Relief Technologies

TEST REPORT FOR

Wearable Lower Back Warmer
Model: R1-001

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.247
(DTS 2400-2483.5 MHz)

Report No.: 102320-9

Date of issue: July 23, 2019

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Test Certificate # 803.01

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Testing the Future
CKC LABORATORIES, INC.

TABLE OF CONTENTS

Administrative Information 3

Test Report Information 3

Report Authorization 3

Test Facility Information 4

Software Versions 4

Site Registration & Accreditation Information 4

Summary of Results 5

Modifications During Testing 5

Conditions During Testing 5

Equipment Under Test 6

General Product Information 6

FCC Part 15 Subpart C 7

15.247(a)(2) 6dB Bandwidth 7

15.247(b)(3) Output Power 13

15.247(e) Power Spectral Density 22

15.247(d) Radiated Emissions & Band Edge 30

15.207 AC Conducted Emissions 44

Supplemental Information 51

Measurement Uncertainty 51

Emissions Test Details 51

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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Representative: Brian Krieger

REPORT PREPARED BY:

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CKC Laboratories, Inc.
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Mariposa, CA 95338

Project Number: 102320

DATE OF EQUIPMENT RECEIPT: April 16, 2019
DATE(S) OF TESTING: April 16 – July 16, 2019

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.12

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Japan
Canyon Park, Bothell, WA	US0081	US1022	A-0136
Brea, CA	US0060	US1025	A-0136
Fremont, CA	US0082	US1023	A-0136
Mariposa, CA	US0103	US1024	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (DTS)

Test Procedure	Description	Modifications	Results
15.247(a)(2)	6dB Bandwidth	NA	Pass
15.247(b)(3)	Output Power	NA	Pass
15.247(e)	Power Spectral Density	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	NA1
15.247(d)	Radiated Emissions & Band Edge	Mod. #1	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable
NA1 =- Not applicable because the EUT has an integral antenna.

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
Modification #1: Added shielding to the electronics housing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Power Supply	Generic	XS-0503000S	NA
Wearable Lower Back Warmer	Relief Technologies	R1-001	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	BLE
Operating Frequency Range:	2402-2480
Modulation Type(s):	GFSK
Maximum Duty Cycle:	98%
Number of TX Chains:	1
Antenna Type(s) and Gain:	Chip / 0.5 dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	120Vac/ 5V rechargeable battery, transmit while charging
Firmware / Software used for Test:	PuTTY ver.0.62

FCC Part 15 Subpart C

15.247(a)(2) 6dB Bandwidth

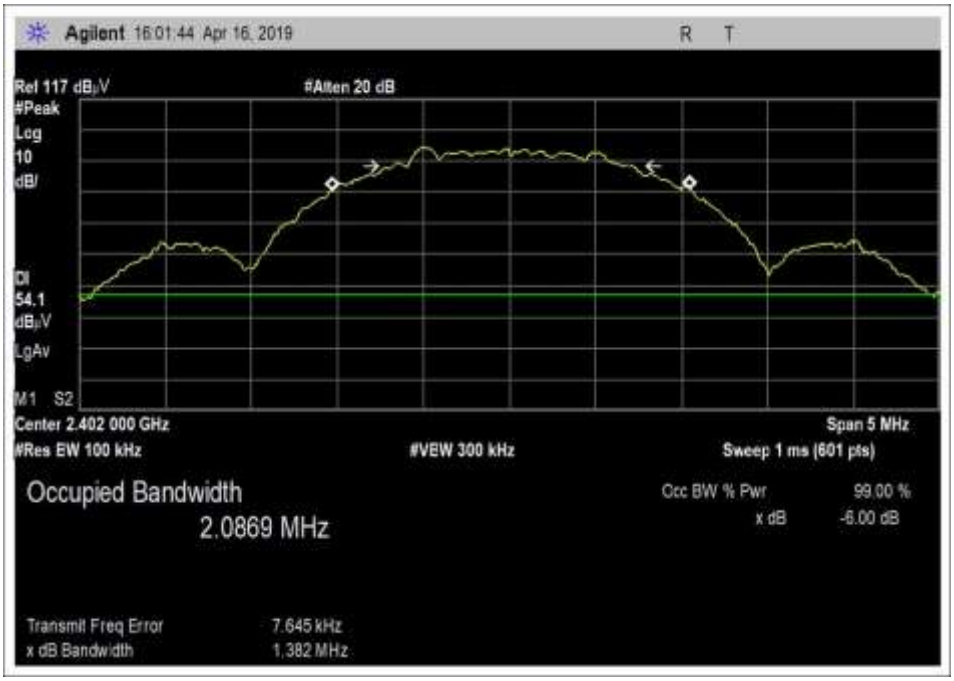
Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	E. Wong
Test Method:	ANSI C63.10 (2013), KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019	Test Date(s):	4/16/2019
Configuration:	1		
Test Setup:	Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform. A charger is connected to the device; rechargeable battery is fully charged. Frequency range: 2402- 2480 MHz TX freq 2402 MHz, 2440 MHz, 2480 MHz Test software setting Channel 02, 40, 80 Power: Pos3dBm Data rate: ble-2Mbit Emission profile of the EUT rotated along three orthogonal axes was investigated. Recorded data represent worse case emission.		

Environmental Conditions			
Temperature (ºC)	20	Relative Humidity (%):	52

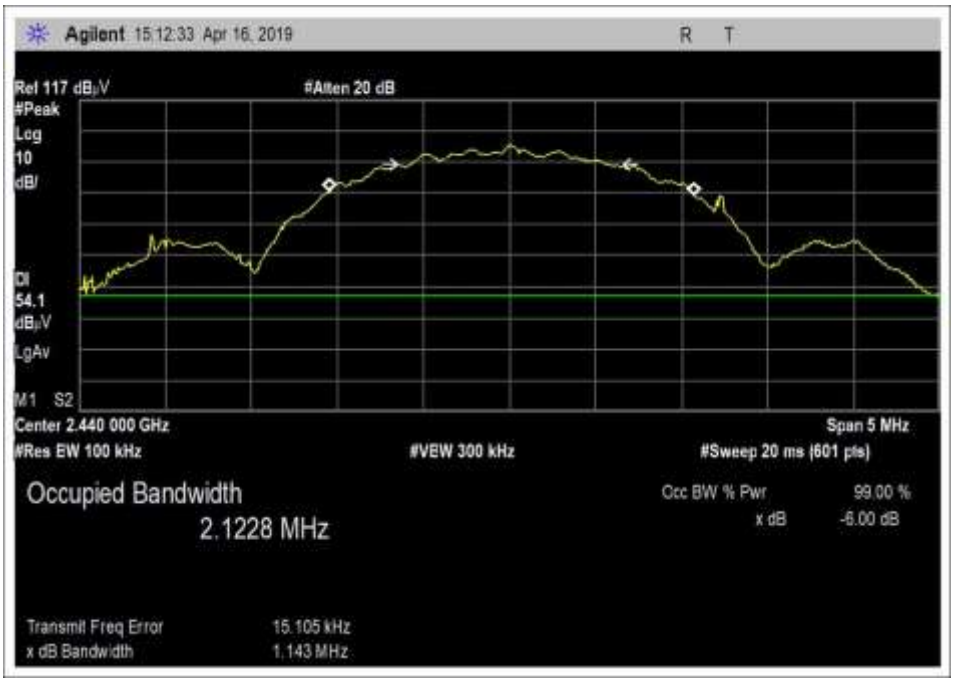
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
AN02672	Spectrum Analyzer	Agilent	E4446A	3/13/2019	3/13/2021
AN00849	Horn Antenna	ETS	3115	3/14/2018	3/14/2020
P07246	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
AN00786	Preamp	HP	83017A	5/12/2018	5/12/2020
P07139	Cable	Andrew	ANDL1-PNMNM-48	3/4/2019	3/4/2021

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2402	1	GFSK	2086.9	≥500	Pass
2440	1	GFSK	2122.8	≥500	Pass
2480	1	GFSK	2082.0	≥500	Pass

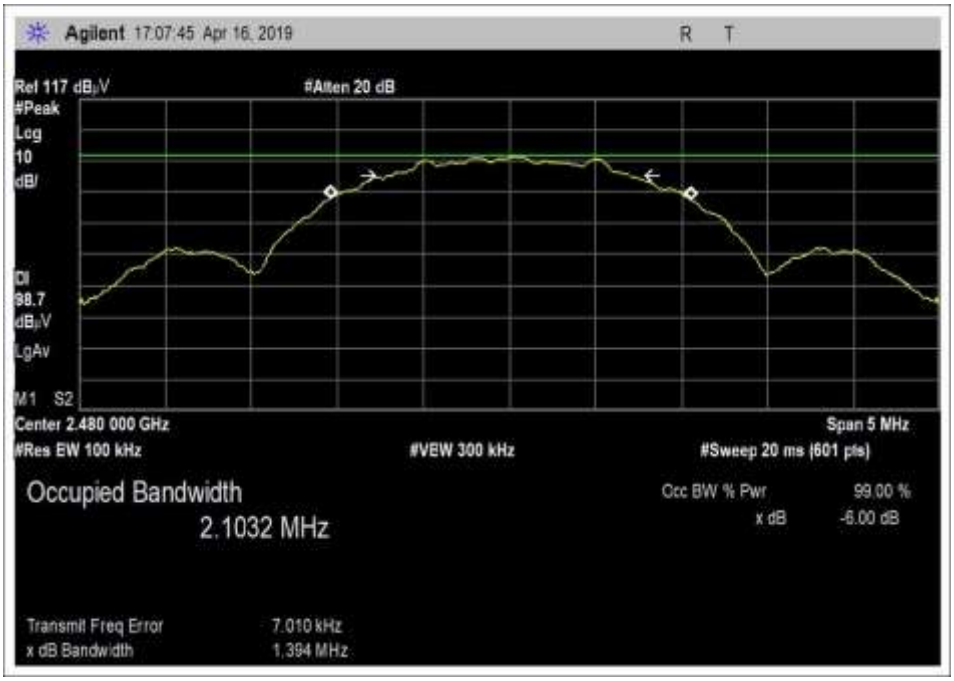
Plot(s)



