

**CLASS II PERMISSIVE CHANGE
TEST REPORT**

Report Number: 103645488MPK-001

Project Number: G103645488

September 24, 2018

**Testing performed on the
Smoke/Heat/Toxic Gas Detector**

Models: 360, 370

FCC ID: V7L300301

to

FCC Part 15 Subpart C (15.247)

FCC Part 15, Subpart B

Industry Canada ICES-003

For

Simplex Time Recorder Co.

Test Performed by:

Intertek

1365 Adams Court

Menlo Park, CA 94025 USA


Test Authorized by:

Simplex Time Recorder Co.

50 Technology Drive

Westminster, MA 01441 USA

Prepared by:


Minh Ly

Date: September 24, 2018

Reviewed by:


Krishna K Vemuri

Date: September 24, 2018

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Report No. 103645488MPK-001

Equipment Under Test:	Smoke/Heat/Toxic Gas Detector
Trade Name:	Simplex Time Recorder Co.
Model Numbers:	360, 370
Applicant:	Simplex Time Recorder Co.
Contact:	Marty Chiarizio
Address:	Simplex Time Recorder Co. 50 Technology Drive Westminster, MA 014411
Country	USA
Tel. Number:	(561) 912-6252
Email:	Marty.chiarizio@jci.com
Applicable Regulation:	FCC Part 15 Subpart C (15.247) FCC Part 15, Subpart B Industry Canada ICES-003 Issue 6
Date of Test:	September 11-14, 2018

We attest to the accuracy of this report:



Minh Ly
Project Engineer



Krishna K Vemuri
Engineering Team Lead

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1.0 Introduction

This report is designed to show compliance of the 900 MHz transceiver with the requirements of FCC Part 15 Subpart C (15.247). This test report covers only the FHSS radio.

1.1 Summary of Tests

TEST	Reference FCC/ IC	RESULTS
RF Output Power	15.247(b)	Complies
Transmitter Radiated Emissions	15.247(d), 15.209, 15.205	Complies
Antenna Requirement	15.203	Complies (Internal Antenna)
Radiated Emissions	15.109/ ICES-003	Complies
AC Line Conducted Emission	15.107/ ICES-003	Not Applicable (Battery Operated)

2.0 General Description

2.1 Product Description

Simplex Time Recorder Co. supplied the following description of the EUT:

The 360 and 370 is smoke/heat/toxic gas detector.

For more information, see user's manual provided by the manufacturer.

Information about the Detector FHSS radio is presented below:

For more information, refer to the following product specification, declared by the manufacturer.

Information about the 900 MHz radio is presented below:

Applicant	Simplex Time Recorder Co.
Model Numbers	360 & 370
FCC Identifier	V7L300301
Type of Transmission	Frequency Hopping Spread Spectrum
Rated RF Output	3.05 dBm
Antenna(s) & Gain	Internal Antenna, Gain: 0 dBi
Frequency Range	904.3 – 926.3 MHz
Number of Channel(s)	25
Modulation Type	FSK
Applicant Name & Address	Simplex Time Recorder Co. 50 Technology Drive Westminster, MA 01441 USA

EUT receive date: September 11, 2018

EUT receive condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.

Test start date: September 11, 2018

Test completion date: September 14, 2018

The test results in this report pertain only to the item tested.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Antenna conducted measurements were performed according to the procedure from ANSI C63.10:2013 for Frequency Hopping Spread Spectrum Systems

Radiated emissions measurements were performed according to the procedures in ANSI C63.10: 2013 & ANSI C63.4-2014. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application.

All other measurements were made in accordance with the procedures in part 2 of CFR 47.

Following is the channel test plan:

Channels in 900 MHz band		
Test Channel	Frequency, MHz	Tested
Low	904.3	√
Middle	915.3	√
High	926.3	√

2.4 Test Facility

The test site used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

3.0 System Test Configuration

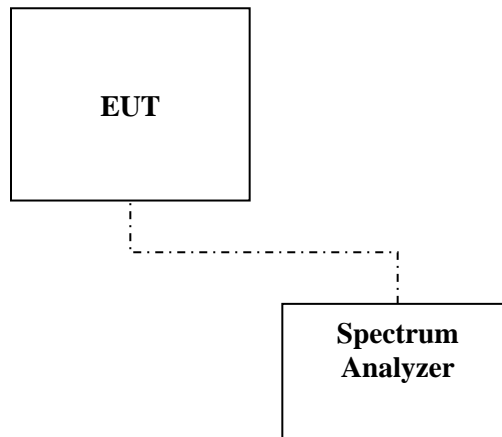
3.1 Support Equipment

EUT is a standalone equipment.

3.2 Block Diagram of Test Setup

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Smoke/Heat/Toxic Gas Detector (Digital Unit)	Simplex Time Recorder Co.	370	MPK1809130836-001
Smoke/Heat/Toxic Gas Detector (Conducted Unit)	Simplex Time Recorder Co.	370	MPK1809130836-002
Smoke/Heat/Toxic Gas Detector (Radiated Unit)	Simplex Time Recorder Co.	370	MPK1809130836-003
Smoke/Heat Detector (Conducted Unit)	Simplex Time Recorder Co.	360	MPK1809130836-004
Smoke/Heat Detector (Radiated Unit)	Simplex Time Recorder Co.	360	MPK1809130836-005

Antenna was removed and co-axial connector with a cable was installed for Conducted Measurements.



S = Shielded	F = With Ferrite
U = Unshielded	m = Length in Meters

3.3 Justification

The 300, 301 models are previously certified under FCC ID: V7L300301.

The 300 and 301 are smoke detectors only and contain the same transceiver circuitry as the 360/370 models. The 360 and 370 have multiple fire sensors including smoke detection. The 370 additionally offers CO detection where the 360 is smoke and heat only. The model 301 has tandem capability so the sounder can be turned on remotely. Both the 360 and 370 offer this same feature. The transceiver board is a different shape between the 300/301 and 360/370 and there is a slight difference in the wire antenna shape but virtually the same length.

The Output power was verified on the 370 model and Radiated emissions were tested on both 360 & 370 Models.

For radiated emission measurements the EUT is placed on a non-conductive table. The EUT is attached to peripherals and they are connected and operational (as typical as possible). The EUT is wired to transmit full power. During testing, all cables are manipulated to produce worst-case emissions.

3.4 Mode of Operation During Test

During transmitter testing, the transmitter was setup to transmit continuously at maximum RF power on the low channel, middle channel, high channel and with hopping channels enabled.

3.5 Modifications Required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.6 Additions, Deviations and Exclusions from Standards

No additions, deviations or exclusions from the standard were made.

4.0 Transmitter Emissions Measurement Results

4.1 Conducted Output Power at Antenna Terminals FCC Rule 15.247(b)(1)

4.1.1 Requirement

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels

4.1.2 Procedure

The Procedure described in the ANSI C63.10:2013 Section 7.8 for Frequency Hopping Spread Spectrum Systems was used to determine the RF Output Power.

- Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
- RBW > the 20 dB bandwidth of the emission being measured
- VBW = 3 x RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (see the NOTE above regarding external attenuation and cable loss). The limit is specified in one of the subparagraphs of this Section. Submit this plot.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Power was read directly from the spectrum analyzer and cable loss correction was added to the reading to obtain the power at the antenna terminals.

Tested By:	Minh Ly
Test Date:	September 12, 2018

4.1.3 Test Result

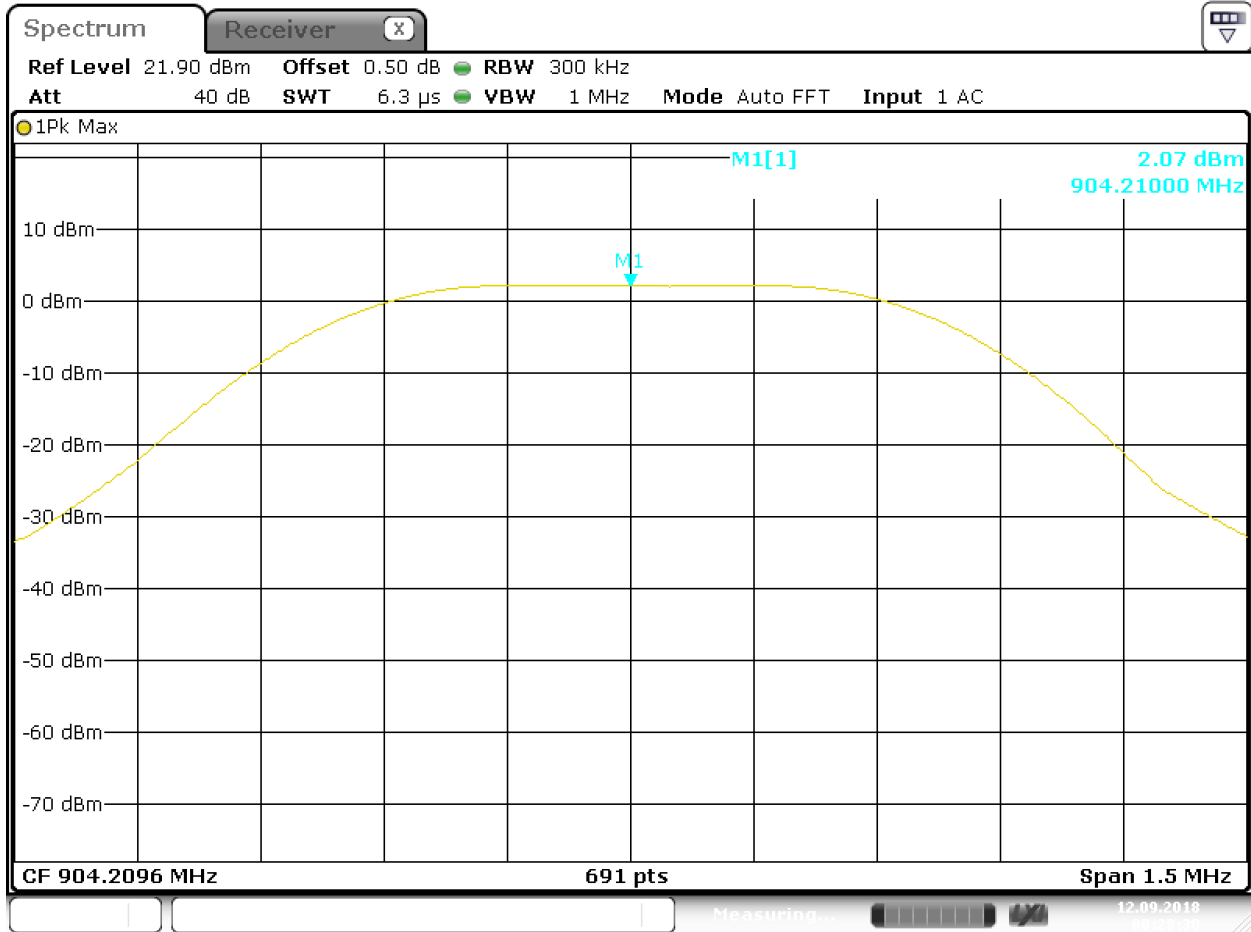
Refer to the following plots for the test result:

