TEST REPORT

FCC Part 15 Subpart C Section 15.231
IC RSS-210 Issue 8, Amendment 1
IC RSS-Gen Issue 4

MANUFACTURER'S NAME	Cinch Systems Inc 12075 43rd Street NE Suite 300 St Michael MN 55376 USA
PRODUCT NAME(S)	Micro Door Window Sensor – Tilt Micro Door Window Sensor – Doorbell Hardwire Converter
MODEL NUMBER(S) TESTED	RF-MDWSX-TILT-ITI RF-MDWSX-DB-ITI RF-CHW-ITI-16
SERIAL NUMBER(S) TESTED	123456 123456 123456
PRODUCT DESCRIPTION	Micro Door Window Sensors with 319.5 MHz transmitters Hardwire Converter with 319.5 MHz transmitter
TEST REPORT NUMBER	NC1411166.1
TEST DATE(S)	03-05 December 2014

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Sections 15.231 “Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.” and 15.207 “Conducted limits.”, Industry Canada RSS-210 Issue 8 Amendment 1 “Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment” and RSS-Gen Issue 4 “General Requirements and Information for the Certification of Radio Apparatus”.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

Issue Date: 27 March 2015

Joel T Schneider
Senior EMC Engineer

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Senior EMC Technician

Not Transferable

EMC TEST REPORT

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Model(s) Tested	RF-MDWSX-TILT-ITI RF-MDWSX-DB-ITI RF-CHW-ITI-16
Serial No(s) Tested	123456 123456 123456
Product Description	Micro Door Window Sensors with 319.5 MHz transmitters Hardwire Conveter with 319.5 MHz transmitter
Manufacturer	Cinch Systems Inc 12075 43rd Street NE Suite 300 St Michael MN 55376
Issuing Laboratory	TÜV SÜD America Inc USA 1775 Old Highway 8 NW, Suite 104 New Brighton MN 55112 - 1891 Phone: 651-631-2487 / Fax: 651-638-0285
Test Result	■ **Positive** ☐ **Negative**

TÜV SÜD America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.

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TÜV SÜD America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI.

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	28	27 March 2015	Initial Release

DIRECTORY

Contents

EMC TEST REGULATIONS:
The tests were performed according to the following regulations:
FCC Part 15 Subpart C §15.231
IC RSS-210 Issue 8 Amendment 1
IC RSS-Gen Issue 4

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 17-18°C
Atmospheric pressure	: 99-100kPa
Relative Humidity	: 14-21%

POWER SUPPLY UTILIZED

Power supply system	: 3VDC (MDWSX)
	: 120VAC/60Hz (RFCHW)

TEST EQUIPMENT
All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

MEASUREMENT UNCERTAINTY
The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ±1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ±4.8 dB. All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

SIGN EXPLANATIONS
☐ - not applicable
■ - applicable

Radiated Emissions 30 - 3200 MHz
FCC 15.231(b), IC RSS-210 A1.1

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.3.

Test location
Taylors Falls Lab Large Test Site (Open Area Test Site)

Test distance
3 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
OWLE03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	16-Oct-14	16-Oct-15
WRLE10897	ZHL-1042J	Mini-Circuits	Amplifier Broadband AMP/ SMA QA1148002	NA	Code B 14-Jan-14	Code B 14-Jan-15
WRLE03894	NHP-600	Mini-Circuits	30-600 MHz Stopband Filter	2	Code B 04-Feb-13	Code B 29-May-15
WRLE11144	8566B	Hewlett-Packard	Spectrum Analyzer	2728A04260	03-Mar-14	03-Mar-15
WRLE11145	85662A	Hewlett-Packard	Analyzer Display	2648A14613	03-Mar-14	03-Mar-15
WRLE11146	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01299	04-Mar-14	04-Mar-15
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code Y	Code Y
OWLE02074	3115	Electro-Mechanics	Ridge Guide Antenna	2504	20-Mar-14	20-Mar-15
WRLE10897	ZHL-1042J	Mini-Circuits	Amplifier Broadband AMP/ SMA QA1148002	NA	Code B 14-Jan-14	Code B 14-Jan-15
WRLE11198	ESI	Rohde & Schwarz	Receiver (20Hz-26.5GHz)	835336/010	18-Feb-14	18-Feb-15

Code B = Calibration verification performed internally. Code Y = Calibration not required when used with other calibrated equipment

Limit with 319.5 MHz fundamental and 3 meter distance

Detector	Field strength fundamental (μV/m)	Field strength Spurious (μV/m)
Average	6229	622.9
Peak	62291	6229

The emission limits shown in the above table are based on measurements employing a CISPR average detector. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, *e.g.*, see §§ 15.250, 15.252, 15.255, and 15.509–15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section. Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer or receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with a 120 kHz / 6 dB bandwidth and average/peak detection and measurements above 1000 MHz are made with a 1 MHz RBW/VBW / 6 dB bandwidth and peak detection, 1 MHz RBW/ 10 Hz VBW for average detection. Table top equipment is placed on a non-conductive support 80 cm above the ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT is rotated 360 degrees. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB / decade (inverse linear-distance for field strength measurements).