Low Channel

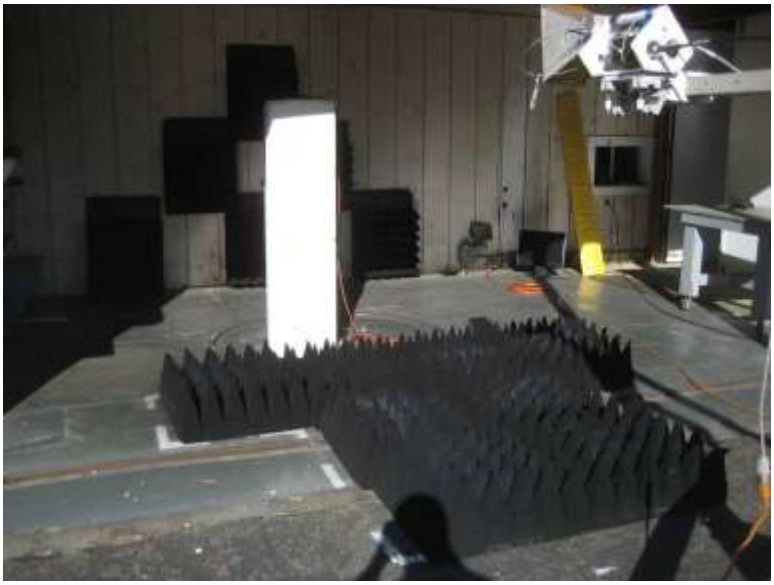


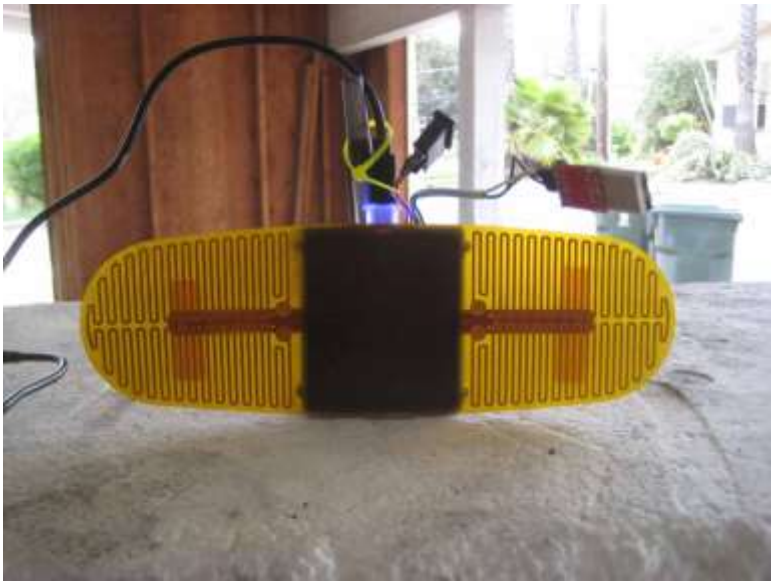
Middle Channel



High Channel

Test Setup Photo(s)





X-Axis

Y-Axis

Z-Axis

15.247(b)(3) Output Power

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBm)	$V_{Nominal}$ (dBm)	$V_{Maximum}$ (dBm)	Max Deviation from $V_{Nominal}$ (dB)
2402	GFSK / integral	-3.8	-3.8	-3.8	0
2440	GFSK / integral	-3.0	-3.0	-3.0	0
2480	GFSK / integral	-5.2	-5.2	-5.2	0

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	120
$V_{Minimum}$:	102
$V_{Maximum}$:	138

Test Data Summary - Radiated Measurement						
Measurement Option: RBW > DTS Bandwidth						
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm)	Limit (dBm)	Results
2402	GFSK	Integral/ 0.5	92.0	-3.8	≤ 30	Pass
2440	GFSK	Integral/ 0.5	92.8	-3.0	≤ 30	Pass
2480	GFSK	Integral/ 0.5	90.6	-5.2	≤ 30	Pass

For fixed point-to-point antennas, the limit is calculated in accordance with 15.247(c)(1): $Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$

For directional beamforming antennas, the limit is calculated in accordance with 15.247(c)(2) and KDB 662911.

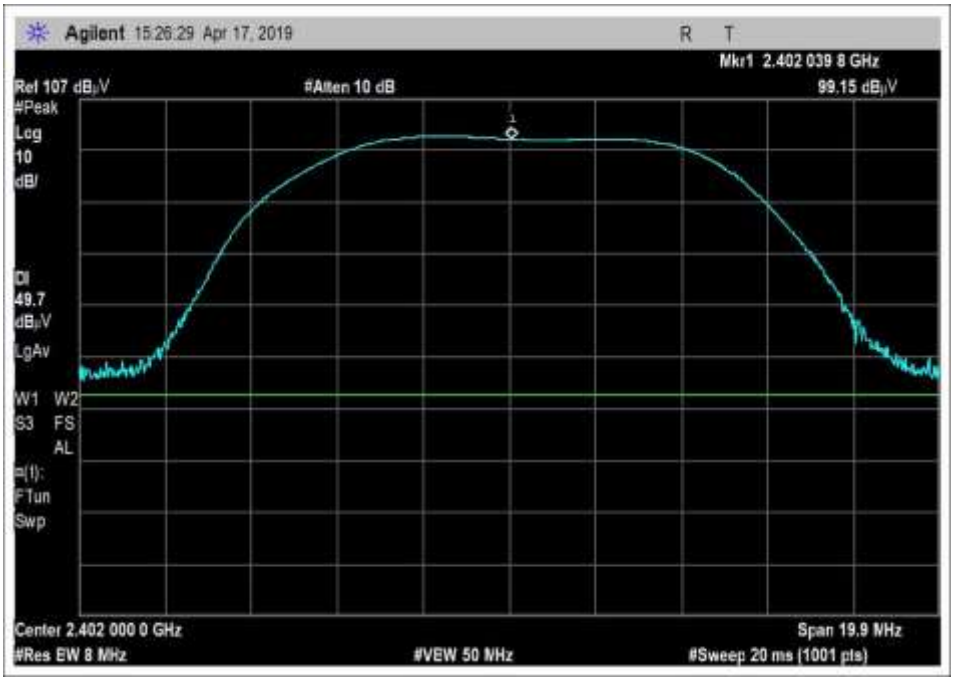
Conducted RF output power calculated in accordance with ANSI C63.10.

$$P(W) = \frac{(E \cdot d)^2}{30\,G}$$

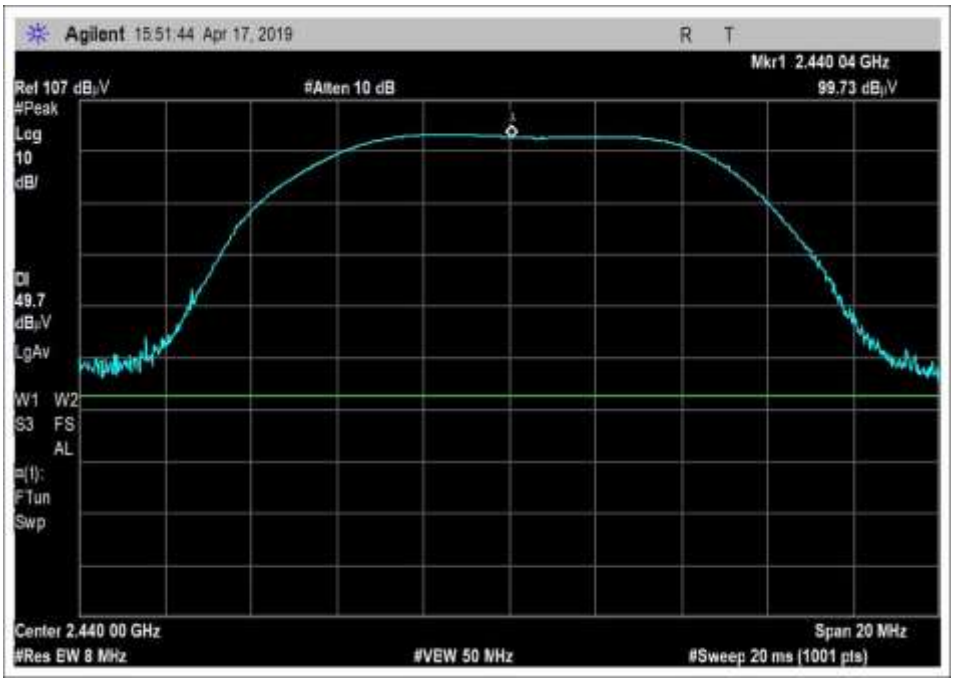
Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G\ - 104.77$$

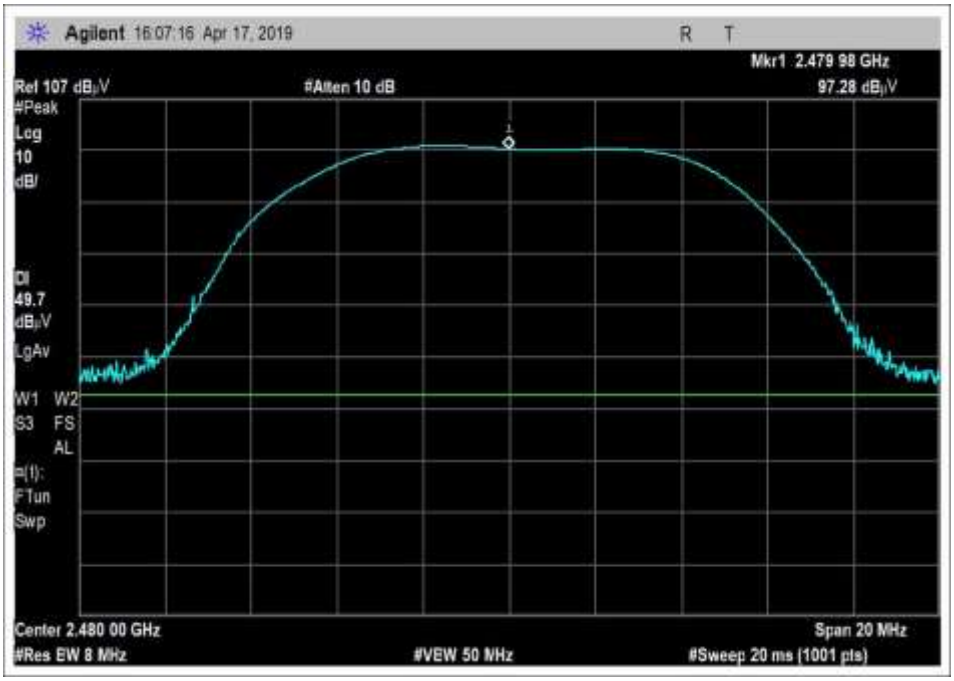
Plots



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510 249 1170		
Customer:	**Relief Technologies**		
Specification:	**15.247(b) Power Output (2400-2483.5 MHz DTS)**		
Work Order #:	**102320**	Date:	4/17/2019
Test Type:	**Radiated Scan**	Time:	17:03:58
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform.
A charger is connected to the device; rechargeable battery is fully charged.

