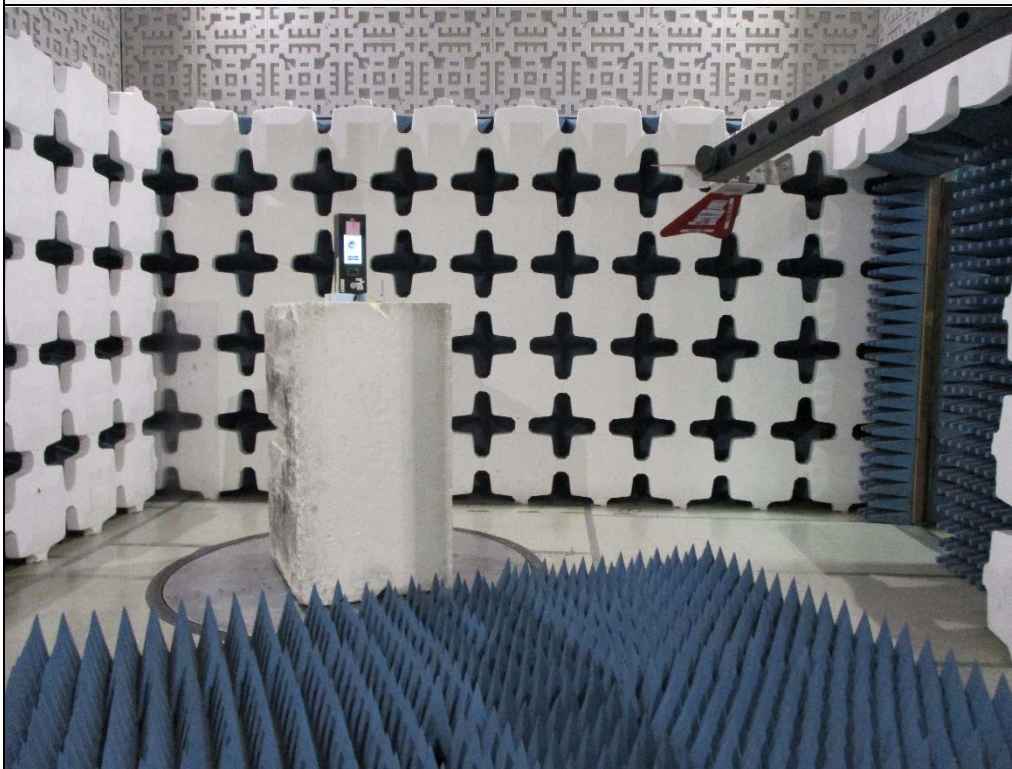


Test Setup for Spurious Radiated Emissions, Above 1GHz – Antenna Polarization Horizontal



Test Setup for Spurious Radiated Emissions, Above 1GHz – Antenna Polarization Vertical

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	902.24MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dBm)
2706.72	H	59.4		3.7	32.6	-40.2	55.4	590.3	5000.0	-18.6
	V	57.7		3.7	32.6	-40.2	53.8	487.6	5000.0	-20.2
3608.96	H	60.3		4.3	33.2	-39.5	58.3	817.7	5000.0	-15.7
	V	57.8		4.3	33.2	-39.5	55.7	611.0	5000.0	-18.3
4511.20	H	51.3		4.7	34.2	-39.6	50.5	336.8	5000.0	-23.4
	V	50.2		4.7	34.2	-39.6	49.5	298.1	5000.0	-24.5
5413.44	H	55.8		5.1	35.0	-39.5	56.4	663.9	5000.0	-17.5
	V	57.3		5.1	35.0	-39.5	58.0	794.5	5000.0	-16.0
8120.16	H	51.9		6.5	35.8	-39.6	54.6	536.9	5000.0	-19.4
	V	51.7		6.5	35.8	-39.6	54.4	522.9	5000.0	-19.6
9022.40	H	48.8		6.5	36.3	-39.4	52.2	406.5	5000.0	-21.8
	V	47.7		6.5	36.3	-39.4	51.1	359.4	5000.0	-22.9

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	902.24MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
2706.72	H	48.07		3.7	32.6	-40.2	-37.7	6.4	2.1	500.0	-47.6
	V	47.06		3.7	32.6	-40.2	-37.7	5.4	1.9	500.0	-48.6
3608.96	H	58.34		4.3	33.2	-39.5	-37.7	18.6	8.5	500.0	-35.4
	V	55.08		4.3	33.2	-39.5	-37.7	15.3	5.8	500.0	-38.7
4511.20	H	35.58		4.7	34.2	-39.6	-37.7	-2.9	0.7	500.0	-56.8
	V	34.38		4.7	34.2	-39.6	-37.7	-4.1	0.6	500.0	-58.0
5413.44	H	51.33		5.1	35.0	-39.5	-37.7	14.3	5.2	500.0	-39.7
	V	53.47		5.1	35.0	-39.5	-37.7	16.4	6.6	500.0	-37.5
8120.16	H	45.83		6.5	35.8	-39.6	-37.7	10.8	3.5	500.0	-43.2
	V	45.10		6.5	35.8	-39.6	-37.7	10.1	3.2	500.0	-43.9
9022.40	H	40.57		6.5	36.3	-39.4	-37.7	6.2	2.0	500.0	-47.7
	V	37.49		6.5	36.3	-39.4	-37.7	3.1	1.4	500.0	-50.8

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	902.24MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dBm)
902.24	H	77.92		2.04	26.47	0.00	106.43	209738.39	NA	NA
	V	76.77		2.04	26.47	0.00	105.28	183729.09	NA	NA
1804.48	H	61.04		2.93	30.91	-40.12	54.76	547.13	20973.84	-31.67
	V	65.72		2.93	30.91	-40.12	59.44	937.76	20973.84	-26.99
6315.68	H	48.81		5.62	35.48	-39.59	50.33	328.44	20973.84	-36.10
	V	44.46		5.62	35.48	-39.59	45.98	199.05	20973.84	-40.45
7217.92	H	43.85		6.11	35.67	-39.66	45.98	199.03	20973.84	-40.46
	V	42.72		6.11	35.67	-39.66	44.85	174.75	20973.84	-41.59