Test data, fundamental

RF-MDWSX-TILT-ITI & RF-MDWSX-DB-ITI

Scan through 3 orthogonal axis for highest fundamental emission level

Device is transmitting packets continuously and configured (for test purposes) to provide its maximum possible total on time of 8.7 mS per 100mS.

Final pk & avg levels with a CISPR receiver (120kHz RBW)

RF-MDWSX-TILT-ITI

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.52	57.1 Pk	2.01 / 19.85 / 0.0 / 0.0	78.96	8871.6	62291	H / 1.10 / 275	-16.16

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.52	32.3 Av	2.01 / 19.85 / 0.0 / 0.0	54.16	510.5	6229	H / 1.10 / 275	-20.96

RF-MDWSX-DB-ITI

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.53	60.8 Pk	2.01 / 19.85 / 0.0 / 0.0	82.66	13583	62291	H / 1.13 / 275	-12.46

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.53	36.3 Av	2.01 / 19.85 / 0.0 / 0.0	58.16	809.1	6229	H / 1.13 / 275	-16.96

RF-CHW-ITI-16

Scan in normal upright position for highest fundamental emission level

Device is transmitting CW.

If modulated, normal packets maximum on time = 8.7 mS in 100 mS

Duty cycle peak-average correction = 20 x Log(8.7/100) = -21.2 dB

Peak levels measured with CISPR receiver

Average levels are calculated (i.e. Peak level - 21.2 dB)

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.508	53.3 Pk	2.01 / 19.85 / 0.0 / 0.0	75.16	5728	62291	V / 1.92 / 187	-19.96

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz fundamental (dB)
319.508	33.3 Av	2.01 / 19.85 / 0.0 / 0.0	55.16	572.8	6229	V / 1.92 / 187	-19.96

Test data, spurious, harmonics
30MHz – 1000MHz
RF-MDWSX-TILT-ITI

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.016	49.5 Pk	2.9 / 25.23 / 30.05 / 0.0	47.58	239.4	6229	H / 1.80 / 252	-28.3
958.556	33.7 Pk	3.61 / 28.72 / 30.13 / 0.0	35.91	62.5	6229	V / 1.47 / 347	-39.97

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.016	27.0 Av	2.9 / 25.23 / 30.05 / 0.0	25.08	18	622.9	H / 1.80 / 252	-30.8
958.556	18.6 Av	3.61 / 28.72 / 30.13 / 0.0	20.81	11	622.9	V / 1.47 / 347	-35.07

RF-MDWSX-DB-ITI

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.048	53.3 Pk	2.9 / 25.23 / 30.05 / 0.0	51.38	370.68	6229	V / 1.16 / 227	-24.5
958.565	37.0 Pk	3.61 / 28.72 / 30.13 / 0.0	39.21	91.31	6229	V / 1.32 / 334	-36.67

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.048	30.0 Av	2.9 / 25.23 / 30.05 / 0.0	28.08	25.35	622.9	V / 1.16 / 227	-27.8
958.565	19.9 Av	3.61 / 28.72 / 30.13 / 0.0	22.11	12.75	622.9	V / 1.32 / 334	-33.77

RF-CHW-ITI-16

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Pk)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.079	55.0 Pk	2.9 / 25.23 / 30.05 / 0.0	53.08	450.82	6229	V / 1.00 / 300	-22.8
33.907	54.2 Pk	0.62 / 26.58 / 29.59 / 0.0	51.82	389.94	6229	V / 1.00 / 111	-24.06
958.586	46.7 Pk	3.61 / 28.72 / 30.13 / 0.0	48.91	278.93	6229	V / 1.49 / 43	-26.97
479.335	47.0 Pk	2.52 / 22.91 / 29.93 / 0.0	42.51	133.51	6229	V / 1.00 / 332	-33.37

