Electromagnetic Compatibility Test Report

Tests Performed on a BRK Brands, Inc.

First Alert Combination Smoke/CO Alarm Transceiver

Model SMCO500V

Radiometrics Document RP-9533

ACCREDITED
TESTING CERT #1495.01

Product Detail:
FCC ID: M7U-500V Equipment type: 915 MHz Low power transceiver
Test Standards:
US CFR Title 47, Chapter I, FCC Part 15 Subpart C FCC Part 15 CFR Title 47: 2021 This report concerns: Original Grant for Certification FCC Part 15.249

Tests Performed For:	*Test Facility:*
BRK Brands, Inc. 3901 W. Liberty St. Aurora, IL 60504-8122	**Radiometrics Midwest Corporation** 12 Devonwood Avenue Romeoville, IL 60446-1349 (815) 293-0772

Test Date(s):
September 21 thru 29, 2021

Document RP-9533 Revisions:

Rev.	Issue Date	Revised By
0	October 28, 2021	

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1.0 ADMINISTRATIVE DATA

Equipment Under Test:	
A BRK Brands, Inc., Combination Smoke/CO Alarm Model: SMCO500V This will be referred to as the EUT in this Report	
Date EUT Received at Radiometrics:	*Test Date(s):*
September 14, 2021	September 21 thru 29, 2021
Test Report Written and Authorized By:	*Test Witnessed By:*
Joseph Strzelecki Senior EMC Engineer	The tests were not witnessed by personnel from BRK Brands, Inc.
Radiometrics' Personnel Responsible for Test:	*EUT Checked By:*
Joseph Strzelecki 10/28/2021 Date Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE Chris D'Alessio EMC Technician	Joseph Strzelecki Chris D'Alessio Radiometrics

2.0 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a First Alert Combination Smoke/CO Alarm, Model SMCO500V, manufactured by BRK Brands, Inc.. The detailed test results are presented in a separate section. The following is a summary of the test results.

Emissions Tests Results

Environmental Phenomena	Frequency Range	Basic Standard	Test Result
RF Radiated Emissions	30-9300 MHz	FCC Part 15.249	Pass

IEC 17025 Decision Rule:
The declaration of pass or fail is based on the specifications listed above. The declaration of pass or fail did not consider measurement uncertainty.

2.1 RF Exposure Compliance Requirements

Since the power output is less than1 mW, the EUT meets the FCC requirement for RF exposure and it is exempt from SAR and RF exposure evaluations. There are no power level adjustments available to the end user. The detailed calculations for RF Exposure are presented in a separate document.

3.0 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is a Combination Smoke/CO Alarm, Model SMCO500V, manufactured by BRK Brands, Inc. The EUT was in good working condition during the tests, with no known defects.

3.1.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The antenna is permanently attached to the printed circuit board. The antenna is internal to the EUT and it is not readily available to be modified by the end user. Therefore, it meets the 15.203 Requirements.

4.0 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm or 150 cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

Since the EUT is wall mounted, it was placed in an upright configuration during the tests. It was tested as a stand-alone device, since in the field it is a battery-operated, stand-alone product. Power was supplied with a new battery.

Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	First Alert Smoke/CO Alarm	E	BRK Brands, Inc.	SMCO500V	None

* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

The modulation of the transmitter is 75 kHz FSK modulation. The standard power setting was used. The power levels cannot be changed by the end user.

4.2 EUT Operating Mode

During the transmit tests, the EUT was set to continuously transmit on one of the three transmit frequencies. The transmit mode for all tests was continuous. Each transmit frequency was tested separately. The continuous mode produces a Duty cycle of at least 98%. For the Receive mode, the transmitter was in the standby mode.

4.3 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.4 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5.0 TEST SPECIFICATIONS

Document	Date	Title
FCC CFR Title 47	2021	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices

6.0 TEST PROCEDURE DOCUMENTS

The tests were performed using the procedures from the following specifications:

Document	Date	Title
ANSI C63.4-2014	2014	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2013	2013	American National Standard for Testing Unlicensed Wireless Devices

7.0 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 2017 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during the tests:

Chamber B: Is a shielded enclosure that measures 20' L X 12' W X 8' H. Erik A. Lindgren & Associates of Chicago, Illinois manufactured the enclosure.

Chamber E: Is a custom-made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber. The floor has a 9' x 9' section of microwave absorber for testing above 1 GHz.

A separate ten-foot long, brass plated, steel ground rod attached via a 6-inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as site number IC 3124A with a CAB ID of US0224.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

8.0 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

9.0 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification and the data contained herein was taken with calibrated test equipment. The results relate only to the EUT listed herein.

10.0 TEST EQUIPMENT TABLE

RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12GHz	12 Mo.	01/04/21
AMP-20	Avantek	Pre-amplifier	SF8-0652	15221	8-18GHz	12 Mo	04/19/21
ANT-53	EMCO	Loop Antenna	6507	1453	1 kHz-30 MHz	24 Mo	02/04/20
ANT-66	ETS-Lindgren	Horn Antenna	3115	62580	1.0-18GHz	24 Mo.	03/11/21
ANT-68	EMCO	Log-Periodic Ant.	93146	9604-4456	200-1000MHz	24 Mo.	01/02/20
ANT-80	AH Systems	Bicon Antenna	SAS-540	294	20-330MHz	24 Mo.	01/05/21
CAB-106A	Teledyne	Coaxial Cable	N/A	106A	DC-2 GHz	24 Mo.	01/29/20
CAB-1221	Storm	Coaxial Cable	N/A	1221	DC-18 GHz	24 Mo.	02/06/20
CAB-160B	Teledyne	Coaxial Cable	N/A	160B	DC-18 GHz	24 Mo.	02/05/20
CAB-090A	Teledyne	Coaxial Cable	N/A	090A	DC-26 GHz	24 Mo.	02/07/20
CAB-295A	Teledyne	Coaxial Cable	N/A	295A	DC-26 GHz	24 Mo.	02/07/20
REC-20	HP / Agilent	Spectrum Analyzer	85460A/84562A	33330A00135 3410A00178	30Hz-6GHz	24 Mo.	08/18/21
REC-21	Agilent	Spectrum Analyzer	E7405A	MY45118341	9Hz-26.5 GHz	24 Mo.	01/14/20
THM-02	Fluke	Temp/Humid Meter	971	93490471	N/A	24 Mo.	11/13/20

Note: All calibrated equipment is subject to periodic checks.

