Global EMC Inc. Labs

EMC & RF Test Report

As per

RSS 210 Issue 8:2010

&

FCC Part 15 Subpart C:2013

Unlicensed Intentional Radiators

on the

Active Control Technology Inc.

CLiK64-T

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Testing produced for

See *Appendix A* for full customer & EUT details.

LAB REGISTRATION #6844A-3

FCC REGISTRATION #377448

Testing Laboratory Certificate #2555.01

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Report Scope

This report addresses the EMC testing and test results of the Click64-T, from Active Control Technology Inc. Testing is performed at Global EMC Labs. This unit is herein referred to as EUT (Equipment Under Test).

The EUT was tested for compliance against the following standards:

RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.

Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

Client	Active Control Technology Inc.
Product	Click64-T
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2013

Summary

The results contained in this report relate only to the item(s) tested.

EUT FCC Certification #, FCC ID:	LW3-CLIK64T
EUT Industry Canada Certification #, IC:	1747A-CLIK64T
EUT Passed all tests performed.	Yes (see test results summary)
Tests conducted by	Raymond Lee Au

Test Results Summary

Table 1 – Manually operated EUT which complies with 15.231(a)

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS 210 (Table 1)	Restricted Bands for intentional operation	Quasi Peak Average	Pass See Justification
FCC 15.207	Power line conducted emissions	Quasi Peak Average	N/A See Justification
FCC 15.209 RSS-210 (Table 2) FCC 15.231(b) RSS-210 (Table 4)	Intentional / Spurious Radiated emissions	Quasi Peak Average	Pass
FCC 15.231(a) RSS-210 A1.1	Type of transmission	Not a continuous transmissions, voice, video or radio control of toys.	Pass. 433.92MHz device
FCC 15.231 (a)(1) RSS-210 A1.1.1(a)	Manual transmission Release holdover	< 5 seconds	Pass Deactivates within 5s.
FCC 15.231 (a)(2) RSS-210 A1.1.1(b)	Automatic transmission Transmission time	< 5 seconds	N/A Not activated automatically.
FCC 15.231 (a)(3) RSS-210 A1.1.1(c)	Predetermined intervals Transmission Security/Safety	< 2 seconds per hour	Pass Does not transmit at regular predetermined intervals.
FCC 15.231 (c) RSS-210 A1.1.3	20 dB Bandwidth	< 0.25% of carrier	Pass 20dB BW is < 1MHz.
Overall Result			**PASS**

All tests were performed by Raymond Lee Au.

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

Justifications, Deviations, and Notes

The following justifications for tests, or deviations from the above listed specifications, apply:

For the antenna requirement specified in FCC 15.203 (RSS 210 section 5.5), this device is designed with an integral antenna or proprietary antenna connector which meets the requirements of FCC 15.203. It uses a PCB trace antenna.

For the Restricted Bands of operation as specified in FCC 15.205, the EUT is designed to operate at 433.92MHz. This does not fall within the restricted bands as listed.

For the power line conducted emissions requirements, the EUT is powered by one standard CR 2032, 3Vdc battery only. This test does not apply.

15.231(a)(2) is not applicable. The EUT does not activate automatically.

Each transmission lasts for 1.7milliseconds. This is less than the maximum of 5 seconds which complies with the requirement of FCC 15.231(a)(1).

This device was scanned in the three orthogonal axes for the applicable radiated emissions and worst case results are presented in this test report.

Applicable Standards, Specifications and Methods

ANSI C63.4:2003	- Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CFR 47 FCC 15	- Code of Federal Regulations – Radio Frequency Devices
CISPR 22:2008	- Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
ICES-003:2012	- Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
ISO 17025:2005	- General Requirements for the competence of testing and calibration laboratories
RSS 210:2010	- Issue 8: Spectrum Management and Telecommunications Radio Standards Specification. Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

Sample calculation(s)

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)
Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)
Margin = 8.0 dB

Document Revision Status

Revision 1 - May 1, 2014

Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

AE – Auxiliary Equipment.

BW – Bandwidth. Unless otherwise stated, this is refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility

EMI – Electro-Magnetic Immunity

EUT – Equipment Under Test

ITE – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

LISN – Line impedance stabilization network

NCR – No Calibration Required

RF – Radio Frequency

Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

Calibrations and Accreditations

The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The semi-anechoic chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

Testing Environmental Conditions and Dates

Following were the environmental conditions in the facility during time of testing –

Date	Test	Init.	Temperature (ºC)	Humidity (%)	Pressure (kPa)
April 21, 2014	All	RA	20-25ºC	30-45%	100 -103kPa

Detailed Test Results Section

Radiated Emissions of Fundamental

Purpose

The purpose of this test is to ensure that the RF energy intentionally emitted from the EUT does not exceed the limit listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect periodic operation services, licensed broadcast services, and so on, from unwanted interference.

Limit(s) and Method

The method is as defined in ANSI C63.4:2003.
The fundamental emission limits for periodic operation are defined in FCC Part 15, Section 15.231(b):

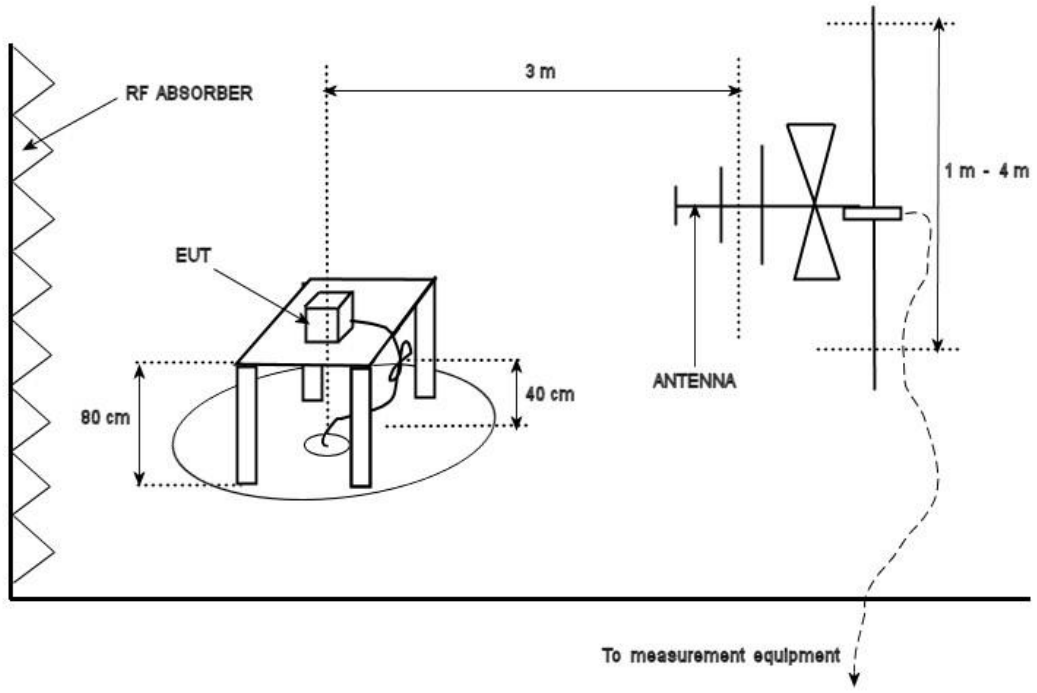
40.66 - 40.70 MHz, 2250 uV/m (67.0 dBuV/m[1]) at 3 m
70 - 130 MHz, 1250 uV/m (61.9 dBuV/m[1]) at 3 m
130 - 174 MHz, 1250 to 3750 uV/m (linear interpolations) (61.9 to 71.4 dBuV/m[1]) at 3 m
174 - 260 MHz, 3750 uV/m (71.4 dBuV/m[1]) at 3 m
260 - 470 MHz, 3750 to 12500 uV/m (linear interpolations) (71.4 to 81.9 dBuV/m[1]) at 3 m
Above 470 MHz, 12500 uV/m (81.9 dBuV/m[1]) at 3 m

Frequency of fundamental: 433.9MHz
Fundamental limit: 80.8 dBuV/m[1]

[1]Based on the average value of the measured emissions. As an alternative, compliance with the limits above may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

There is also a peak limit 20dB above the average limits where average limits are defined.

Typical Radiated Emissions Setup



Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a 'k=2' coverage factor and a 95% confidence level.

Final Measurements

Averaging Factor

The averaging factor is -10dB. The averaging factor for this pulse modulated device was calculated as per specifications in section 15.35 as follows:

One pulse train consists of a series of pulses made up of two types of pulses; one with a long pulse width and another with a narrow pulse width. These are shown with a 100ms sweep time in Fig. 1.

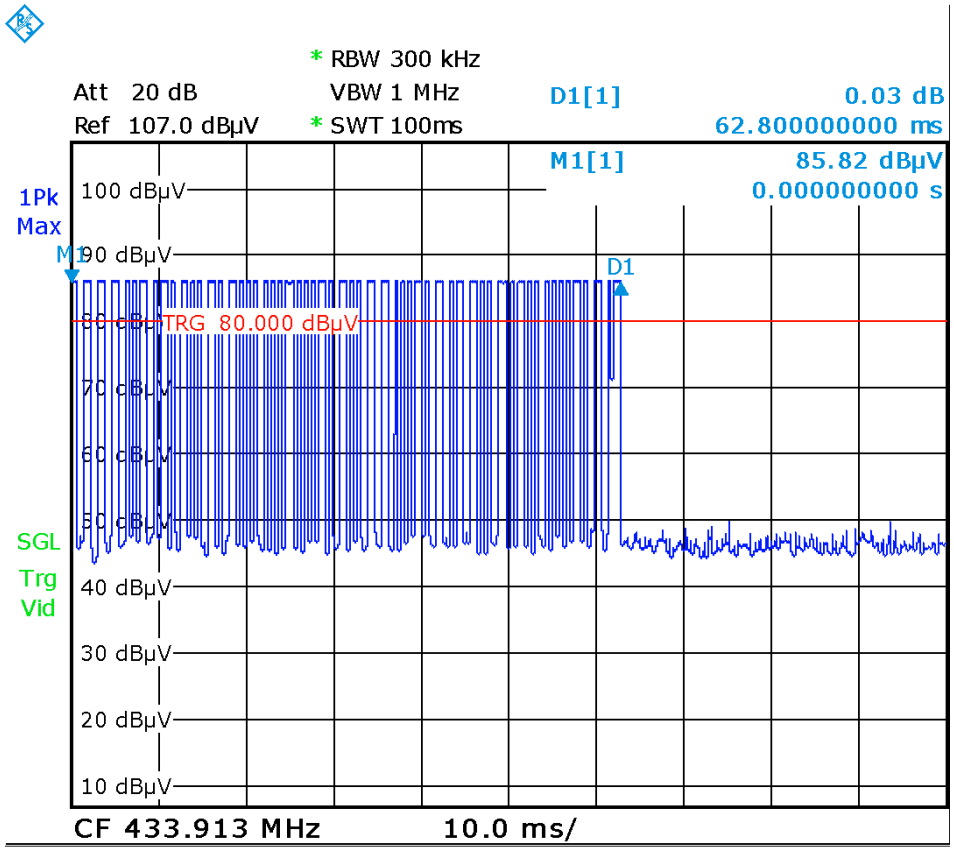


Fig. 1

The number of each type of pulse can be seen in Fig. 2. A red circle above the pulse denotes a long pulse, and a green triangle indicates a short pulse. There are 21 long pulses and 39 short pulses in the pulse train.

