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EMC Test Report

for FCC Grant of Equipment Authorization

FCC Part 15 Subpart C

Model: QuickCare Thermometer

FCC ID:	2AFEOQC1
APPLICANT:	Kinsa Health 535 Mission St. 18th Floor San Francisco, CA 94105
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
PROJECT NUMBER:	JD106182 / PR070839
REPORT DATE:	December 7, 2017
FINAL TEST DATES:	November 7, 10 and 14, 2017
TOTAL NUMBER OF PAGES:	49

ACCREDITED
Testing Cert #0214.26

VALIDATING SIGNATORIES

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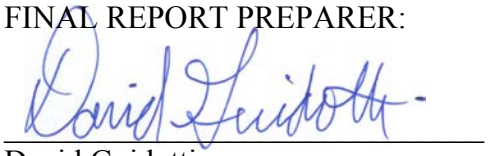
FINAL REPORT PREPARER:



David Guidotti
Senior Technical Writer

QUALITY ASSURANCE DELEGATE

Gary Izard
Technical Writer

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	December 7, 2017	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Kinsa Health model QuickCare Thermometer, pursuant to the following rules:

FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2013
FCC DTS Measurement Guidance KDB558074

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

National Technical Systems - Silicon Valley is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Kinsa Health model QuickCare Thermometer complied with the requirements of the following regulations:

FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Kinsa Health model QuickCare Thermometer and therefore apply only to the tested sample. The sample was selected and prepared by David Gal of Kinsa Health.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)		Digital Modulation	Systems uses GFSK modulation	System must utilize a digital transmission technology	Complies
15.247 (a) (2)		6dB Bandwidth	0.88 MHz	>500kHz	Complies
15.247 (b) (3)		Output Power (multipoint systems)	-3.4 dBm (0.00046 Watts) EIRP = 0.00032 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(e)		Power Spectral Density	-3.4 dBm/3MHz	8dBm/3kHz	Complies
15.247(d)		Antenna Port Spurious Emissions 30kHz – 25 GHz	All emissions > 20 dB below the fundamental	< -20dBc	Complies
15.247(d) / 15.209		Radiated Spurious Emissions 30MHz – 25 GHz	52.4 dBµV/m @ 4879.73 MHz (-1.6 dB)	Refer to the limits section (p16) for restricted bands, all others < -20dBc	Complies
15.203	-	RF Connector	Integral antenna	Unique or integral antenna required	Complies
15.407 (b) (6)	RSS-Gen Table 3	AC Conducted Emissions	N/A – EUT is battery powered (non-rechargeable)		
15.247 (i) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR exclusion calculations in separate exhibit,	Refer to OET 65, FCC Part 1 and RSS 102	Complies
Note 1: EIRP calculated using antenna gains of -1.5 dBi for the highest EIRP system.					

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Kinsa Health model QuickCare Thermometer is a Bluetooth low energy enabled thermometer that is designed to measure human body temperature. Since the EUT could be placed in any position during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3V Volts DC.

The sample was received on November 7, 2017 and tested on November 7, 10 and 14, 2017. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Kinsa Health	QuickCare	Thermometer	DVT-FCC-2	2AFEOQC1

ANTENNA SYSTEM

The antenna system consists of integral PCB antenna.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 3.5x10x1.5 cm.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

No support equipment was used during testing.

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
None				

EUT OPERATION

During emissions testing the EUT was configured to transmit a continuous modulated signal on the selected channel at the selected power setting.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	US0027	2845B-7	

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

Software is used to view and convert receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers. The software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters for testing below 1 GHz and 1.5m for testing above 1 GHz. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