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	914.74MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dB μ V)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dB μ V/m)	Peak Total at 3m (μ V/m)	Peak Limit at 3m (μ V/m)	Margin (dBm)
2744.22	H	54.2	0.0	3.7	32.6	-40.2	50.4	329.5	5000.0	-23.6
	V	57.2	0.0	3.7	32.6	-40.2	53.3	464.4	5000.0	-20.6
3658.96	H	59.0	0.0	4.3	33.2	-39.5	57.0	705.0	5000.0	-17.0
	V	60.1	0.0	4.3	33.2	-39.5	58.0	795.6	5000.0	-16.0
4573.70	H	50.2	0.0	4.7	34.3	-39.7	49.5	299.3	5000.0	-24.5
	V	51.9	0.0	4.7	34.3	-39.7	51.2	364.4	5000.0	-22.7
7317.92	H	50.7	0.0	6.2	35.7	-39.6	52.9	442.2	5000.0	-21.1
	V	50.3	0.0	6.2	35.7	-39.6	52.5	423.3	5000.0	-21.4
8232.66	H	49.6	0.0	6.5	35.9	-39.5	52.4	418.8	5000.0	-21.5
	V	49.4	0.0	6.5	35.9	-39.5	52.2	408.3	5000.0	-21.8
9147.40	H	47.3	0.0	6.6	36.3	-39.4	50.8	347.9	5000.0	-23.2
	V	47.9	0.0	6.6	36.3	-39.4	51.4	370.2	5000.0	-22.6

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	914.74MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
2744.22	H	47.15		3.7	32.6	-40.2	-37.7	5.6	1.9	500.0	-48.4
	V	53.44		3.7	32.6	-40.2	-37.7	11.8	3.9	500.0	-42.1
3658.96	H	56.55		4.3	33.2	-39.5	-37.7	16.8	6.9	500.0	-37.2
	V	57.70		4.3	33.2	-39.5	-37.7	17.9	7.9	500.0	-36.1
4573.70	H	38.02		4.7	34.3	-39.7	-37.7	-0.4	1.0	500.0	-54.3
	V	39.41		4.7	34.3	-39.7	-37.7	1.0	1.1	500.0	-52.9
7317.92	H	33.84		6.2	35.7	-39.6	-37.7	-1.6	0.8	500.0	-55.6
	V	38.39		6.2	35.7	-39.6	-37.7	2.9	1.4	500.0	-51.1
8232.66	H	37.71		6.5	35.9	-39.5	-37.7	2.8	1.4	500.0	-51.1
	V	33.34		6.5	35.9	-39.5	-37.7	-1.5	0.8	500.0	-55.5
9147.40	H	33.08		6.6	36.3	-39.4	-37.7	-1.1	0.9	500.0	-55.1
	V	33.89		6.6	36.3	-39.4	-37.7	-0.3	1.0	500.0	-54.3

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	914.74MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dBm)
914.74	H	77.79	0.00	2.05	26.31	0.00	106.15	203112.92	NA	NA
	V	76.95	0.00	2.05	26.31	0.00	105.31	184390.08	NA	NA
1829.48	H	62.90	0.00	2.95	30.94	-40.11	56.68	682.06	20311.29	-29.48
	V	66.61	0.00	2.95	30.94	-40.11	60.39	1045.50	20311.29	-25.77
5488.44	H	55.53	0.00	5.18	34.99	-39.44	56.27	650.98	20311.29	-29.88
	V	50.85	0.00	5.18	34.99	-39.44	51.59	379.81	20311.29	-34.56
6403.18	H	47.38	0.00	5.67	35.54	-39.54	49.05	283.51	20311.29	-37.10
	V	42.99	0.00	5.67	35.54	-39.54	44.66	171.03	20311.29	-41.49

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	926.74MHz
Parameters	Peak Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dB μ V)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dB μ V/m)	Peak Total at 3m (μ V/m)	Peak Limit at 3m (μ V/m)	Margin (dBm)
2780.22	H	57.4	0.0	3.7	32.5	-40.1	53.6	475.9	5000.0	-20.4
	V	55.9	0.0	3.7	32.5	-40.1	52.0	399.5	5000.0	-21.9
3706.96	H	64.7	0.0	4.3	33.2	-39.5	62.7	1370.3	5000.0	-11.2
	V	63.1	0.0	4.3	33.2	-39.5	61.1	1134.6	5000.0	-12.9
4633.70	H	49.1	0.0	4.8	34.5	-39.6	48.7	273.1	5000.0	-25.3
	V	48.8	0.0	4.8	34.5	-39.6	48.4	262.3	5000.0	-25.6
7413.92	H	48.1	0.0	6.2	35.6	-39.6	50.4	331.9	5000.0	-23.6
	V	50.0	0.0	6.2	35.6	-39.6	52.3	413.6	5000.0	-21.6
8340.66	H	49.5	0.0	6.5	35.9	-39.5	52.4	419.2	5000.0	-21.5
	V	49.8	0.0	6.5	35.9	-39.5	52.8	435.0	5000.0	-21.2