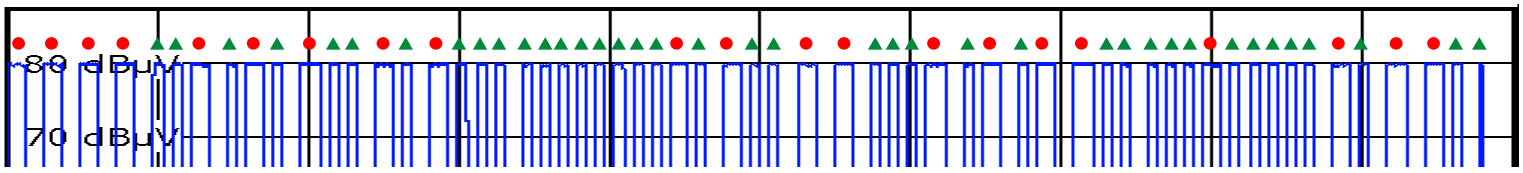


Fig. 2

The On time of a long pulse is 780µs, and the On time of a short pulse is 390µs, as shown in Fig. 3 and Fig. 4.

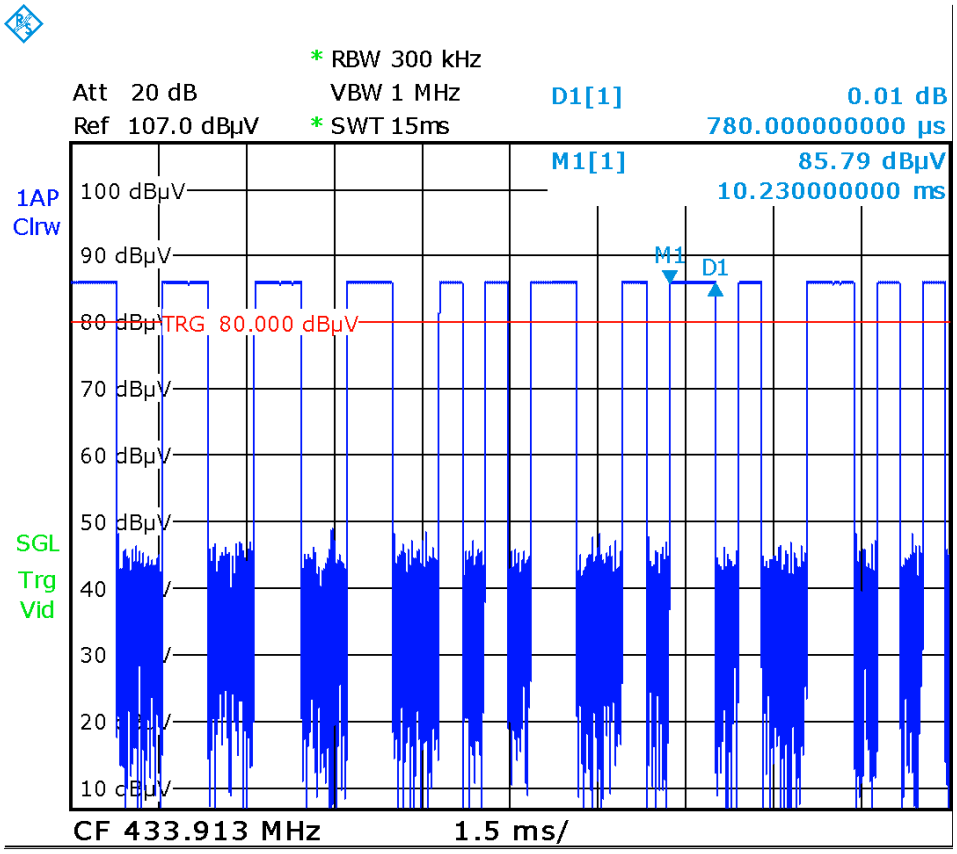


Fig. 3

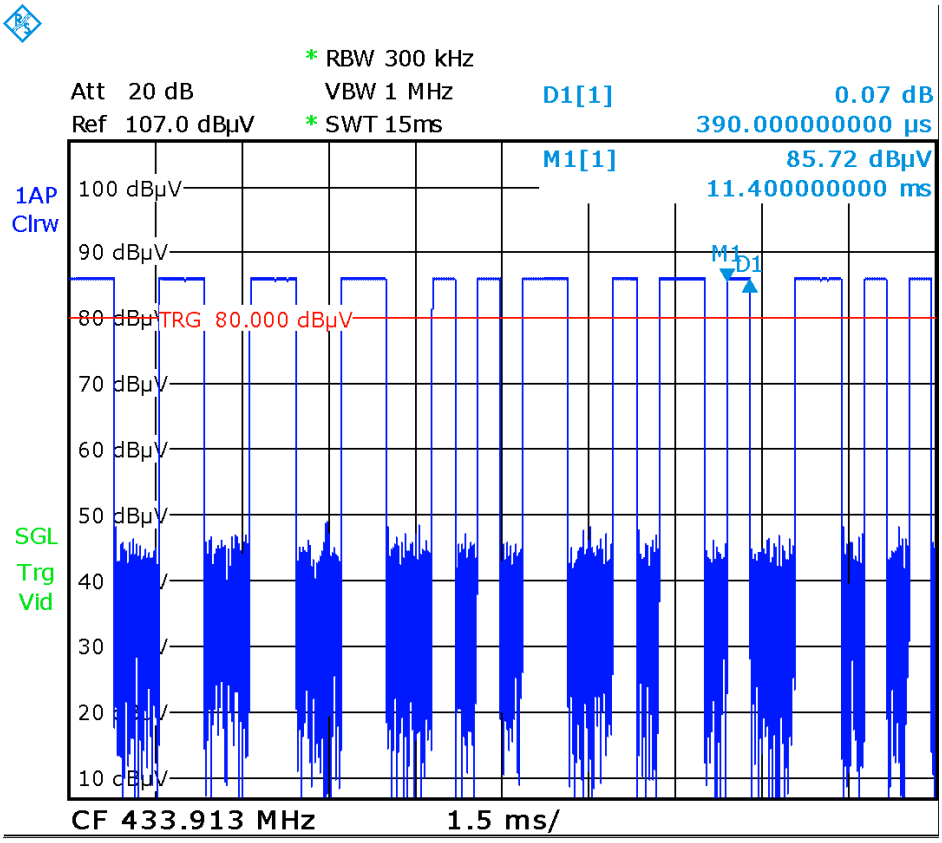


Fig. 4

Total On time in a pulse train is 31.590ms.

(21 x 780µs) + (39 x 390µs) = 31590µs = 31.590ms

The averaging factor is obtained with:

20log(31.59ms/100ms) = **-10.0dB**

Fundamental Emissions

The device complies with the requirement. All sides of the EUT were scanned in 3 orthogonal axes. The highest fundamental field strength is presented in the table below.

A worst case measurement of 89.3 dBuV/m at 3 meters was obtained using a peak detector at the fundamental frequency of 433.9MHz at vertical antenna polarity. This is passing with 11.5dB of margin.

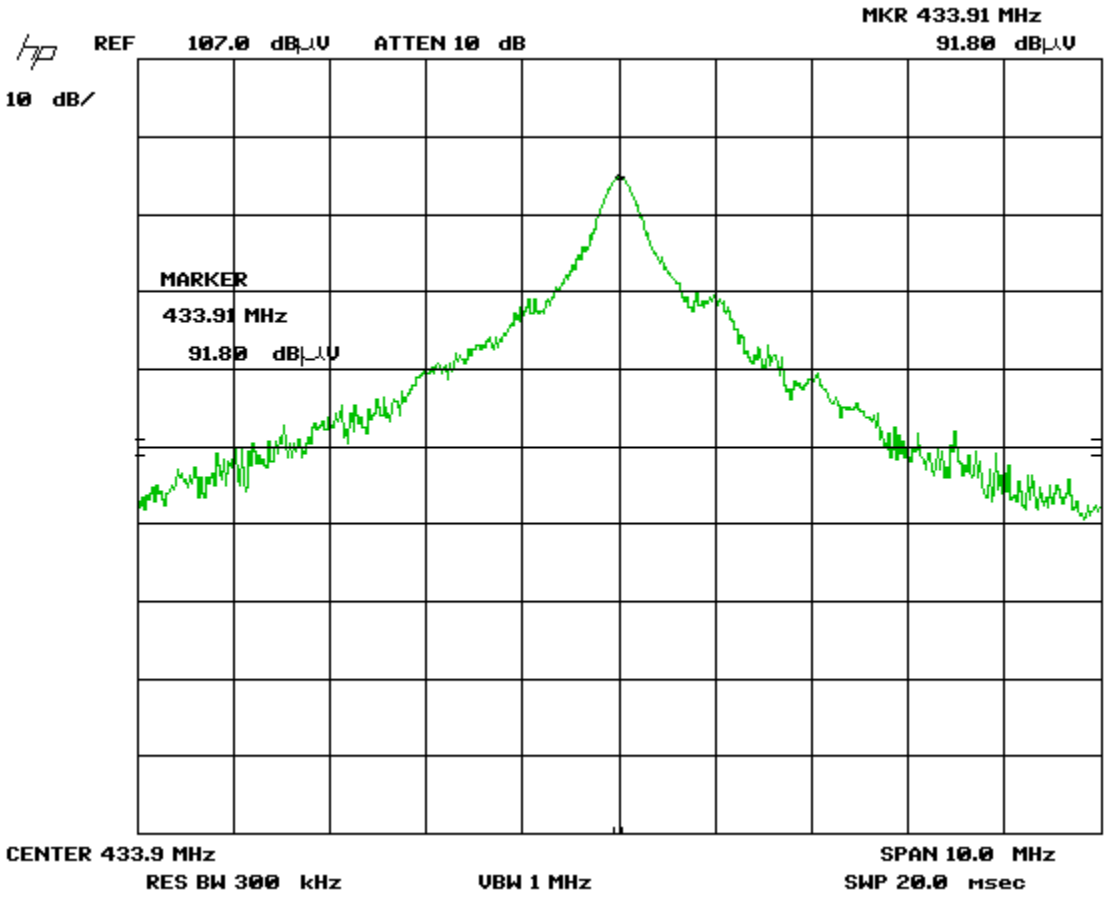
The maximum calculated average field strength is 89.3 dBuV/m - 10.0dB = 79.3dBuV/m. This passes with 1.5dB of margin