EUT Model: 370

Frequency MHz	Conducted Peak Power dBm	Conducted Peak Power mW	Plot #
904.3	2.07	1.62	1.1
915.3	3.02	2.00	1.2
926.3	3.05	2.02	1.3

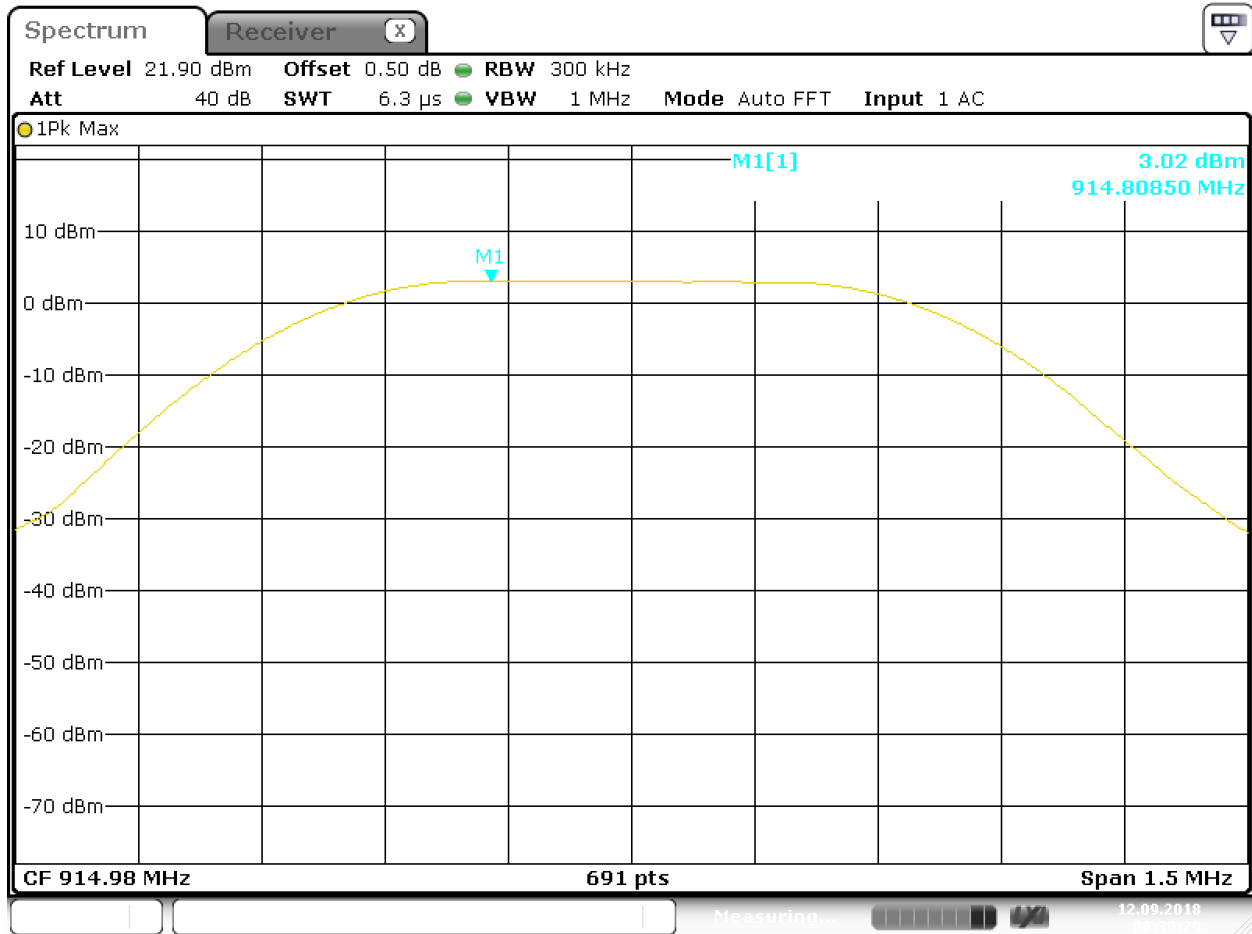
Results	Complies
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Plot 1. 1 – Output Power Low Channel



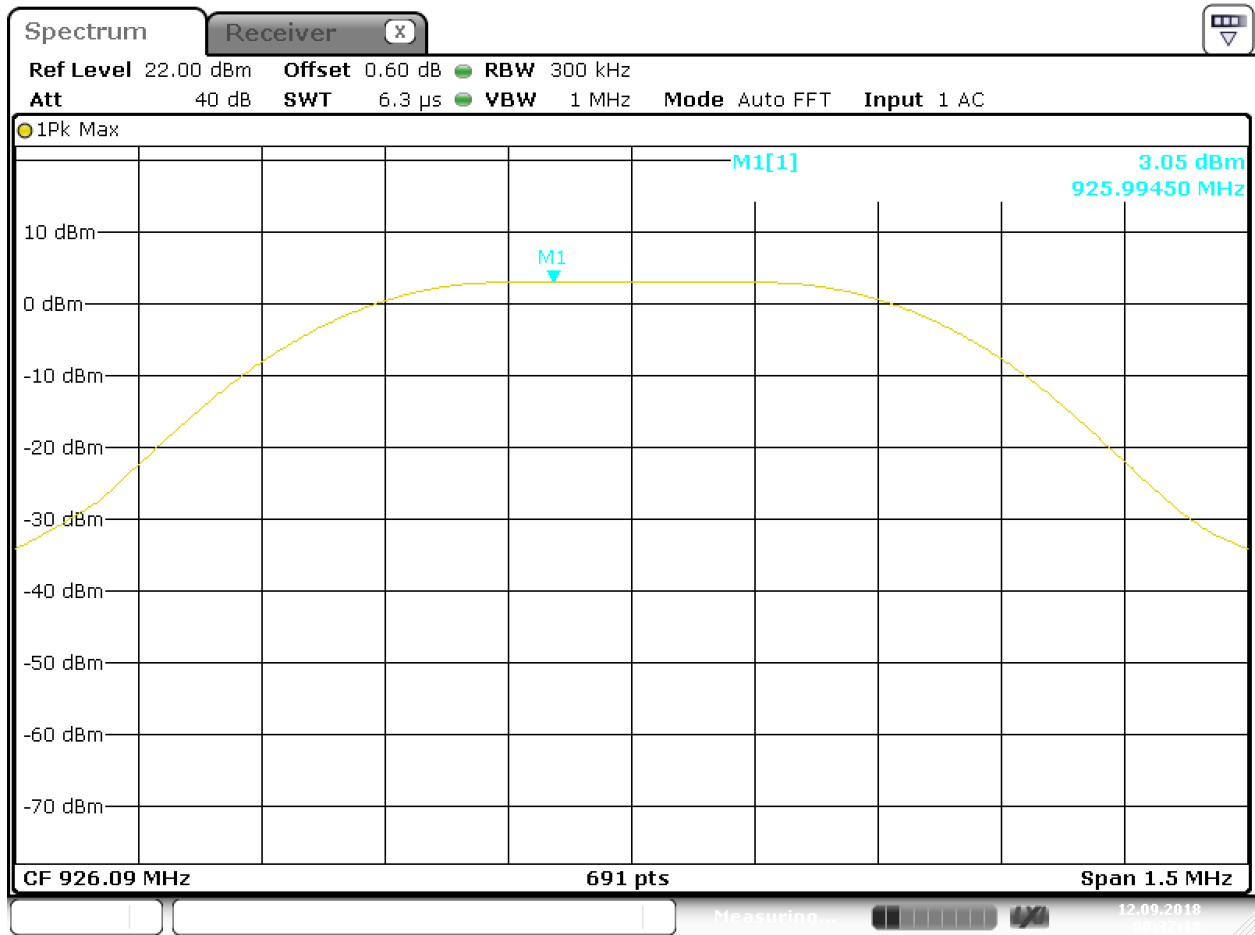
Date: 12.SEP.2018 00:28:30

Plot 1. 2 – Output Power Middle Channel



Date: 12.SEP.2018 00:30:29

Plot 1.3 – Output Power High Channel



Date: 12.SEP.2018 00:37:18

4.2 Transmitter Radiated Emissions
FCC Rule 15.247(d), 15.209, 15.205

4.2.1 Requirement

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

For out of band radiated emissions (except for frequencies in restricted bands), in any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20dB (peak) or 30 dB (average) below that of the maximum in-band 100 kHz emissions.

