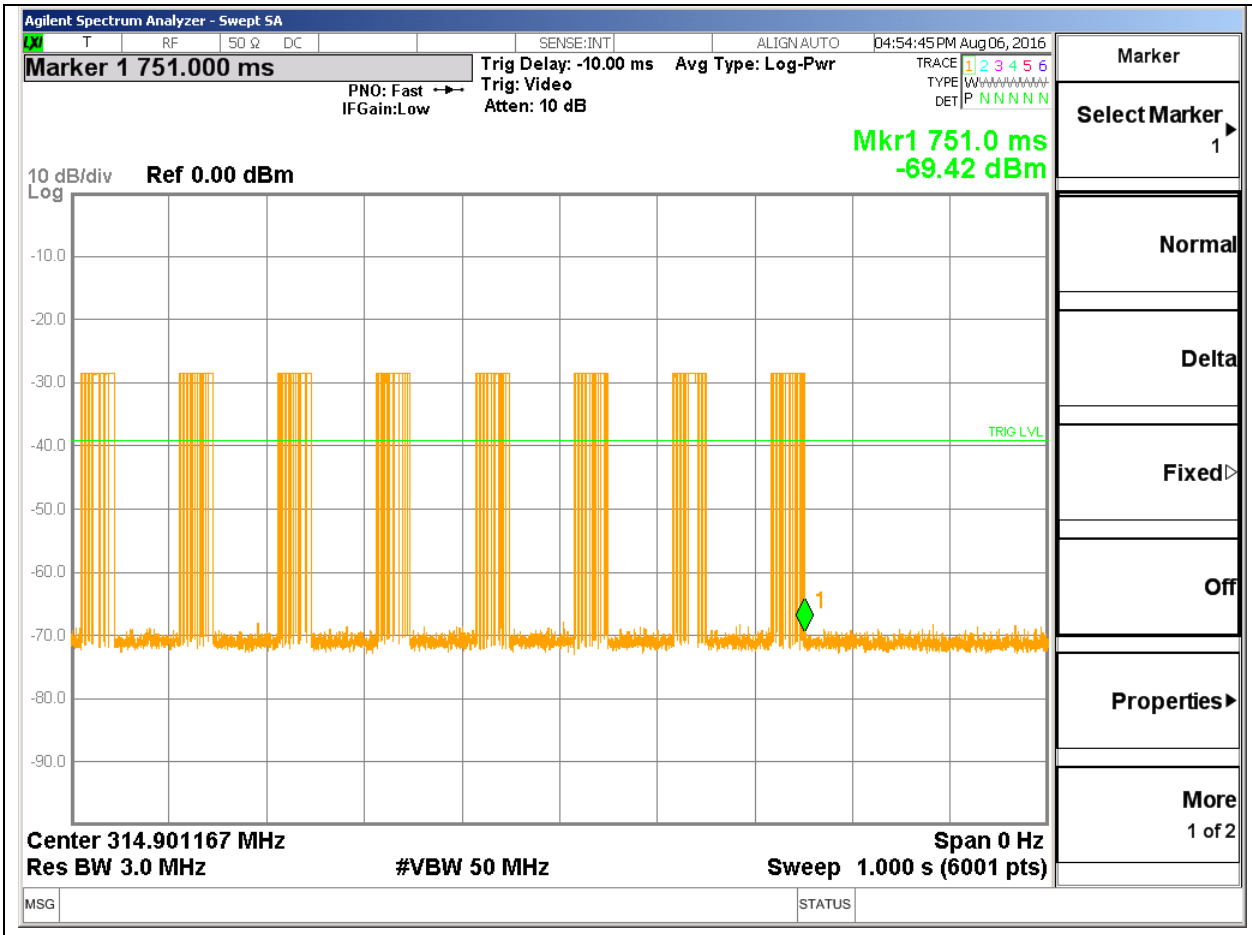

Total Transmission Burst Package

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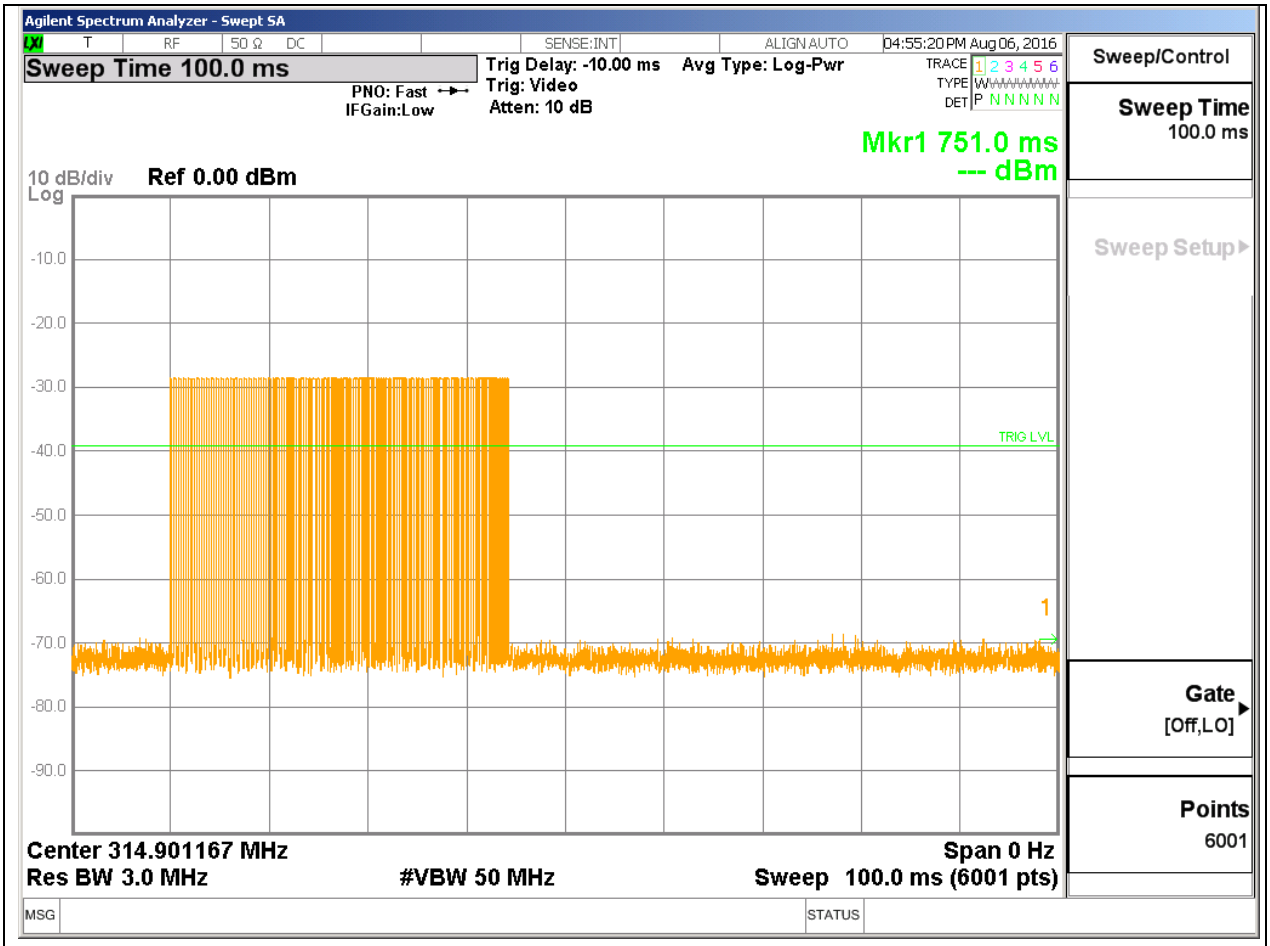