Measurement summary for limit1: fcc 15.231-319.5 MHz fundamental (Av)							
FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA1 fcc 15.231-319.5 MHz spurious (dB)
639.079	54.6 Av	2.9 / 25.23 / 30.05 / 0.0	52.68	430.53	622.9	V / 1.00 / 300	-3.2
958.586	45.5 Av	3.61 / 28.72 / 30.13 / 0.0	47.71	242.94	622.9	V / 1.49 / 43	-8.17
479.335	45.8 Av	2.52 / 22.91 / 29.93 / 0.0	41.31	116.28	622.9	V / 1.00 / 332	-14.57
33.907	38.5 Av	0.62 / 26.58 / 29.59 / 0.0	36.12	63.97	622.9	V / 1.00 / 111	-19.76

Test data, spurious, harmonics
1000MHz – 3200MHz
Using 15.209 limits for any emissions in the restricted bands. ~1.8dB less than 15.231 limits

RF-MDWSX-TILT-ITI

Measurement summary: FCC 15.209 >1GHz 3m pk Spurious within restricted bands							
FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
2.237	42.35 Pk	5.55 / 27.82 / 29.53 / 0.0	46.19	203.94	5000	H / 1.00 / 270	-27.81
2.876	39.15 Pk	6.42 / 29.49 / 30.08 / 0.0	44.97	177.21	5000	V / 1.00 / 0	-29.03
1.598	42.05 Pk	4.65 / 26.09 / 30.53 / 0.0	42.27	129.87	5000	H / 1.00 / 270	-31.73

Measurement summary: FCC 15.231 >1GHz 3m pk Spurious outside the restricted bands							
FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
3.195	53.45 Pk	6.62 / 30.55 / 30.64 / 0.0	59.99	998.85	6229	H / 1.02 / 288	-15.89
2.556	47.2 Pk	5.98 / 28.87 / 29.49 / 0.0	52.56	424.62	6229	H / 1.00 / 180	-23.32
1.917	47.55 Pk	5.1 / 27.85 / 30.18 / 0.0	50.32	328.10	6229	H / 1.00 / 270	-25.56
1.278	47.3 Pk	4.14 / 25.66 / 30.33 / 0.0	46.77	218.02	6229	V / 1.00 / 0	-29.11

Measurement summary: FCC 15.209 >1GHz 3m av Spurious within restricted bands							
FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
2.237	32.39 Av	5.55 / 27.82 / 29.53 / 0.0	36.23	64.79	500	H / 1.00 / 270	-17.77
2.876	30.23 Av	6.42 / 29.49 / 30.08 / 0.0	36.05	63.46	500	V / 1.00 / 0	-17.95
1.598	32.51 Av	4.65 / 26.09 / 30.53 / 0.0	32.73	43.30	500	H / 1.00 / 270	-21.27

Measurement summary: FCC 15.231 >1GHz 3m av
Spurious outside the restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
3.195	39.76 Av	6.62 / 30.55 / 30.64 / 0.0	46.3	206.54	622.9	H / 1.02 / 288	-9.58
2.556	36.02 Av	5.98 / 28.87 / 29.49 / 0.0	41.38	117.22	622.9	H / 1.00 / 180	-14.5
1.917	36.58 Av	5.1 / 27.85 / 30.18 / 0.0	39.35	92.79	622.9	H / 1.00 / 270	-16.53
1.278	35.8 Av	4.14 / 25.66 / 30.33 / 0.0	35.27	58.01	622.9	V / 1.00 / 0	-20.61

RF-MDWSX-DB-ITI

Measurement summary: FCC 15.209 >1GHz 3m pk
Spurious within restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
2.237	41.8 Pk	5.55 / 27.82 / 29.53 / 0.0	45.64	191.43	5000	H / 1.00 / 90	-28.36
2.876	37.15 Pk	6.42 / 29.49 / 30.08 / 0.0	42.97	140.77	5000	V / 1.00 / 0	-29.18
1.598	38.8 Pk	4.65 / 26.09 / 30.53 / 0.0	39.02	89.33	5000	V / 1.00 / 180	-34.98

Measurement summary: FCC 15.231 >1GHz 3m pk
Spurious outside the restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
2.556	52.65 Pk	5.98 / 28.87 / 29.49 / 0.0	58.01	795.24	6229	H / 1.00 / 239	-17.87
3.195	49.25 Pk	6.62 / 30.55 / 30.64 / 0.0	55.79	615.89	6229	H / 1.00 / 270	-20.09
1.278	53.5 Pk	4.14 / 25.66 / 30.33 / 0.0	52.97	445.14	6229	V / 1.00 / 0	-22.91
1.917	42.05 Pk	5.1 / 27.85 / 30.18 / 0.0	44.82	174.18	6229	V / 1.00 / 0	-31.06