Software Company	Test Software Name	Version	Applicable Tests
Radiometrics	REREC11D	07.16.19	RF Radiated Emissions (FCC Part 15 & EN 55032)
Agilent	PSA/ESA-E/L/EMC	2.4.0.42	Bandwidth and screen shots

11.0 TEST SECTIONS

11.1 Radiated Limits

Radiated Emissions Field Strength Limits

	Frequency	Test Distance	Limits	
Notes	Range (MHz)	(meters)	uV/m	dB(uV/m)
Spurious	30 - 88	3	100	40.0
Spurious	88 - 216	3	150	43.5
Spurious	216 - 960	3	200	46.0
Fundamental	902-928	3	50,000	94.0
Spurious	Above 960	3	500	54.0

The emission limits shown in the above table are based on measurements using a CISPR quasi-peak detector except for above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

11.2 Radiated RF Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 150 kHz to 30 MHz is 9 kHz and the bandwidth from 30 MHz to 1000 MHz is 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists. Figure 1 herein lists the details of the test equipment used during radiated emissions tests. The EUT was rotated through three orthogonal axis as per 5.10.1 of ANSI C63.10 during the radiated tests.

Final radiated emissions measurements were performed inside of an anechoic chamber at a test distance of 3 meters. The anechoic chamber is designated as Chamber E. This Chamber meets the Site Attenuation requirements of ANSI C63.4 and CISPR 16-1. Chamber E is located at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 to 9300 MHz was slowly scanned. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded. All measurements may be performed using either the peak, average or quasi-peak detector functions. If the peak detector data exceeds or is marginally close to the limits, the measurements are repeated using a quasi-peak detector or average function as required by the specification for final determination of compliance. The QP and average detectors have a linear response.

The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground.

11.2.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

FS = RA + AF + CF - AG + HPF + PKA

Where: FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

11.2.2 Radiated Emissions Test Results

Test Date	9/21/2021 to 9/29/2021
Test Distance	3 Meters
Specification	FCC Part 15 Subpart C
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP
Configuration	The EUT is in the transmit mode with the receiver on

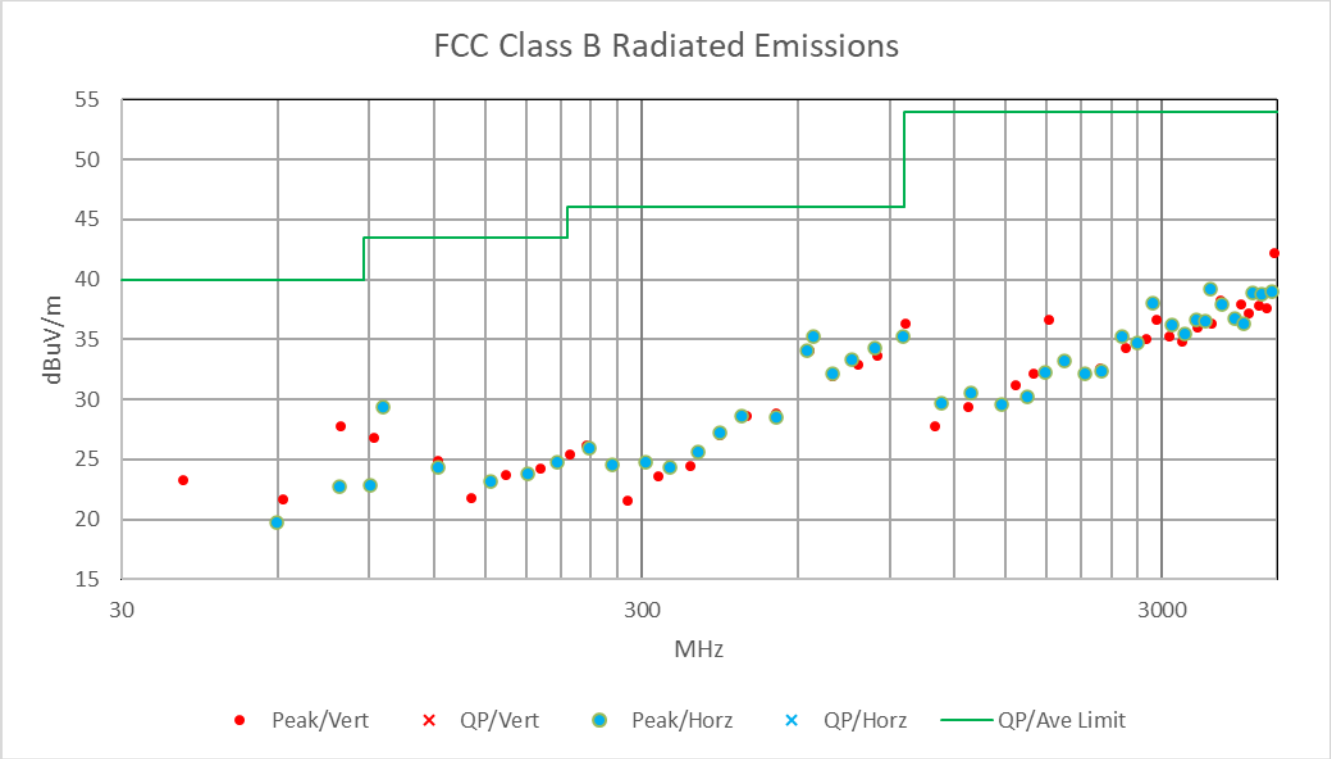
This table includes all emissions except Fundamental, Band edge, and harmonics emissions.