4.2.2 Procedure

Radiated emission measurements were performed from 30 MHz to 26,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable that is 80 cm in height. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at 3 meters

All measurements were made with a Peak Detector and compared to QP limits for 30MHz – 1GHz and Average or Peak limits for 1GHz – 26GHz where applicable.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

EUT was tested with Internal Antenna.

4.2.3 Field Strength Calculation

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$FS = RA + AF + CF - AG$; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in dB(μ V/m)

RA = Receiver Amplitude (including preamplifier) in dB(μ V); AF = Antenna Factor in dB(1/m)

CF = Cable Attenuation Factor in dB; AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μ V) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μ V/m). This value in dB(μ V/m) was converted to its corresponding level in μ V/m.

RA = 52.0 dB(μ V)

AF = 7.4 dB(1/m)

CF = 1.6 dB

AG = 29.0 dB

$FS = 52.0 + 7.4 + 1.6 - 29.0 = 32$ dB(μ V/m).

Level in μ V/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m.

4.2.4 Test Results

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Radiated emission measurements were performed up to 18GHz. No other emissions were detected beyond 10GHz (10th harmonic).

All radiated measurements were conducted in different orientation. The worst-case data was reported.

Tested By:	Minh Ly
Test Date:	September 11-14, 2018

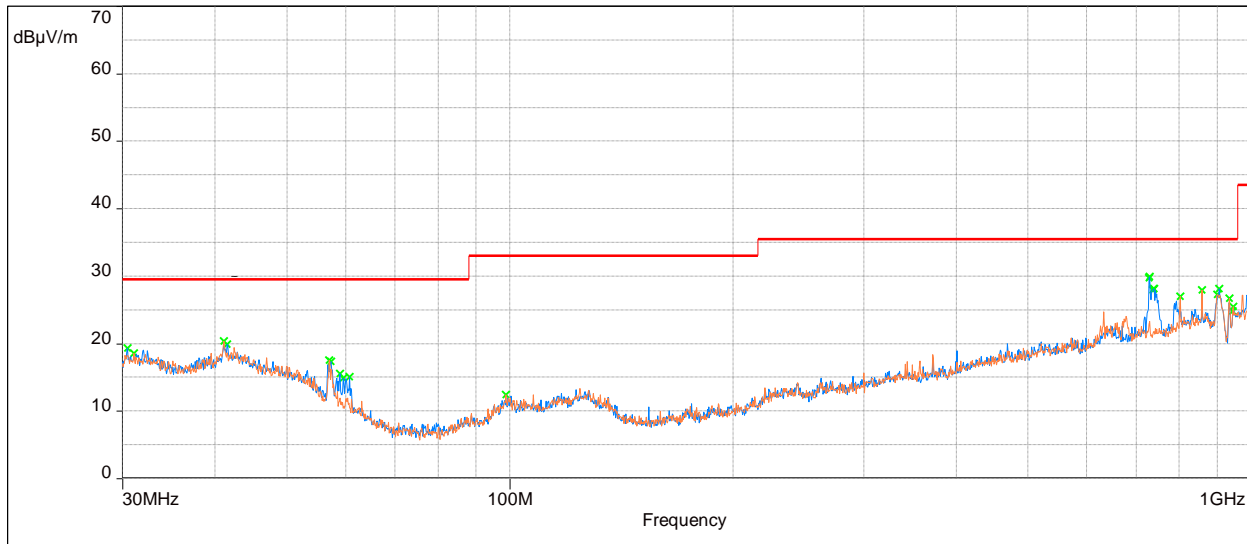
4.2.4 Test Results: 15.209 Out-of-Band Radiated Spurious Emissions:

TABLE 4.2

Model	Frequency MHz	Field Strength measured at 3m distance dB(uV/m)
EUT Model: 370	904.3	100.19
	915.3	101.70
	926.3	102.30
EUT Model: 360	904.3	100.16
	915.3	102.64
	926.3	103.96

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan, 904.3MHz, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)

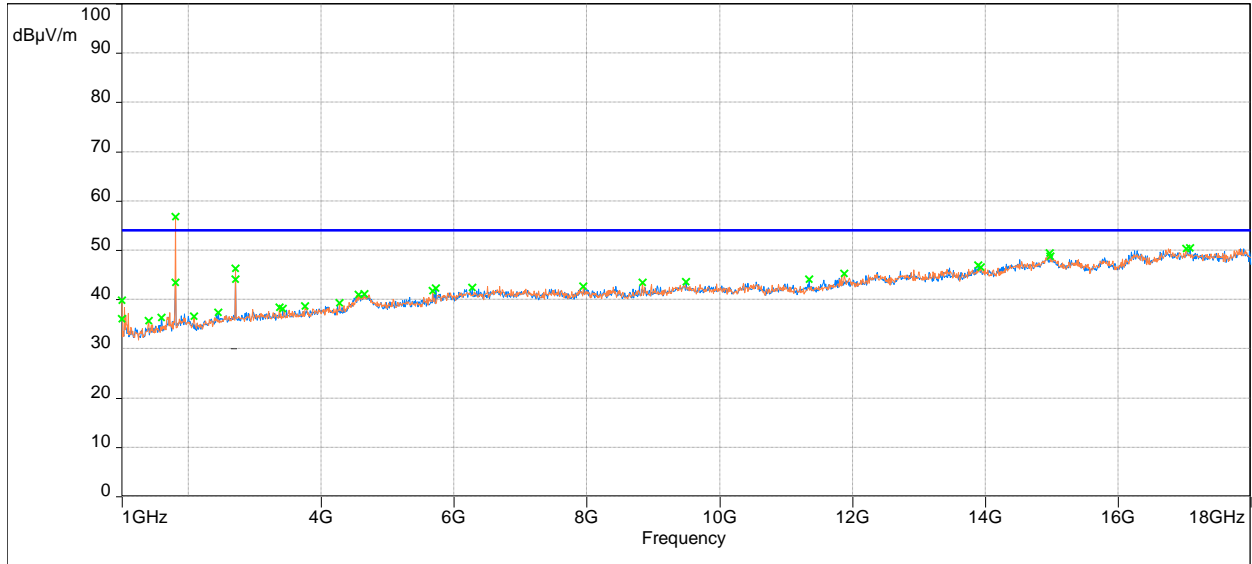


Model: ; Client: ; Comments: ; Test Date: 09/11/2018 17:08

Frequency (MHz)	Peak dB(µV/m)	QP Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
729.920	29.9	35.5	-5.6	0	1.0	Vertical	34.0	-4.1

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/11/2018 19:29

Frequency (MHz)	FS@3m dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
2711.90	46.2	54.0	-7.8	275.0	1.5	Horizontal	59.6	-13.4
1808.00	56.69	80.19*	-23.5	347.0	1.5	Horizontal	72.18	-15.49

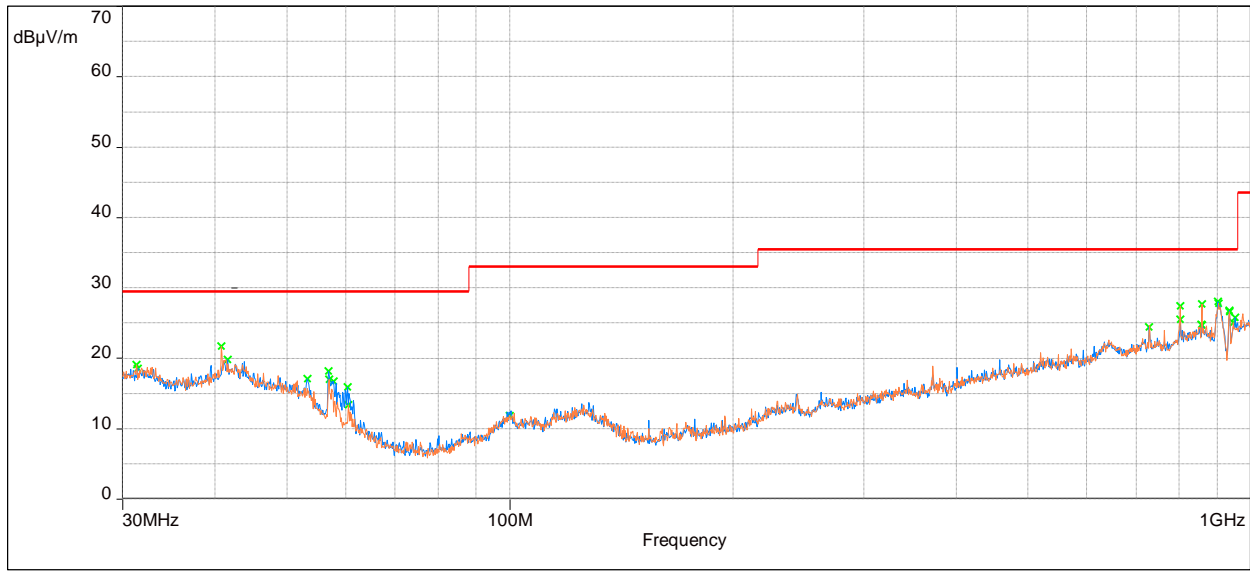
*1808.0MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 904.3MHz at 3m is 100.19 dB(µV/m). The 20dBc limit per 15.247(d) is 80.19 dB(µV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Test Results: 15.209 Out-of-Band Radiated Spurious Emissions, 915.3 MHz, EUT Model: 370