Measurement summary: FCC 15.209 >1GHz 3m av
Spurious within restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
2.237	31.16 Av	5.55 / 27.82 / 29.53 / 0.0	35.0	56.23	500	H / 1.00 / 90	-19.0
2.876	27.59 Av	6.42 / 29.49 / 30.08 / 0.0	33.41	46.83	500	V / 1.00 / 270	-20.59
1.598	29.82 Av	4.65 / 26.09 / 30.53 / 0.0	30.04	31.77	500	V / 1.00 / 270	-20.59

Measurement summary: FCC 15.231 >1GHz 3m av
Spurious outside the restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
2.556	38.74 Av	5.98 / 28.87 / 29.49 / 0.0	44.1	160.32	622.9	H / 1.00 / 239	-11.78
3.195	36.44 Av	6.62 / 30.55 / 30.64 / 0.0	42.98	140.93	622.9	H / 1.00 / 270	-12.9
1.278	37.93 Av	4.14 / 25.66 / 30.33 / 0.0	37.4	74.13	622.9	V / 1.00 / 0	-18.48
1.917	31.44 Av	5.1 / 27.85 / 30.18 / 0.0	34.21	51.35	622.9	V / 1.00 / 0	-21.67

RF-CHW-ITI-16

Measurement summary: FCC 15.209 >1GHz 3m pk
Spurious within restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
1.598	42.8 Pk	4.65 / 26.09 / 30.53 / 0.0	43.02	141.58	5000	V / 1.00 / 90	-30.98
2.876	36.9 Pk	6.42 / 29.49 / 30.08 / 0.0	42.72	136.77	5000	V / 1.00 / 90	-31.28
2.237	38.65 Pk	5.55 / 27.82 / 29.53 / 0.0	42.49	133.20	5000	V / 1.00 / 0	-31.51

Measurement summary: FCC 15.231 >1GHz 3m pk
Spurious outside the restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
3.195 GHz	39.7 Pk	6.62 / 30.55 / 30.64 / 0.0	46.24	205.12	6229	H / 1.47 / 63	-29.64
2.556 GHz	36.2 Pk	5.98 / 28.87 / 29.49 / 0.0	41.56	119.67	6229	V / 1.00 / 0	-34.32
1.917 GHz	38.1 Pk	5.1 / 27.85 / 30.18 / 0.0	40.87	110.54	6229	V / 1.00 / 0	-35.01
1.278 GHz	37.35 Pk	4.14 / 25.66 / 30.33 / 0.0	36.82	69.34	6229	V / 1.00 / 0	-39.06

Measurement summary: FCC 15.209 >1GHz 3m av
Spurious within restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.209 >1GHz 3m av (dB)
1.598	39.06 Av	4.65 / 26.09 / 30.53 / 0.0	39.28	92.04	500	V / 1.00 / 90	-14.72
2.876	28.67 Av	6.42 / 29.49 / 30.08 / 0.0	34.49	53.03	500	V / 1.00 / 90	-19.51
2.237	30.5 Av	5.55 / 27.82 / 29.53 / 0.0	34.34	52.12	500	V / 1.00 / 0	-19.66

Measurement summary: FCC 15.231 >1GHz 3m av
Spurious outside the restricted bands

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	FINAL (uV/m)	LIMIT (uV/m)	POL / HGT / AZ (m)(DEG)	DELTA FCC 15.231 >1GHz 3m av (dB)
3.195 GHz	33.42 Av	6.62 / 30.55 / 30.64 / 0.0	39.96	99.54	622.9	H / 1.47 / 63	-15.92
1.917 GHz	29.06 Av	5.1 / 27.85 / 30.18 / 0.0	31.83	39.04	622.9	V / 1.00 / 0	-24.05
2.556 GHz	26.21 Av	5.98 / 28.87 / 29.49 / 0.0	31.57	37.89	622.9	V / 1.00 / 0	-24.31
1.278 GHz	27.64 Av	4.14 / 25.66 / 30.33 / 0.0	27.11	22.67	622.9	V / 1.00 / 0	-28.77

Occupied bandwidth
FCC 15.231(c), IC RSS-210 A1.1.3

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2009 clause 13.7

Test location
Taylors Falls Lab Large Test Site (Open Area Test Site)