Freq range: 2402- 2480 MHz
TX freq 2402 MHz, 2440 MHz, 2480 MHz

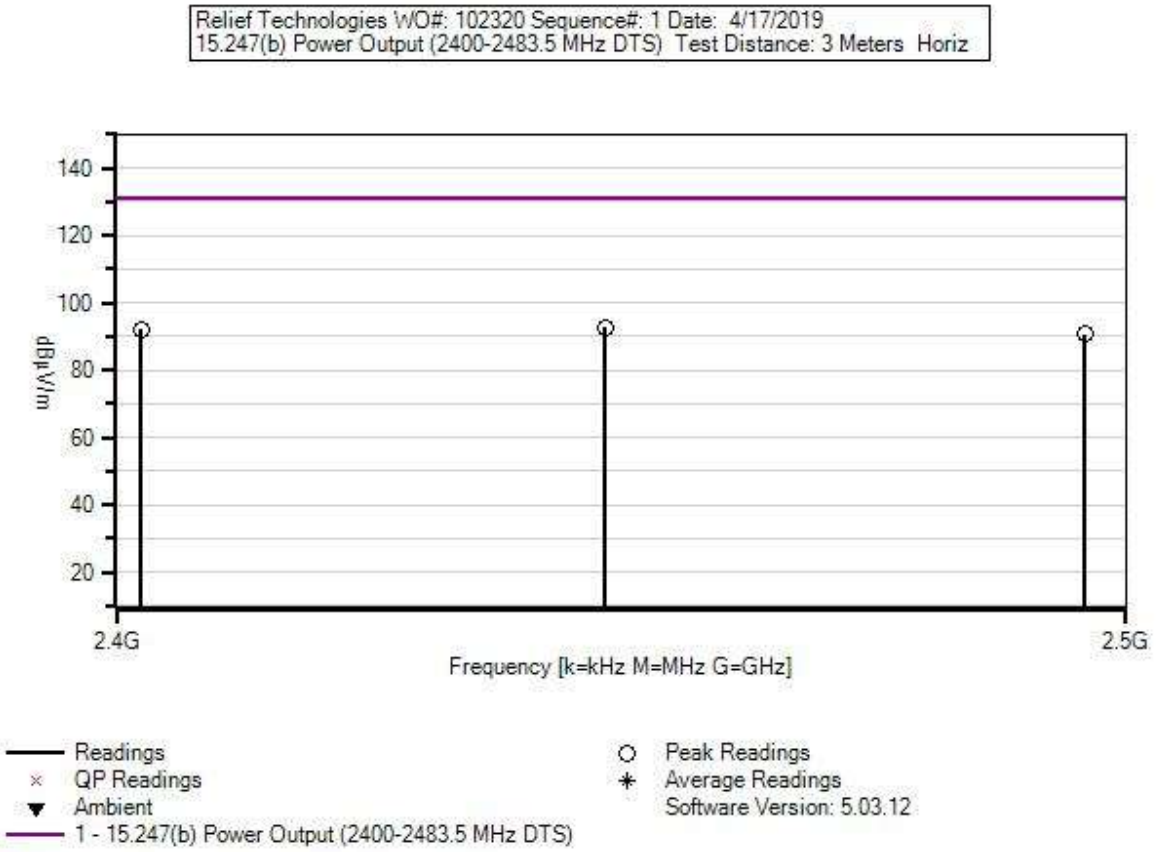
Test software setting
Channel 02, 40, 80
Power: Pos3dBm
Data rate: ble-2Mbit

Frequency range of measurement = Fundamental.

Test environment conditions:
Temperature: 20°C
Relative humidity: 52%
Pressure: 99kPa

Emission profile of the EUT rotated along three orthogonal axes was investigated.
Recorded data represent worse case emission.

ANSI C63.10 (2013), KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019



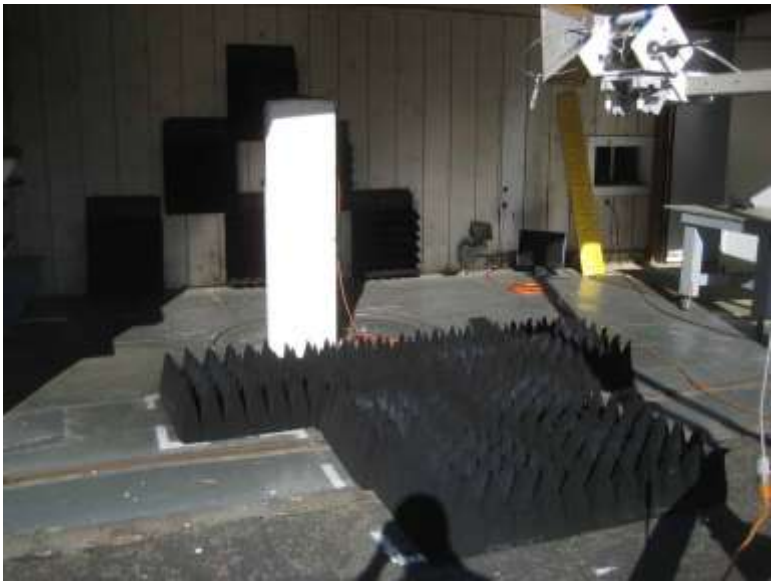
Test Equipment:

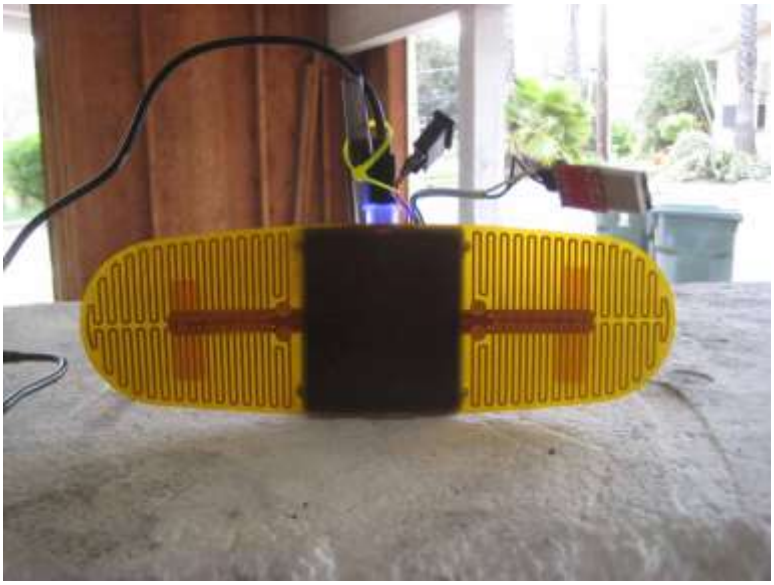
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T2	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T3	ANP07246	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T4	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T5	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2440.040M	99.7	+0.0 +3.1	+28.4	+0.3	-38.7	+0.0	92.8	131.2 M_y_3dBm	-38.4	Horiz
2	2402.040M	99.1	+0.0 +3.1	+28.2	+0.3	-38.7	+0.0	92.0	131.2 L_y_3dBm	-39.2	Horiz
3	2479.980M	97.3	+0.0 +3.2	+28.5	+0.3	-38.7	+0.0	90.6	131.2 H_y_3dBm	-40.6	Horiz

Test Setup Photo(s)





X-Axis

Y-Axis

Z-Axis

15.247(e) Power Spectral Density

Test Data Summary - Radiated Measurement						
Measurement Method: PKPSD						
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Field Strength (dBuV/m @3m)**	**Calculated (dBm/3kHz)**	**Limit (dBm/3kHz)**	**Results**
2402	GFSK	Integral/ 0.5	75.6	-20.2	≤8	Pass
2440	GFSK	Integral/ 0.5	76.3	**-19.5**	≤8	Pass
2480	GFSK	Integral/ 0.5	73.8	-22.0	≤8	Pass

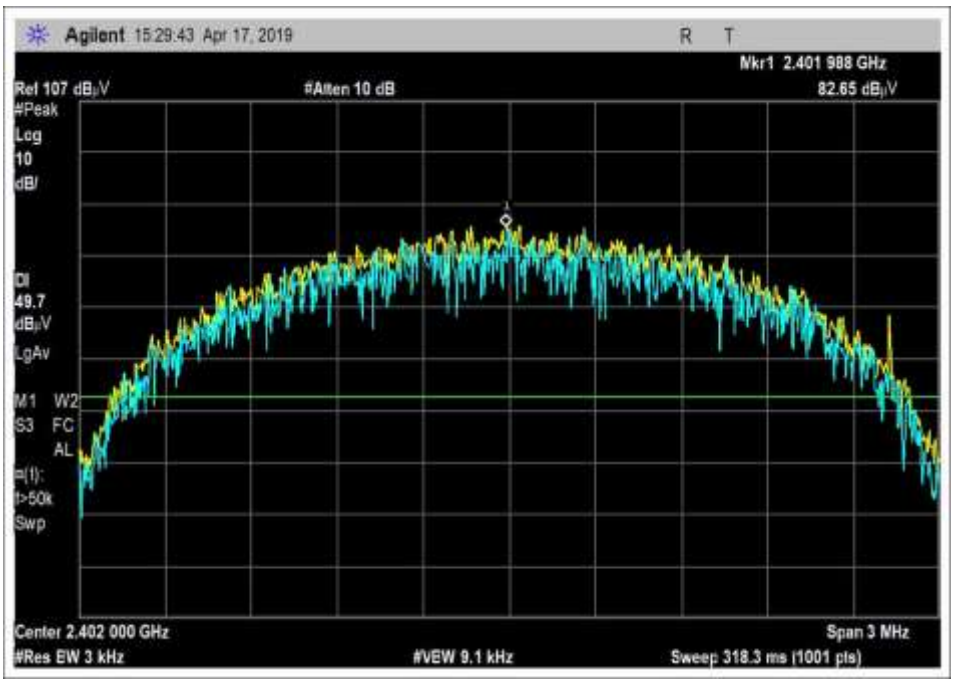
Conducted RF output power calculated in accordance with ANSI C63.10.