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
59.8	9.8	P	H	9.2	0.8	0.0	19.8	40.0	20.2	
78.6	12.4	P	H	9.4	0.9	0.0	22.7	40.0	17.3	
90.2	12.0	P	H	9.8	1.0	0.0	22.8	43.5	20.7	
95.7	18.3	P	H	10.1	1.0	0.0	29.4	43.5	14.1	
122.3	11.3	P	H	11.8	1.2	0.0	24.3	43.5	19.2	
154.3	9.1	P	H	12.8	1.3	0.0	23.2	43.5	20.3	
181.4	8.7	P	H	13.6	1.5	0.0	23.8	43.5	19.7	
206.8	8.7	P	H	14.6	1.5	0.0	24.8	43.5	18.7	
238.3	9.1	P	H	15.1	1.7	0.0	25.9	46.0	20.1	
264.0	10.6	P	H	12.2	1.8	0.0	24.6	46.0	21.4	
304.9	8.1	P	H	14.8	1.9	0.0	24.8	46.0	21.2	
339.6	8.0	P	H	14.3	2.0	0.0	24.3	46.0	21.7	
385.0	8.7	P	H	14.8	2.1	0.0	25.6	46.0	20.4	
423.4	9.3	P	H	15.7	2.2	0.0	27.2	46.0	18.8	
467.5	9.2	P	H	17.0	2.4	0.0	28.6	46.0	17.4	
545.0	7.9	P	H	18.0	2.6	0.0	28.5	46.0	17.5	
623.8	12.3	P	H	19.0	2.8	0.0	34.1	46.0	11.9	
642.5	12.9	P	H	19.5	2.8	0.0	35.2	46.0	10.8	
700.0	8.1	P	H	21.1	2.9	0.0	32.1	46.0	13.9	
761.3	9.2	P	H	21.1	3.0	0.0	33.3	46.0	12.7	
841.3	9.0	P	H	22.1	3.2	0.0	34.3	46.0	11.7	
955.0	8.4	P	H	23.4	3.5	0.0	35.3	46.0	10.7	
1135.0	37.2	P	H	24.6	-32.1	0.0	29.7	74.0	44.3	1
1292.5	37.4	P	H	25.1	-32.0	0.0	30.5	74.0	43.5	1
1480.0	36.6	P	H	24.8	-31.8	0.0	29.6	74.0	44.4	1
1655.0	36.6	P	H	25.3	-31.7	0.0	30.2	74.0	43.8	1
1790.0	37.1	P	H	26.7	-31.5	0.0	32.3	74.0	41.7	1
1947.5	36.8	P	H	27.6	-31.2	0.0	33.2	74.0	40.8	1
2135.0	35.3	P	H	27.7	-30.9	0.0	32.1	74.0	41.9	1
2305.0	35.5	P	H	27.7	-30.8	0.0	32.4	74.0	41.6	1
2517.5	37.0	P	H	28.5	-30.2	0.0	35.3	74.0	38.7	1
2690.0	36.2	P	H	28.8	-30.3	0.0	34.7	74.0	39.3	1
2890.0	38.3	P	H	29.3	-29.6	0.0	38.0	74.0	36.0	1
3137.5	34.6	P	H	30.9	-29.3	0.0	36.2	74.0	37.8	1
3330.0	33.3	P	H	31.1	-28.9	0.0	35.5	74.0	38.5	1
3490.0	34.2	P	H	31.1	-28.7	0.0	36.6	74.0	37.4	1
3645.0	33.5	P	H	31.7	-28.7	0.0	36.5	74.0	37.5	1
3722.5	35.4	P	H	32.3	-28.5	0.0	39.2	74.0	34.8	1
3912.5	33.1	P	H	32.9	-28.1	0.0	37.9	74.0	36.1	1
4150.0	32.1	P	H	32.4	-27.8	0.0	36.7	74.0	37.3	1
4310.0	31.1	P	H	32.6	-27.4	0.0	36.3	74.0	37.7	1
4477.5	33.2	P	H	32.9	-27.2	0.0	38.9	74.0	35.1	1
4662.5	32.4	P	H	33.1	-26.7	0.0	38.8	74.0	35.2	1