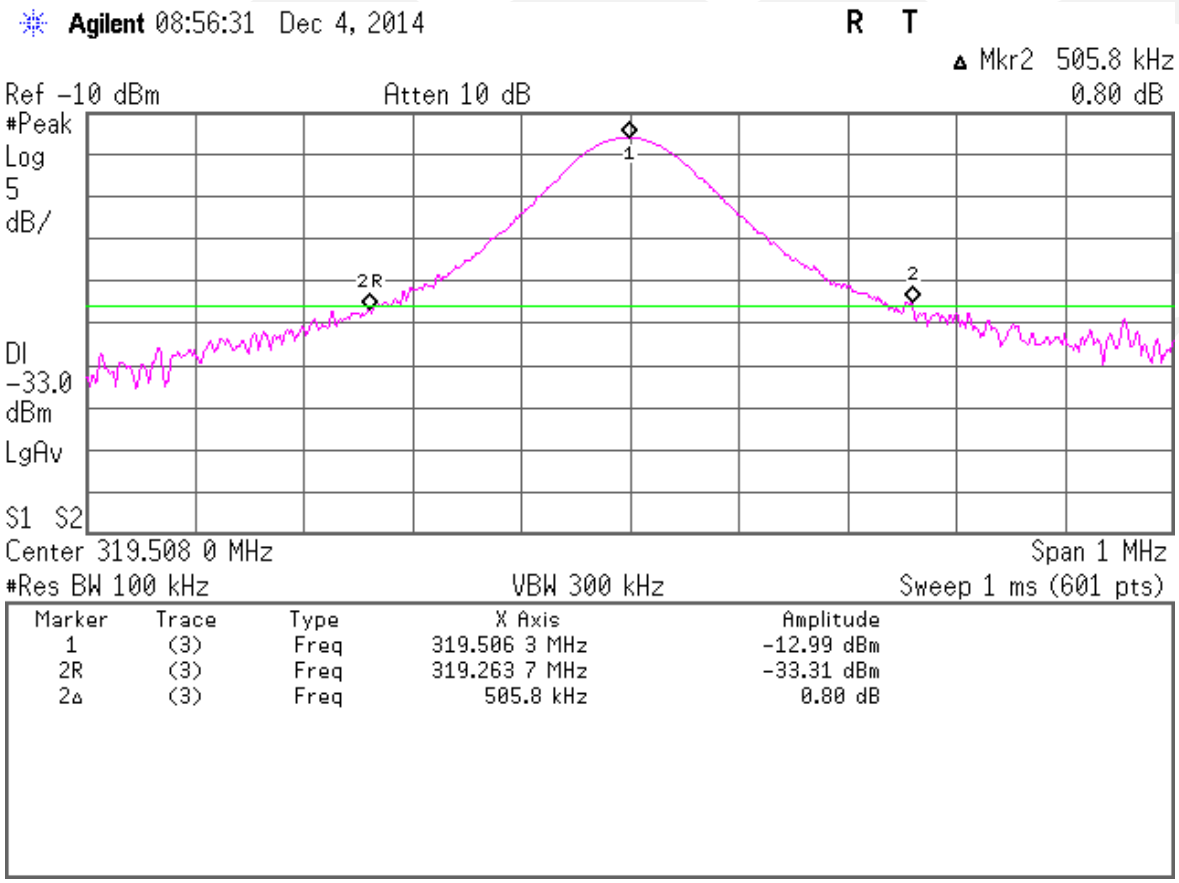
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	10-Sep-14	10-Sep-15
WRLE01564	7405-901	EMCO	Near field probe	na	Code Y	Code Y

Code Y = Calibration not required when used with other calibrated equipment.

Test limit
No wider than 0.25% of the center frequency. 319.508 MHz x 0.25% = 798.77 kHz. Per FCC, measured at the -20 dBc points. Per IC RSS-210 A1.1.3, the 99% occupied bandwidth