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	926.74MHz
Parameters	Average Measurements in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	CBL Fac (dB)	Ant Fac (dB/m)	Pre Amp (dB)	Duty Cycle Factor (dB)	Average Total at 3m (dBμV/m)	Average Total at 3m (μV/m)	Average Limit at 3m (μV/m)	Margin (dB)
2780.22	H	49.92		3.7	32.5	-40.1	-37.7	8.3	2.6	500.0	-45.7
	V	52.86		3.7	32.5	-40.1	-37.7	11.3	3.7	500.0	-42.7
3706.96	H	63.40		4.3	33.2	-39.5	-37.7	23.7	15.4	500.0	-30.3
	V	61.35		4.3	33.2	-39.5	-37.7	21.7	12.1	500.0	-32.3
4633.70	H	35.29		4.8	34.5	-39.6	-37.7	-2.8	0.7	500.0	-56.8
	V	35.14		4.8	34.5	-39.6	-37.7	-3.0	0.7	500.0	-57.0
7413.92	H	34.66		6.2	35.6	-39.6	-37.7	-0.8	0.9	500.0	-54.7
	V	41.50		6.2	35.6	-39.6	-37.7	6.1	2.0	500.0	-47.9
8340.66	H	38.75		6.5	35.9	-39.5	-37.7	4.0	1.6	500.0	-50.0
	V	35.82		6.5	35.9	-39.5	-37.7	1.1	1.1	500.0	-52.9

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	926.74MHz
Parameters	Peak Measurements not in the Restricted Bands
Notes	None

Freq (MHz)	Ant Pol	Meter Reading (dBμV)	Ambient	Cable Factor (dB)	Antenna Factor (dB/m)	Pre Amp (dB)	Peak Total at 3m (dBμV/m)	Peak Total at 3m (μV/m)	Peak Limit at 3m (μV/m)	Margin (dBm)
926.74	H	79.96	0.00	2.07	26.65	0.00	108.68	271681.26	NA	NA
	V	78.72	0.00	2.07	26.65	0.00	107.44	235537.29	NA	NA
1853.48	H	67.39	0.00	2.96	31.00	-40.10	61.26	1155.55	27168.13	-27.43
	V	70.77	0.00	2.96	31.00	-40.10	64.64	1705.26	27168.13	-24.05
5560.44	H	52.92	0.00	5.22	34.96	-39.45	53.65	481.34	27168.13	-35.03
	V	51.36	0.00	5.22	34.96	-39.45	52.09	402.21	27168.13	-36.59
6487.18	H	45.41	0.00	5.72	35.57	-39.50	47.19	228.94	27168.13	-41.49
	V	44.78	0.00	5.72	35.57	-39.50	46.56	212.92	27168.13	-42.12
9267.40	H	39.98	0.00	6.64	36.34	-39.37	43.59	151.17	27168.13	-45.09
	V	38.90	0.00	6.64	36.34	-39.37	42.51	133.50	27168.13	-46.17

31. Band-Edge Compliance

Test Information	
Manufacturer	Chamberlain Group, Inc.
Product	Access Control Device
Model	CAPXM
Serial No	SMP-76795
Mode	Tx & Hopping Enabled

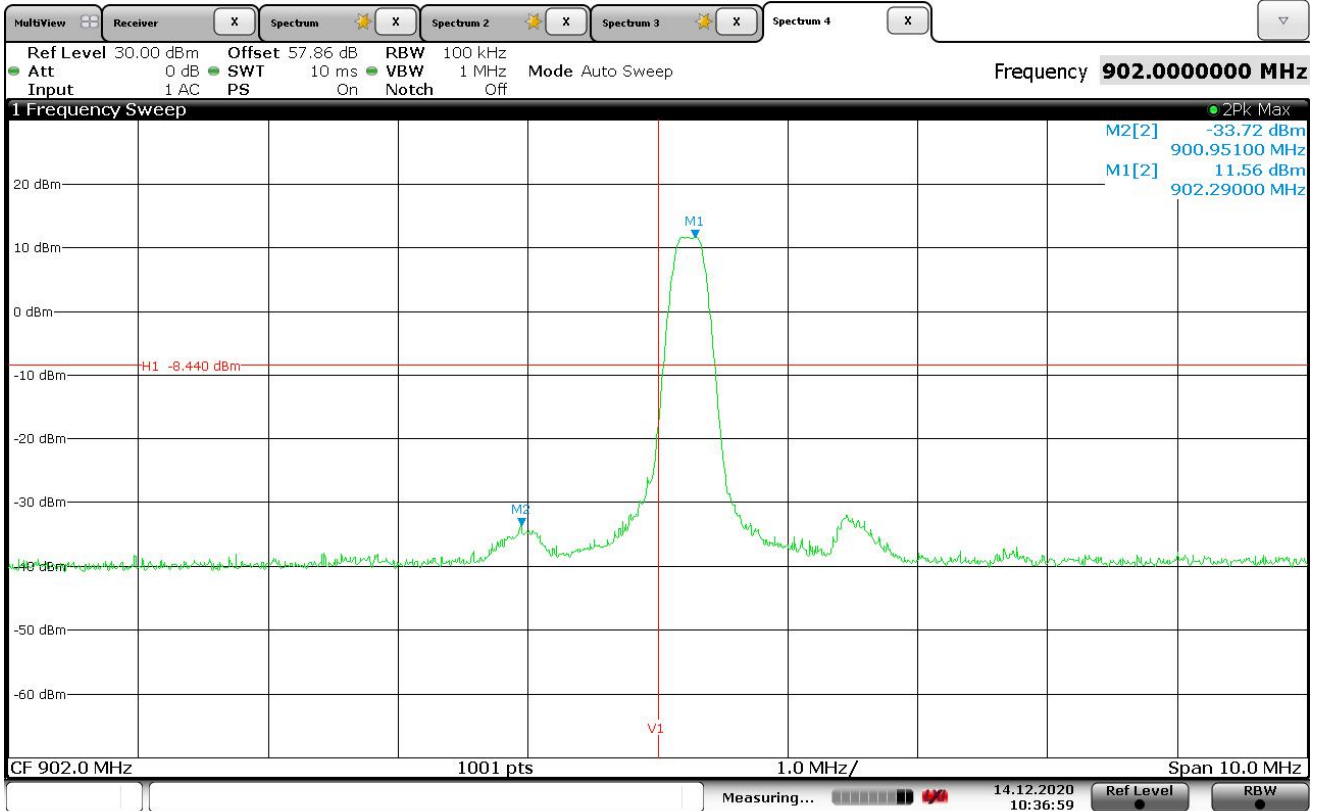
Test Setup Details	
Setup Format	Tabletop
Height of Support	NA
Measurement Method	Antenna Conducted
Type of Test Site	Shielded Chamber
Notes	None