See spurious emissions section for related graphs.

Maximum Fundamental Field Strength Table

Test Freq. (MHz)	Detection mode (Q-Peak)	Antenna polarity (Horz/ Vert)	Raw signal dB(µV)	Antenna factor dB	Cable loss dB + Preselecor	Atten. dB	Pre-Amp Gain dB	Received signal dB(µV/m)	Emission limit dB(µV/m) Part 15.231(b)	Margin dB(µV)	Result
433.92	Peak	Horz	85.8	17.0	1.6	10.0	30.2	84.2	100.8	16.6	PASS
433.92	Avg	Horz	75.8	17.0	1.6	10.0	30.2	74.2	80.8	6.6	PASS
433.92	Peak	Vert	91.8	16.1	1.6	10.0	30.2	**89.3**	100.8	11.5	PASS
433.92	Avg	Vert	81.8	16.1	1.6	10.0	30.2	79.3	80.8	1.5	PASS

Peak fundamental
(Raw signal, no factors applied)



Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Spectrum Analyzer	ESL6	Rhode & Schwarz	Nov. 15, 2013	Nov. 15, 2015	GEMC 160
Spectrum Analyzer	8566B	HP	Oct. 2, 2013	Oct. 2, 2015	GEMC 190
BiLog Antenna	3142-C	ETS	Aug. 28, 2012	Aug. 28, 2014	GEMC 8
Pre-Amp 9kHz – 2GHz	CPA9231A	Chase	Aug. 29, 2012	Aug. 29, 2014	GEMC 6403
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 28
RF Cable 1m	LMR-400-1M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 29
RF Cable 0.5M	LMR-400-0.5M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 31

This report module is based on GEMC template "FCC - 15.209 - Radiated Emissions_Rev1.doc"

Radiated Emissions of Spurious Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limit(s) and Method

The method is as defined in ANSI C63.4:2003. The limits are as defined in FCC Part 15, Section 15.209 and 15.231 (b). Whichever limit permits the higher field strength is allowed. The following are radiated emission limits for general requirements as defined in FCC Part 15, Section 15.209. All scans are performed at a 3m test distance. Where limits are specified for a farther distance, limits are extrapolated as specified in FCC Part 15 Section 15.31(f)(2). Note that F = frequency in kHz:

Frequency range	Field strength limit	Measurement distance (m)	Detector	Measurement bandwidth
0.009 – 0.090 MHz	2400/F(kHz) µV/m	300	Avg	200 Hz
	128.5 – 108.5 dBµV/m	3		
0.090 – 0.110 MHz	2400/F(kHz) µV/m	300	QP	200 Hz
	108.5-106.7 dBµV/m	3		
0.110 – 0.150 MHz	2400/F(kHz) µV/m	300	Avg	200 Hz
	106.7-104.0 dBµV/m	3		
0.150 – 0.490 MHz	2400/F(kHz) µV/m	300	Avg	9 kHz
	104.0-93.8 dBµV/m	3		
0.490 – 1.705 MHz	24000/F(kHz) µV/m	30	QP	9 kHz
	73.8-62.9 dBµV/m	3		
1.705 – 30 MHz	30 µV/m	30	QP	9 kHz
	69.5 dBµV/m	3		
30 – 88 MHz	100 µV/m	3	QP	120 kHz
	40.0 dBµV/m	3		
88 – 216 MHz	150 µV/m	3	QP	120 kHz
	43.5 dBµV/m	3		
216 – 300 MHz	200 µV/m	3	QP	120 kHz
	46.0 dBµV/m	3		
300 – 960 MHz	200 µV/m	3	QP	120 kHz
	46.0 dBµV/m	3		
960 – 1000 MHz	500 µV/m	3	QP	120 kHz
	53.9 dBµV/m	3		
1000 - 18000 MHz	500 µV/m	3	Avg	1 MHz
	53.9 dBuV/m	3		

The following are spurious emission limits for the EUT as defined in FCC Part 15, Section 15.231(b). The value is calculated for 433.92 MHz:

> For all spurious emissions, the limit is 1099.6 uV/m (60.8 dBuV/m) at 3m using an Average detector. However, if the values of the measured emissions based on the use of measurement instrumentation with a CISPR quasi-peak detector meets those limits, that is permissible as well. Measurement bandwidths are as listed above in the corresponding frequency ranges.

The spurious emission limit defined in FCC 15.231(b) is applied for the second harmonic at 867.8MHz, and the third harmonic at 1301.7MHz. The radiated emission limits for general requirements defined in FCC 15.209, which are tighter than those of FCC 15.231(b) for the EUT, is applied for subsequent measurements. When the emission meets the requirements in FCC 15.209, it automatically meets the requirements in 15.231(b).

Beyond the 5th harmonic, only the noise floor was detected.

For reference, the tables below show the limits of FCC 15.231(b), FCC 15.209, and FCC 15.205(a) Restricted Frequency Bands:

FCC 15.231 (b) Emission Limits:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66–40.70	2,250	225
70–130	1,250	125
130–174	[1]1,250 to 3,750	[1]125 to 375
174–260	3,750	375
260–470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

[1]Linear interpolations.

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

FCC 15.209 Emission Limits

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

FCC 15.205 (a) Restricted Frequency Bands:

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1]0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

[2]Above 38.6

Notes:

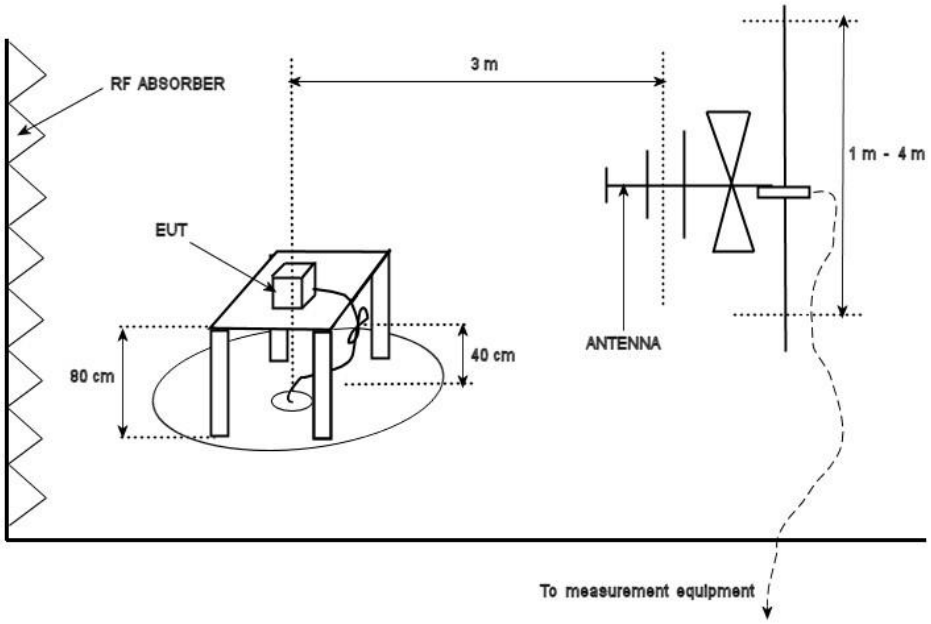
As specified in 15.231(b)(3), spurious emissions may meet the higher limit permitted by 15.209 or 15.231(b), in addition to the requirements of 15.205. The provisions in Section 15.35 apply to these measurements. The method used is noted in the *Final Measurements* table in this report.

Where average limits are specified, a peak limit that is 20 dB higher than the average limit applies.

Where peak measurements are under the quasi-peak and/or average limits, the emission is considered a pass, since peak measurements are always greater than or equal to readings with these detectors.

Frequency range is scanned in accordance with 15.33.