Single Burst within 100ms

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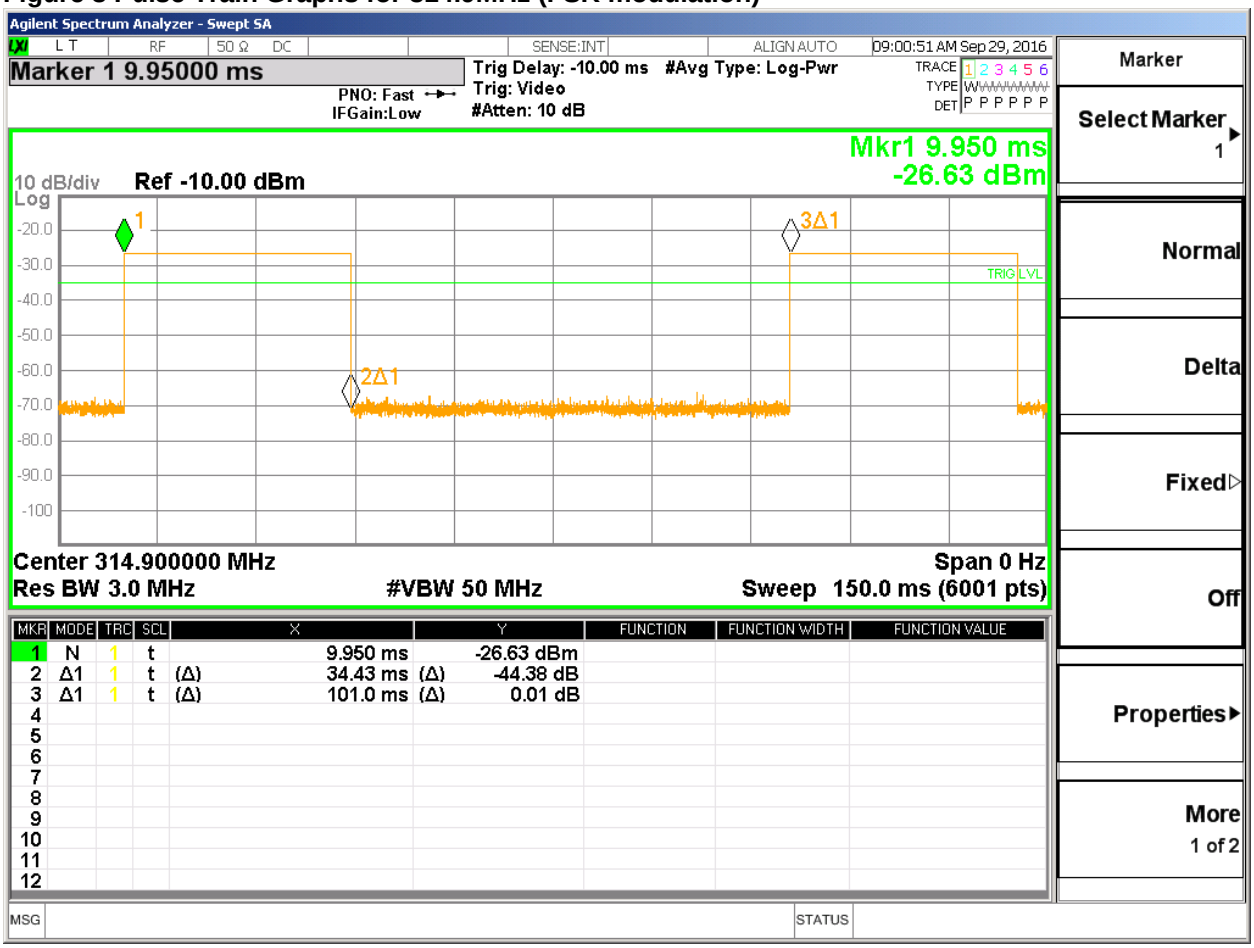
Figure 8 Pulse Train Graphs for 314.9MHz (FSK modulation)