$$P(W) = \frac{(E \cdot d)^2}{30\ G}$$

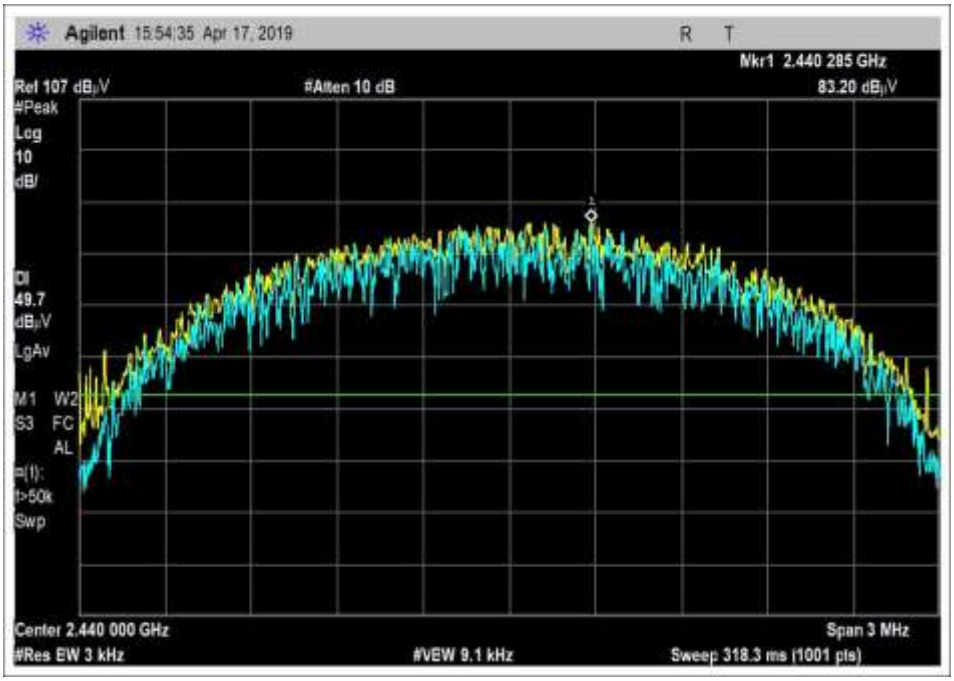
Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G\ - 104.77$$

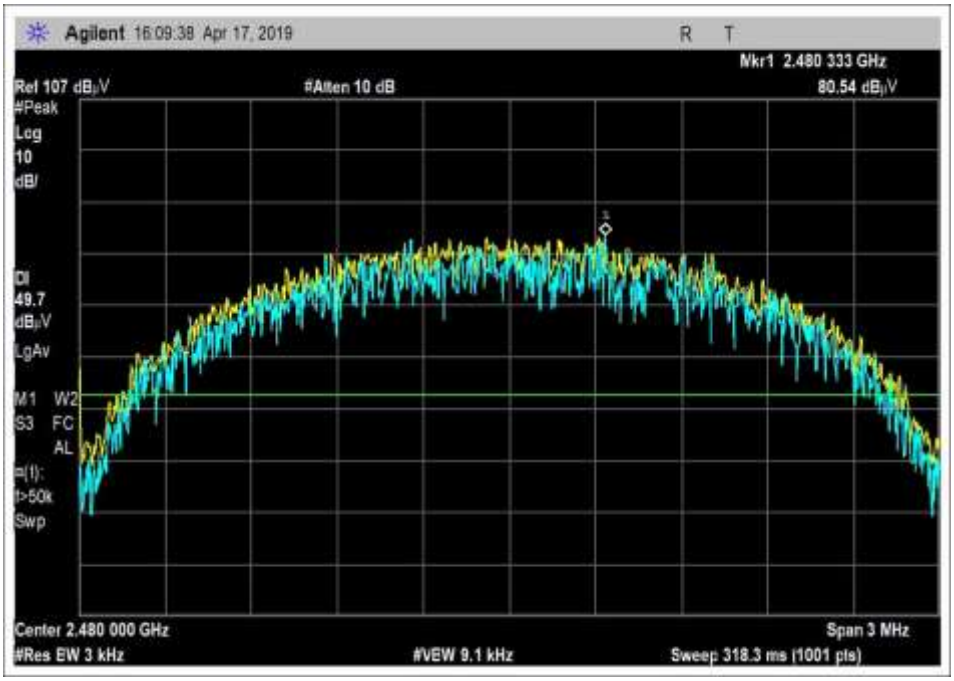
Plots



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Relief Technologies**		
Specification:	**15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**		
Work Order #:	**102320**	Date:	4/17/2019
Test Type:	**Radiated Scan**	Time:	17:03:58
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform.
A charger is connected to the device; rechargeable battery is fully charged.

Freq range: 2402- 2480 MHz
TX freq 2402 MHz, 2440 MHz, 2480 MHz

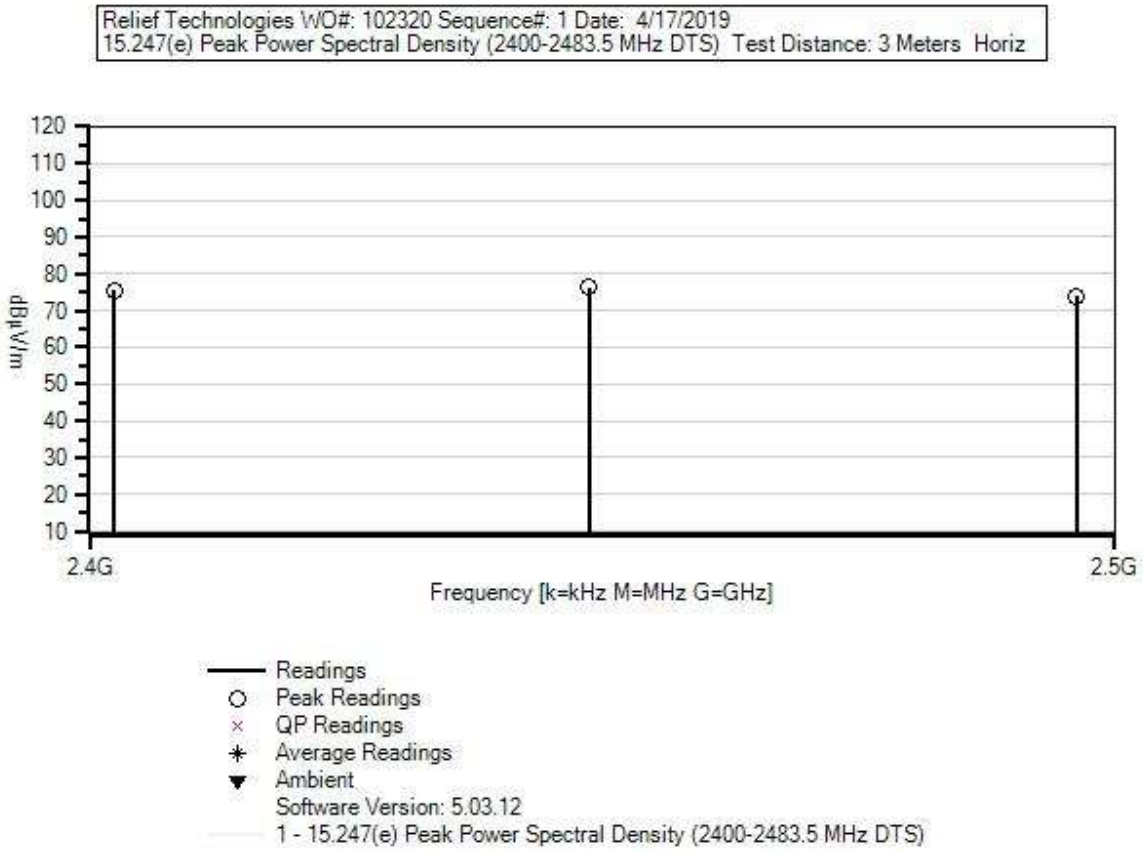
Test software setting
Channel 02, 40, 80
Power: Pos3dBm
Data rate: ble-2Mbit

Frequency range of measurement = Fundamental

Test environment conditions:
Temperature: 20°C
Relative humidity: 52%
Pressure: 99kPa

Emission profile of the EUT rotated along three orthogonal axes was investigated.
Recorded data represent worse case emission.