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)

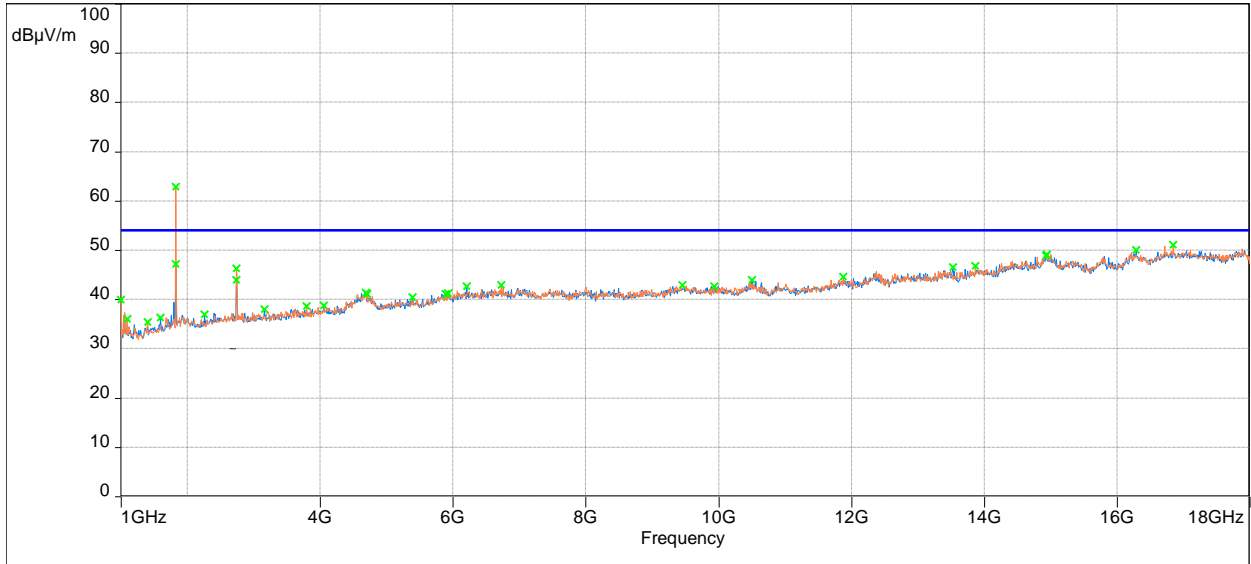


Model: ; Client: ; Comments: ; Test Date: 09/11/2018 17:19

Frequency (MHz)	Peak dB(µ V/m)	QP Limit dB(µ V/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
856.052	24.7	35.5	-10.8	310.0	1.0	Horizontal	27.3	-2.6
859.091	27.7	35.5	-7.8	302.8	2.0	Horizontal	30.2	-2.6
902.095	28.1	35.5	-7.5	125.8	1.0	Vertical	29.6	-1.6

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/11/2018 19:48

Frequency (MHz)	FS@3m dB(μV/m)	Limit dB(μV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBUV)	Correction (dB)
2745.90	46.2	54.0	-7.8	352.3	1.5	Horizontal	59.5	-13.2
1830.60	62.82	81.7*	-18.88	352.0	1.5	Horizontal	78.22	-15.4

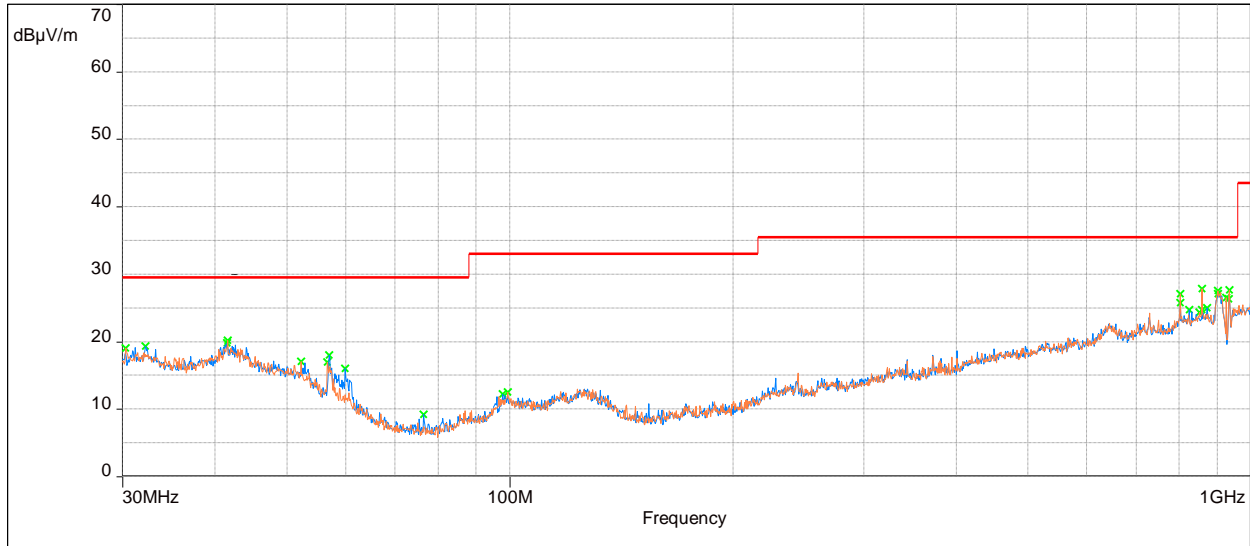
*1830.6MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 915.3 MHz at 3m is 101.7 dB(μV/m). The 20dBc limit per 15.247(d) is 81.7 dB(μV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Test Results: 15.209 Out-of-Band Radiated Spurious Emissions, 926.3 MHz, EUT Model: 370

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)

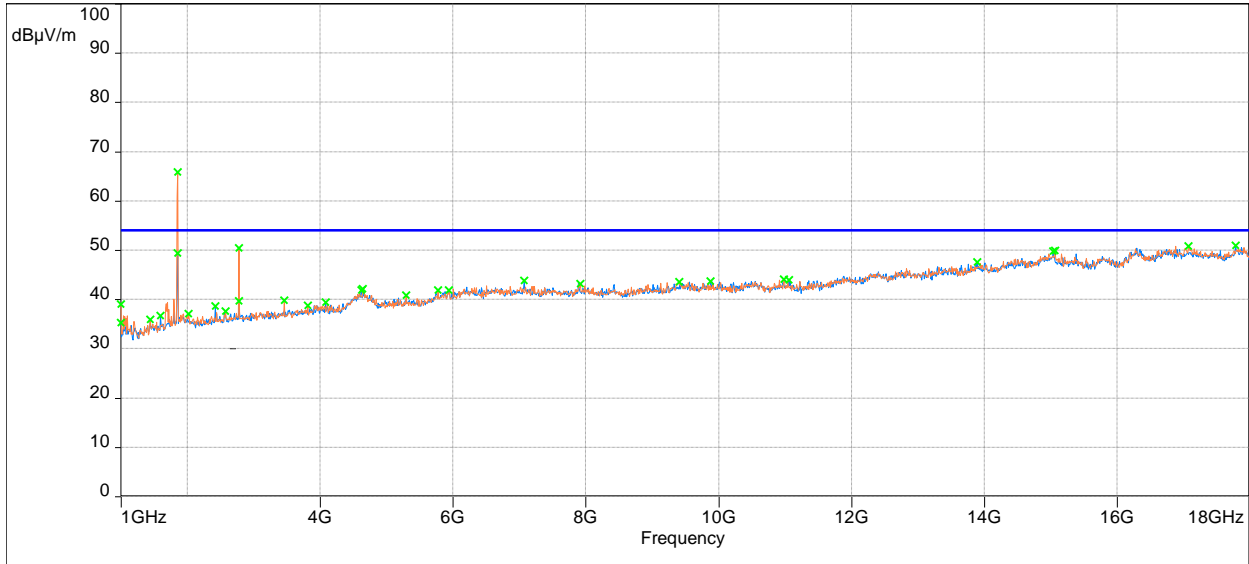


Model: ; Client: ; Comments: ; Test Date: 09/11/2018 18:17

Frequency (MHz)	Peak dB(µV/m)	QP Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBµV)	Correction (dB)
801.829	27.0	35.5	-8.5	182.5	1.0	Horizontal	30.5	-3.5
852.269	24.3	35.5	-11.2	11.3	1.0	Horizontal	27.0	-2.7
859.091	27.8	35.5	-7.7	122.5	2.0	Horizontal	30.4	-2.6