Typical Radiated Emissions Setup



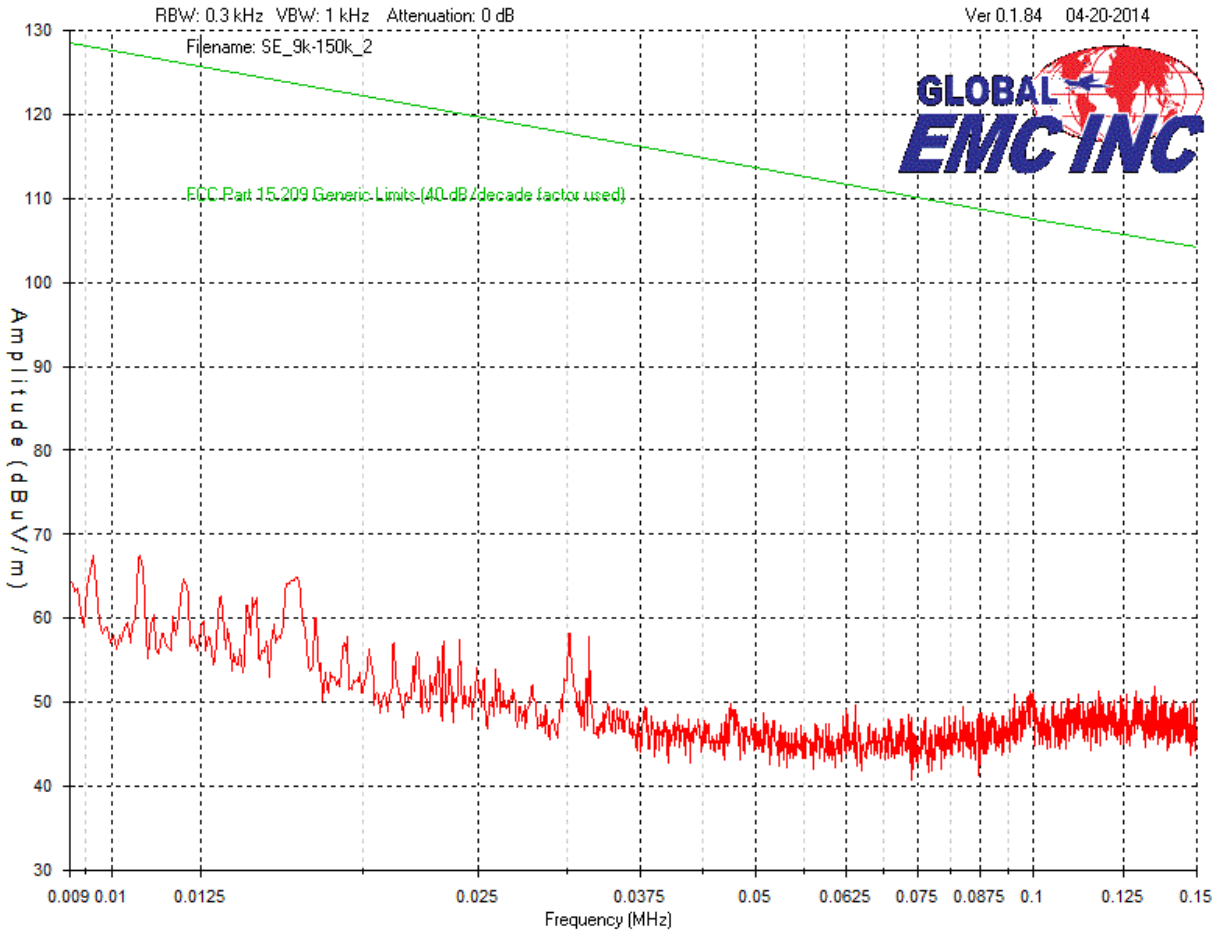
Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a 'k=2' coverage factor and a 95% confidence level.

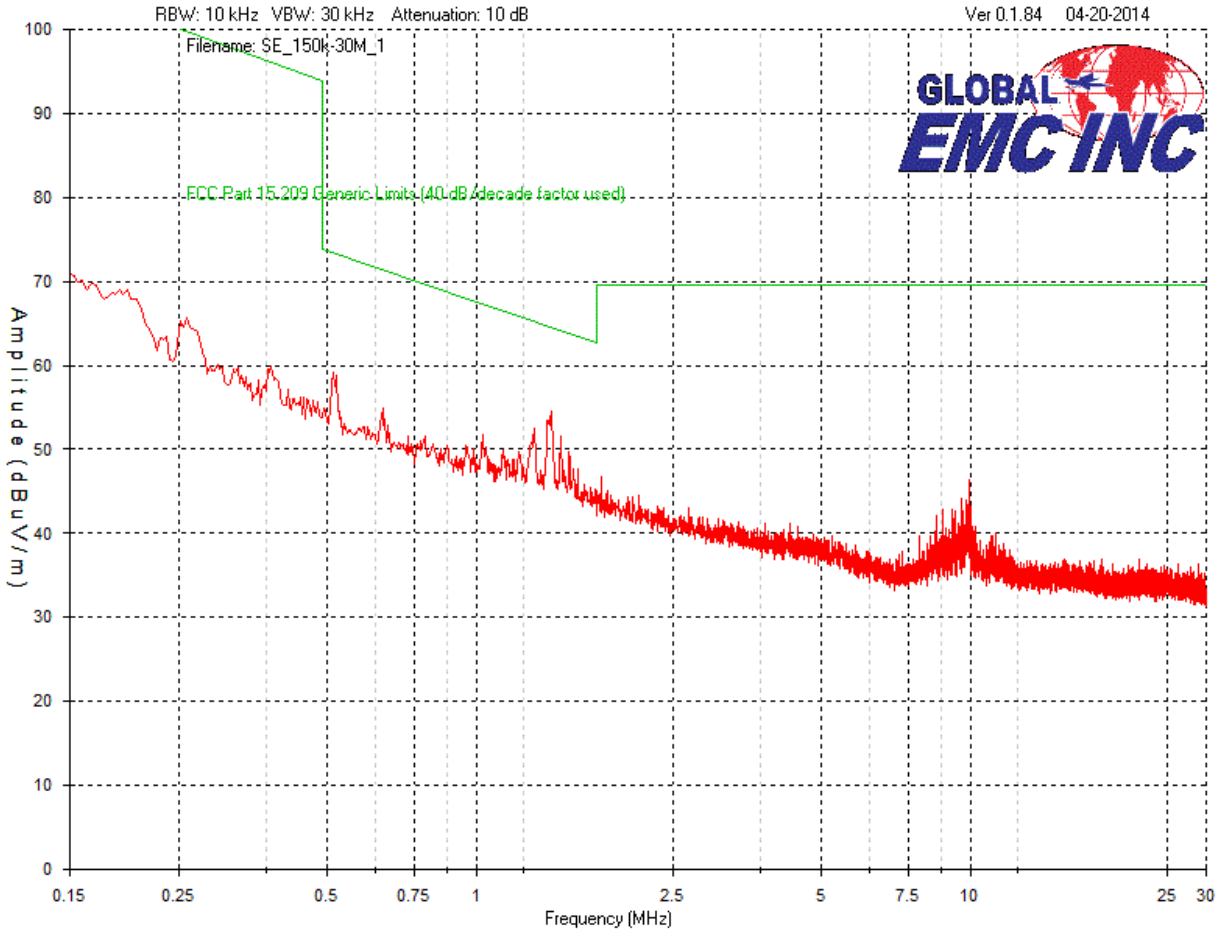
Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurements table where applicable. The graphs shown below are maximized peak measurement graphs, measured with a resolution bandwidth greater than the final required detector and over a full 0-360° rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings. In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to a minimum of a 4.3392 GHz.