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7.1.4 Test Conditions and Results – RADIATED EMISSIONS Fundamental and Spurious

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4:2003. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter as noted. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard	47 CFR Part 15 subpart C, and RSS-210 A1.1.2		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	3 meter distance	
	1GHz – 4GHz	3 meter distance	

Out of band spurious emissions limit

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Peak
30 - 88	40.00	NA
88 - 216	43.52	NA
216 - 960	46.02	NA
960 - 1000	54	NA
Above 1000 (FCC)	NA	54 (at 3-meter)

Fundamental Frequency Limits and Non-restricted band Harmonic Limits

Frequency (MHz)	Limit (dBµV/m) @ 3m distance All harmonics except those in restricted bands must be attenuated by 20dB or more	
	Average - Fundamental	Peak - Fundamental
314.9	75.62	95.62

Supplementary information: See section 7.1.3 for duty cycle information.

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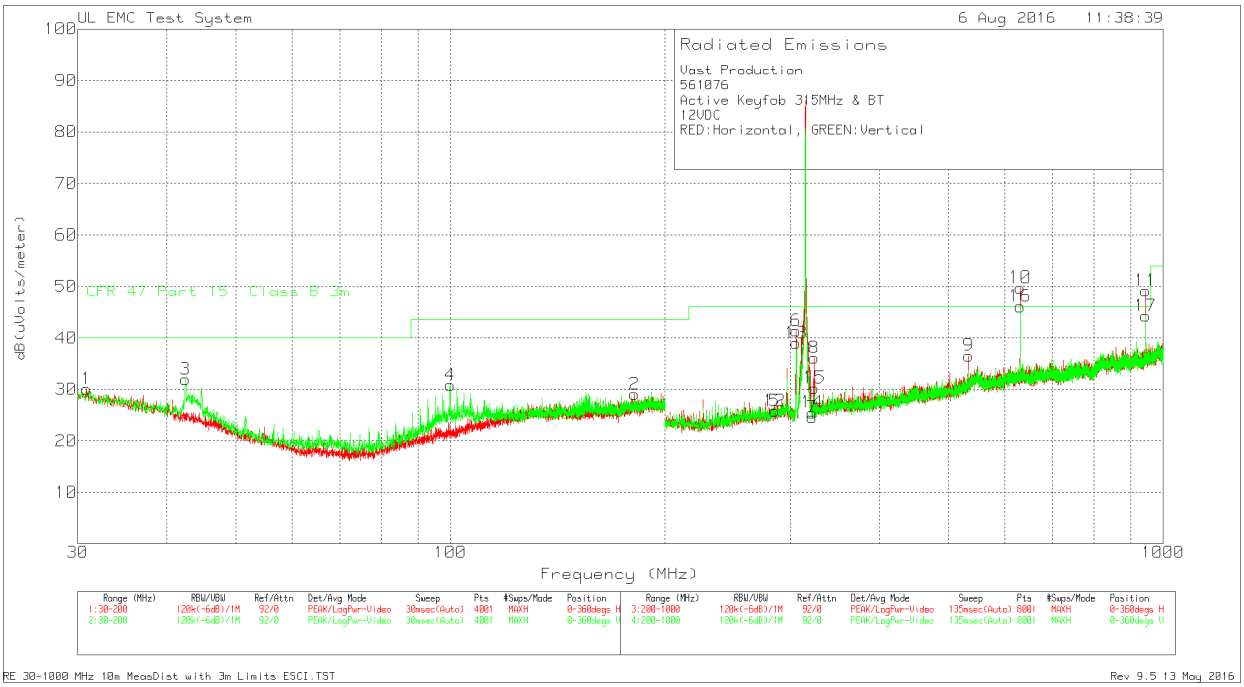
Figure 9 Radiated Emissions Graph (30MHz to 1GHz) – ASK Modulation