ANSI C63.10 (2013), KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019



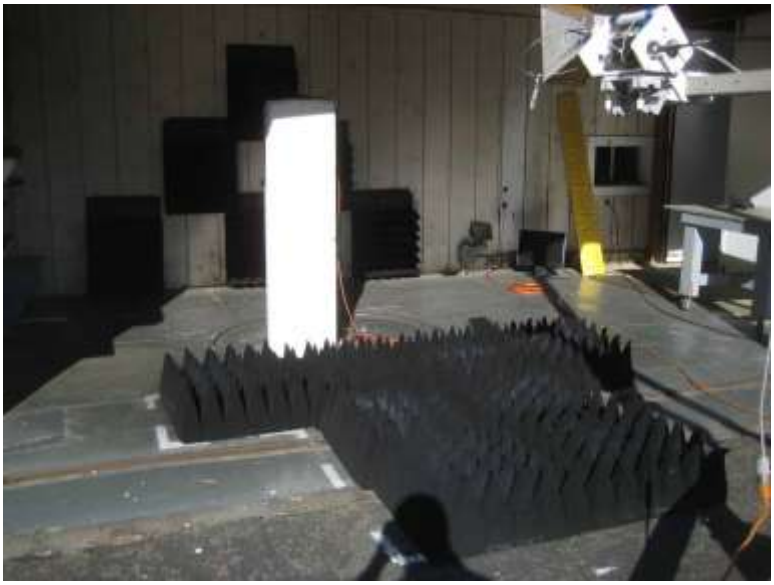
Test Equipment:

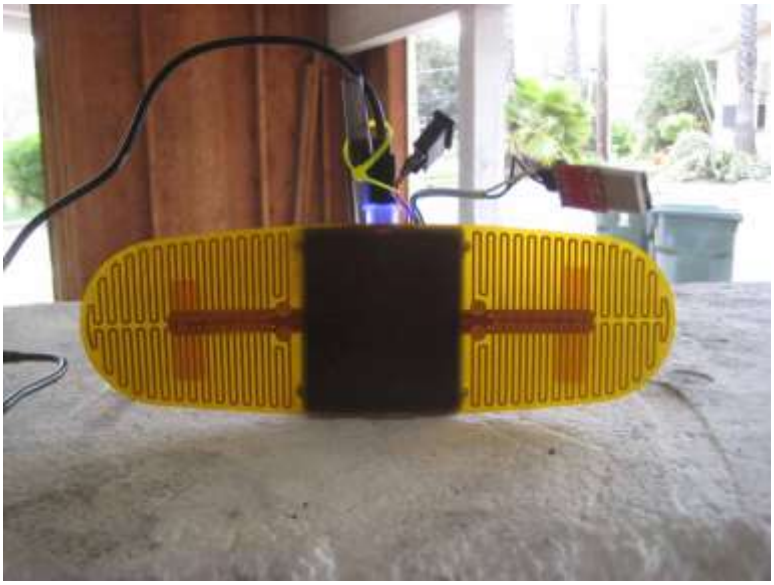
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T2	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T3	ANP07246	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T4	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T5	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2440.285M	83.2	+0.0 +3.1	+28.4	+0.3	-38.7	+0.0	76.3	109.2 M_y_3dBm_PSD	-32.9	Horiz
2	2401.988M	82.7	+0.0 +3.1	+28.2	+0.3	-38.7	+0.0	75.6	109.2 L_y_3dBm_PSD	-33.6	Horiz
3	2480.333M	80.5	+0.0 +3.2	+28.5	+0.3	-38.7	+0.0	73.8	109.2 H_y_3dBm_PSD	-35.4	Horiz

Test Setup Photo(s)





X-Axis

Y-Axis

Z-Axis

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Relief Technologies**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**102320**	Date:	7/16/2019
Test Type:	**Maximized Emissions**	Time:	09:16:23
Tested By:	E. Wong/Don Nguyen	Sequence#:	2
Software:	EMITest 5.03.12		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform.
A charger is connected to the device; rechargeable battery is fully charged.

Freq range: 2402- 2480 MHz
TX freq 2402 MHz, 2440 MHz, 2480 MHz

Test software setting
Channel 02, 40, 80
Power: Pos3dBm
Data rate: ble-2Mbit

Frequency range of measurement = 9 kHz- 25 GHz.
9 kHz -150 kHz;RBW=200 Hz,VBW=600 Hz;150 kHz-30 MHz;RBW=9 kHz,VBW=27 kHz;30 MHz-1000 MHz;RBW=120 kHz,VBW=360 kHz,1000 MHz-25000 MHz;RBW=1 MHz,VBW=3 MHz.

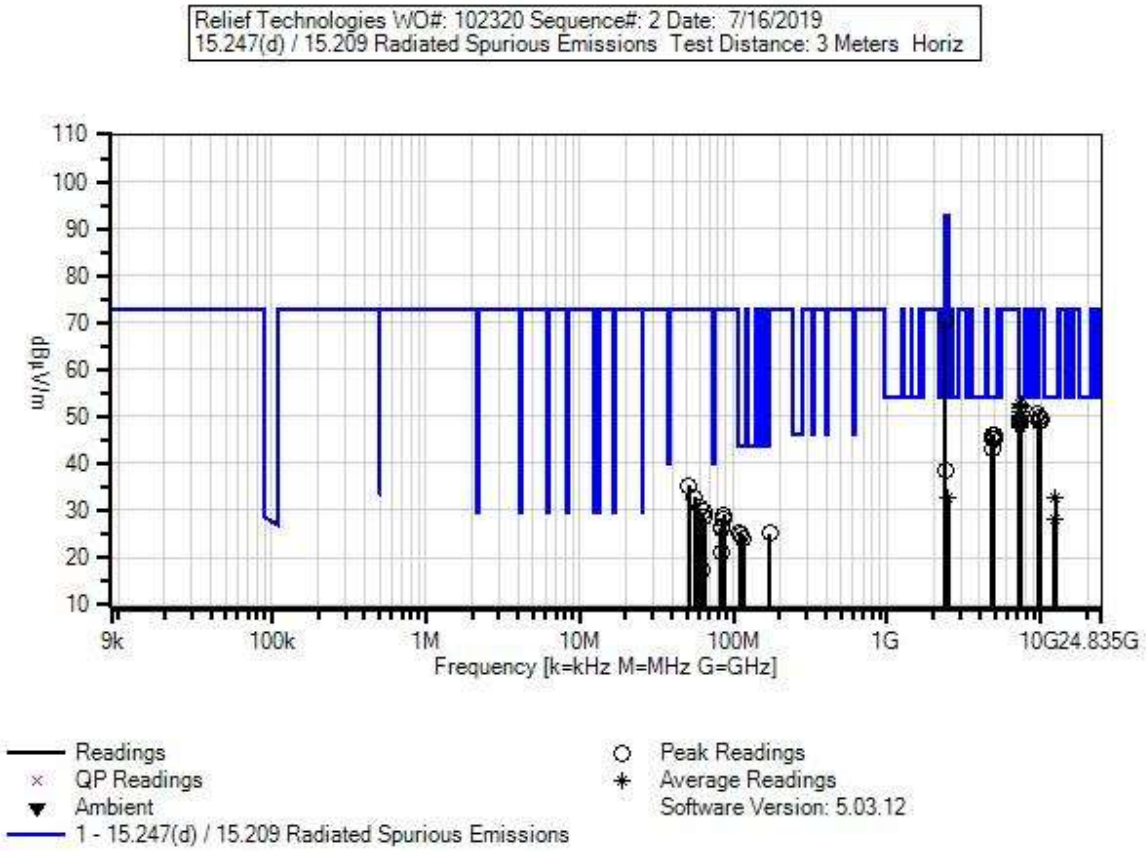
Test environment conditions:
Temperature: 24.5°C
Relative humidity: 59%
Pressure: 99kPa

Emission profile of the EUT rotated along three orthogonal axes was investigated.
Recorded data represent worse case emission.

Site A

ANSI C63.10 (2013), KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

Modification #1 was in place during testing.


Relief Technologies WO#: 102320 Sequence#: 2 Date: 7/16/2019
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
dBµV/m
110
100
90
80
70
60
50
40
30
20
10
9k
100k
1M
10M
100M
1G
10G24.835G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.12

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T2	AN00849	Horn Antenna	3115	3/14/2018	3/14/2020
T3	ANP07246	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T4	AN00786	Preamp	83017A	5/12/2018	5/12/2020
T5	ANP07139	Cable	ANDL1-PNMNM-48	3/4/2019	3/4/2021
T6	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	5/13/2019	5/13/2021
T7	AN03367	Horn Antenna-ANSI C63.5 Calibration	62-GH-62-25.	8/24/2017	8/24/2019
T8	AN01995	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
T9	ANP05275	Attenuator	1W	4/5/2018	4/5/2020
T10	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T11	AN00309	Preamp	8447D	2/19/2018	2/19/2020
T12	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020
	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	10/17/2018	10/17/2020

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	7439.293M Ave	47.2	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	52.4	54.0 H_y	-1.6	Vert
^	7439.293M	55.2	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	60.4	54.0 H_y	+6.4	Vert
3	7440.843M Ave	47.0	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	52.2	54.0 H_y	-1.8	Vert
^	7440.843M	54.4	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	59.6	54.0 H_y	+5.6	Vert
5	2400.000M	77.7	+0.0 +3.1 +0.0	+28.2 +0.0 +0.0	+0.3 +0.0 +0.0	-38.7 +0.0 +0.0	+0.0	70.6	72.8 bandedge_3dBm	-2.2	Horiz

6	7321.580M Ave	47.1	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	51.8	54.0 M_y	-2.2	Vert
^	7321.580M	55.6	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	60.3	54.0 M_y	+6.3	Vert
8	7318.480M Ave	46.3	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	51.0	54.0 M_y	-3.0	Vert
^	7318.480M	55.1	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	59.8	54.0 M_y	+5.8	Vert
10	7439.255M Ave	43.8	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.0	54.0 H_y	-5.0	Horiz
^	7439.255M	52.6	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	57.8	54.0 H_y	+3.8	Horiz
12	7440.855M Ave	43.7	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	48.9	54.0 H_y	-5.1	Horiz
^	7440.855M	51.3	+0.0 +5.9 +0.0	+36.3 +0.2 +0.0	+0.2 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	56.5	54.0 H_y	+2.5	Horiz
14	7321.590M Ave	43.5	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	48.2	54.0 M_y	-5.8	Horiz
^	7321.590M	52.5	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	57.2	54.0 M_y	+3.2	Horiz
16	7318.540M Ave	43.0	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	47.7	54.0 M_y	-6.3	Horiz
^	7318.540M	51.9	+0.0 +5.9 +0.0	+35.9 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	56.6	54.0 M_y	+2.6	Horiz
18	4960.480M	44.2	+0.0 +4.8 +0.0	+33.8 +0.4 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	46.0	54.0 H_y	-8.0	Horiz
19	4805.000M	44.8	+0.0 +4.8 +0.0	+33.3 +0.3 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	46.0	54.0 L_y	-8.0	Horiz
20	4960.480M	43.5	+0.0 +4.8 +0.0	+33.8 +0.4 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	45.3	54.0 H_y	-8.7	Vert
21	4879.040M	43.7	+0.0 +4.8 +0.0	+33.5 +0.3 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	45.1	54.0 M_y	-8.9	Horiz
22	4804.250M	43.9	+0.0 +4.8 +0.0	+33.3 +0.3 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	45.1	54.0 L_y	-8.9	Vert