Procedures
<p>Low Band Edge</p> <ol style="list-style-type: none"> 1) The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. 2) The EUT was set to transmit continuously at the channel closest to the low band-edge hopping function disabled. 3) To determine the band edge compliance, the following spectrum analyzer settings were used: <ol style="list-style-type: none"> a) Center frequency = low band-edge frequency. b) Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation. c) Resolution bandwidth (RBW) \geq 1% of the span. d) The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. e) The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.) f) The analyzer's display was plotted using a 'screen dump' utility. 4) Step 3) was repeated with the frequency hopping function enabled. <p>High Band Edge</p> <ol style="list-style-type: none"> 1) The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. 2) The EUT was set to transmit continuously at the channel closest to the high band-edge hopping function disabled. 3) To determine the band edge compliance, the following spectrum analyzer settings were used: <ol style="list-style-type: none"> a) Center frequency = high band-edge frequency. b) Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation. c) Resolution bandwidth (RBW) \geq 1% of the span. d) The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. e) The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the right of the center frequency (band-edge) must be below the display line.)

- f) The analyzer's display was plotted using a 'screen dump' utility.
 4) Step 3) was repeated with the frequency hopping function enabled.

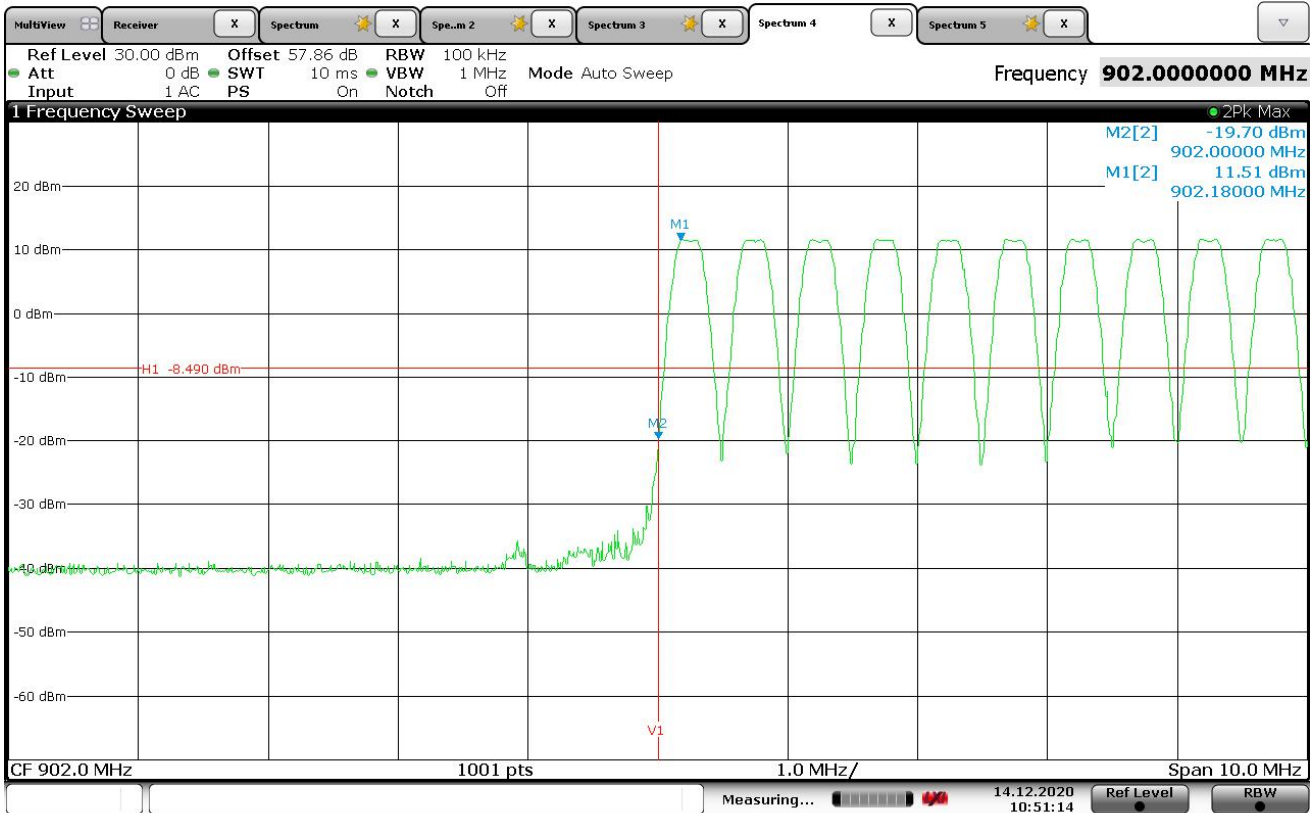
Measurement Uncertainty	
Measurement Type	Expanded Measurement Uncertainty
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2
Radiated disturbance (electric field strength on an open area test site or alternative test site) (18 GHz – 26.5 GHz)	3.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (26.5 GHz – 40 GHz)	3.4

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	902.24MHz
Parameters	Low Band-Edge
Notes	None