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
4892.5	31.8	P	H	33.3	-26.1	0.0	39.0	74.0	35.0	1
39.4	11.2	P	V	11.4	0.7	0.0	23.3	40.0	16.7	
61.5	11.6	P	V	9.3	0.8	0.0	21.7	40.0	18.3	
79.2	17.5	P	V	9.4	0.9	0.0	27.8	40.0	12.2	
91.9	16.0	P	V	9.8	1.0	0.0	26.8	43.5	16.7	
121.7	12.0	P	V	11.7	1.2	0.0	24.9	43.5	18.6	
141.6	7.9	P	V	12.6	1.3	0.0	21.8	43.5	21.7	
164.8	9.2	P	V	13.1	1.4	0.0	23.7	43.5	19.8	
191.9	8.7	P	V	14.0	1.5	0.0	24.2	43.5	19.3	
218.4	9.0	P	V	14.8	1.6	0.0	25.4	46.0	20.6	
235.5	9.4	P	V	15.1	1.7	0.0	26.2	46.0	19.8	
282.3	6.7	P	V	13.1	1.8	0.0	21.6	46.0	24.4	
322.6	7.6	P	V	14.0	2.0	0.0	23.6	46.0	22.4	
373.6	7.8	P	V	14.5	2.1	0.0	24.4	46.0	21.6	
423.4	9.1	P	V	15.7	2.2	0.0	27.0	46.0	19.0	
476.9	9.1	P	V	17.1	2.4	0.0	28.6	46.0	17.4	
543.8	8.2	P	V	18.0	2.6	0.0	28.8	46.0	17.2	
631.3	12.0	P	V	19.3	2.8	0.0	34.1	46.0	11.9	
698.8	8.0	P	V	21.0	2.9	0.0	31.9	46.0	14.1	
781.3	8.7	P	V	21.1	3.1	0.0	32.9	46.0	13.1	
853.8	8.1	P	V	22.3	3.2	0.0	33.6	46.0	12.4	
963.8	9.4	P	V	23.4	3.5	0.0	36.3	54.0	17.7	
1097.5	35.3	P	V	24.6	-32.1	0.0	27.8	74.0	46.2	1
1277.5	36.1	P	V	25.3	-32.0	0.0	29.4	74.0	44.6	1
1570.0	37.8	P	V	25.2	-31.8	0.0	31.2	74.0	42.8	1
1702.5	37.8	P	V	26.0	-31.7	0.0	32.1	74.0	41.9	1
1827.5	41.1	P	V	26.9	-31.4	0.0	36.6	74.0	37.4	1
2147.5	35.5	P	V	27.7	-30.9	0.0	32.3	74.0	41.7	1
2287.5	35.8	P	V	27.6	-30.8	0.0	32.6	74.0	41.4	1
2565.0	35.8	P	V	28.6	-30.1	0.0	34.3	74.0	39.7	1
2800.0	36.0	P	V	28.9	-29.9	0.0	35.0	74.0	39.0	1
2930.0	36.6	P	V	29.6	-29.6	0.0	36.6	74.0	37.4	1
3105.0	34.0	P	V	30.7	-29.4	0.0	35.3	74.0	38.7	1
3285.0	32.6	P	V	31.1	-28.9	0.0	34.8	74.0	39.2	1
3512.5	33.6	P	V	31.2	-28.8	0.0	36.0	74.0	38.0	1
3740.0	32.3	P	V	32.5	-28.5	0.0	36.3	74.0	37.7	1
3902.5	33.4	P	V	32.9	-28.1	0.0	38.2	74.0	35.8	1
4140.0	32.3	P	V	32.4	-27.8	0.0	36.9	74.0	37.1	1
4262.5	33.1	P	V	32.4	-27.6	0.0	37.9	74.0	36.1	1
4410.0	31.6	P	V	32.8	-27.2	0.0	37.2	74.0	36.8	1
4617.5	31.6	P	V	33.0	-26.8	0.0	37.8	74.0	36.2	1
4782.5	30.8	P	V	33.3	-26.5	0.0	37.6	74.0	36.4	1
4952.5	34.9	P	V	33.4	-26.1	0.0	42.2	74.0	31.8	1

Note 1: The Peak data is under the Average limit, therefore Average measurement not performed.

Judgment: Passed by at least 10 dB
No other emissions were from 30 to 9300 MHz within 10 dB of the limits.
All emissions outside of the band from 902 to 928 were below the limits of 15.209.



Radiated emissions in a graphical format. The above chart is the same data as the previous table. The peak limit is not shown, since the peak readings meet the lower average limit.

Fundammental and Harmonic Emissions FCC 15.249; Three axis

		Axis of Rotation							EUT			Worst
	Tx	X	Y	Z	X	Y	Z	Corr	Emission	Max	Lowest	Case
Harm.	Freq.	Vertical Antenna			Horizontal Antenna			Factor	Freq	Peak	Limit	Margin
#	MHz	dBuV						dB/m	MHz	dBuV/m		dB
1	908.9	54.1	59.3	64.0	60.8	60.9	55.7	26.3	908.9	90.3	94	3.7
BE	908.9	13.6	14.1	16.5	15.8	10.9	9.5	26.3	902.0	42.8	46	3.2
2	908.9	46.0	52.9	47.1	46.3	47.8	52.3	-7.1	1817.8	45.8	74	8.2
3	908.9	41.4	44.0	41.5	41.7	42.0	41.2	-4.5	2726.7	39.5	74	14.5
4	908.9	39.0	40.1	40.4	39.1	39.2	39.7	-0.7	3635.6	39.7	74	14.3
5	908.9	38.6	39.0	39.3	39.1	39.3	38.8	1.5	4544.5	40.8	74	13.2
6	908.9	38.3	38.1	38.7	38.2	38.5	38.2	4.3	5453.4	43.0	74	11.0
7	908.9	38.1	38.1	37.8	38.2	38.4	37.2	5.0	6362.3	43.4	74	10.6
8	908.9	36.4	35.5	36.4	36.0	35.5	36.6	7.5	7271.2	44.1	74	9.9
9	908.9	35.8	36.0	35.9	34.0	36.2	35.7	8.4	8180.1	44.6	74	9.4
10	908.9	34.7	35.1	35.0	34.7	34.9	35.3	9.5	9089.0	44.8	74	9.2
1	913.3	53.4	57.8	63.7	61.1	59.5	57.7	26.3	913.3	90.0	94	4.0
2	913.3	45.1	53.8	49.6	45.8	51.2	51.2	-7.0	1826.6	46.8	74	7.2
3	913.3	41.6	44.6	41.8	41.3	41.5	41.5	-4.5	2739.9	40.1	74	13.9
4	913.3	39.3	38.9	38.5	38.9	39.0	39.0	-0.6	3653.2	38.7	74	15.3
5	913.3	39.9	39.6	39.0	38.3	39.5	39.5	1.7	4566.5	41.6	74	12.4
6	913.3	38.5	38.1	38.3	38.6	38.8	38.1	4.3	5479.8	43.1	74	10.9
7	913.3	38.9	37.8	37.5	38.1	37.6	37.6	5.0	6393.1	43.9	74	10.1
8	913.3	36.3	35.7	36.6	36.0	35.5	36.6	6.4	7306.4	43.0	74	11.0
9	913.3	35.7	34.8	35.2	35.4	36.1	35.7	8.5	8219.7	44.6	74	9.4
10	913.3	35.8	35.3	35.6	34.8	34.9	35.4	9.5	9133.0	45.3	74	8.7
1	922.9	51.3	56.3	62.8	60.4	60.2	54.1	26.3	922.9	89.1	94	4.9
BE	922.9	10.8	16.1	17.8	17.5	17.8	14.2	26.3	928.0	44.1	46	1.9
2	922.9	47.0	53.9	47.9	45.8	47.1	51.5	-6.8	1845.7	47.1	74	6.9
3	922.9	43.1	44.8	41.5	41.4	42.4	41.6	-4.5	2768.6	40.3	74	13.7
4	922.9	36.8	39.3	38.2	38.5	37.8	37.4	-0.5	3691.4	38.8	74	15.2
5	922.9	36.7	37.3	36.8	37.1	37.8	37.0	1.9	4614.3	39.7	74	14.3
6	922.9	36.6	35.0	35.5	35.7	37.1	36.2	4.5	5537.2	41.6	74	12.4
7	922.9	36.2	34.7	36.3	34.9	35.8	36.4	5.0	6460.0	41.4	74	12.6
8	922.9	36.3	35.2	36.6	36.0	35.5	36.6	7.6	7382.9	44.2	74	9.8
9	922.9	35.7	35.5	36.1	35.8	36.0	36.2	8.6	8305.7	44.8	74	9.2
10	922.9	34.9	35.3	35.6	34.9	35.2	35.1	9.6	9228.6	45.2	74	8.8
1	2	3	4	5	6	7	8	9	10	11	12	13