23	4881.100M	41.7	+0.0 +4.8 +0.0	+33.5 +0.3 +0.0	+0.4 +0.0 +0.0	-37.6 +0.0 +0.0	+0.0	43.1	54.0 M_y	-10.9	Vert
24	2390.000M	45.7	+0.0 +3.1 +0.0	+28.3 +0.0 +0.0	+0.3 +0.0 +0.0	-38.7 +0.0 +0.0	+0.0	38.7	54.0 bandedge_3dBm	-15.3	Horiz
25	109.200M	34.7	+0.0 +0.0 +6.0	+0.0 +0.0 +1.8	+0.0 +0.0 -28.1	+0.0 +10.9 +0.1	+0.0	25.4	43.5	-18.1	Horiz
26	172.100M	34.9	+0.0 +0.0 +6.0	+0.0 +0.0 +2.4	+0.0 +0.0 -28.0	+0.0 +9.7 +0.2	+0.0	25.2	43.5	-18.3	Horiz
27	112.700M	33.8	+0.0 +0.0 +6.0	+0.0 +0.0 +1.9	+0.0 +0.0 -28.0	+0.0 +11.1 +0.1	+0.0	24.9	43.5	-18.6	Horiz
28	115.700M	32.5	+0.0 +0.0 +6.0	+0.0 +0.0 +1.9	+0.0 +0.0 -28.0	+0.0 +11.4 +0.1	+0.0	23.9	43.5	-19.6	Horiz
29	7204.490M Ave	48.2	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	52.5	72.8 L_y ***	-20.3	Vert
30	7204.504M Ave	47.4	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	51.7	72.8 L_x	-21.1	Horiz
31	7207.590M Ave	47.3	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	51.6	72.8 L_y	-21.2	Vert
32	12402.700 M Ave	31.4	+0.0 +7.8 +0.0	+0.0 +0.5 +0.0	+0.7 +28.7 +0.0	-36.3 +0.0 +0.0	+0.0	32.8	54.0 H_y	-21.2	Horiz
^	12402.700 M	43.2	+0.0 +7.8 +0.0	+0.0 +0.5 +0.0	+0.7 +28.7 +0.0	-36.3 +0.0 +0.0	+0.0	44.6	54.0 H_y	-9.4	Horiz
34	2483.500M Ave	39.3	+0.0 +3.2 +0.0	+28.5 +0.0 +0.0	+0.3 +0.0 +0.0	-38.7 +0.0 +0.0	+0.0	32.6	54.0 bandedge_3dBm	-21.4	Horiz
^	2483.500M	62.4	+0.0 +3.2 +0.0	+28.5 +0.0 +0.0	+0.3 +0.0 +0.0	-38.7 +0.0 +0.0	+0.0	55.7	54.0 bandedge_3dBm	+1.7	Horiz
36	7207.554M Ave	46.8	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	51.1	72.8 L_x	-21.7	Horiz
37	9609.890M	41.9	+0.0 +6.9 +0.0	+37.7 +0.2 +0.0	+0.5 +0.0 +0.0	-36.5 +0.0 +0.0	+0.0	50.7	72.8 L_y	-22.1	Vert
38	7204.600M Ave	45.9	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	50.2	72.8 L_x	-22.6	Vert
^	7204.600M	54.8	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	59.1	72.8 L_x	-13.7	Vert

40	7204.490M Ave	45.6	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.9	72.8 L_z	-22.9	Vert
^	7204.490M	56.9	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	61.2	72.8 L_y	-11.6	Vert
^	7204.490M	55.3	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	59.6	72.8 L_z	-13.2	Vert
43	7204.540M Ave	45.5	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.8	72.8 L_z	-23.0	Horiz
44	7207.540M Ave	45.4	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.7	72.8 L_z	-23.1	Vert
45	9758.670M	40.2	+0.0 +7.0 +0.0	+37.9 +0.3 +0.0	+0.5 +0.0 +0.0	-36.4 +0.0 +0.0	+0.0	49.5	72.8 M_y	-23.3	Vert
46	7207.590M Ave	45.1	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.4	72.8 L_z	-23.4	Horiz
^	7207.590M	54.2	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	58.5	72.8 L_z	-14.3	Horiz
48	9920.620M	39.4	+0.0 +7.3 +0.0	+38.0 +0.4 +0.0	+0.5 +0.0 +0.0	-36.4 +0.0 +0.0	+0.0	49.2	72.8 H_y	-23.6	Vert
49	7204.580M Ave	44.8	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	49.1	72.8 L_y	-23.7	Horiz
^	7204.504M	56.3	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	60.6	72.8 L_x	-12.2	Horiz
^	7204.540M	54.6	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	58.9	72.8 L_z	-13.9	Horiz
^	7204.580M	53.7	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	58.0	72.8 L_y	-14.8	Horiz
53	7207.574M Ave	44.5	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	48.8	72.8 L_x	-24.0	Vert
^	7207.590M	56.2	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	60.5	72.8 L_y	-12.3	Vert
^	7207.540M	54.2	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	58.5	72.8 L_z	-14.3	Vert
^	7207.574M	53.6	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	57.9	72.8 L_x	-14.9	Vert

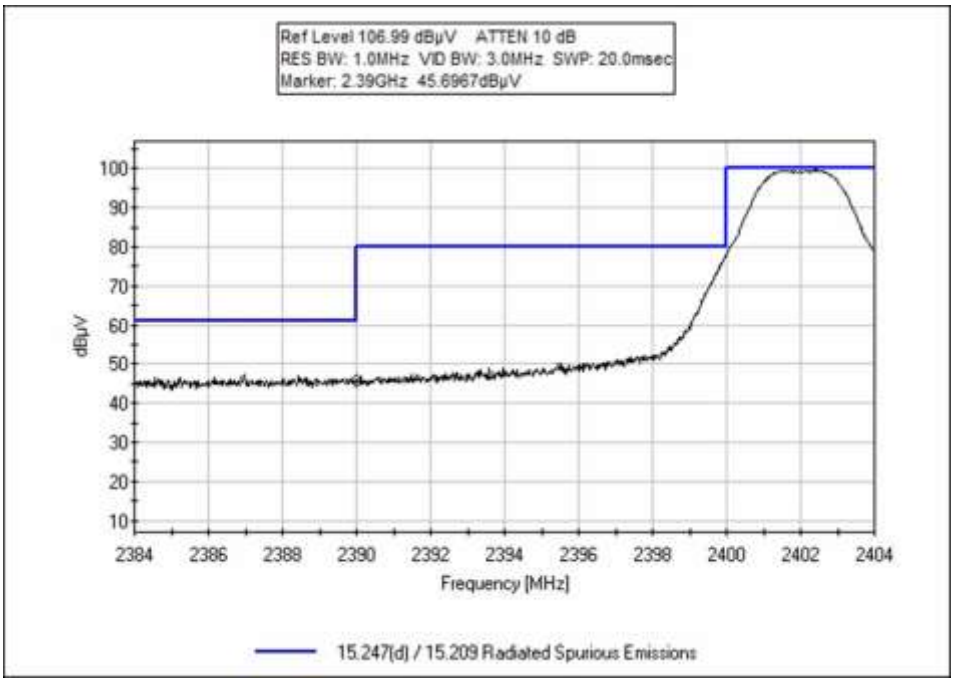
57	9761.390M	39.4	+0.0 +7.0 +0.0	+37.9 +0.3 +0.0	+0.5 +0.0 +0.0	-36.4 +0.0 +0.0	+0.0	48.7	72.8 M_y	-24.1	Horiz
58	7207.480M Ave	44.0	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	48.3	72.8 L_y	-24.5	Horiz
^	7207.554M	55.8	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	60.1	72.8 L_x	-12.7	Horiz
^	7207.480M	52.7	+0.0 +5.9 +0.0	+35.5 +0.2 +0.0	+0.1 +0.0 +0.0	-37.4 +0.0 +0.0	+0.0	57.0	72.8 L_y	-15.8	Horiz
61	12197.550 M Ave	27.1	+0.0 +7.7 +0.0	+0.0 +0.5 +0.0	+0.6 +28.7 +0.0	-36.4 +0.0 +0.0	+0.0	28.2	54.0 M_y	-25.8	Vert
^	12197.550 M	38.3	+0.0 +7.7 +0.0	+0.0 +0.5 +0.0	+0.6 +28.7 +0.0	-36.4 +0.0 +0.0	+0.0	39.4	54.0 M_y	-14.6	Vert
63	51.500M	48.1	+0.0 +0.0 +6.0	+0.0 +0.0 +1.2	+0.0 +0.0 -28.1	+0.0 +7.9 +0.1	+0.0	35.2	72.8	-37.6	Vert
64	55.750M	46.8	+0.0 +0.0 +6.0	+0.0 +0.0 +1.3	+0.0 +0.0 -28.1	+0.0 +6.7 +0.1	+0.0	32.8	72.8	-40.0	Vert
65	60.500M	45.4	+0.0 +0.0 +6.0	+0.0 +0.0 +1.4	+0.0 +0.0 -28.1	+0.0 +5.7 +0.1	+0.0	30.5	72.8	-42.3	Vert
66	63.750M	44.3	+0.0 +0.0 +6.0	+0.0 +0.0 +1.4	+0.0 +0.0 -28.1	+0.0 +5.9 +0.1	+0.0	29.6	72.8	-43.2	Vert
67	87.250M	40.9	+0.0 +0.0 +6.0	+0.0 +0.0 +1.7	+0.0 +0.0 -28.1	+0.0 +8.5 +0.1	+0.0	29.1	72.8	-43.7	Vert
68	65.250M	43.0	+0.0 +0.0 +6.0	+0.0 +0.0 +1.5	+0.0 +0.0 -28.1	+0.0 +5.9 +0.1	+0.0	28.4	72.8	-44.4	Vert
69	86.000M	40.2	+0.0 +0.0 +6.0	+0.0 +0.0 +1.7	+0.0 +0.0 -28.1	+0.0 +8.4 +0.1	+0.0	28.3	72.8	-44.5	Vert
70	82.750M	38.7	+0.0 +0.0 +6.0	+0.0 +0.0 +1.6	+0.0 +0.0 -28.1	+0.0 +8.1 +0.1	+0.0	26.4	72.8	-46.4	Vert
71	83.750M	38.3	+0.0 +0.0 +6.0	+0.0 +0.0 +1.6	+0.0 +0.0 -28.1	+0.0 +8.2 +0.1	+0.0	26.1	72.8	-46.7	Vert
72	84.400M	33.1	+0.0 +0.0 +6.0	+0.0 +0.0 +1.6	+0.0 +0.0 -28.1	+0.0 +8.2 +0.1	+0.0	20.9	72.8	-51.9	Horiz
73	62.650M	32.0	+0.0 +0.0 +6.0	+0.0 +0.0 +1.4	+0.0 +0.0 -28.1	+0.0 +5.8 +0.1	+0.0	17.2	72.8	-55.6	Horiz