Besides the fundamental transmit frequency and its harmonics, All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

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Table 7 - Radiated Emissions Data Points 314.9MHz ASK Modulation – 30MHz to 1GHz

Vast Production
561076
Active Keyfob 315MHz & BT
12VDC
Trace Markers

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	Peak Level dBuV/m	DC Factor dB	Average Level with DC Factor dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity	Notes
314.9013	59.33	Pk	13.5	8.3	81.13	-15.37	65.76	95.62	-14.49	75.62	-9.86	0	247	V	3
314.9013	64.1	Pk	13.5	8.3	85.9	-15.37	70.53	95.62	-9.72	75.62	-5.09	75	102	H	3
629.8051	17.93	Pk	20.3	8.9	47.13	-15.37	31.76	75.62	-28.49	55.62	-23.86	282	101	V	3
629.7975	21.9	Pk	20.3	8.9	51.1	-15.37	35.73	75.62	-24.52	55.62	-19.89	282	147	H	3
944.7063	16.63	Pk	23.4	9.6	49.63	-15.37	34.26	75.62	-25.99	55.62	-21.36	252	165	H	3
944.6928	13.28	Pk	23.4	9.6	46.28	-15.37	30.91	75.62	-29.34	55.62	-24.71	357	119	V	3

Pk - Peak detector

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Figure 10 Radiated Emissions Graph (30MHz to 1GHz) – FSK Modulation

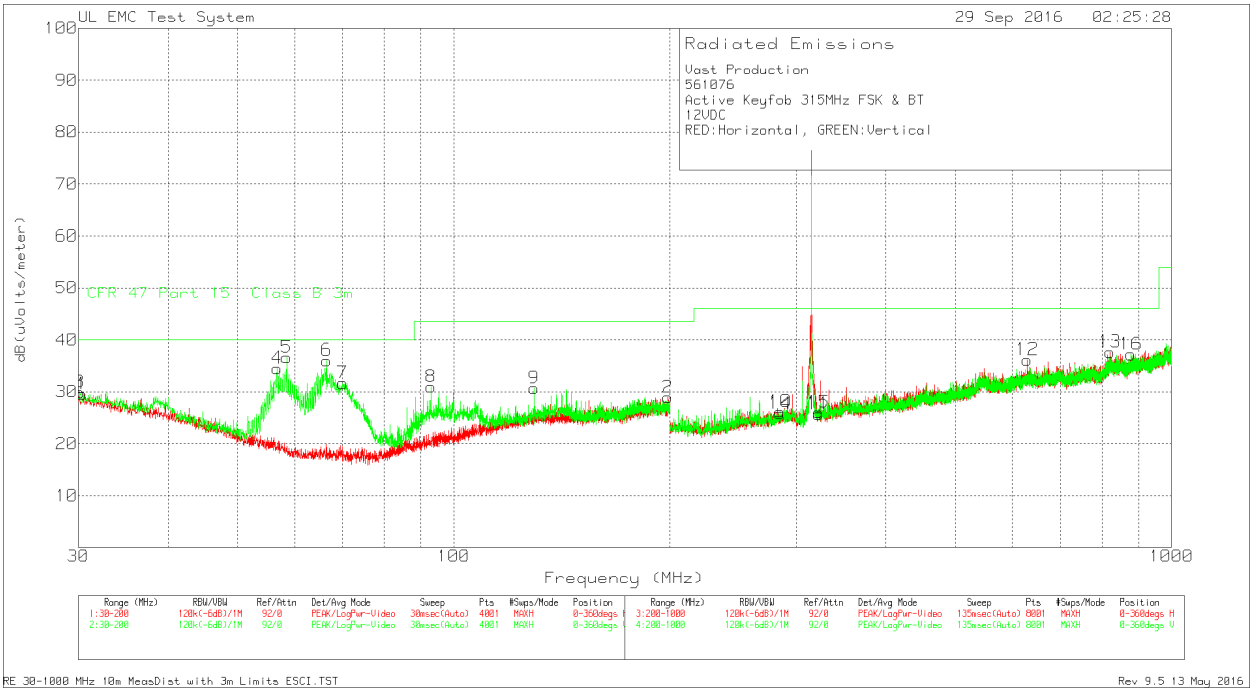

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Table 8 - Radiated Emissions Data Points 314.9MHz FSK Modulation – 30MHz to 1GHz

Vast Production
561076
Active Keyfob 315MHz FSK & BT
12VDC
RED:Horizontal, GREEN:Vertical