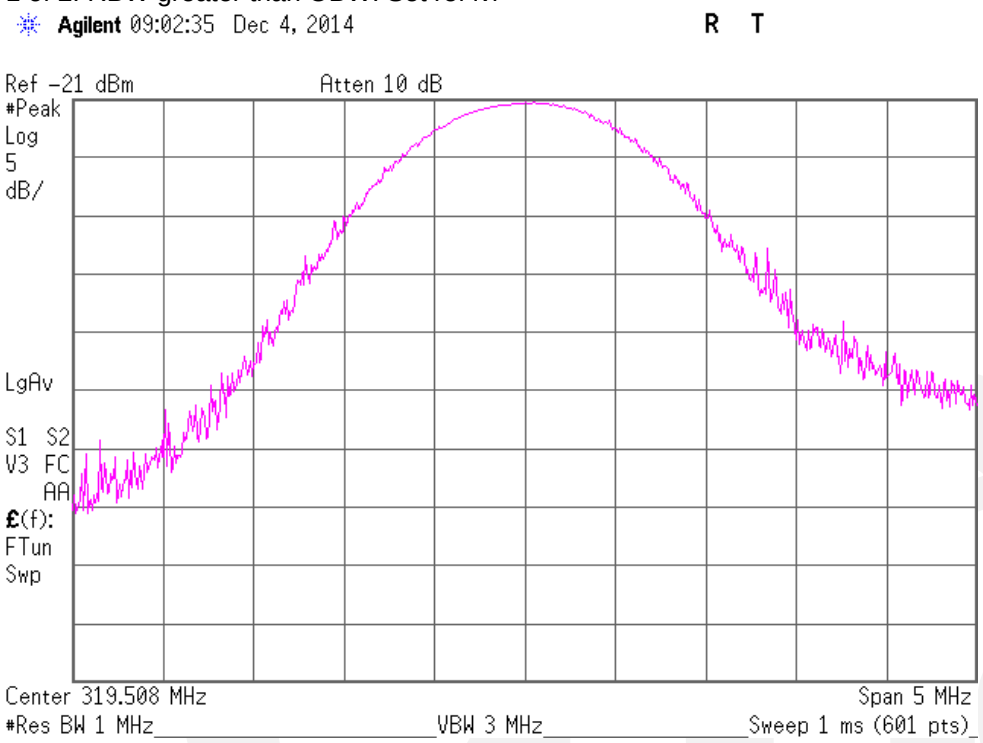
Test data per FCC 15.231(c)
20 dB occupied bandwidth = 505.8 kHz



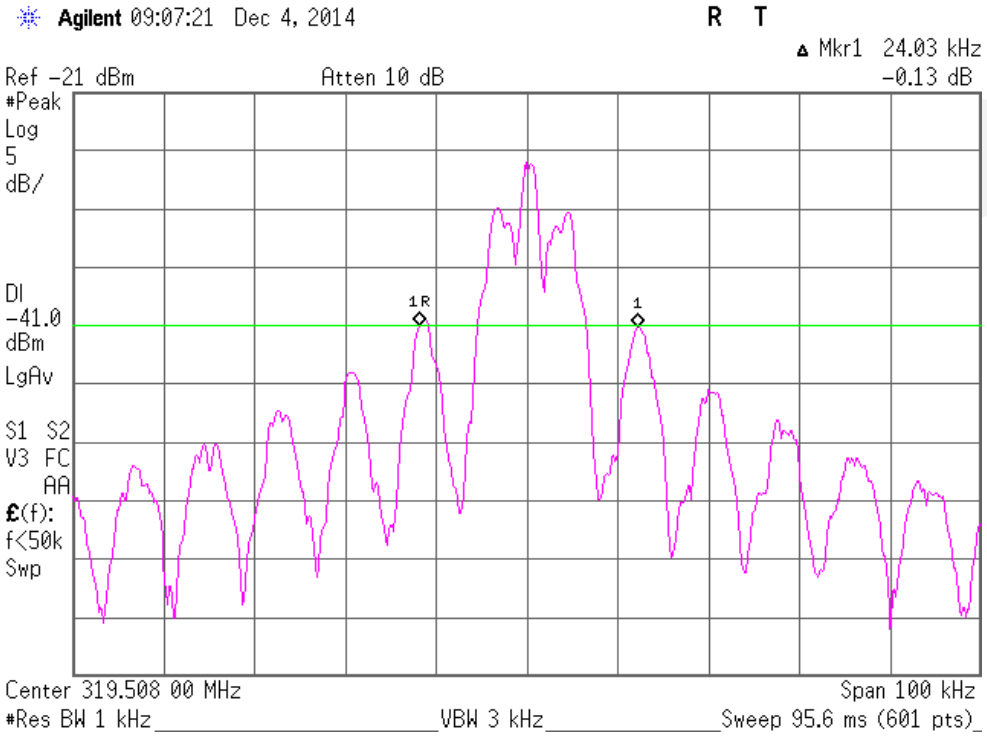
Test data per IC RSS-210
See following pages

99% Occupied bandwidth = 24.03 kHz

1 of 2. RBW greater than OBW. Set ref lvl



2 of 2. RBW near 1% of OBW. Markers at -20dB from ref levl



Periodic operation
FCC 15.231(a), IC RSS-210 A1.1.1

Test summary
The requirements are: ■ - MET ☐ - NOT MET

Manufacturer declared operation mode.