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/11/2018 19:15

Frequency (MHz)	FS@3m dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBµV)	Correction (dB)
2778.20	50.4	54.0	-3.6	2.0	1.5	Horizontal	63.6	-13.3
1852.60	65.8	82.3*	-16.5	360.0	1.5	Horizontal	81.08	-15.28

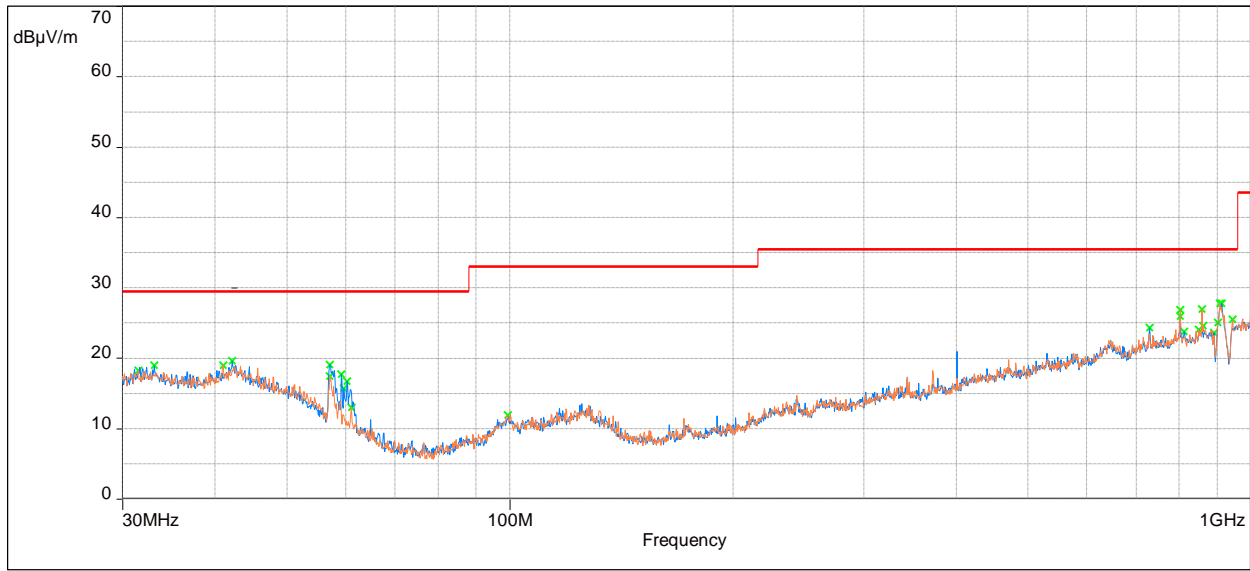
*1852.6MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 926.3 MHz at 3m is 102.3 dB(µV/m). The 20dBc limit per 15.247(d) is 82.3 dB(µV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Test Results: 15.209 Out-of-Band Radiated Spurious Emissions, 904.3MHz

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- x Peak (Peak /Lim. QPeak) (Horizontal)
- x Peak (Peak /Lim. QPeak) (Vertical)

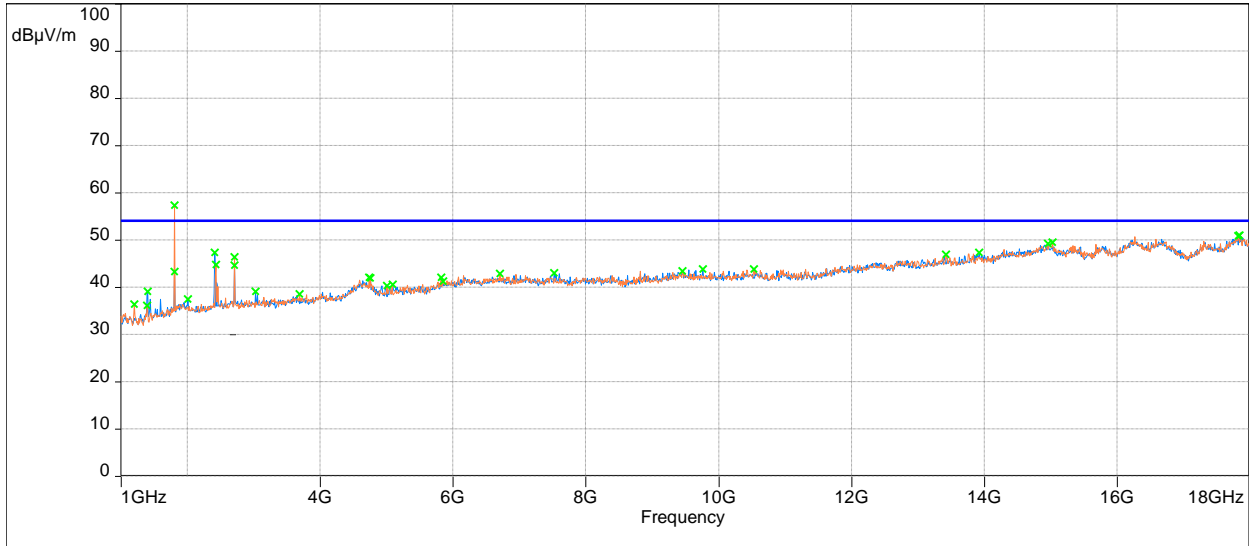


Model: ; Client: ; Comments: ; Test Date: 09/14/2018 17:15

Frequency (MHz)	Peak dB(μV/m)	QP Limit dB(μV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
801.829	26.9	35.5	-8.6	341.0	1.0	Horizontal	30.4	-3.5
859.091	27.0	35.5	-8.6	73.5	2.0	Horizontal	29.5	-2.6
907.139	27.8	35.5	-7.7	349.8	2.0	Horizontal	29.2	-1.4

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/14/2018 19:26

Frequency (MHz)	FS@3m dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
2711.90	46.4	54.0	-7.6	228.0	1.5	Horizontal	59.8	-13.4
2711.90	44.7	54.0	-9.3	273.0	1.5	Vertical	58.1	-13.4
1808.00	57.4	80.16*	-22.76	271.0	1.5	Horizontal	72.85	-15.49

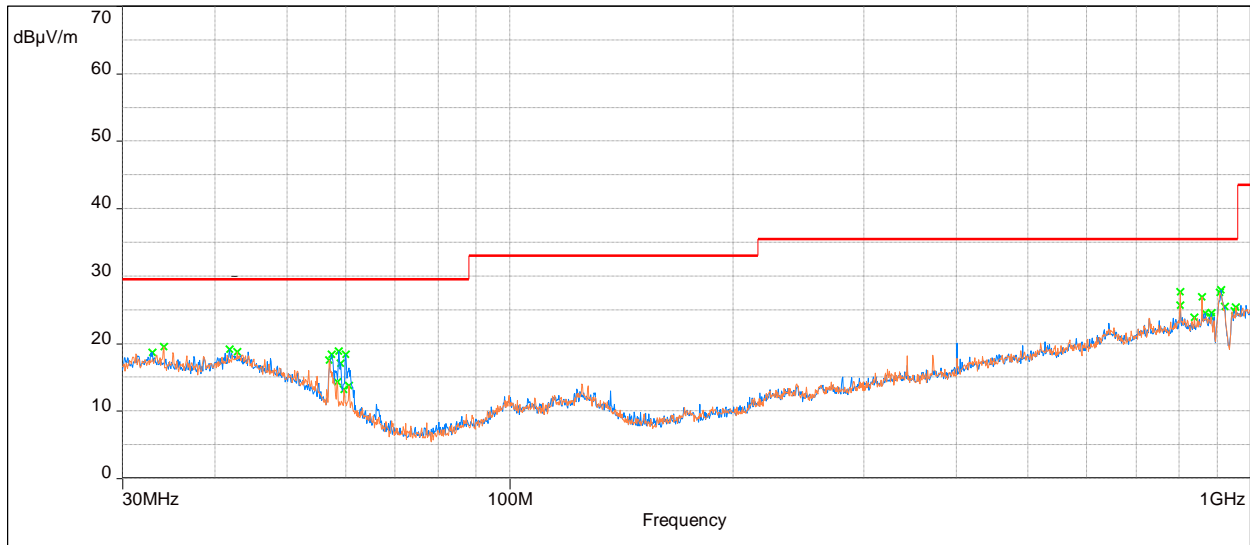
*1808MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 904.3MHz at 3m is 100.16dB(µV/m). The 20dBc limit per 15.247(d) is 80.16 dB(µV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Test Results: 15.209 Out-of-Band Radiated Spurious Emissions, 915.3 MHz, EUT Model: 360

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)