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dBm	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.3825	31.05	Pk	18	-30	10.5	29.55	40	-10.45	0-360	398	H
2	198.64	31.14	Pk	16	-28.7	10.5	28.94	43.52	-14.58	0-360	249	H
3	30.1275	31.3	Pk	18.1	-30	10.5	29.9	40	-10.1	0-360	398	V
4	56.7325	46.12	Pk	7.9	-30	10.5	34.52	40	-5.48	0-360	251	V
5	58.5175	48.68	Pk	7.4	-30	10.5	36.58	40	-3.42	0-360	251	V
6	66.5075	49.04	Pk	6.5	-30	10.5	36.04	40	-3.96	0-360	251	V
7	70.035	44.56	Pk	6.5	-29.9	10.5	31.66	40	-8.34	0-360	251	V
8	92.985	40.67	Pk	9.7	-29.9	10.5	30.97	43.52	-12.55	0-360	101	V
9	129.45	35.84	Pk	14.1	-29.7	10.5	30.74	43.52	-12.78	0-360	101	V
10	285	31.38	Pk	13.3	-29	10.5	26.18	46.02	-19.84	0-360	299	H
11	322	29.94	Pk	14	-28.7	10.5	25.74	46.02	-20.28	0-360	299	H
12	629.8	32.47	Pk	20.3	-27.1	10.5	36.17	46.02	-9.85	0-360	100	H
13	820.3	32.06	Pk	22.8	-27.7	10.5	37.66	46.02	-8.36	0-360	199	H
14	285	31	Pk	13.3	-29	10.5	25.8	46.02	-20.22	0-360	299	V
15	322	30.26	Pk	14	-28.7	10.5	26.06	46.02	-19.96	0-360	299	V
16	878.3	31.9	Pk	22.6	-27.8	10.5	37.2	46.02	-8.82	0-360	102	V

Pk - Peak detector

Radiated Emission Data

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dBm	Path dB	10M to 3M Factor dB	Corrected Reading dB(uVolts/ meter)	QP Limit	QP Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
56.742375	41.94	Qp	7.9	-30	10.5	30.34	40	-9.66	8	241	V
58.5583	43.78	Qp	7.4	-30	10.5	31.68	40	-8.32	175	259	V
66.49418	42.74	Qp	6.5	-30	10.5	29.74	40	-10.26	9	230	V

Qp - Quasi-Peak detector

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Table 9 - Radiated Emissions Data Points 314.9MHz FSK Modulation – 30MHz to 1GHz

Fundamental and Harmonic Measurements

Vast Production
561077
Active Keyfob FSK 315MHz & BT
12VDC
RED:Horizontal, GREEN:Vertical

Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dBm	Path dB	Peak Level dBuV/m	DC Factor dB	Average Level with DC factor dBuV/m	Peak Limit	Peak Margin (dB)	Average Limit	Average margin	Azimuth [Degs]	Height [cm]	Polarity
314.8701	47.93	Pk	13.5	8	69.43	-9.26	60.17	95.62	-26.19	75.62	-15.45	292	237	V
314.9298	55.03	Pk	13.5	8	76.53	-9.26	67.27	95.62	-19.09	75.62	-8.35	287	106	H
629.8639	10	Pk	20.3	8.9	39.2	-9.26	29.94	75.62	-36.42	55.62	-25.68	238	144	H
629.8607	6.88	Pk	20.3	8.9	36.08	-9.26	26.82	75.62	-39.54	55.62	-28.8	120	102	V
944.8938	4.7	Pk	23.4	9.6	37.7	-9.26	28.44	75.62	-37.92	55.62	-27.18	203	163	V
944.8465	5.79	Pk	23.4	9.6	38.79	-9.26	29.53	75.62	-36.83	55.62	-26.09	70	165	H

Pk - Peak detector

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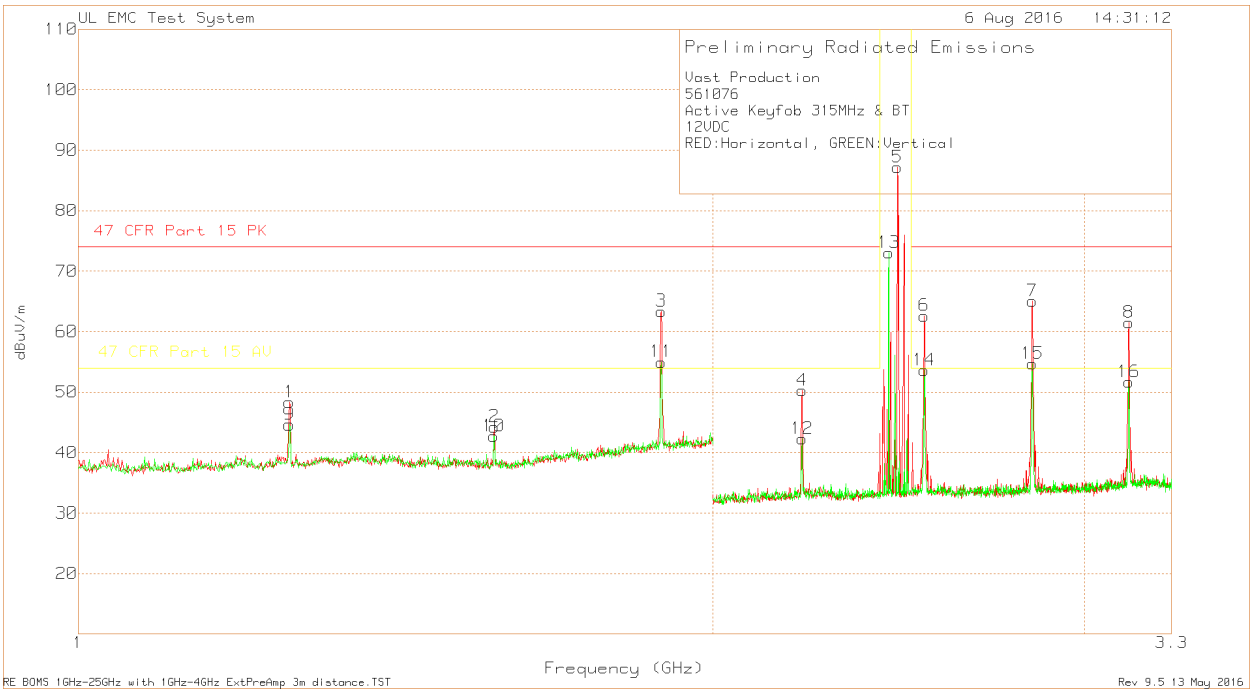
Figure 11 Radiated Emissions Graph (Above 1GHz) ASK Modulation