Description of table:
Column #1. hrm = Harmonic; BE = Band Edge emissions (BE measured with QP)
Column #2. Transmitter output frequency.
Column #3. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #4. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #5. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #6. Uncorrected readings from the spectrum analyzer with First Axis Rotation.
Column #7. Uncorrected readings from the spectrum analyzer with Second Axis Rotation.
Column #8. Uncorrected readings from the spectrum analyzer with Third Axis Rotation.
Column #9. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor
Column #10. Frequency of Tested Emission
Column #11. Highest peak field strength at listed frequency.
Column #12. Lowest Limit for peak, average or QP.
Column #13. The margin (last column) is the worst-case margin under the limits for that row.

Overall Judgment: Passed by 1.9 dB

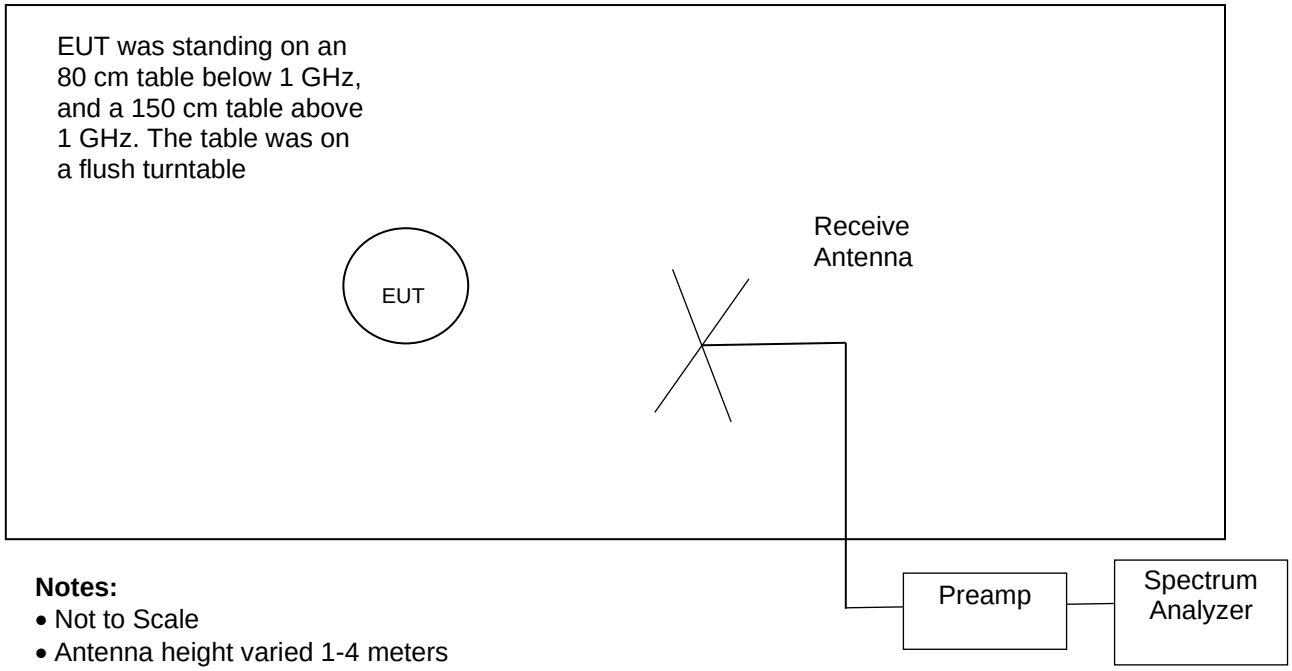
No other Emissions were detected from 30 to 9300 MHz within 10 dB of the limits.

Notes:

1. Fundamental peak emissions met the quasi-peak limits
2. Harmonic peak emissions met the Average limits
3. Band edge readings performed using a Quasi-peak detector
4. Where there is a Peak and Average limit, the peak readings were used, and it complied with the average limits.