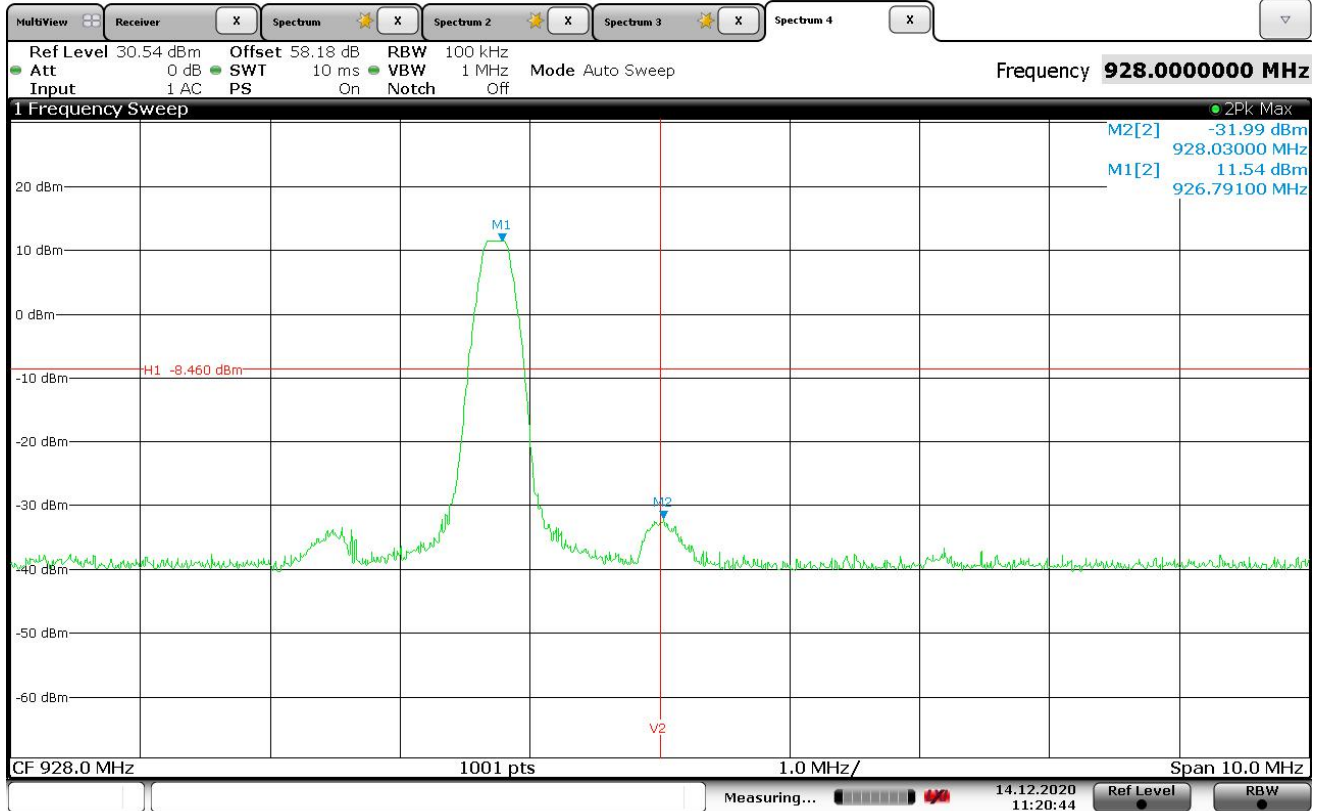
Date: 14.DEC.2020 10:36:58

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Hopping Enabled
Carrier Frequency	902.24MHz
Parameters	Low Band-Edge
Notes	None



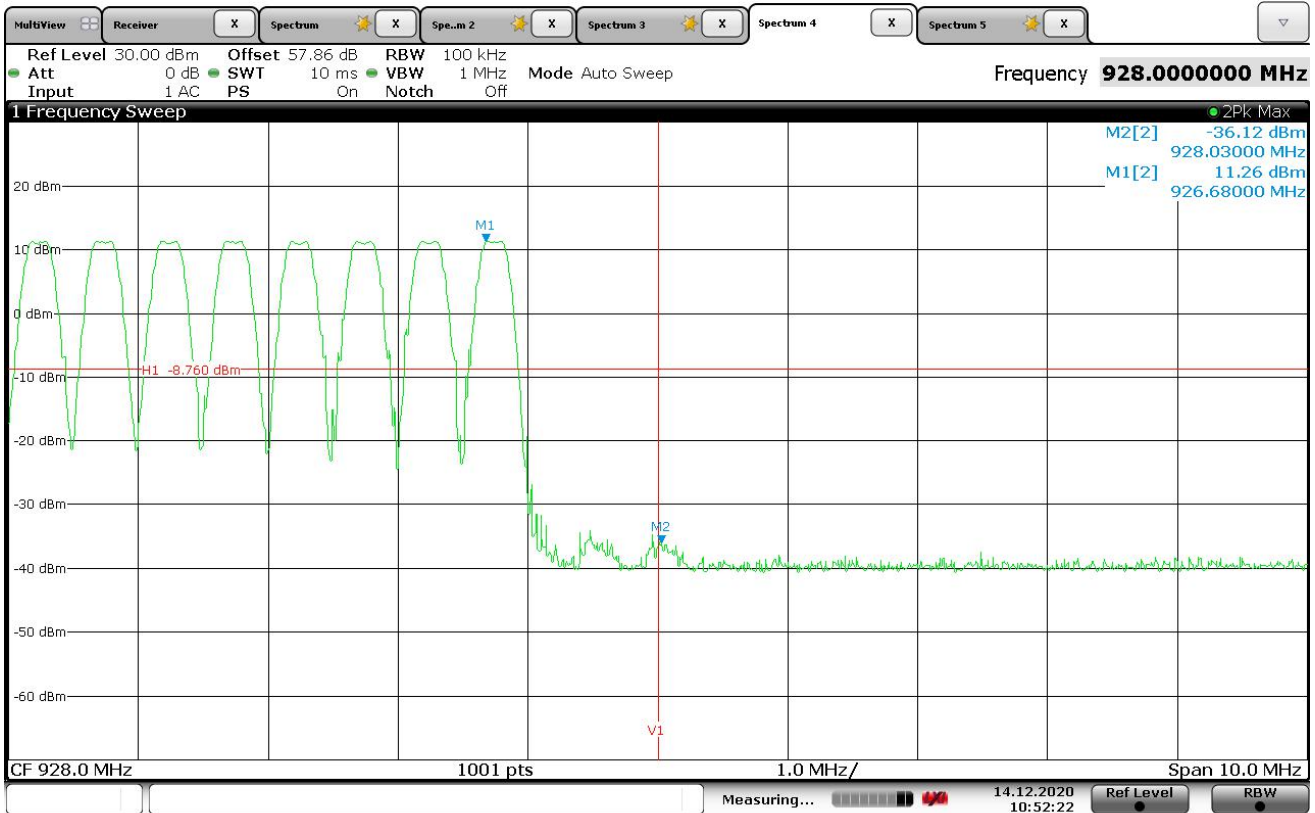
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Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Tx
Carrier Frequency	926.74MHz
Parameters	High Band-Edge
Notes	None