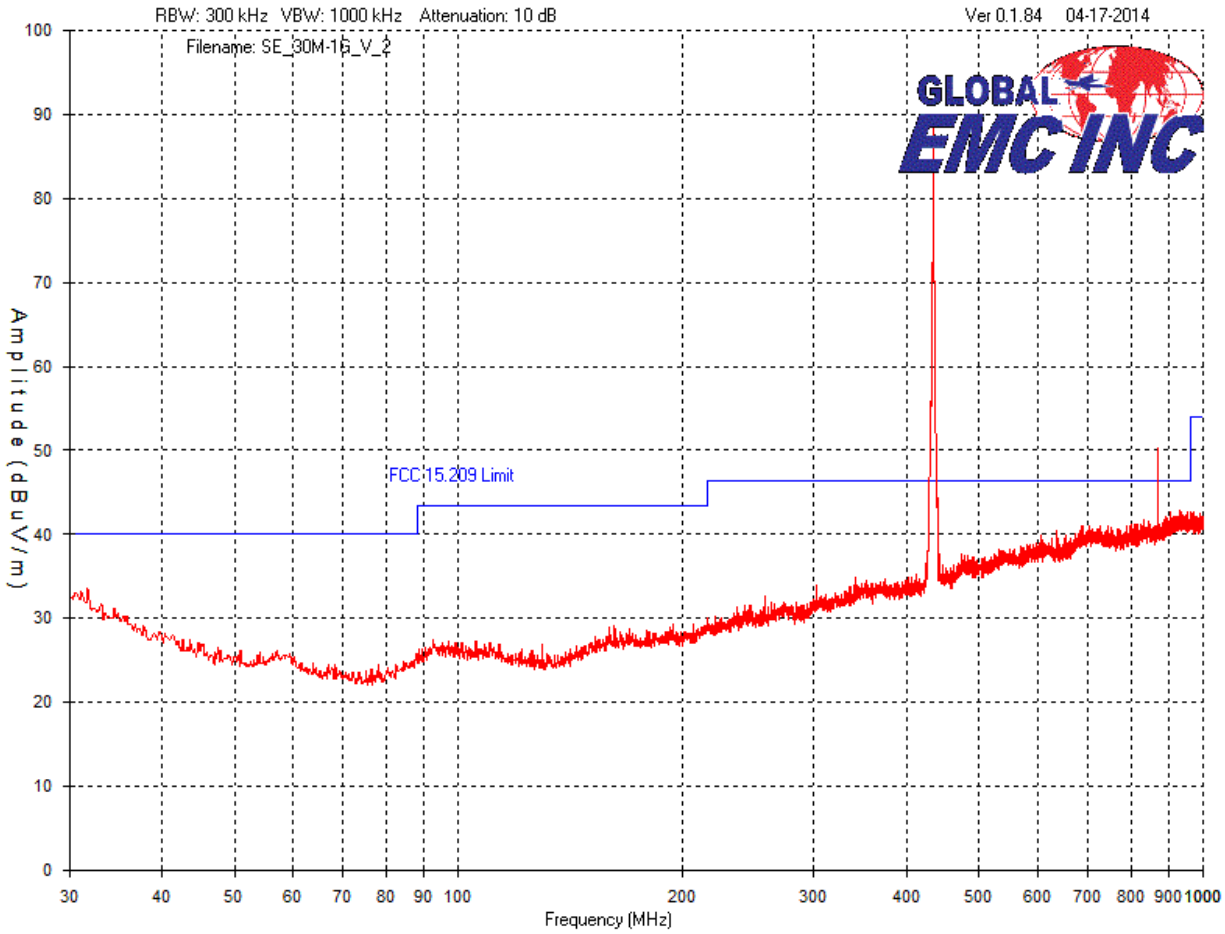
Peak Emissions Graph
9kHz – 150kHz



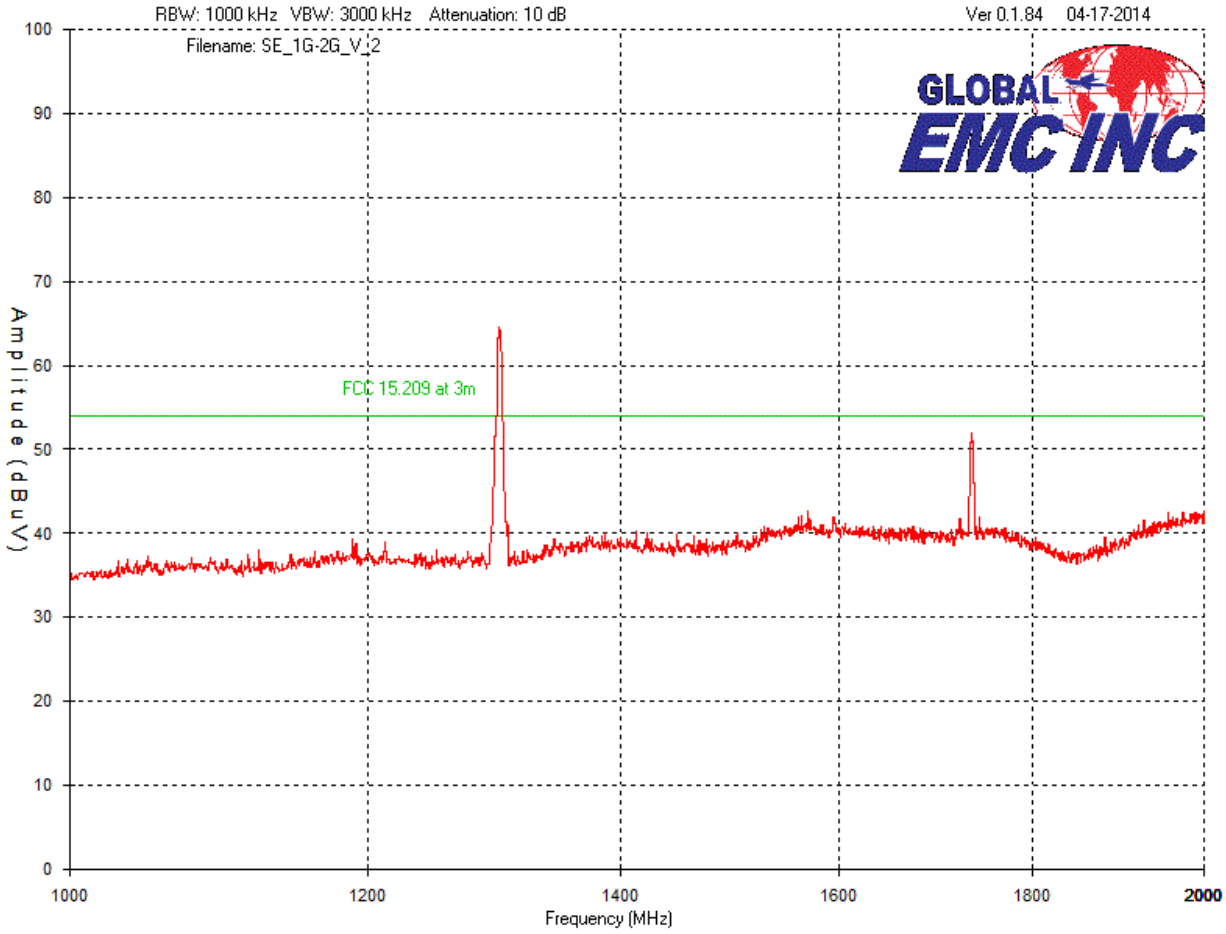
Peak Emissions Graph
150kHz – 30MHz



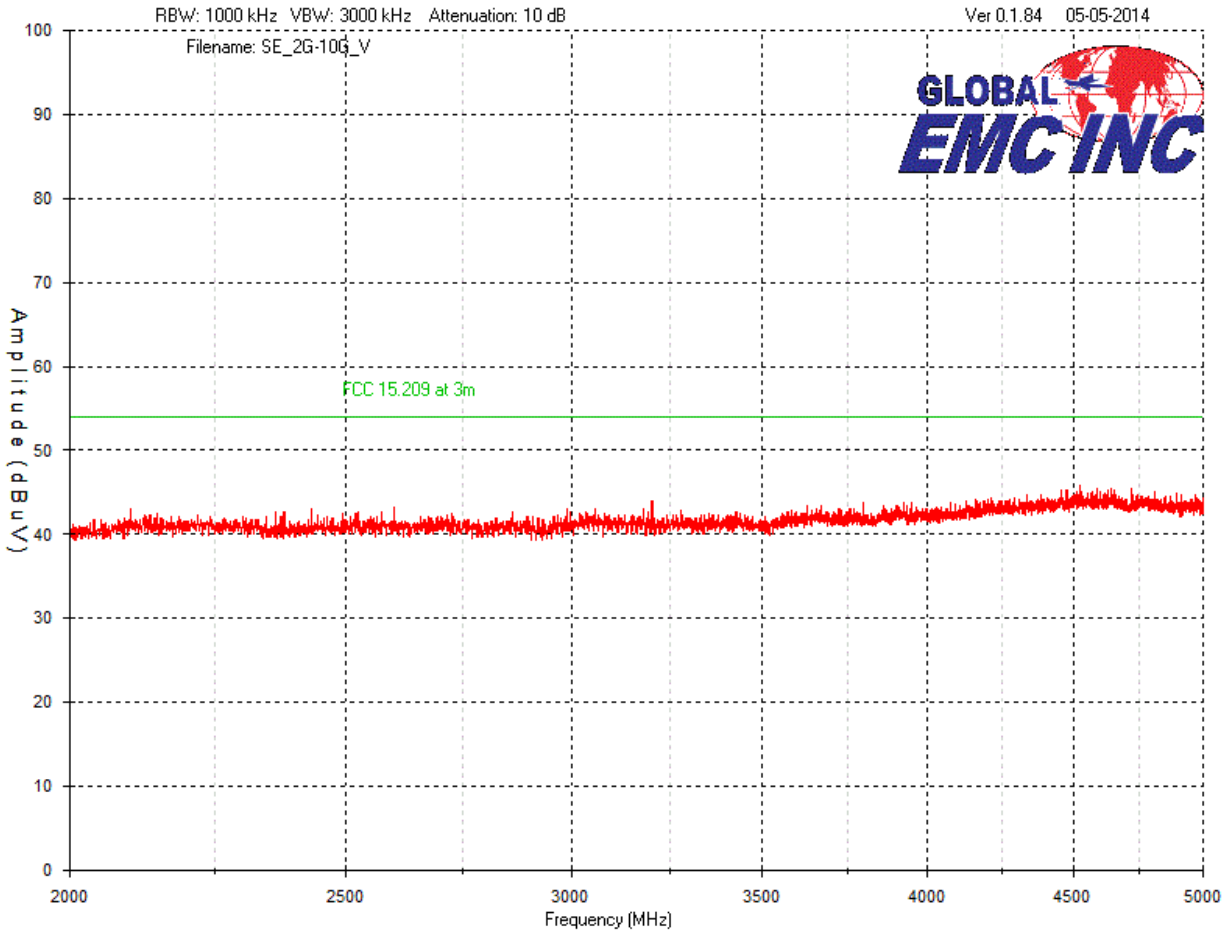
Vertical – Peak Emissions Graph
30MHz – 1GHz



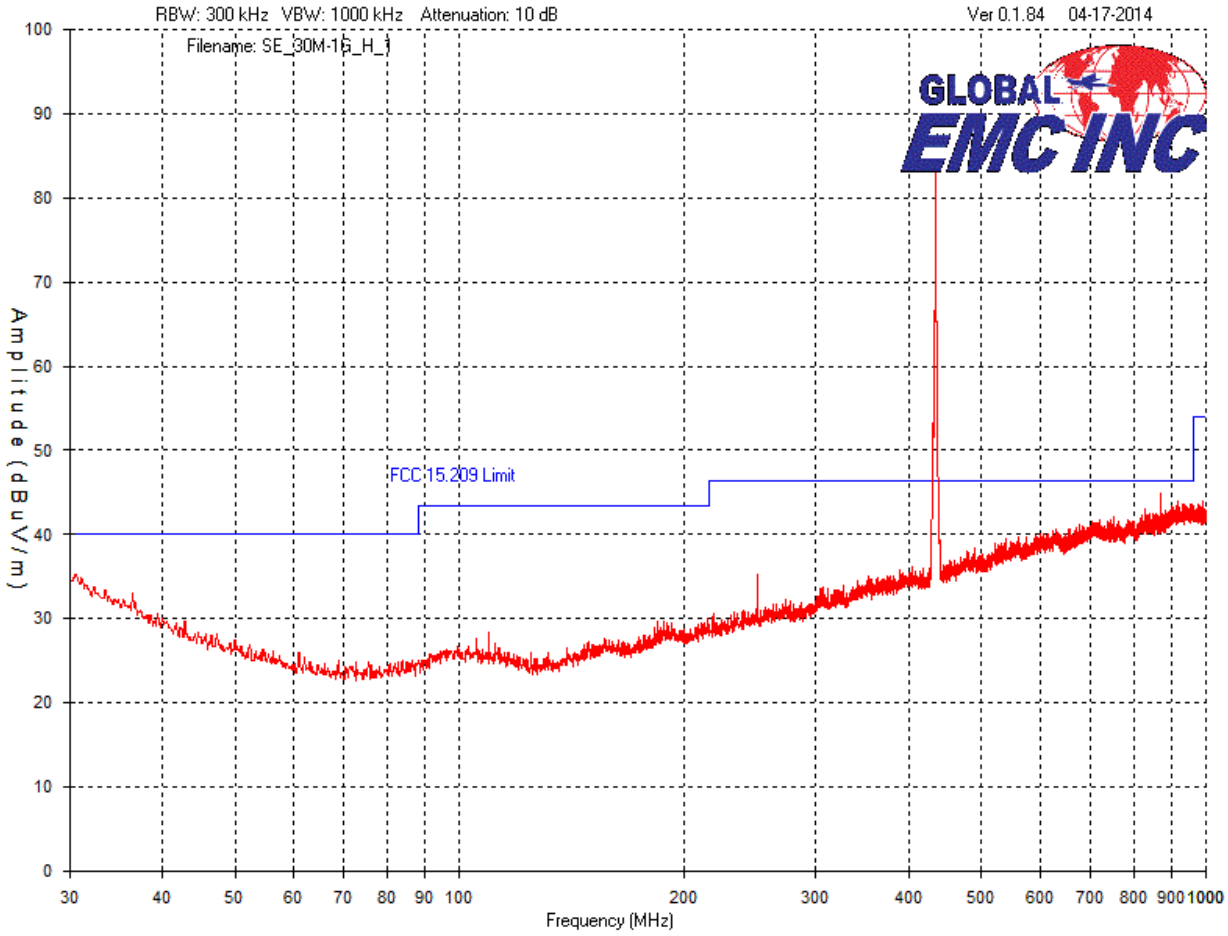
Vertical – Peak Emissions Graph
1GHz – 2GHz