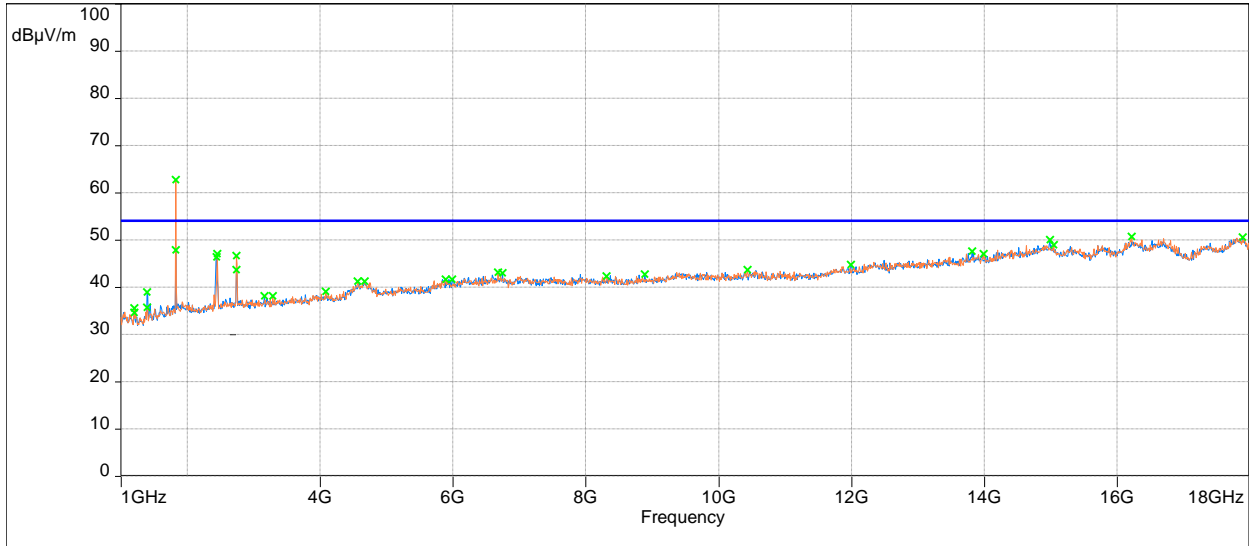


Model: ; Client: ; Comments: ; Test Date: 09/14/2018 18:08

Frequency (MHz)	Peak dB(µV/m)	QP Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
801.829	27.6	35.5	-7.9	254.8	1.0	Horizontal	31.1	-3.5
859.091	26.9	35.5	-8.7	105.8	2.0	Horizontal	29.4	-2.6
908.367	27.6	35.5	-7.9	296.0	1.0	Horizontal	28.9	-1.3

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/14/2018 19:36

Frequency (MHz)	FS@3m dB(µV/m)	Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBµV)	Correction (dB)
2744.20	46.6	54.0	-7.4	223.3	1.5	Horizontal	59.8	-13.2
2744.20	43.7	54.0	-10.3	269.5	1.5	Vertical	56.9	-13.2
1830.60	62.8	82.64*	-19.84	267.0	1.52	Horizontal	78.16	-15.4

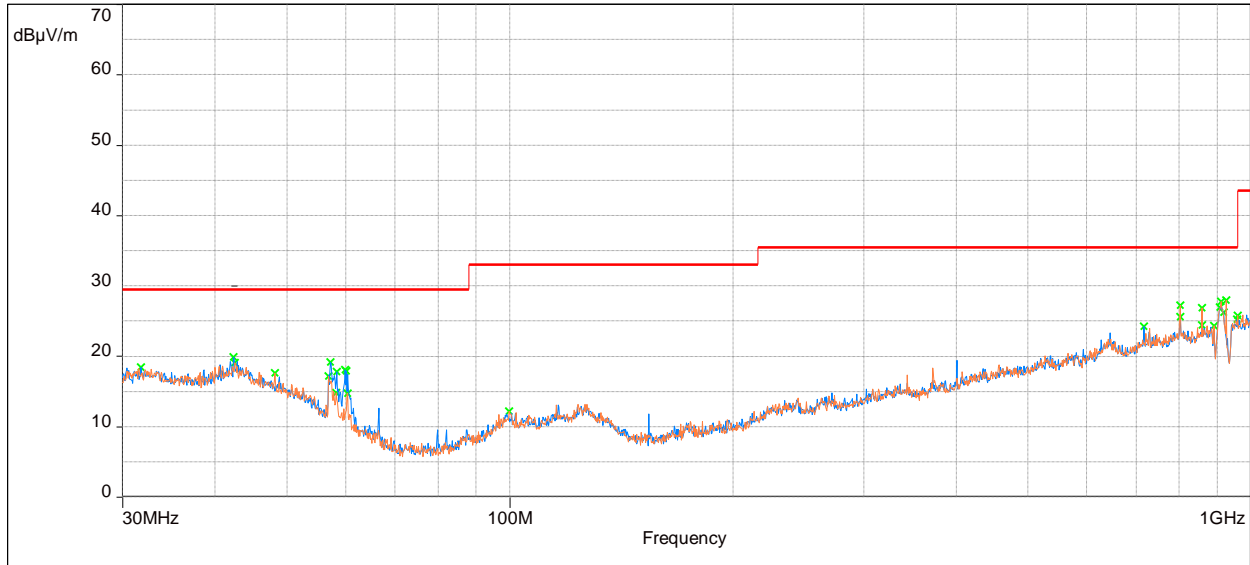
*1830.6MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 915.3 MHz at 3m is 102.64 dB(µV/m). The 20dBc limit per 15.247(d) is 82.64 dB(µV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

Test Results: 15.209 Out-of-Band Radiated Spurious Emissions, 926.3 MHz, EUT Model: 360

Radiated Spurious Emissions 30 - 1000 MHz, Peak Scan

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)

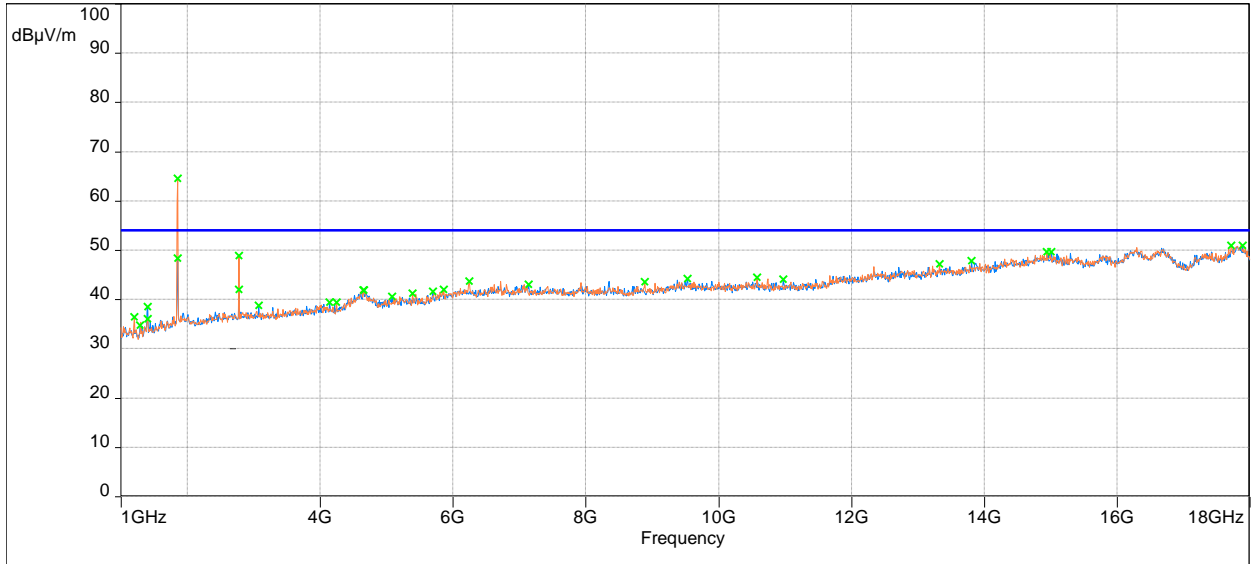


Model: ; Client: ; Comments: ; Test Date: 09/14/2018 18:17

Frequency (MHz)	Peak dB(µV/m)	QP Limit dB(µV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBuV)	Correction (dB)
801.829	27.2	35.5	-8.3	40.5	1.0	Horizontal	30.7	-3.5
910.663	27.8	35.5	-7.7	14.5	3.0	Horizontal	29.0	-1.2
926.248	27.9	35.5	-7.6	281.0	1.0	Horizontal	28.7	-0.7
859.091	24.4	35.5	-11.1	130.3	2.0	Vertical	27.0	-2.6

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/14/2018 18:32

Frequency (MHz)	FS@3m dB(μV/m)	Limit dB(μV/m)	Margin (dB)	Angle (°)	Height (m)	Polarity	Raw (dBUV)	Correction (dB)
2778.20	48.9	54.0	-5.2	267.3	1.5	Horizontal	62.1	-13.3
1852.60	64.5	83.96*	-19.46	267.0	1.5	Horizontal	79.77	-15.28