Emissions visible at 2.4GHz are the product of the modular certified Bluetooth transmitter. Besides the transmit frequency harmonics, All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Table 10 - Radiated Emissions Data Points 314.9MHz ASK Modulation – Above 1GHz

Vast Production
561076
Active Keyfob 315MHz & BT
12VDC

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path (dB)	Peak Level dBuV/m	DC Factor dB	Average Level with DC Factor dBuV/m	PK Limit	PK Margin (dB)	AV Limit	AV Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.3016	73.1	Pk	28.9	-57.01	44.99	-15.37	29.62	74	-29.01	54	-24.38	11	108	H
1.3018	78.72	Pk	28.9	-57.01	50.61	-15.37	35.24	74	-23.39	54	-18.76	278	212	V
1.7357	69.52	Pk	29.6	-55.42	43.7	-15.37	28.33	74	-30.3	54	-25.67	149	157	V
1.7359	69.42	Pk	29.6	-55.42	43.6	-15.37	28.23	74	-30.4	54	-25.77	296	153	H
2.1696	93.55	Pk	21.7	-52.18	63.07	-15.37	47.7	74	-10.93	54	-6.3	301	226	H
2.1696	95.05	Pk	21.7	-52.18	64.57	-15.37	49.2	74	-9.43	54	-4.8	85	101	V
2.6035	91.95	Pk	22.3	-51.19	63.06	-15.37	47.69	74	-10.94	54	-6.31	111	119	V
2.6035	92.59	Pk	22.3	-51.19	63.7	-15.37	48.33	74	-10.3	54	-5.67	78	100	H
3.0373	86.23	Pk	22.5	-50.24	58.49	-15.37	43.12	74	-15.51	54	-10.88	84	105	H
3.0374	79.21	Pk	22.5	-50.23	51.48	-15.37	36.11	74	-22.52	54	-17.89	71	150	V
3.4713	76.29	Pk	23.5	-50.59	49.2	-15.37	33.83	74	-24.8	54	-20.17	308	115	V
3.4715	78.81	Pk	23.5	-50.59	51.72	-15.37	36.35	74	-22.28	54	-17.65	77	162	H
3.9053	79.74	Pk	23.8	-51	52.54	-15.37	37.17	74	-21.46	54	-16.83	248	100	H
3.9052	77.48	Pk	23.8	-51	50.28	-15.37	34.91	74	-23.72	54	-19.09	135	156	V
4.3393	70.36	Pk	28.1	-52.09	46.37	-15.37	31	74	-27.63	54	-23	330	103	V
4.3392	73.56	Pk	28.1	-52.09	49.57	-15.37	34.2	74	-24.43	54	-19.8	47	208	H