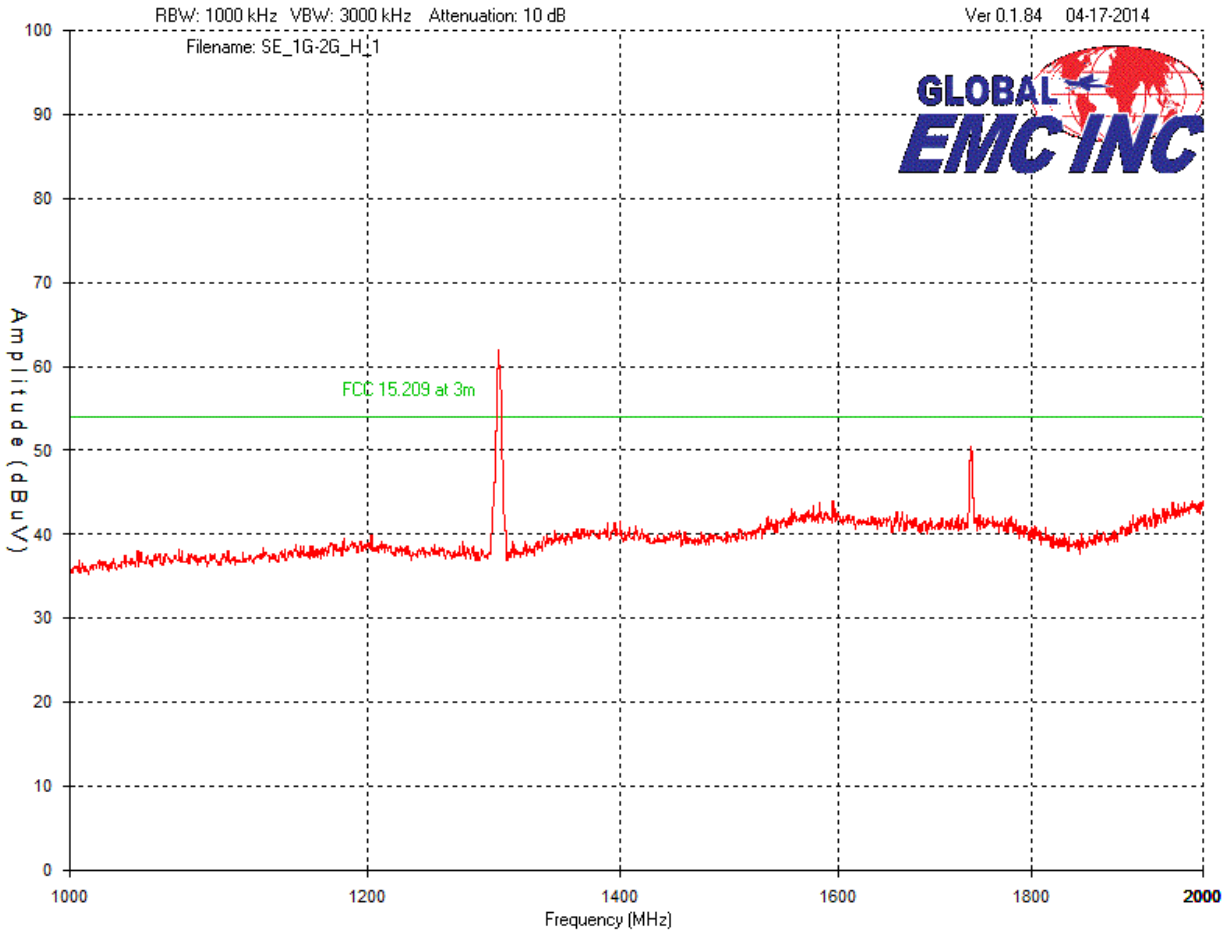
Vertical – Peak Emissions Graph
2GHz – 5GHz



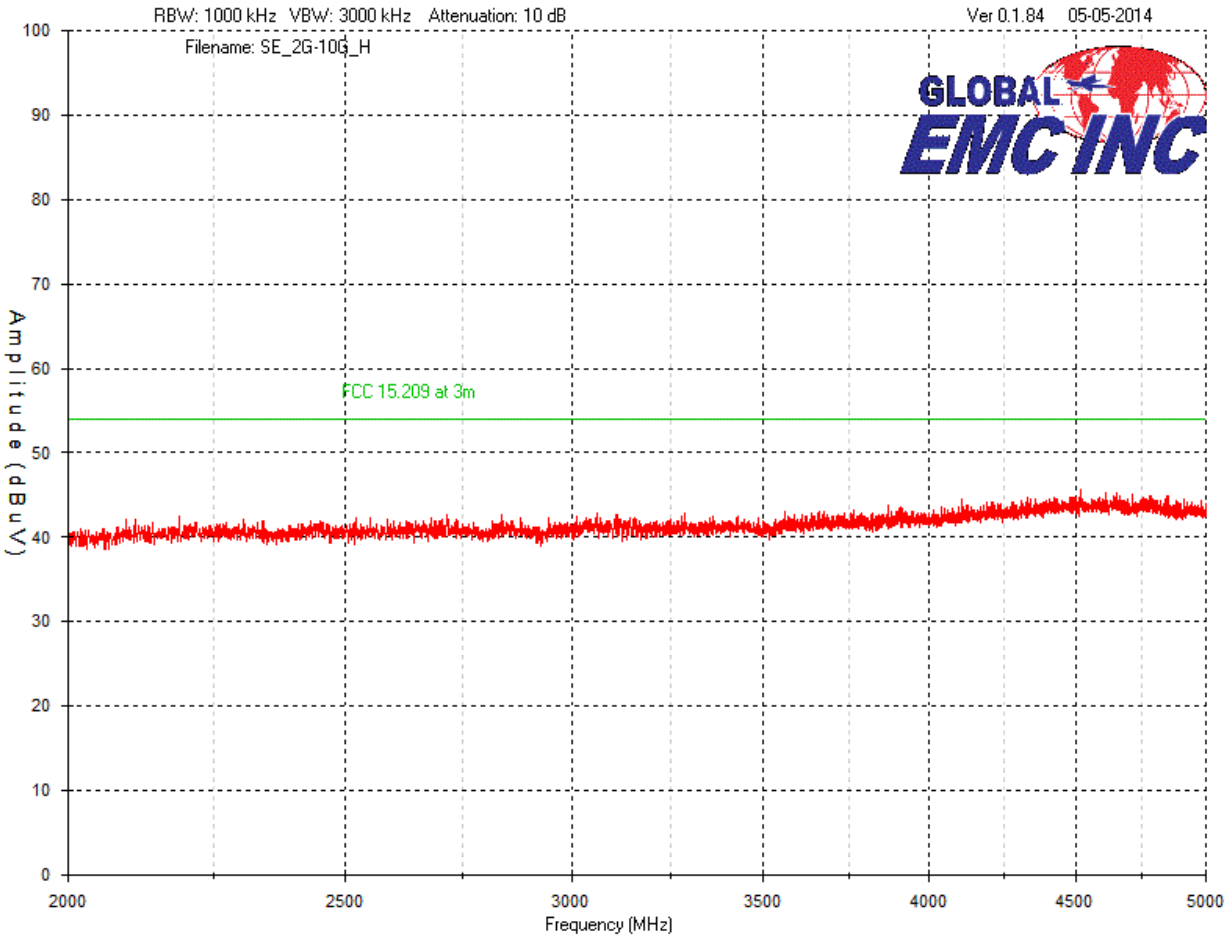
Horizontal – Peak Emissions Graph
30MHz – 1GHz