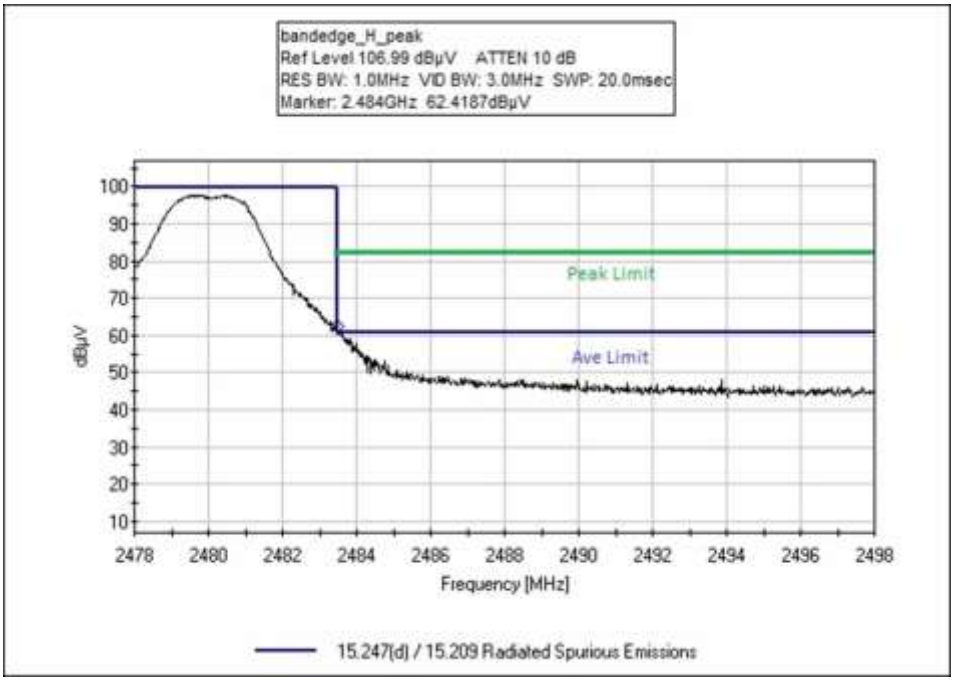
Band Edge

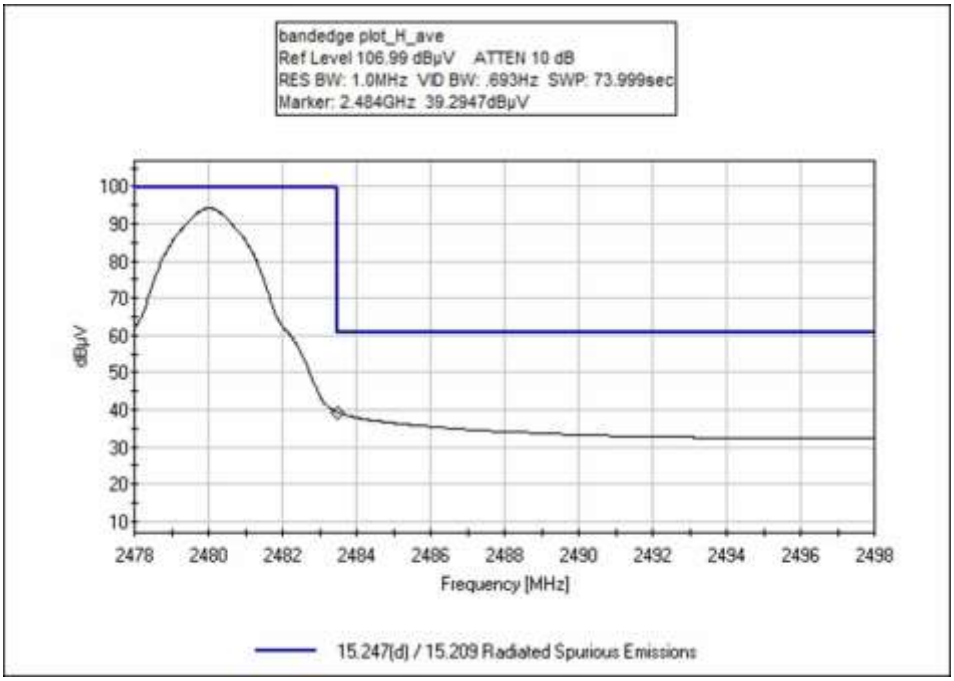
Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
2390.0	GFSK	Integral	38.7	<54	Pass
2400.0	GFSK	Integral	70.6	<72.8	Pass
2483.5	GFSK	Integral	32.6 *	<54	Pass

* average

Band Edge Plots




bandedge_H_peak
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 2.484GHz 62.4187dBµV
Peak Limit
Ave Limit
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


bandedge plot_H_ave
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: .693Hz SWP: 73.999sec
Marker: 2.484GHz 39.2947dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

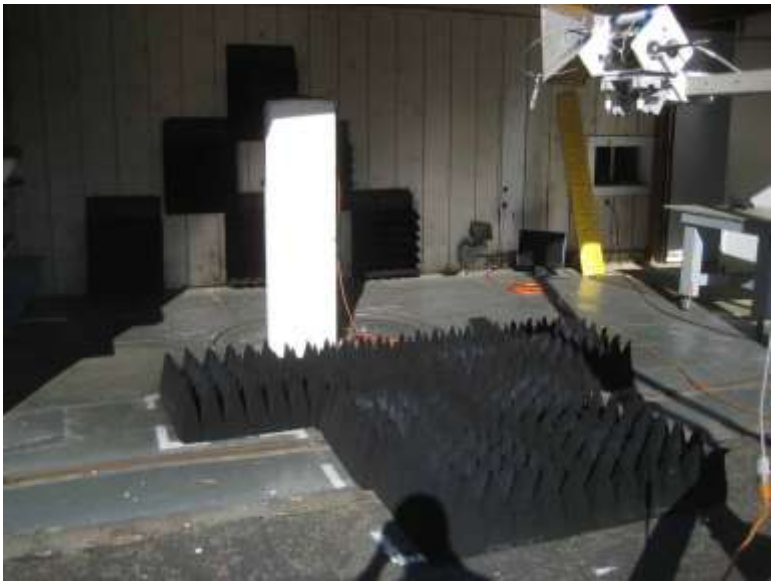
Test Setup Photo(s)

Below 1 GHz

Below 1 GHz

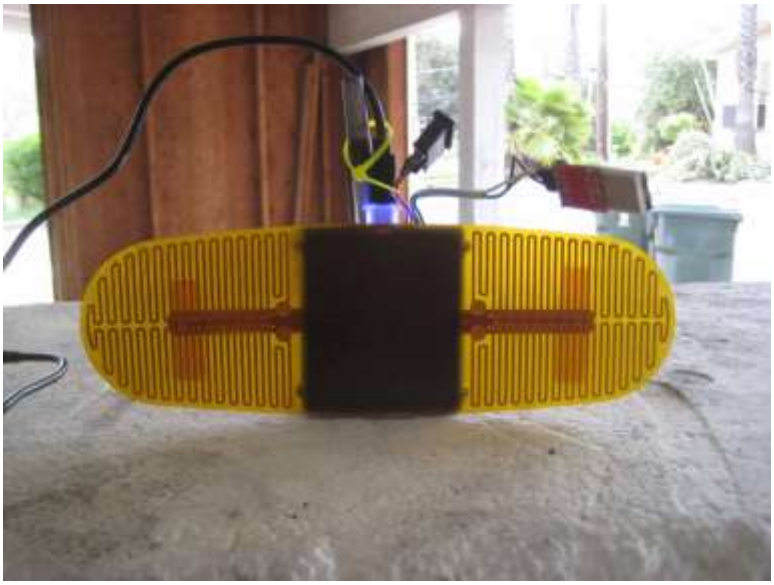
Above 1 GHz

Above 1 GHz



Above 1 GHz

Above 1 GHz



X-Axis

Y Axis

Z-Axis

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories, Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Relief Technologies**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102320**	Date:	4/18/2019
Test Type:	**Conducted Emissions**	Time:	14:36:18
Tested By:	E. Wong	Sequence#:	3
Software:	EMITest 5.03.12		120/60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform.
A charger is connected to the device; rechargeable battery is fully charged.