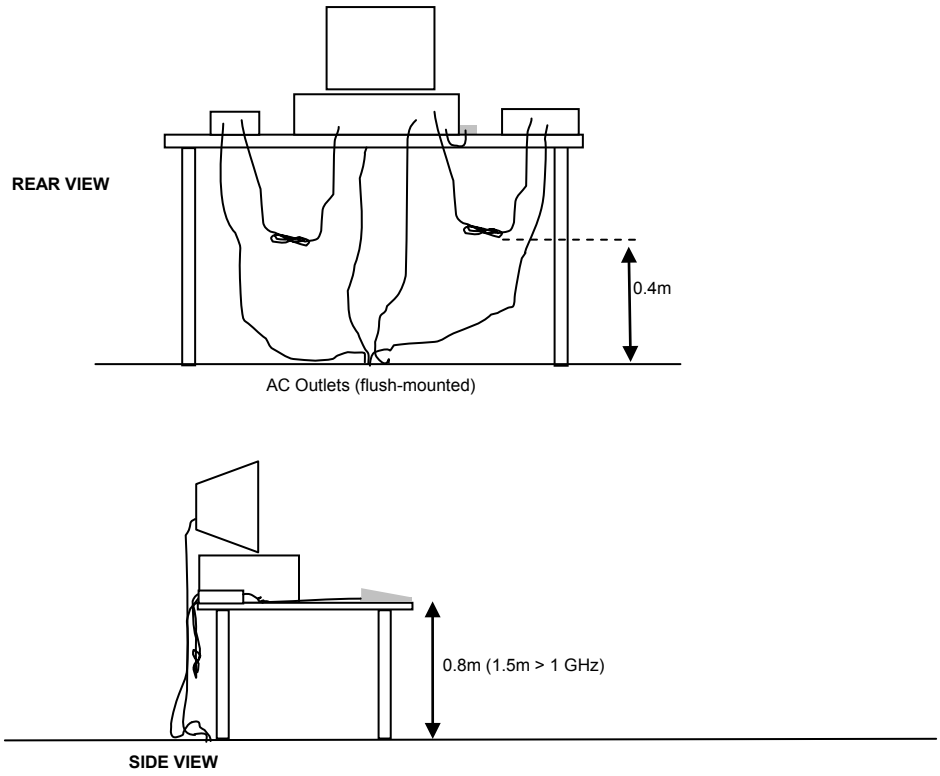
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

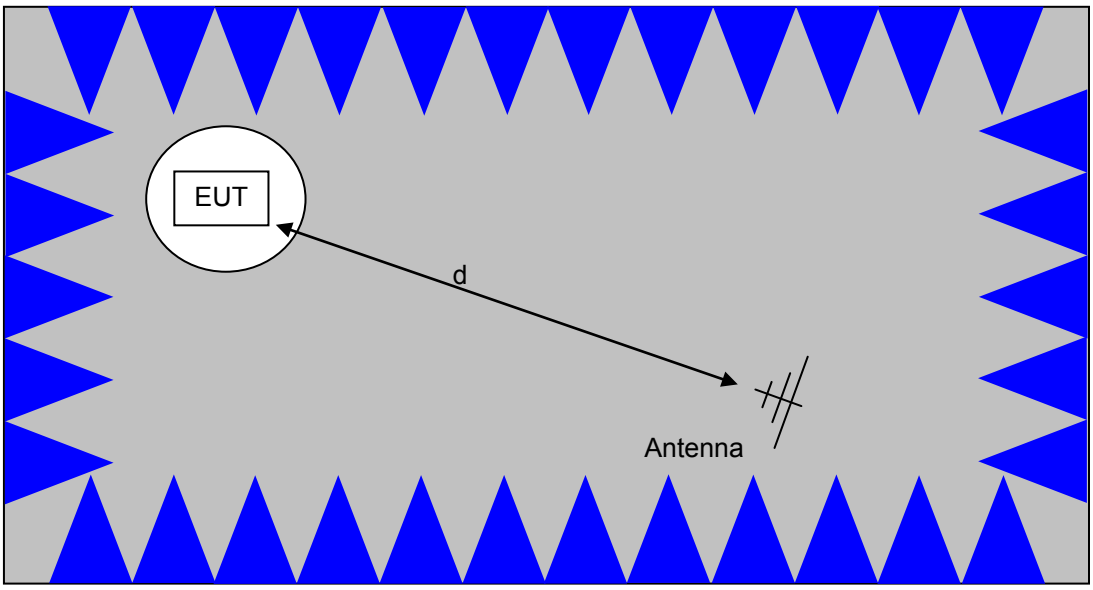
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