Test Limit 15.231(a);
(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

"Whenever the transmitter is activated automatically it will transmit 8 packets of 17.4 msec in length spaced by 130 msec. Transmission cease after 362 msec."

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

"The supervisory periodic transmissions are the four automatic transmissions noted above. They occur once per hour, for a total hourly transmission time of 69.6 msec."

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

"The transmitter is limited to reporting devices opening and closing. Other than the initial status change condition report there are no repeat transmissions other than the hourly supervisory transmissions."

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

"Set up information cannot exceed 6 17.4 msec packets, spaced by 130 msec. Transmissions cease after 255 msec."

AC Power Line Conducted Emissions (RF-CHW-ITI-16)

FCC 15.207(a), IC RSS-Gen 7.2.4

Test summary

The requirements are: ■ - MET ☐ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 13.3

Test location

Taylors Falls Lab Large Test Site

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
WRLE10942	FCC-LISN-50-25-2-10	Fischer Custom Comm	LISN	120306	16-Jun-14	16-Jun-15
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	837055/003	11-Aug-14	11-Aug-15

Code B = Calibration verification performed internally. Code Y = Calibration not required when used with other calibrated equipment

Limit

Frequency (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

*Decreases with the logarithm of the frequency

Test data

Measurement summary for limit1: FCC 15.207 Qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 FCC 15.207 Qp
150.0 kHz	62.55 Qp	0.5 / -0.25 / 0.0 / 0.0	62.8	L2	-3.2
300.0 kHz	54.39 Qp	0.51 / -0.25 / 0.0 / 0.0	54.65	L1	-5.59
600.0 kHz	45.24 Qp	0.53 / -0.24 / 0.0 / 0.0	45.52	L1	-10.48
714.47 kHz	44.62 Qp	0.53 / -0.24 / 0.0 / 0.0	44.91	L1	-11.09
1.944 MHz	43.37 Qp	0.61 / -0.22 / 0.0 / 0.0	43.75	L1	-12.25
1.047 MHz	42.49 Qp	0.55 / -0.24 / 0.0 / 0.0	42.81	L1	-13.19
2.841 MHz	40.92 Qp	0.66 / -0.21 / 0.0 / 0.0	41.37	L1	-14.63
17.421 MHz	32.22 Qp	1.5 / -0.01 / 0.0 / 0.0	33.71	L1	-26.29
8.124 MHz	31.8 Qp	0.98 / -0.14 / 0.0 / 0.0	32.64	L1	-27.36
23.847 MHz	30.24 Qp	1.75 / 0.05 / 0.0 / 0.0	32.04	L1	-27.96

Measurement summary for limit2: FCC 15.207 Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA2 FCC 15.207 Avg
714.47 kHz	34.03 Av	0.53 / -0.24 / 0.0 / 0.0	34.32	L1	-11.68
1.944 MHz	32.57 Av	0.61 / -0.22 / 0.0 / 0.0	32.95	L1	-13.05
600.0 kHz	31.62 Av	0.53 / -0.24 / 0.0 / 0.0	31.9	L1	-14.1
1.047 MHz	31.07 Av	0.55 / -0.24 / 0.0 / 0.0	31.39	L1	-14.61
2.841 MHz	30.21 Av	0.66 / -0.21 / 0.0 / 0.0	30.66	L1	-15.34
150.0 kHz	35.8 Av	0.5 / -0.25 / 0.0 / 0.0	36.05	L1	-19.95
300.0 kHz	26.7 Av	0.51 / -0.25 / 0.0 / 0.0	26.96	L1	-23.28
17.421 MHz	24.39 Av	1.5 / -0.01 / 0.0 / 0.0	25.88	L1	-24.12
8.124 MHz	23.98 Av	0.98 / -0.14 / 0.0 / 0.0	24.82	L1	-25.18
23.847 MHz	22.92 Av	1.75 / 0.05 / 0.0 / 0.0	24.72	L1	-25.28

Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions during immunity testing :

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

■ - Sends continuous packets- carrier with modulation

Configuration of the device under test:

■ - See Appendix A and test setup photos

☐ - See Product Information Form(s) in Appendix B

DEVIATIONS FROM STANDARD:
None.