Horizontal – Peak Emissions Graph
1GHz – 2GHz



Horizontal – Peak Emissions Graph
2GHz – 5GHz



Final Measurements

Spurious Emissions Table

Test Frequency (MHz)	Detection mode (Q-Peak)	Antenna polarity (Horz/ Vert)	Raw signal dB(µV)	Antenna factor dB	Cable loss dB + Pre-selector	Attenuator dB	Pre-Amp Gain dB	Received signal dB(µV/m)	Emission limit dB(µV/m)	Margin dB(µV)	Result
867.8	Peak	Horz	51.3	22.8	2.2	10.0	29.9	56.4	80.8	24.4	PASS
867.8	Avg	Horz	41.3	22.8	2.2	10.0	29.9	46.4	60.8	14.4	PASS
867.8	Peak	Vert	56.9	21.8	2.2	10.0	29.9	61.0	80.8	19.8	PASS
867.8	Avg	Vert	46.9	21.8	2.2	10.0	29.9	51.0	60.8	9.8	PASS
1301.7	Peak	Horz	73.6	25.6	3.6	0.0	36.7	66.1	80.8	14.7	PASS
1301.7	Avg	Horz	63.6	25.6	3.6	0.0	36.7	56.1	60.8	4.7	PASS
1301.7	Peak	Vert	75.9	24.7	3.6	0.0	36.7	67.5	80.8	13.3	PASS
1301.7	Avg	Vert	65.9	24.7	3.6	0.0	36.7	57.5	60.8	3.3	PASS
1735.6	Peak	Horz	56.1	28.8	4.3	0.0	36.3	52.9	74.0	21.1	PASS
1735.6	Avg	Horz	46.1	28.8	4.3	0.0	36.3	42.9	54.0	11.1	PASS
1735.6	Peak	Vert	62.8	27.3	4.3	0.0	36.3	58.1	74.0	15.9	PASS
1735.6	Avg	Vert	52.8	27.3	4.3	0.0	36.3	48.1	54.0	5.9	PASS
2169.5	Peak	Horz	47.6	30.5	3.2	0.0	36.2	45.1	74.0	28.9	PASS
2169.5	Avg	Horz	37.6	30.5	3.2	0.0	36.2	35.1	54.0	18.9	PASS
2169.5	Peak	Vert	48.4	30.7	3.2	0.0	36.2	46.1	74.0	27.9	PASS
2169.5	Avg	Vert	38.4	30.7	3.2	0.0	36.2	36.1	54.0	17.9	PASS

Restricted Band Edge Emissions Table

Test Frequency (MHz)	Detection mode (Quasi-Peak)	Antenna polarity (Horz/ Vert)	Raw signal dB(µV)	Antenna factor dB	Cable loss dB + Pre-selector	Attenuator dB	Pre-Amp Gain dB	Received signal dB(µV/m)	Emission limit dB(µV/m)	Margin dB(µV)	Result
410	Peak	Horz	36.7	16.6	1.5	10.0	30.2	34.6	46.0	11.4	PASS
410	Peak	Vert	38.3	15.6	1.5	10.0	30.2	35.2	46.0	10.8	PASS
608	Peak	Horz	36.5	20.5	1.9	10.0	29.8	39.1	46.0	6.9	PASS
608	Peak	Vert	37.7	19.6	1.9	10.0	29.8	39.4	46.0	6.6	PASS

Notes:

Average measurements shown are obtained by applying a duty cycle correction factor, as reported previously in this test report, in the *Radiated Emissions of Fundamental* section.

Peak readings at the band edges are under the tighter quasi-peak limits of 15.209 as required by 15.231(b)(1). The EUT passes requirements at the band edges.

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Spectrum Analyzer	85650A	HP	Jan. 23, 2013	Jan. 23, 2015	GEMC 170
Quasi-Peak Detector	8566B	HP	Jan. 22, 2013	Jan. 22, 2015	GEMC 169
BiLog Antenna	3142-C	ETS	Feb 4, 2013	Feb 4, 2015	GEMC 137
Horn Antenna	6878/24	Q-par	Aug. 23, 2012	Aug. 23, 2014	GEMC 6365
Pre-Amp 9kHz – 1GHz	CPA9231A	Chase	Aug. 29, 2012	Aug. 29, 2014	GEMC 6403
Pre-Amp 1 - 26 GHz	HP 8449B	HP	Aug. 22, 2012	Aug. 22, 2014	GEMC 6351
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 28
RF Cable 1m	LMR-400-1M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 29
RF Cable 0.5M	LMR-400-0.5M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 31

This report module is based on GEMC template "FCC - 15.209 - Radiated Emissions_Rev1.doc"

20 dB Bandwidth of Periodically Operated Transmitters

Purpose

The purpose of this test is to ensure that the bandwidth occupied does not exceed a stated minimum. This helps ensure the utilization of the frequency allocation is sufficiently narrow and not occupying excessive spectrum. This also helps prevent accidental interference of data by ensuring adequate data separation to distinguish the reception of the intended information by enabling the receiver to have a relatively narrow band response tuned to the transmitter's frequency.

Limits

The Limit is as specified in FCC Part 15 and RSS 210.

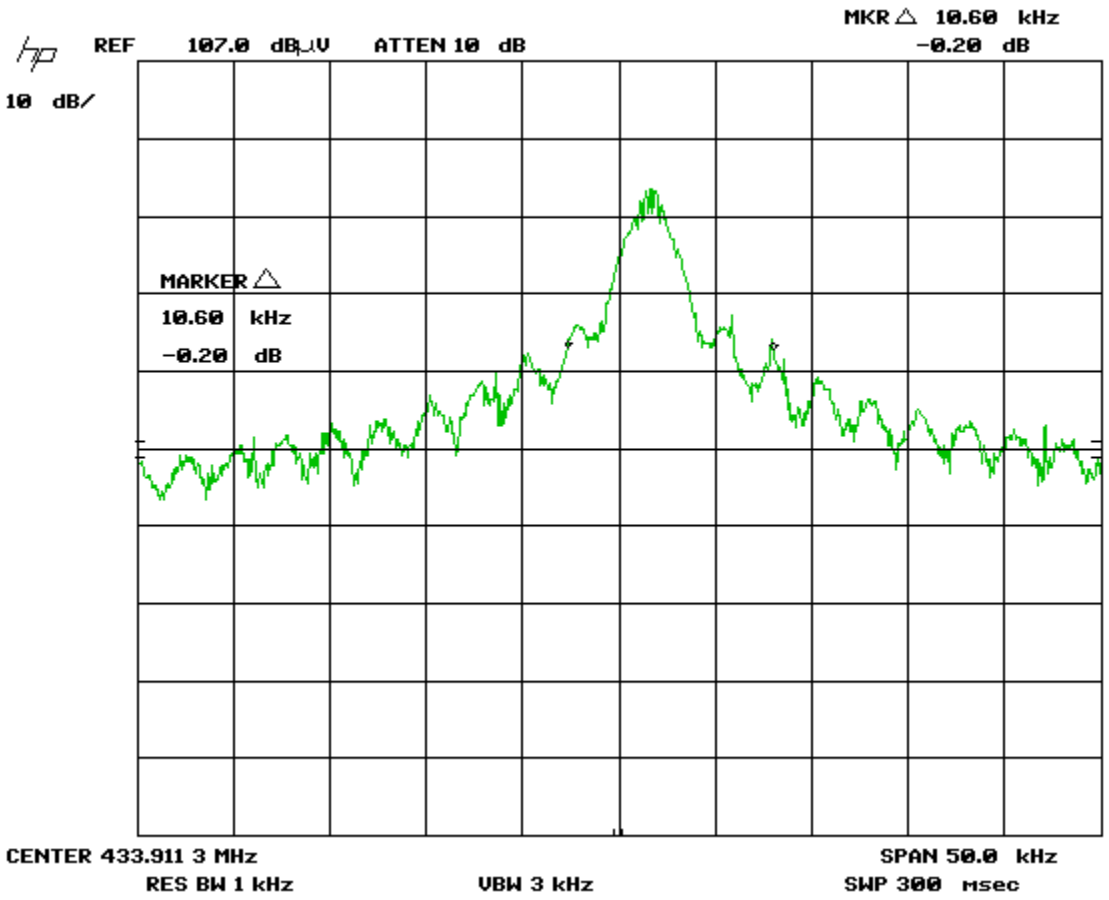
For periodic transmitters below 900 MHz, this should not exceed 0.25% of the fundamental frequency. For periodic transmitters above 900 MHz, this should not exceed 0.5 % of the fundamental frequency. This should be measured with a RBW equal to approximately 1% of the 20 dB BW of the signal and a VBW more than the RBW.

Results

The EUT passed. The 20 dB bandwidth measured was 10.6 kHz, and the requirement was that this be less than 1.08 MHz.

Graph(s)

This is measured by a max hold on the spectrum analyzer and the resolution bandwidth chosen represents the worst case for the 20 dB BW during operation of the EUT. This measurement is a peak measurement. Max hold is performed for a duration of not less than 1 minute. The markers are set at approximately 20dB below the peak.



Note: See 'Appendix B – EUT & Test Setup Photographs' for photos showing the test set-up.

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Spectrum Analyzer	85650A	HP	Jan. 23, 2013	Jan. 23, 2015	GEMC 170
BiLog Antenna	3142-C	ETS	Feb 4, 2013	Feb 4, 2015	GEMC 137
Pre-Amp 9kHz – 1GHz	CPA9231A	Chase	Aug. 29, 2012	Aug. 29, 2014	GEMC 6403
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 28
RF Cable 1m	LMR-400-1M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 29

This report module is based on GEMC template "FCC – Power Line Conducted Emissions Class B_Rev1"

Appendix A – EUT Summary

For further details for filing purposes, refer to filing package.