TX freq 2440 MHz

Test software setting
Channel 40
Power: Pos3dBm
Data rate: ble-2Mbit

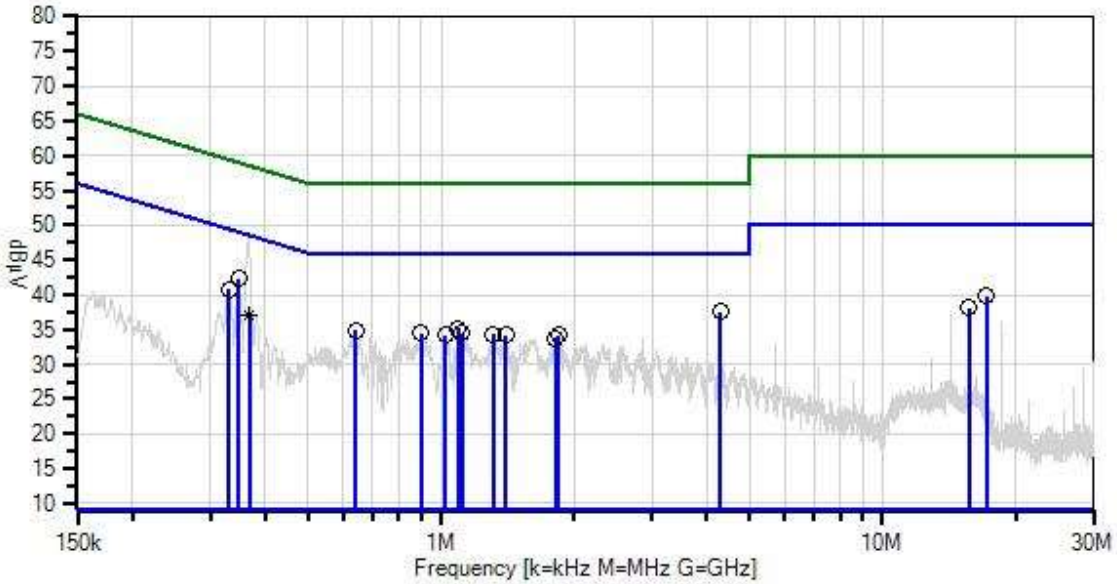
Frequency range of measurement = 150kHz- 30MHz.
150 kHz-30 MHz;RBW=9 kHz,VBW=30kHz

Test environment conditions:
Temperature: 20°C
Relative humidity: 52%
Pressure: 99kPa

Site A

ANSI C63.10 (2013)

Relief Technologies WO#: 102320 Sequence#: 3 Date: 4/18/2019
15.207 AC Mains - Average Test Lead: 120/60Hz L1-Line



Sweep Data
× QP Readings
Software Version: 5.03.12
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T1	AN02610	High Pass Filter	HE9615-150K-50-720B	10/25/2017	10/25/2019
T2	ANP07338	Cable	2249-Y-240	2/19/2018	2/19/2020
T3	ANP07545	Attenuator	SA18N10W-06	1/18/2019	1/18/2021
T4	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2018	3/31/2020
	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2018	3/31/2020
T5	AN00969A	50uH LISN-Line (dB)	3816/2NM	3/11/2019	3/11/2021
	AN00969A	50uH LISN-Return (dB)	3816/2NM	3/11/2019	3/11/2021

Measurement Data: Reading listed by margin. Test Lead: L1-Line

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	347.800k	36.3	+0.2 +0.0	+0.0	+5.8	+0.0	+0.0	42.3	49.0	-6.7	L1-Li
2	4.288M	31.1	+0.1 +0.2	+0.2	+5.8	+0.1	+0.0	37.5	46.0	-8.5	L1-Li
3	330.347k	34.8	+0.1 +0.1	+0.0	+5.8	+0.0	+0.0	40.8	49.4	-8.6	L1-Li
4	17.157M	32.2	+0.2 +0.6	+0.3	+5.8	+0.7	+0.0	39.8	50.0	-10.2	L1-Li
5	1.094M	29.0	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	35.2	46.0	-10.8	L1-Li
6	640.864k	28.7	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.9	46.0	-11.1	L1-Li
7	1.115M	28.2	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.4	46.0	-11.6	L1-Li
8	367.480k Ave	30.9	+0.2 +0.1	+0.0	+5.8	+0.0	+0.0	37.0	48.6	-11.6	L1-Li
^	365.980k	41.7	+0.2 +0.1	+0.0	+5.8	+0.0	+0.0	47.8	48.6	-0.8	L1-Li
10	902.721k	28.2	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.4	46.0	-11.6	L1-Li
11	1.315M	28.1	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.3	46.0	-11.7	L1-Li
12	1.022M	28.0	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.2	46.0	-11.8	L1-Li
13	1.405M	28.0	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	34.2	46.0	-11.8	L1-Li
14	1.843M	27.9	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	34.2	46.0	-11.8	L1-Li
15	15.725M	30.6	+0.2 +0.5	+0.3	+5.8	+0.7	+0.0	38.1	50.0	-11.9	L1-Li
16	1.817M	27.5	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	33.8	46.0	-12.2	L1-Li

Test Location:	CKC Laboratories, Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112		
Customer:	**Relief Technologies**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**102320**	Date:	4/18/2019
Test Type:	**Conducted Emissions**	Time:	2:37:40 PM
Tested By:	E. Wong	Sequence#:	4
Software:	EMITest 5.03.12		120/60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Removed from nonconductive enclosure, the EUT is placed on the Styrofoam platform.
A charger is connected to the device; rechargeable battery is fully charged.

TX freq 2440 MHz

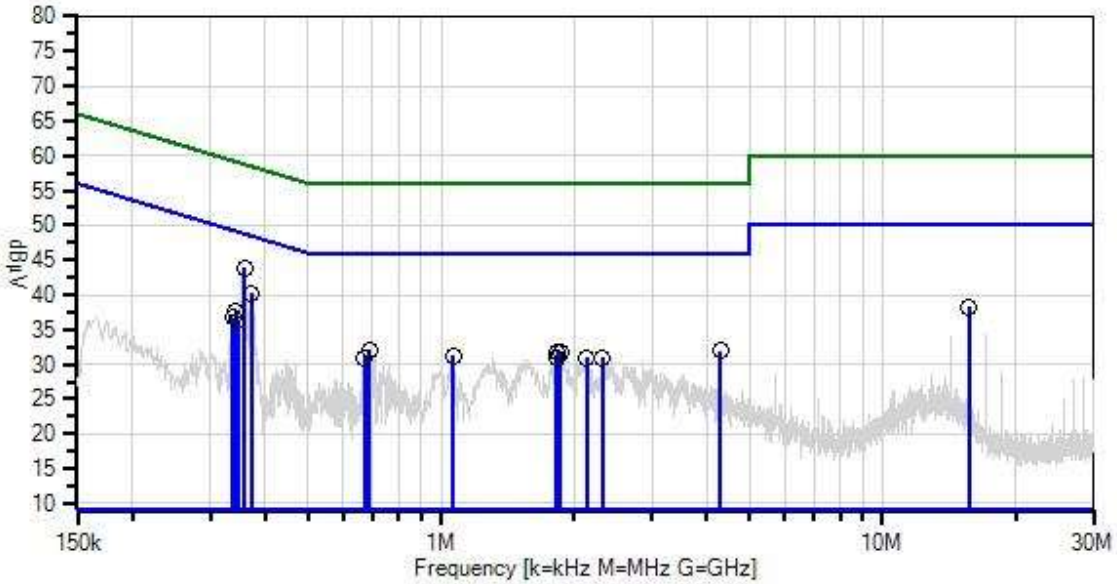
Test software setting
Channel 40
Power: Pos3dBm
Data rate: ble-2Mbit

Frequency range of measurement = 150kHz- 30MHz.
150 kHz-30 MHz;RBW=9 kHz,VBW=30kHz

Test environment conditions:
Temperature: 20°C
Relative humidity: 52%
Pressure: 99kPa

Site A
ANSI C63.10-2013

Relief Technologies WO#: 102320 Sequence#: 4 Date: 4/18/2019
15.207 AC Mains - Average Test Lead: 120/60Hz L2-Neutral



Sweep Data
× QP Readings
Software Version: 5.03.12
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
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2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/13/2019	3/13/2021
T1	AN02610	High Pass Filter	HE9615-150K-50-720B	10/25/2017	10/25/2019
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T3	ANP07545	Attenuator	SA18N10W-06	1/18/2019	1/18/2021
	ANP06986	Cable-Line L1(dB)	90cm-extcord	3/31/2018	3/31/2020
T4	ANP06986	Cable-Neutral L2(dB)	90cm-extcord	3/31/2018	3/31/2020
	AN00969A	50uH LISN-Line (dB)	3816/2NM	3/11/2019	3/11/2021
T5	AN00969A	50uH LISN-Return (dB)	3816/2NM	3/11/2019	3/11/2021

Measurement Data: Reading listed by margin. Test Lead: L2-Neutral

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	357.980k	37.7	+0.2 +0.1	+0.0	+5.8	+0.0	+0.0	43.8	48.8	-5.0	L2-Ne
2	371.797k	34.1	+0.2 +0.1	+0.0	+5.8	+0.0	+0.0	40.2	48.5	-8.3	L2-Ne
3	343.436k	31.7	+0.1 +0.1	+0.0	+5.8	+0.0	+0.0	37.7	49.1	-11.4	L2-Ne
4	15.706M	30.7	+0.2 +0.5	+0.3	+5.8	+0.7	+0.0	38.2	50.0	-11.8	L2-Ne
5	336.891k	30.7	+0.1 +0.1	+0.0	+5.8	+0.0	+0.0	36.7	49.3	-12.6	L2-Ne
6	346.345k	30.3	+0.1 +0.1	+0.0	+5.8	+0.0	+0.0	36.3	49.0	-12.7	L2-Ne
7	688.132k	25.9	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	32.1	46.0	-13.9	L2-Ne
8	4.288M	25.6	+0.1 +0.2	+0.2	+5.8	+0.1	+0.0	32.0	46.0	-14.0	L2-Ne
9	1.838M	25.5	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	31.8	46.0	-14.2	L2-Ne
10	1.860M	25.5	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	31.8	46.0	-14.2	L2-Ne
11	1.064M	25.1	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	31.3	46.0	-14.7	L2-Ne
12	1.821M	24.7	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	31.0	46.0	-15.0	L2-Ne
13	669.952k	24.8	+0.2 +0.1	+0.1	+5.8	+0.0	+0.0	31.0	46.0	-15.0	L2-Ne
14	2.315M	24.7	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	31.0	46.0	-15.0	L2-Ne
15	2.140M	24.7	+0.2 +0.1	+0.1	+5.8	+0.1	+0.0	31.0	46.0	-15.0	L2-Ne

Test Setup Photo(s)

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point, the measuring device is set into the linear mode and the scan time is reduced.