Date: 14.DEC.2020 11:20:44

Test Details	
Manufacturer	Chamberlain Group, Inc.
Model	CAPXM
S/N	SMP-76795
Mode	Hopping Enabled
Carrier Frequency	926.74MHz
Parameters	High Band-Edge
Notes	None



Date: 14.DEC.2020 10:52:22

32. Scope of Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELITE ELECTRONIC ENGINEERING, INC.
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Website: www.elitetest.com

ELECTRICAL

Valid to: June 30, 2021

Certificate Number: 1786.01

In recognition of the successful completion of the A2LA Accreditation Program evaluation process, accreditation is granted to this laboratory to perform the following automotive electromagnetic compatibility and other electrical tests:

Test Technology:**Test Method(s) ¹:*****Transient Immunity***

ISO 7637-2 (including emissions); ISO 7637-3;
ISO 16750-2:2012, Sections 4.6.3 and 4.6.4;
CS-11979, Section 6.4; CS.00054, Section 5.9;
EMC-CS-2009.1 (CI220); FMC1278 (CI220, CI221, CI222);
GMW 3097, Section 3.5;
SAE J1113-11; SAE J1113-12

Electrostatic Discharge (ESD)

ISO 10605 (2001, 2008);
CS-11979 Section 7.0; CS.00054, Section 5.10;
EMC-CS-2009.1 (CI 280); FMC1278 (CI280); SAE J1113-13;
GMW 3097 Section 3.6

Conducted Emissions

CISPR 25 (2002, 2008), Sections 6.2 and 6.3;
CISPR 25 (2016), Sections 6.3 and 6.4;
CS-11979, Section 5.1; CS.00054, Sections 5.6.1 and 5.6.2;
GMW 3097, Section 3.3.2;
EMC-CS-2009.1 (CE 420); FMC1278 (CE420, CE421)

Radiated Emissions Anechoic

CISPR 25 (2002, 2008), Section 6.4;
CISPR 25 (2016), Section 6.5;
CS-11979, Section 5.3; CS.00054, Section 5.6.3;
GMW 3097, Section 3.3.1;
EMC-CS-2009.1 (RE 310); FMC1278 (RE310)

Vehicle Radiated Emissions

CISPR 12; ICES-002

(A2LA Cert. No. 1786.01) Revised 01/10/2020



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<u>Test Technology:</u>	<u>Test Method(s) ¹:</u>
<i>Bulk Current Injection (BCI)</i>	ISO 11452-4; CS-11979, Section 6.1; CS.00054, Section 5.8.1; GMW 3097, Section 3.4.1; SAE J1113-4; EMC-CS-2009.1 (RI112); FMC1278 (RI112)
<i>Bulk Current Injections (BCI) (Closed Loop Method)</i>	ISO 11452-4; SAE J1113-4
<i>Radiated Immunity Anechoic (Including Radar Pulse)</i>	ISO 11452-2; ISO 11452-5; CS-11979, Section 6.2; CS.00054, Section 5.8.2; GMW 3097, Section 3.4.2; EMC-CS-2009.1 (RI114); FMC1278 (RI114); SAE J1113-21
<i>Radiated Immunity Magnetic Field</i>	ISO 11452-8
<i>Radiated Immunity Reverb</i>	ISO/IEC 61000-4-21; GMW 3097, Section 3.4.3; EMC-CS-2009.1 (RI114); FMC1278 (RI114); ISO 11452-11
<i>Radiated Immunity (Portable Transmitters)</i>	ISO 11452-9; EMC-CS-2009.1 (RI115); FMC1278 (RI115)
<i>Vehicle Radiated Immunity (ALSE)</i>	ISO 11451-2
<i>Electrical Loads</i>	ISO 16750-2, Sections 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.11, and 4.12
<i>Dielectric Withstand Voltage</i>	MIL-STD-202, Method 301; EIA-364-20D
<i>Insulation Resistance</i>	MIL-STD-202, Method 302; SAE/USCAR-2, Revision 6, Section 5.5.1; EIA-364-21D
<i>Contact Resistance</i>	MIL-STD-202, Method 307; SAE/USCAR-2, Revision 6, Section 5.3.1; EIA/ECA-364-23C; USCAR21-3 Section 4.5.3
<i>DC Resistance</i>	MIL-STD-202, Method 303
<i>Contact Chatter</i>	MIL-STD-202, Method 310; SAE/USCAR-2, Revision 6, Section 5.1.9
<i>Voltage Drop</i>	SAE/USCAR-2, Revision 6, Section 5.3.2; USCAR21-3 Section 4.5.6