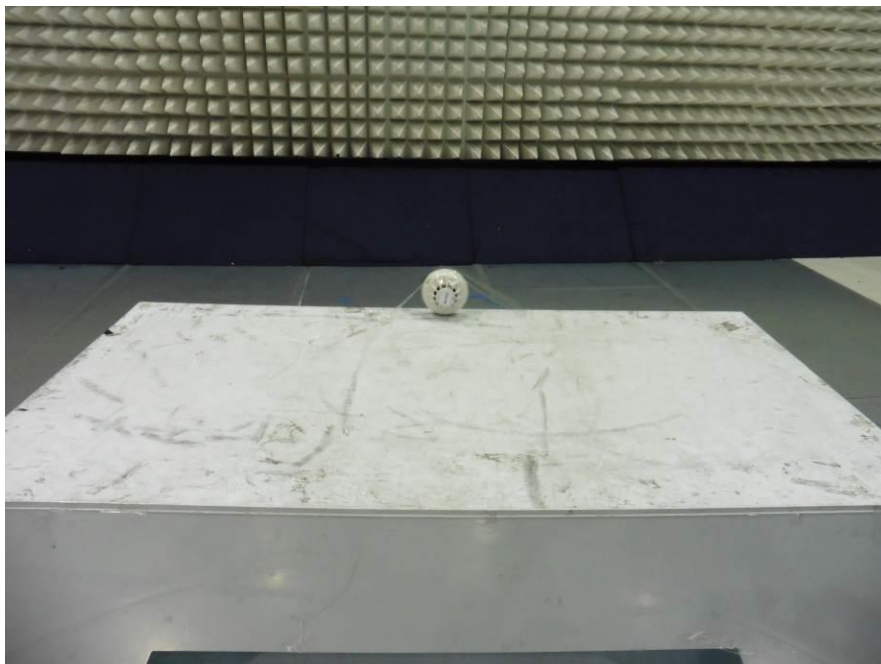
*1852.6MHz does not fall under restricted band per FCC 15.205. The fundamental field strength measurement at 926.3 MHz at 3m is 103.96 dB(μV/m). The 20dBc limit per 15.247(d) is 83.96 dB(μV/m).

Note: FS@3m = RA + Correction
Correction = AF + CF - Preamp

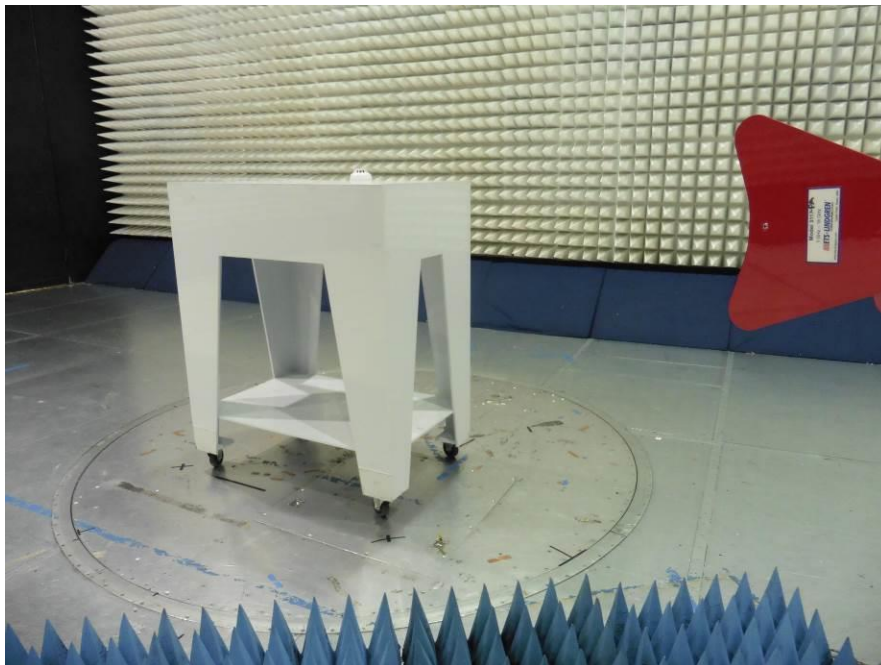
Results	Complies by 5.2dB
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4.2.5 Test Setup Photographs

The following photographs show the testing configurations used.



4.7.5 Test Setup Photographs (Continued)



4.3 Radiated Emissions

FCC Ref: 15.109, ICES 003

4.3.1 Requirement

Limits for Electromagnetic Radiated Emissions FCC Section 15.109(b), ICES 003*, RSS GEN

Frequency (MHz)	Class A at 10m dB(μV/m)	Class B at 3m dB(μV/m)
30-88	39	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

4.3.2 Procedures

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz and with the average detector instrument in the frequency range above 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meters from the EUT. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements of Class B equipment may be made at a closer distance, for example 3m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for a larger EUT.

Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material.

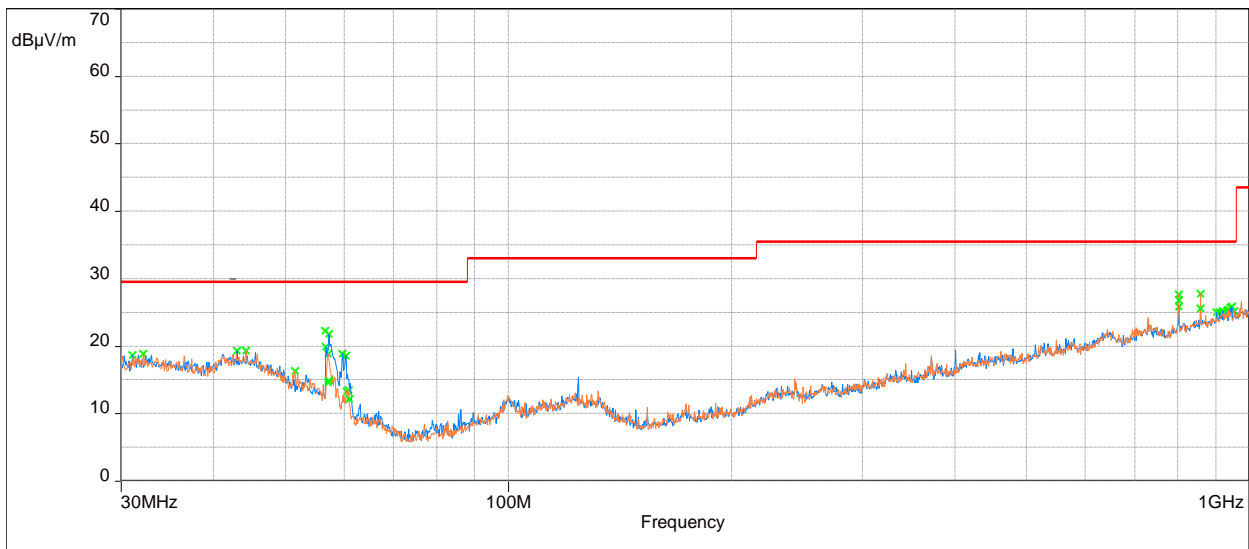
Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.

4.3.3 Test Results

Date of Test:	September 11-14, 2018
Results	Complies

Test Results: Radiated Emissions 30 MHz – 1000 MHz, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. QPeak) (Horizontal)
- × Peak (Peak /Lim. QPeak) (Vertical)
- × FS (Final QP) (Horizontal)
- × FS (Final QP) (Vertical)



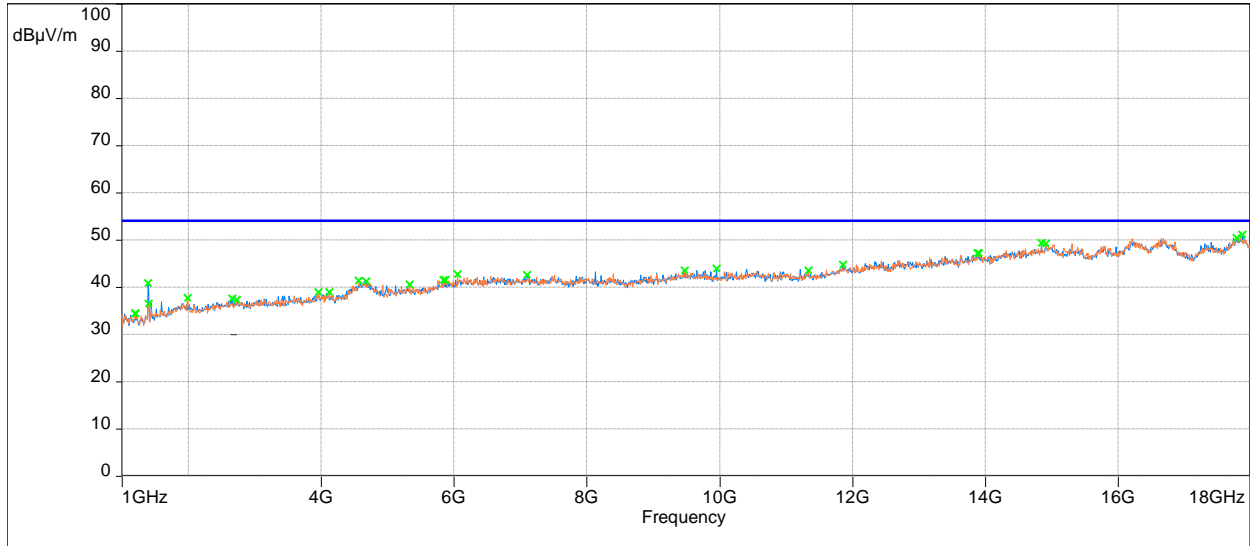
Model: ; Client: ; Comments: ; Test Date: 09/11/2018 15:36