Pk - Peak detector

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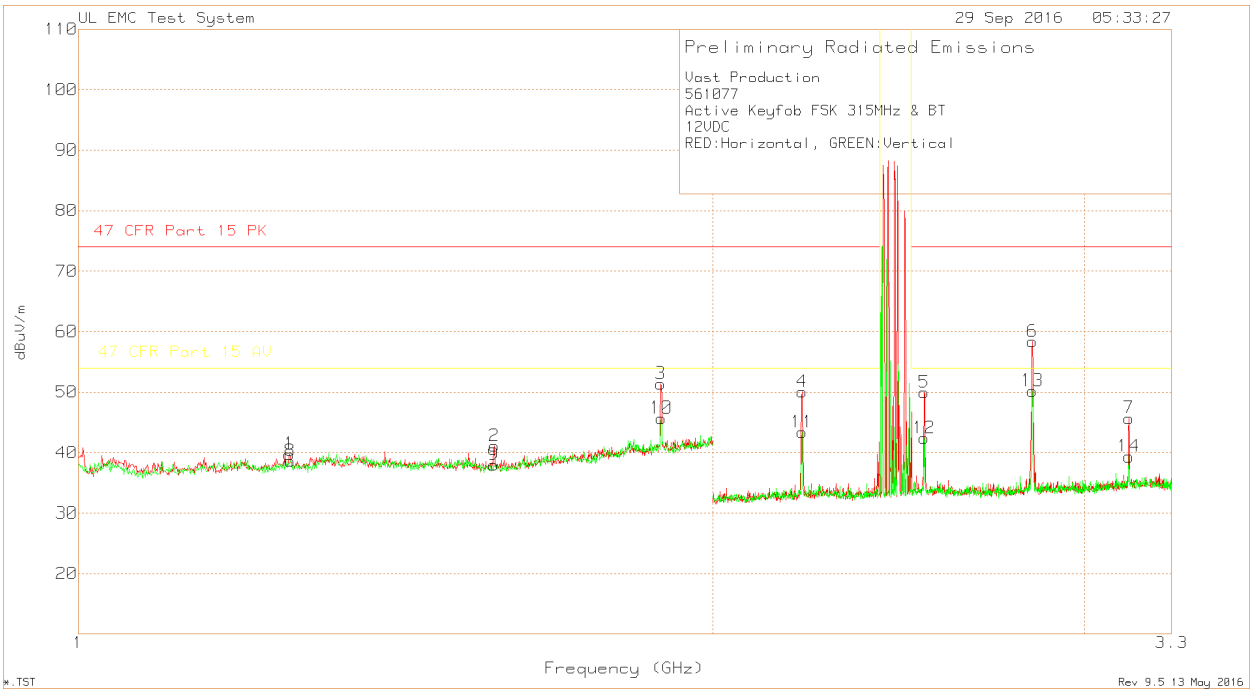
Figure 12 Radiated Emissions Graph (Above 1GHz) FSK Modulation



Emissions visible at 2.4GHz are the product of the modular certified Bluetooth transmitter. Besides the transmit frequency harmonics, All other visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

Table 11 - Radiated Emissions Data Points 314.9MHz FSK Modulation – Above 1GHz

Vast Production
561077
Active Keyfob FSK 315MHz & BT
12VDC
RED:Horizontal, GREEN:Vertical
Radiated Emission Data

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dBm	Path (dB)	Peak Level dBuV/m	DC Factor dB	Average Level with DC Factor dBuV/m	Peak Limit	Peak Margin (dB)	Average Limit	Average Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.2595	68.87	Pk	28.7	-57.12	40.45	-9.26	31.19	74	-33.55	54	-22.81	335	186	H
1.5743	69.24	Pk	28.2	-55.94	41.5	-9.26	32.24	74	-32.5	54	-21.76	2	159	H
1.8896	75.79	Pk	31.1	-54.69	52.2	-9.26	42.94	74	-21.8	54	-11.06	298	200	H
2.2041	79.94	Pk	21.8	-51.85	49.89	-9.26	40.63	74	-24.11	54	-13.37	29	130	H
2.5191	78.1	Pk	22.1	-51.02	49.18	-9.26	39.92	74	-24.82	54	-14.08	35	120	H
2.8338	86.16	Pk	22.3	-50.58	57.88	-9.26	48.62	74	-16.12	54	-5.38	357	134	H
3.1486	73.39	Pk	22.9	-50.51	45.78	-9.26	36.52	74	-28.22	54	-17.48	347	145	H
1.2593	67.49	Pk	28.7	-57.12	39.07	-9.26	29.81	74	-34.93	54	-24.19	131	159	V
1.5752	66.16	Pk	28.2	-55.93	38.43	-9.26	29.17	74	-35.57	54	-24.83	274	149	V
1.8891	69.68	Pk	31.1	-54.69	46.09	-9.26	36.83	74	-27.91	54	-17.17	181	100	V
2.2045	73.45	Pk	21.8	-51.84	43.41	-9.26	34.15	74	-30.59	54	-19.85	298	150	V
2.5195	72.2	Pk	22.1	-51.02	43.28	-9.26	34.02	74	-30.72	54	-19.98	327	183	V
2.8344	76.92	Pk	22.3	-50.58	48.64	-9.26	39.38	74	-25.36	54	-14.62	356	106	V
3.1493	64.49	Pk	22.9	-50.51	36.88	-9.26	27.62	74	-37.12	54	-26.38	242	100	V