Test Technology:

Test Method(s) ¹:

Emissions

Radiated and Conducted
(3m Semi-anechoic chamber,
up to 40 GHz)

47 CFR, FCC Part 15 B (using ANSI C63.4:2014);
47 CFR, FCC Part 18 (using FCC MP-5:1986);
ICES-001; ICES-003; ICES-005;
IEC/CISPR 11, Ed. 4.1 (2004-06); AS/NZS CISPR 11 (2004);
IEC/CISPR 11 Ed 5 (2009-05) + A1 (2010);
KN 11 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008);
CISPR 11; EN 55011; KN 11; CNS 13803 (1997, 2003);
CISPR 14-1; EN 55014-1; AS/NZS CISPR 14.1; KN 14-1;
IEC/CISPR 22 (1997); EN 55022 (1998) + A1(2000);
EN 55022 (1998) + A1(2000) + A2(2003); EN 55022 (2006);
IEC/CISPR 22 (2008-09); AS/NZS CISPR 22 (2004);
AS/NZS CISPR 22, 3rd Edition (2006); KN 22 (up to 6 GHz);
CNS 13438 (up to 6 GHz); VCCI V-3 (up to 6 GHz);
CISPR 32; EN 55032; KN 32

Current Harmonics

IEC 61000-3-2; EN 61000-3-2; KN 61000-3-2

Flicker and Fluctuations

IEC 61000-3-3; EN 61000-3-3; KN 61000-3-3

Immunity

Electrostatic Discharge

IEC 61000-4-2, Ed. 1.2 (2001);
IEC 61000-4-2 (1995) + A1(1998) + A2(2000);
EN 61000-4-2 (1995); EN 61000-4-2 (2009-05);
KN 61000-4-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-2; EN 61000-4-2; KN 61000-4-2;
IEEE C37.90.3 2001

Radiated Immunity

IEC 61000-4-3 (1995) + A1(1998) + A2(2000);
IEC 61000-4-3, Ed. 3.0 (2006-02);
IEC 61000-4-3, Ed. 3.2 (2010);
KN 61000-4-3 (2008-5); RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-3; EN 61000-4-3; KN 61000-4-3;
IEEE C37.90.2 2004

Electrical Fast Transient/Burst

IEC 61000-4-4, Ed. 2.0 (2004-07); IEC 61000-4-4, Ed. 2.1 (2011);
IEC 61000-4-4 (1995) + A1(2000) + A2(2001);
KN 61000-4-4 (2008-5); RRL Notice No. 2008-5 (May 20, 2008);
IEC 61000-4-4; EN 61000-4-4; KN 61000-4-4

Surge

IEC 61000-4-5 (1995) + A1(2000);
IEC 61000-4-5, Ed 1.1 (2005-11);
EN 61000-4-5 (1995) + A1(2001);
KN 61000-4-5 (2008-5); RRL Notice No. 2008-4 (May 20, 2008);
IEC 61000-4-5; EN 61000-4-5; KN 61000-4-5;
IEEE C37.90.1 2012

<u>Test Technology:</u>	<u>Test Method(s) ¹:</u>
Immunity (cont'd) Conducted Immunity	IEC 61000-4-6 (1996) + A1(2000); IEC 61000-4-6, Ed 2.0 (2006-05); IEC 61000-4-6 Ed. 3.0 (2008); KN 61000-4-6 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); EN 61000-4-6 (1996) + A1(2001); IEC 61000-4-6; EN 61000-4-6; KN 61000-4-6
Power Frequency Magnetic Field Immunity	IEC 61000-4-8 (1993) + A1(2000); IEC 61000-4-8 (2009); EN 61000-4-8 (1994) + A1(2000); KN 61000-4-8 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-8; EN 61000-4-8; KN 61000-4-8
Voltage Dips, Short Interrupts, and Line Voltage Variations	IEC 61000-4-11, Ed. 2 (2004-03); KN 61000-4-11 (2008-5); RRL Notice No. 2008-4 (May 20, 2008); IEC 61000-4-11; EN 61000-4-11; KN 61000-4-11
Ring Wave	IEC 61000-4-12, Ed. 2 (2006-09); EN 61000-4-12:2006; IEC 61000-4-12; EN 61000-4-12; KN 61000-4-12
Generic and Product Specific EMC Standards	IEC/EN 61000-6-1; AS/NZS 61000-6-1; KN 61000-6-1; IEC/EN 61000-6-2; AS/NZS 61000-6-2; KN 61000-6-2; IEC/EN 61000-6-3; AS/NZS 61000-6-3; KN 61000-6-3; IEC/EN 61000-6-4; AS/NZS 61000-6-4; KN 61000-6-4; EN 50130-4; IEC 61326-1; IEC/CISPR 14-2; EN 55014-2; AS/NZS CISPR 14.2; KN 14-2; IEC/CISPR 24; AS/NZS CISPR 24; EN 55024; KN 24; IEC 60601-1-2; JIS T0601-1-2
<i>TxRx EMC Requirements</i>	EN 301 489-1; EN 301 489-3; EN 301 489-9; EN 301 489-17; EN 301 489-19; EN 301 489-52;
<i>European Radio Test Standards</i>	ETSI EN 300 086-1; ETSI EN 300 086-2; ETSI EN 300 113-1; ETSI EN 300 113-2; ETSI EN 300 220-1; ETSI EN 300 220-2; ETSI EN 300 330-1; ETSI EN 300 330-2; ETSI EN 300 440-1; ETSI EN 300 440-2; ETSI EN 300 422-1; ETSI EN 300 422-2; ETSI EN 300 328; ETSI EN 301 893; ETSI EN 301 511; ETSI EN 301 908-1; ETSI EN 908-2; ETSI EN 908-13; ETSI EN 301 413; ETSI EN 302 502