Figure 1. Drawings of Radiated Emissions Setup

Chamber E, anechoic

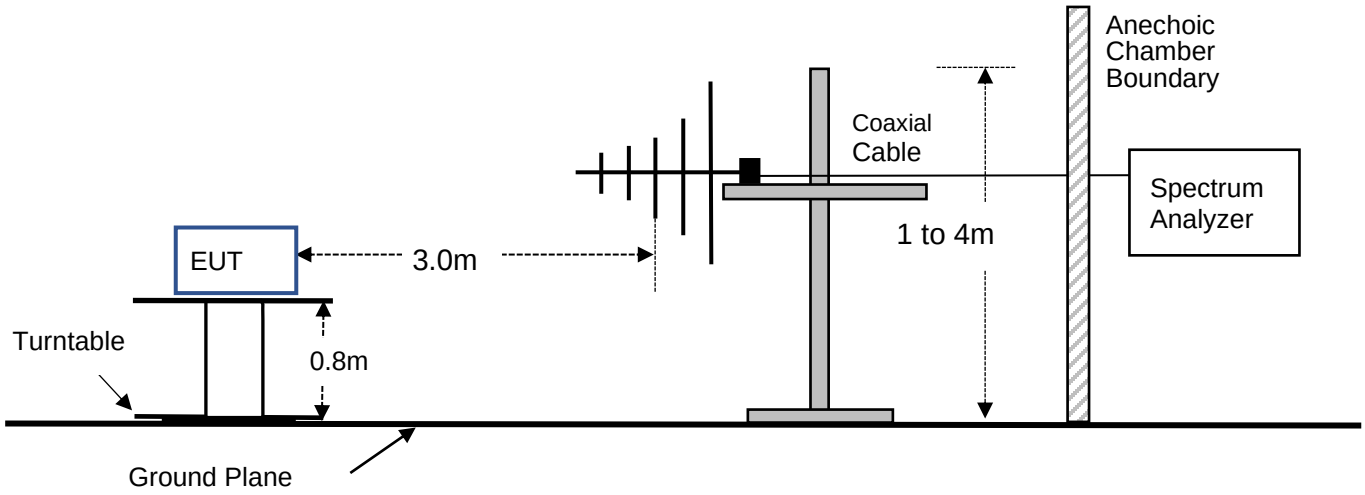


Notes:

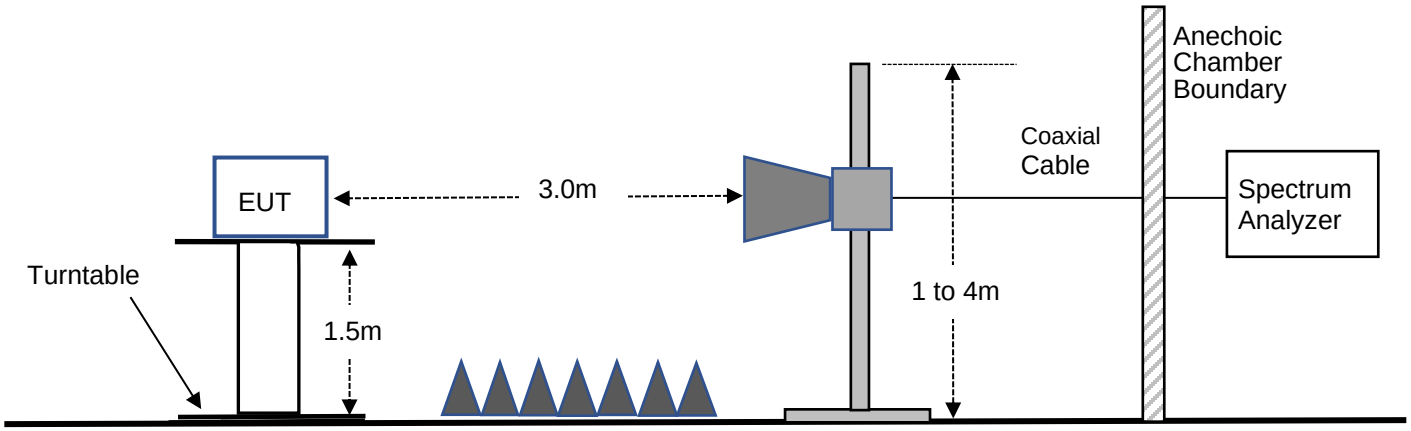
- Not to Scale
- Antenna height varied 1-4 meters
- Distance from antenna to tested system is 3 meters
- AC cords not shown. They are connected to AC outlet with low-pass filter on turntable

Frequency Range	Receive Antenna	Pre-Amplifier	Spectrum Analyzer
30 to 200 MHz	ANT-80	AMP-22	REC-21
200 to 1000 MHz	ANT-68	AMP-22	REC-21
1 to 10 GHz	ANT-66	AMP-05	REC-21

Radiated Emissions Test Setup for Frequencies from 30MHz to 1000MHz (Side View)



Radiated Emissions Test Setup for Frequencies over 1000MHz (Side View)