General EUT Description

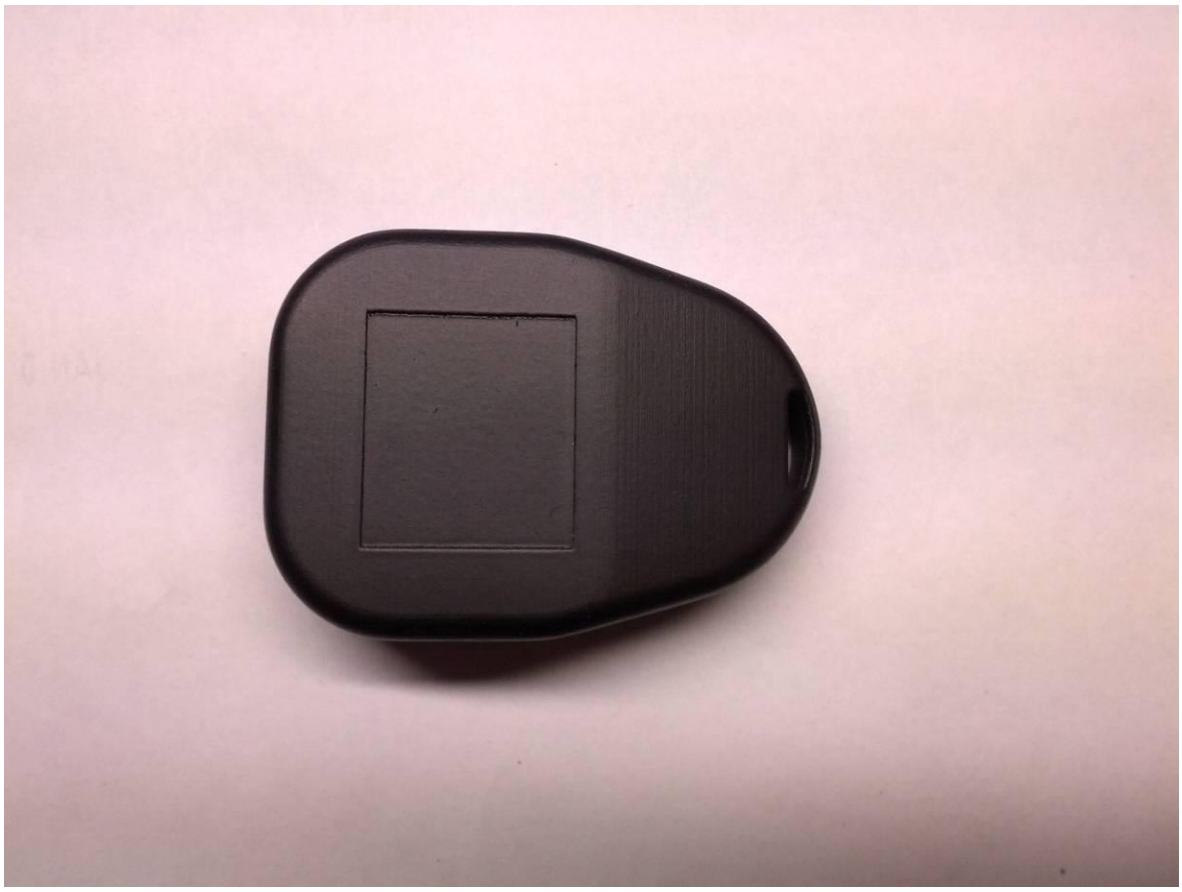
Client/Manufacturer Details	
Organization / Address	Active Control Technology Inc. 200 Ridgeway Drive, Unit 17 Mississauga, Ontario Canada, L5L 5Y6
Contact	Terry Orr
Phone	(905) 635-2993
Email	torr@activecontrol.com
EUT (Equipment Under Test) Details	
EUT Name	Quik-Kee
EUT Model / SN	CLIK64-T
EUT revision	New product
Equipment category	RF Transmitter
EUT is powered using	1x 3V CR2032 lithium batttery
Input voltage range(s) (V)	3V
Number of power supplies in EUT	N/A
Transmits RF energy?	Yes, 433.92MHz
Basic EUT functionality description	Remote control to access secured areas using an encrypted signal.
Step by step instructions for setup and operation	Pushing upper left button for about 1 second activates device and automatically shuts off.
Frequency of all clocks present in EUT	13.56 MHz
I/O cable description Specify length and type	None
Available connectors on EUT	None
Dimensions of product (approx.)	L: 55 mm W: 40 mm H: 15mm

Note: The EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see 'Appendix B – EUT & Test Setup Photographs'.

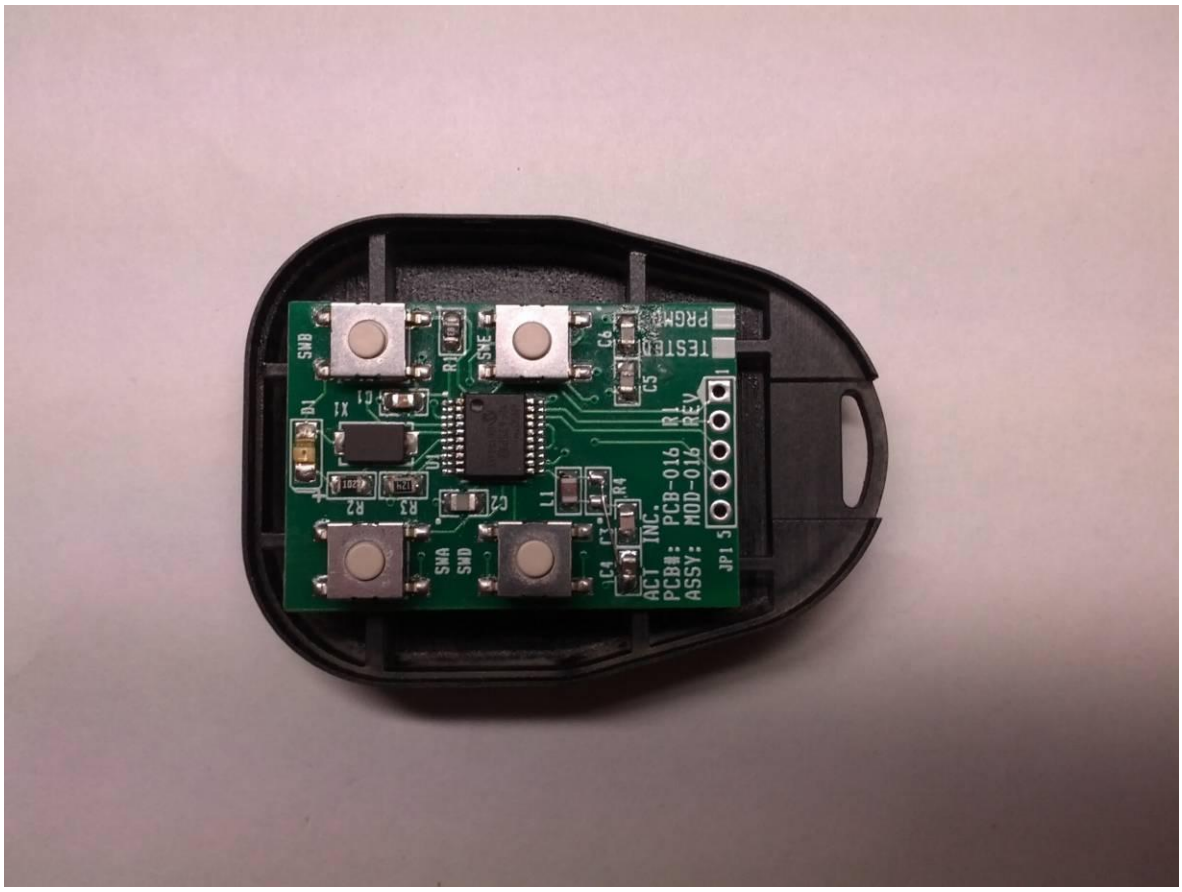
Appendix B – EUT and Test Setup Photographs

Note: These photos are for information purposes only.
Also refer to PDF files separate from this test report.

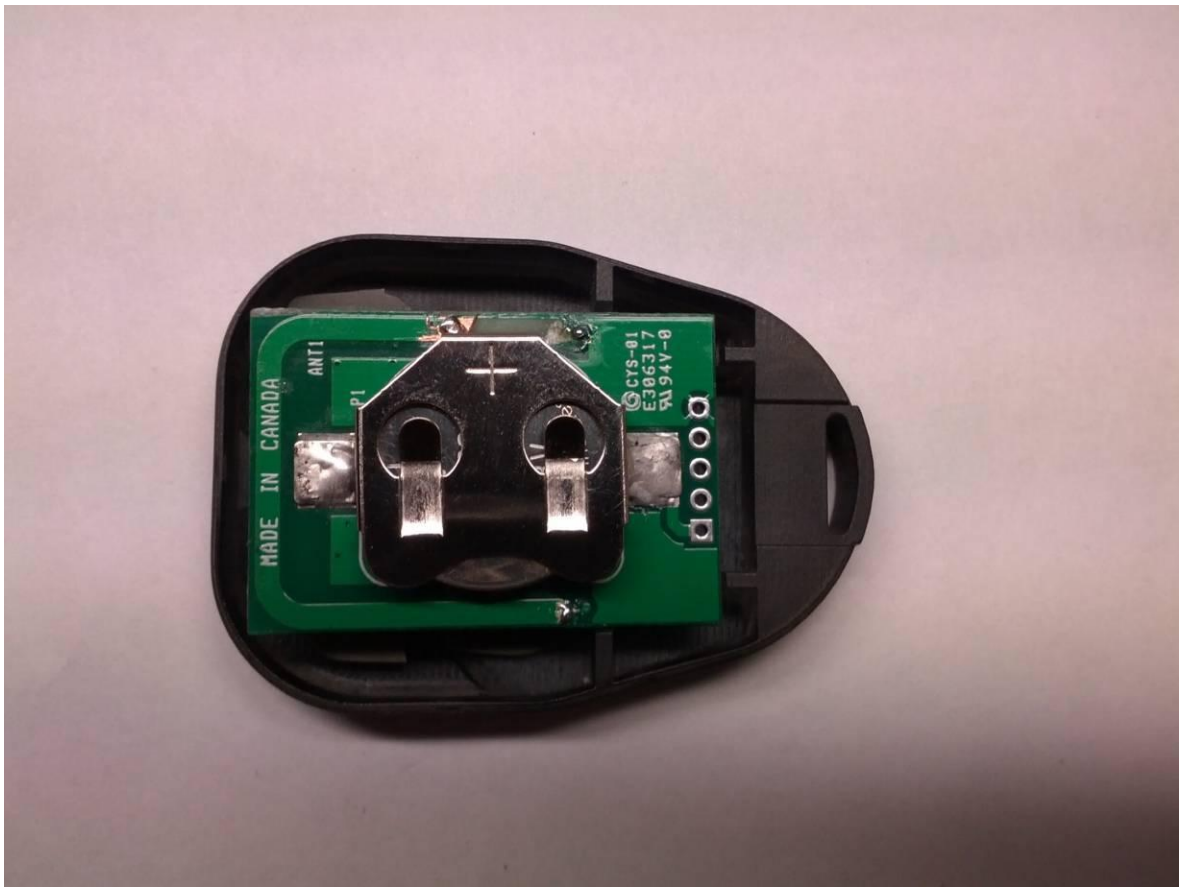
EUT exterior: View 1



EUT exterior: View 2



EUT interior: Enclosure opened, view 1



EUT interior: Enclosure opened, view 2

Radiated emissions testing (less than 30MHz)

Radiated emissions testing (greater than 30MHz)