Test Technology:

Test Method(s) ¹:

Canadian Radio Tests

RSS-102 (RF Exposure Evaluation only); RSS-111; RSS-112; RSS-117; RSS-119; RSS-123; RSS-125; RSS-127; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-137; RSS-139; RSS-140; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192; RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210; RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222; RSS-236; RSS-238; RSS-243; RSS-244; RSS-246; RSS-247; RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-GEN

Mexico Radio Tests

IFT-008; NOM-208-SCFI

Japan Radio Tests

Radio Law No. 131, Ordinance of MPT No. 37, 1981, MIC Notification No. 88:2004, Table No. 22-11; ARIB STD-T66, Regulation 18

Taiwan Radio Tests

LP-0002

Australia/New Zealand Radio Tests

AS/NZS 4268; Radiocommunications (Short Range Devices) Standard (2014)

Hong Kong Radio Tests

HKCA 1039 Issue 6; HKCA 1042; HKCA 1033 Issue 7; HKCA 1061; HKCA 1008; HKCA 1043; HKCA 1057; HKCA 1073

Korean Radio Test Standards

KN 301 489-1; KN 301 489-3; KN 301 489-9; KN 301 489-17; KN 301 489-52

*Unlicensed Radio Frequency Devices
(3 Meter Semi-Anechoic Room)*

47 CFR FCC Part 15C, 15D, 15E, 15F, 15G, 15H (using ANSI C63.10:2013, ANSI C63.17:2013 and FCC KDB 905462 D02 (v02))

Licensed Radio Service Equipment

47 CFR FCC Parts 20, 22, 24, 25, 27, 30, 73, 74, 80, 87, 90, 95, 96, 97, 101; ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015;

OTA (Over the Air) Performance

GSM, GPRS, EGPRS
UMTS (W-CDMA)
LTE including CAT M1
A-GPS for UMTS/GSM
LTS A-GPS, A-GLONASS,
SIB8/SIB16
Large Device/Laptop/Tablet Testing
Integrated Device Testing
WiFi 802.11 a/b/g/n/ac

CTIA Test Plan for Wireless Device Over-the-Air Performance (Method for Measurement for Radiated Power and Receiver Performance) V3.8.2;
CTIA Test Plan for RF Performance Evaluation of WiFi Mobile Converged Devices V2.1.0

Test Technology:

Test Method(s)¹:

Electrical Measurements and Simulation

AC Voltage / Current

(1mV to 5kV) 60 Hz
(0.1V to 250V) up to 500 MHz
(1µA to 150A) 60 Hz

FAA AC 150/5345-10H

FAA AC 150/5345-43J

FAA AC 150/5345-44K

FAA AC 150/5345-46E

DC Voltage / Current

(1mV to 15-kV) / (1µA to 10A)

FAA AC 150/5345-47C

FAA EB 67D

Power Factor / Efficiency / Crest Factor

(Power to 30kW)

Resistance

(1mΩ to 4000MΩ)

Surge

(Up to 10 kV / 5 kA) (Combination Wave and Ring Wave)

On the following products and materials:

Telecommunications Terminal Equipment (TTE), Radio Equipment, Network Equipment, Information Technology Equipment (ITE), Automotive Electronic Equipment, Automotive Hybrid Electronic Devices, Maritime Navigation and Radio Communication Equipment and Systems, Vehicles, Boats and Internal Combustion Engine Driven Devices, Automotive, Aviation, and General Lighting Products, Medical Electrical Equipment, Motors, Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment, Household Appliances, Electric Tools, Low-voltage Switchgear and Control gear, Programmable Controllers, Electrical Equipment for Measurement, Control and Laboratory Use, Base Materials, Power and Data Transmission Cables and Connectors

¹ When the date, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is expected to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA R101 - *General Requirements - Accreditation of ISO-IEC 17025 Laboratories.*

Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Unintentional Radiators</u> Part 15B	ANSI C63.4:2014	40000
<u>Industrial, Scientific, and Medical Equipment</u> Part 18	FCC MP-5 (February 1986)	40000
<u>Intentional Radiators</u> Part 15C	ANSI C63.10:2013	40000
<u>Unlicensed Personal Communication Systems Devices</u> Part 15D	ANSI C63.17:2013	40000



Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>U-NII without DFS Intentional Radiators</u> Part 15E	ANSI C63.10:2013	40000
<u>U-NII with DFS Intentional Radiators</u> Part 15E	FCC KDB 905462 D02 (v02)	40000
<u>UWB Intentional Radiators</u> Part 15F	ANSI C63.10:2013	40000
<u>BPL Intentional Radiators</u> Part 15G	ANSI C63.10:2013	40000
<u>White Space Device Intentional Radiators</u> Part 15H	ANSI C63.10:2013	40000
<u>Commercial Mobile Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>General Mobile Radio Services (FCC Licensed Radio Service Equipment)</u> Parts 22 (non-cellular), 90 (below 3 GHz), 95, 97, and 101 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)</u> Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Maritime and Aviation Radio Services</u> Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	40000
<u>Microwave and Millimeter Bands Radio Services</u> Parts 25, 30, 74, 90 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000
<u>Broadcast Radio Services</u> Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E; ANSI C63.26:2015	40000

Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1²

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Signal Boosters</u> Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters) Section 90.219	ANSI C63.26:2015	40000

²Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (<https://apps.fcc.gov/oetcf/eas/>) for a listing of FCC approved laboratories.





Accredited Laboratory

A2LA has accredited

ELITE ELECTRONIC ENGINEERING INC.

Downers Grove, IL

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 8th day of August 2019.



Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1786.01
Valid to June 30, 2021

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.