Pk - Peak detector

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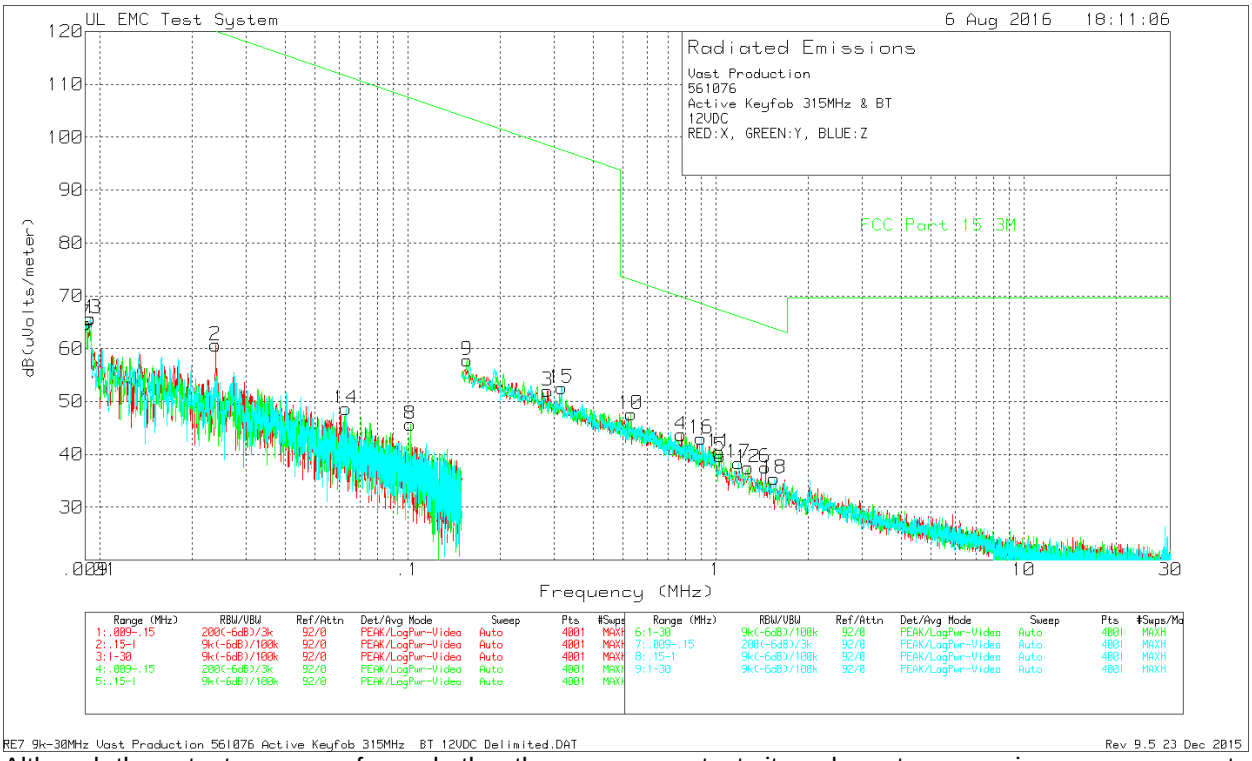
Figure 13 Radiated Emissions Graph (9kHz to 30MHz) Worst-Case – ASK Modulation



Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 3 m open area test site. Therefore sufficient tests weremade to demonstrate that the alternative site produces results that correlate with the ones oftests made in an open field based on KDB 937606.

All visible emissions are at least 6dB below the limit or under the noise floor, therefore no further measurement needed.

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Table 12 - Radiated Emissions Data Points 314.9MHz – 9kHz to 30MHz – ASK Modulation

Vast Production
561076
Active Keyfob 315MHz & BT
12VDC
RED:X, GREEN:Y, BLUE:Z
Trace Markers

Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path dB	Corrected Reading dB(uVolts/ meter)	AV Limit	Margin (dB)	Azimuth [Degs]	Antenna Polarity
1	0.00935	43.84	Pk	21.9	0	65.74	128.17	-62.43	0-360	X
2	0.02384	44.29	Pk	16.4	0	60.69	120.04	-59.35	0-360	X
3	0.28483	40.11	Pk	11.9	0	52.01	98.51	-46.5	0-360	X
4	0.77324	31.73	Pk	12	0	43.73	69.84	-26.11	0-360	X
5	1.03625	26.97	Pk	12.6	0.1	39.67	67.29	-27.62	0-360	X
6	1.4495	24.97	Pk	12.5	0.1	37.57	64.38	-26.81	0-360	X
7	0.009035	42.42	Pk	22.4	0	64.82	128.47	-63.65	0-360	Y
8	0.10217	33.21	Pk	12.5	0	45.71	107.41	-61.7	0-360	Y
9	0.15628	45.62	Pk	12.2	0	57.82	103.72	-45.9	0-360	Y
10	0.53084	35.54	Pk	12.1	0	47.64	73.1	-25.46	0-360	Y
11	1.029	27.74	Pk	12.6	0.1	40.44	67.36	-26.92	0-360	Y
12	1.2755	24.87	Pk	12.5	0.1	37.47	65.49	-28.02	0-360	Y
13	0.009315	43.67	Pk	22	0	65.67	128.2	-62.53	0-360	Z
14	0.063005	35.48	Pk	13.2	0	48.68	111.61	-62.93	0-360	Z
15	0.31614	40.71	Pk	11.9	0	52.61	97.6	-44.99	0-360	Z
16	0.89763	30.83	Pk	12.1	0.1	43.03	68.54	-25.51	0-360	Z
17	1.1885	25.77	Pk	12.5	0.1	38.37	66.1	-27.73	0-360	Z
18	1.551	22.96	Pk	12.4	0.1	35.46	63.79	-28.33	0-360	Z

Pk - Peak detector

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