11.3 Unintentional Emissions (Receive Mode)

This section is only needed for 900 MHz receivers

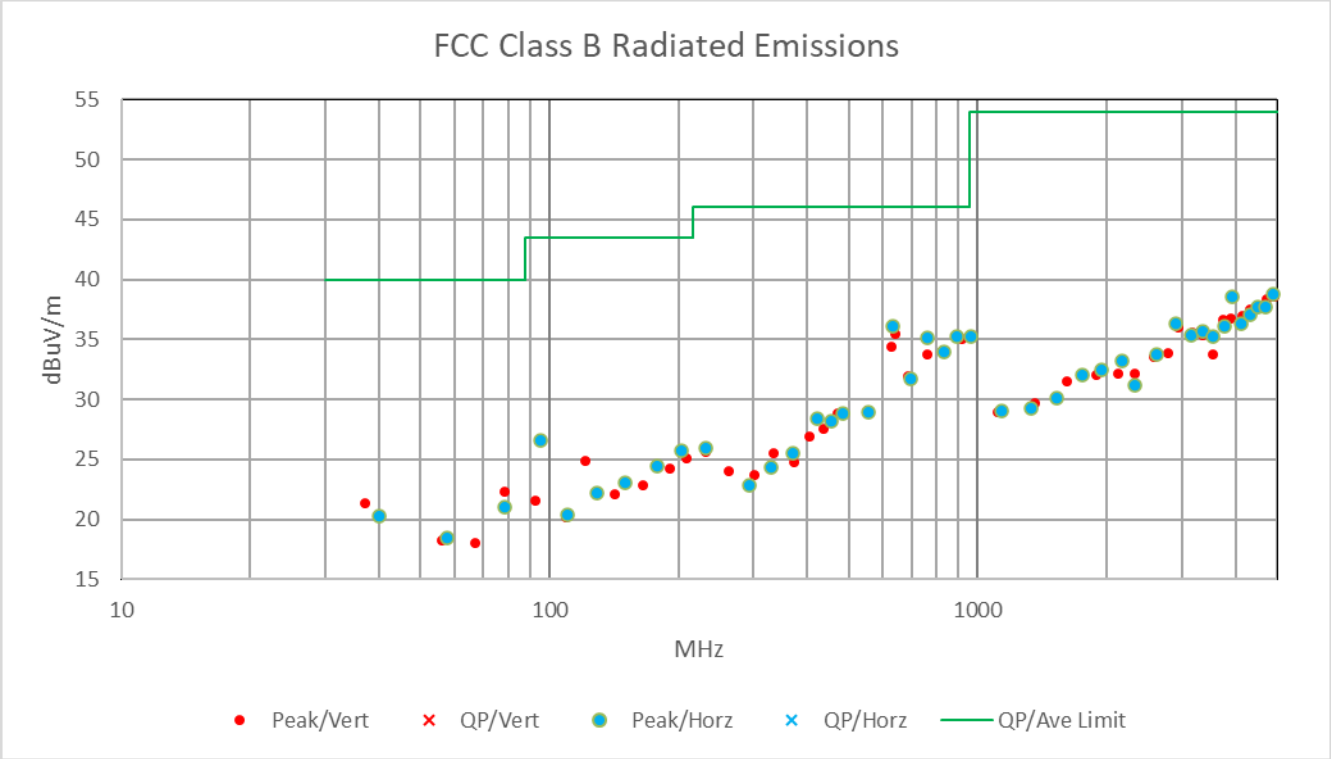
Manufacturer	BRK Brands, Inc.	Specification	FCC Part 15.209 & RSS-GEN
Model	SMCO500V	Test Date	09/29/2021
Serial Number	RMC-1	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Corr. Factors = Cable Loss – Preamp Gain		
Configuration	Receive mode		

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors dB	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
39.9	8.4	P	H	11.2	0.7	0.0	20.3	40.0	19.7	
57.6	8.4	P	H	9.3	0.8	0.0	18.5	40.0	21.5	
78.6	10.7	P	H	9.4	0.9	0.0	21.0	40.0	19.0	
95.2	15.6	P	H	10.0	1.0	0.0	26.6	43.5	16.9	
110.1	8.3	P	H	11.0	1.1	0.0	20.4	43.5	23.1	
128.9	8.9	P	H	12.1	1.2	0.0	22.2	43.5	21.3	

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors dB	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
149.9	9.0	P	H	12.8	1.3	0.0	23.1	43.5	20.4	
178.6	9.5	P	H	13.5	1.4	0.0	24.4	43.5	19.1	
203.5	9.7	P	H	14.5	1.5	0.0	25.7	43.5	17.8	
231.1	9.2	P	H	15.0	1.7	0.0	25.9	46.0	20.1	
293.6	7.3	P	H	13.7	1.9	0.0	22.9	46.0	23.1	
328.9	8.2	P	H	14.1	2.0	0.0	24.3	46.0	21.7	
369.8	9.0	P	H	14.4	2.1	0.0	25.5	46.0	20.5	
422.1	10.5	P	H	15.7	2.2	0.0	28.4	46.0	17.6	
454.9	9.2	P	H	16.7	2.3	0.0	28.2	46.0	17.8	
485.1	9.2	P	H	17.2	2.4	0.0	28.8	46.0	17.2	
557.5	8.1	P	H	18.2	2.6	0.0	28.9	46.0	17.1	
631.3	14.0	P	H	19.3	2.8	0.0	36.1	46.0	9.9	
697.5	7.8	P	H	21.0	2.9	0.0	31.7	46.0	14.3	
763.8	10.9	P	H	21.1	3.1	0.0	35.1	46.0	10.9	
836.3	8.9	P	H	21.9	3.2	0.0	34.0	46.0	12.0	
896.3	9.2	P	H	22.7	3.3	0.0	35.2	46.0	10.8	
962.5	8.3	P	H	23.4	3.5	0.0	35.2	54.0	18.8	
1137.5	36.6	P	H	24.6	-32.1	0.0	29.1	74.0	44.9	1
1332.5	36.1	P	H	25.2	-32.0	0.0	29.3	74.0	44.7	1
1525.0	36.9	P	H	25.0	-31.8	0.0	30.1	74.0	43.9	1
1757.5	36.8	P	H	26.7	-31.5	0.0	32.0	74.0	42.0	1
1947.5	36.1	P	H	27.6	-31.2	0.0	32.5	74.0	41.5	1
2167.5	36.5	P	H	27.6	-30.9	0.0	33.2	74.0	40.8	1
2335.0	33.8	P	H	28.1	-30.7	0.0	31.2	74.0	42.8	1
2625.0	35.1	P	H	28.8	-30.2	0.0	33.7	74.0	40.3	1
2905.0	36.5	P	H	29.4	-29.6	0.0	36.3	74.0	37.7	1
3155.0	33.8	P	H	30.9	-29.3	0.0	35.4	74.0	38.6	1
3347.5	33.4	P	H	31.1	-28.8	0.0	35.7	74.0	38.3	1
3555.0	32.7	P	H	31.3	-28.8	0.0	35.2	74.0	38.8	1
3777.5	31.9	P	H	32.7	-28.5	0.0	36.1	74.0	37.9	1
3917.5	33.7	P	H	32.9	-28.0	0.0	38.6	74.0	35.4	1
4130.0	31.7	P	H	32.4	-27.8	0.0	36.3	74.0	37.7	1
4335.0	31.8	P	H	32.7	-27.4	0.0	37.1	74.0	36.9	1
4507.5	32.0	P	H	32.9	-27.2	0.0	37.7	74.0	36.3	1
4712.5	31.2	P	H	33.1	-26.6	0.0	37.7	74.0	36.3	1
4910.0	31.6	P	H	33.3	-26.1	0.0	38.8	74.0	35.2	1
37.2	9.0	P	V	11.8	0.6	0.0	21.4	40.0	18.6	
56.0	8.1	P	V	9.3	0.8	0.0	18.2	40.0	21.8	
67.0	7.9	P	V	9.3	0.8	0.0	18.0	40.0	22.0	
78.6	12.0	P	V	9.4	0.9	0.0	22.3	40.0	17.7	
93.0	10.7	P	V	9.9	1.0	0.0	21.6	43.5	21.9	
109.6	8.2	P	V	10.9	1.1	0.0	20.2	43.5	23.3	
121.7	12.0	P	V	11.7	1.2	0.0	24.9	43.5	18.6	
142.2	8.2	P	V	12.6	1.3	0.0	22.1	43.5	21.4	
165.4	8.3	P	V	13.1	1.4	0.0	22.8	43.5	20.7	
191.3	8.7	P	V	14.0	1.5	0.0	24.2	43.5	19.3	
208.5	8.9	P	V	14.6	1.6	0.0	25.1	43.5	18.4	
231.7	8.9	P	V	15.0	1.7	0.0	25.6	46.0	20.4	
262.7	10.2	P	V	12.1	1.7	0.0	24.0	46.0	22.0	
301.8	7.4	P	V	14.4	1.9	0.0	23.7	46.0	22.3	
334.5	9.3	P	V	14.2	2.0	0.0	25.5	46.0	20.5	
373.6	8.2	P	V	14.5	2.1	0.0	24.8	46.0	21.2	
404.5	9.3	P	V	15.4	2.2	0.0	26.9	46.0	19.1	
436.6	9.2	P	V	16.1	2.3	0.0	27.6	46.0	18.4	