GENERAL REMARKS:
None

Modifications required to pass:
■ None
☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:
■ None
☐ As indicated in the Test Plan

SUMMARY:
The requirements according to the technical regulations are
■ - met and the device under test does fulfill the general approval requirements.
☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

EUT Received Date: 03 December 2014
Condition of EUT: Normal
Testing Start Date: 03 December 2014
Testing End Date: 05 December 2014

TÜV SÜD AMERICA INC

Approved by:
Joel T Schneider
Senior EMC Engineer

Tested by:
Greg Jakubowski
Senior EMC Technician

Appendix A

Constructional Data Form

Form

EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.

Company:	Cinch Systems Inc		
Address:	12075 43 ST NE		
	Suite 300		
	St Michael, MN 55376		
Contact:	Mark Cawley	Position:	Engineer
Phone:	763-497-1059	Fax:	763-497-0898
E-mail Address:	mark.cawley@cinchsystems.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	Micro Door Window Sensors, Hardwire Conveter		
EUT Name	Micro Door Window Sensor- Tilt, Micro DWS-Doorbell, Hardwire Converter		
Model No.:	RF-MDWSX-TILT-ITI, RF-MDWSX-DB-ITI, RF-CHW-ITI-16	Serial No.:	123456
Product Options:			
Configurations to be tested:			

Equipment Modification (*If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)*

Modifications since last test:	N/A
Modifications made during test:	N/A

Test Objective(s): ***Please indicate the tests to be performed, entering the applicable standard(s) where noted.***

☐	EMC Directive 2004/108/EC (EMC) Std:	☒	FCC:	Class	☐	A	☒	B	Part 15
		☐	VCCI:	Class	☐	A	☐	B	
☐	Machinery Directive 89/392/EEC (EMC) Std:	☐	BSMI:	Class	☐	A	☐	B	(Separate Report)
		☒	Canada:	Class	☐	A	☒	B	
☐	Medical Device Directive 93/42/EEC (EMC) Std:	☐	Australia:	Class	☐	A	☐	B	
		☐	Other:						
☐	Vehicle Directive - 2004/104/EC (EMC) ☐ Other Vehicle Std:	☐	Ag Directive *2009/64/EC (EMC)						
☐	FDA Reviewers Guidance for Premarket Notification Submissions (EMC)								

Form

EMC Test Plan and Constructional Data Form

Third Party Certification (contact TÜV for quote), if applicable (*Signature on last page required).	
☐ Attestation of Compliance (AoC)*	☐ EMC Certification (used with Octagon Mark)*
☐ Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed	
Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III (Press **F1** when field is selected to show additional information on Protection Class.)	
☒ FCC / TCB Certification	☐ Taiwan Certification
☒ Industry Canada / FCB Certification	☐ Korean Certification
☐ e-Mark Certification	

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TÜV SÜD America should:

☒ Call contact listed above, if not available then stop testing. (After hrs phone): 651-269-4981
☐ Continue testing to complete test series.
☐ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length: 2.50" Width: 0.95" Height: 0.56" Weight: 2oz.

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 3V (MDWSX), 120VAC (RF-CHW) (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: DC/1P

Current (Amps/phase(max)): 100mA Current (Amps/phase(nominal)): 10mA

Other

Other Special Requirements

Need all testing/certs. required to obtain FCC ID and be ready to sell in US and Canada.

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Residential preferrable, but commercial as a fall-back

EMC Test Plan and Constructional Data Form

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): 2
☐ Shielded OR ☒ Unshielded
☐ Not Applicable

EUT Interface Ports and Cables

Type	Analog	Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
Zone	☐	☒	☒	☐	16	☐	☒	na	none	na	na	2	☒	☐
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Form

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: 1

Description: Production release candidate

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Sends continuous packets- carrier with modulation

2. Normal standby with 1 packet transmitted per hour

3. na

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
Sensor	RF-MDWS-TILT-ITI	123456	na
Sensor	RF-MDWSX-DB-ITI	123456	na

Form

EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
SJK	9.98438 Mhz	319.508 Mhz	Y1	x32 to derive transmit freq.

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
Eagle	GPU5W1601000WD00	na	☒ Switched-mode: (Frequency) 120 kHz ☐ Linear ☐ Other:
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*
na		

Form

EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***
na				

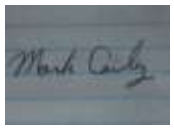
EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

na

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

Authorization (Signature Required if a Third Party Certification is checked on pg 1)

12/3/2014

X 

Mark Cawley
Engineer

Customer authorization to perform tests according to this test plan. — Date

Test Plan/CDF Prepared By (please print) — Date