Frequency	Quasi Pk FS	Limit	Margin	Azimuth	Height	Polarity	Raw	Correction
MHz	dB(uV/m)	dB(uV/m)	dB	deg	cm		dB(uV/m)	dB
57.094	14.6	29.5	-15.0	356.0	1.3	Horizontal	29.8	-15.3
801.821	26.8	35.5	-8.7	60.0	1.4	Horizontal	30.3	-3.5
859.083	25.6	35.5	-9.9	277.0	2.0	Horizontal	28.1	-2.6
56.564	22.3	29.5	-7.2	276.8	1.2	Vertical	37.4	-15.1
57.224	14.9	29.5	-14.6	23.8	3.2	Vertical	30.3	-15.3
60.947	12.1	29.5	-17.4	87.0	1.4	Vertical	28.5	-16.7

4.3.3 Test Results (Continued)

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 370

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- x Peak (Peak /Lim. Peak) (Horizontal)
- x Peak (Peak /Lim. Peak) (Vertical)

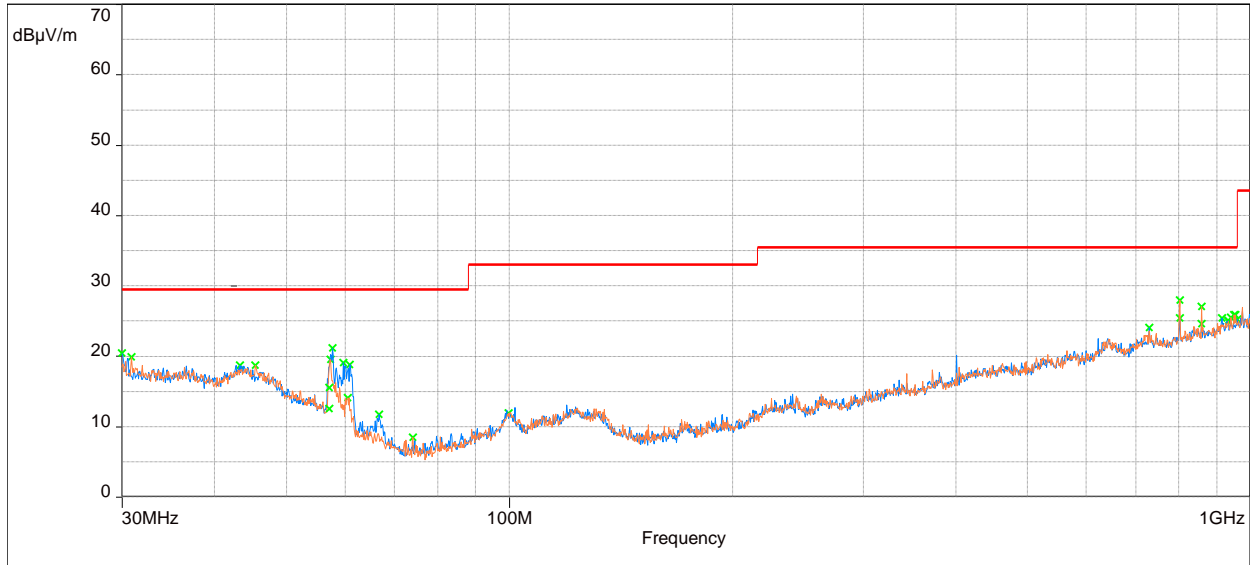


Model: ; Client: ; Comments: ; Test Date: 09/14/2018 20:03

4.3.3 Test Results (Continued)

Test Results: Radiated Emissions 30 MHz – 1000 MHz, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/10.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- x Peak (Peak /Lim. QPeak) (Horizontal)
- x Peak (Peak /Lim. QPeak) (Vertical)
- x FS (Final QP) (Horizontal)
- x FS (Final QP) (Vertical)



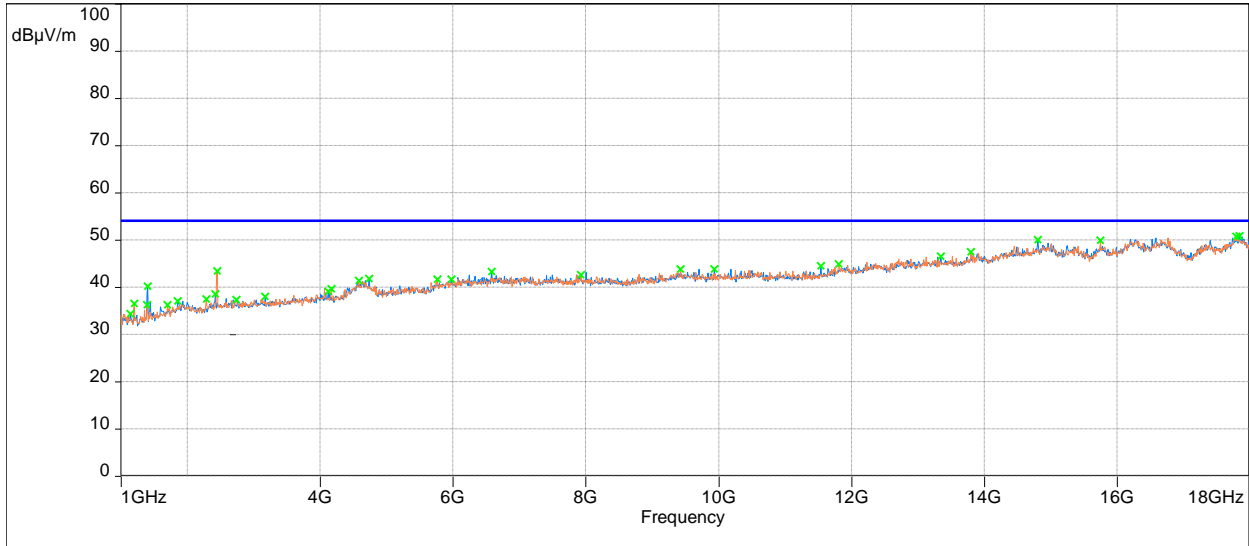
Model: ; Client: ; Comments: ; Test Date: 09/14/2018 16:46

Frequency	Quasi Pk FS	Limit	Margin	Azimuth	Height	Polarity	Raw	Correction
MHz	dB(uV/m)	dB(uV/m)	dB	deg	cm		dB(uV/m)	dB
57.095	12.5	29.5	-17.0	356.0	3.7	Horizontal	27.9	-15.3
57.131	15.5	29.5	-14.0	78.0	3.9	Vertical	31.1	-15.3
57.710	21.2	29.5	-8.3	121.0	4.0	Vertical	36.7	-15.5
801.829	27.9	35.5	-7.6	321.5	1.0	Horizontal	31.4	-3.5
801.829	25.4	35.5	-10.1	37.8	2.0	Vertical	28.9	-3.5
859.091	27.0	35.5	-8.5	306.3	2.0	Horizontal	29.6	-2.6

4.3.3 Test Results (Continued)

Radiated Spurious Emissions 1000 - 18000 MHz, Peak Scan vs Average Limit, EUT Model: 360

- FCC Part 15/FCC Part 15.109 30M-40GHz B - Average/3.0m/
- FCC Part 15/FCC Part 15.109 30M-40GHz B - QPeak/3.0m/
- Meas.Peak (Horizontal)
- Meas.Peak (Vertical)
- × Peak (Peak /Lim. Peak) (Horizontal)
- × Peak (Peak /Lim. Peak) (Vertical)



Model: ; Client: ; Comments: ; Test Date: 09/14/2018 19:56

Result: Complies by 7.2 dB

4.3.4 Test Configuration Photographs

The following photographs show the testing configurations used.



4.3.4 Test Configuration Photographs (Continued)



4.4 AC Line Conducted Emission
15.107; RSS-GEN;

4.4.1 Requirement

Frequency Band MHz	Class B Limit dB(μ V)		Class A Limit dB(μ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15-0.50	66 to 56 *	56 to 46 *	79	66
0.50-5.00	56	46	73	60
5.00-30.00	60	50	73	60

*Note: *Decreases linearly with the logarithm of the frequency. At the transition frequency the lower limit applies.*

4.4.2 Test Result

Result	Not Applicable. The EUT is battery operated.
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5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and Schwarz	FSU	ITS 00913	12	01/24/19
Spectrum Analyzer	Rohde and Schwarz	ESR	ITS 01607	12	10/09/18
Active Horn Antenna	ETS-Lindgren	3117-PA	ITS 01636	12	01/11/19
BI-Log Antenna	Antenna Research	LPB-2513	ITS 00355	12	02/21/19
Pre-Amplifier	Sonoma Instrument	310	ITS 00942	12	01/26/19
RF Cable	Megaphase	EMC1-K1K1-236	ITS 01538	12	06/25/19
RF Cable	Megaphase	TM40-K1K1-59	ITS 01657	12	06/26/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01330	12	11/29/18
RF Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	08/16/19
RF Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	08/16/19
Notch Filter	Micro-tronics	BRC50722	ITS 01170	12	01/26/19

No Calibration required

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
BAT-EMC	Nexio	3.16.0.64	Simplex Time Recorder, G103645488.bpp
RS Commander	Rohde Schwarz	1.6.4	Not Applicable (Screen grabber)

6.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G103645488	ML	KV	September 24, 2018	Original document
2.0 / G103645488	ML	KV	November 02, 2018	Added Table 4.2 and 2 nd harmonic data (Section 4.2) to show 20dBc compliant.