Freq. MHz	Meter Reading dBuV	Dect.	Ant. Pol.	Ant Factor dB/m	Cbl/amp Factors dB	Dist Fact dB	EUT dBuV/m	Limit dBuV/m	Margin Under Limit dB	Note
471.9	9.4	P	V	17.0	2.4	0.0	28.8	46.0	17.2	
551.3	8.4	P	V	18.1	2.6	0.0	29.1	46.0	16.9	
630.0	12.4	P	V	19.2	2.8	0.0	34.4	46.0	11.6	
643.8	13.2	P	V	19.5	2.8	0.0	35.5	46.0	10.5	
688.8	8.2	P	V	20.8	2.9	0.0	31.9	46.0	14.1	
762.5	9.7	P	V	21.1	3.0	0.0	33.8	46.0	12.2	
831.3	9.1	P	V	21.8	3.2	0.0	34.1	46.0	11.9	
916.3	8.7	P	V	22.9	3.4	0.0	35.0	46.0	11.0	
972.5	8.4	P	V	23.5	3.5	0.0	35.4	54.0	18.6	
1112.5	36.4	P	V	24.6	-32.1	0.0	28.9	74.0	45.1	1
1357.5	36.4	P	V	25.2	-31.9	0.0	29.7	74.0	44.3	1
1612.5	38.0	P	V	25.2	-31.7	0.0	31.5	74.0	42.5	1
1887.5	35.8	P	V	27.5	-31.3	0.0	32.0	74.0	42.0	1
2127.5	35.6	P	V	27.6	-31.0	0.0	32.2	74.0	41.8	1
2320.0	35.0	P	V	27.9	-30.7	0.0	32.2	74.0	41.8	1
2575.0	34.9	P	V	28.7	-30.1	0.0	33.5	74.0	40.5	1
2780.0	35.1	P	V	28.8	-30.0	0.0	33.9	74.0	40.1	1
2935.0	36.0	P	V	29.6	-29.6	0.0	36.0	74.0	38.0	1
3175.0	33.8	P	V	31.0	-29.2	0.0	35.6	74.0	38.4	1
3355.0	33.1	P	V	31.1	-28.8	0.0	35.4	74.0	38.6	1
3542.5	31.4	P	V	31.2	-28.8	0.0	33.8	74.0	40.2	1
3735.0	32.7	P	V	32.4	-28.5	0.0	36.6	74.0	37.4	1
3900.0	31.9	P	V	32.9	-28.1	0.0	36.7	74.0	37.3	1
4162.5	32.4	P	V	32.4	-27.8	0.0	37.0	74.0	37.0	1
4332.5	32.2	P	V	32.7	-27.4	0.0	37.5	74.0	36.5	1
4525.0	32.0	P	V	32.9	-27.1	0.0	37.8	74.0	36.2	1
4732.5	31.8	P	V	33.1	-26.5	0.0	38.4	74.0	35.6	1
4922.5	31.4	P	V	33.3	-26.1	0.0	38.6	74.0	35.4	1

Note: All Peak readings above 1 GHz were under the Average limits, so average readings are not required.



Radiated emissions in a graphical format. The above chart is the same data as the previous table. The peak limit is not shown, since the peak readings meet the lower average limit.

11.3.1 Measurement Instrumentation Uncertainty

Measurement	Uncertainty
Radiated Emissions, E-field, 3 meters, 30 to 200 MHz	4.7 dB
Radiated Emissions, E-field, 3 meters, 200 to 1000 MHz	6.2 dB
Radiated Emissions, E-field, 3 meters, 1 to 6 GHz	5.0 dB
Radiated Emissions, E-field, 3 meters, 6 to 18 GHz	5.5 dB
Temperature THM-02	0.6 Deg C

The uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2 in accordance with CISPR 16-4-2.

12.0 REVISION HISTORY

Document RP-9533 Revisions:			
Rev.	Affected Sections	Description	Rationale