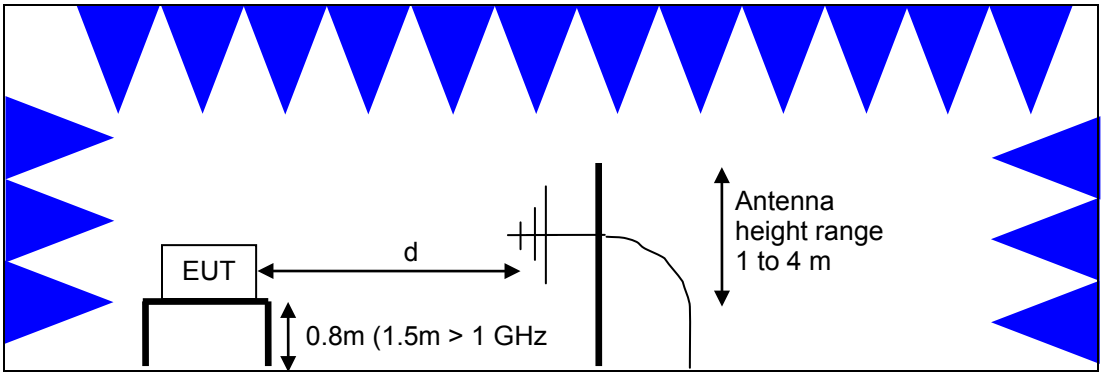


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

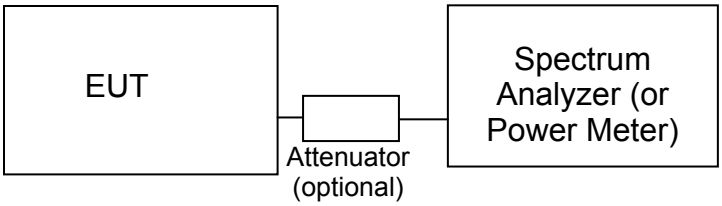
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1].

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

[1] The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 6

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m
F_d = Distance Factor in dB
R_c = Corrected Reading in dBuV/m
L_s = Specification Limit in dBuV/m
M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, Selected Frequencies, 07-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/8/2016	7/8/2018
Hewlett Packard	High Pass filter, 3.5 GHz (Purple System)	P/N 84300-80038 (84125C)	1768	10/6/2017	10/6/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	8/30/2017	8/30/2018
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	3/1/2017	3/1/2018
Radiated Emissions, 30 - 1,000 MHz, 10-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	7/27/2016	7/27/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/17/2017	3/17/2018
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	1/27/2017	1/27/2018
Radio Antenna Port (Power and Spurious Emissions), 10-Nov-17					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/22/2017	5/22/2018
Radiated Emissions, 1,000 - 25,000 MHz, 14-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	9/8/2017	9/8/2018
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/8/2016	7/8/2018
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	5/17/2017	5/17/2018
HP / Miteq	SA40 P Head HF preAmplifier, 18-40 GHz (w/2415)	TTA1840-45-5P-HG-S	1772	9/14/2017	N/A
A. H. Systems	System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/21/2017	7/21/2019
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	3/1/2017	3/1/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018

Appendix B Test Data

T106183 Pages 22 – 48

Client:	Kinsa Health	Job Number:	JD106182
Product	QuickCare Thermometer	T-Log Number:	T106183
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Emissions Standard(s):	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	B
Immunity Standard(s):	EN 60601-1-2	Environment:	Medical & Radio

EMC Test Data

For The

Kinsa Health

Product

QuickCare Thermometer

Date of Last Test: 11/14/2017

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Antenna Port Measurements

Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 11/10/2017
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4

Config. Used: 1
Config Change: None
EUT Voltage: Battery

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 48 %

Summary of Results

Run #	Pwr setting		Test Performed	Limit	Pass / Fail	Result / Margin
1	-4		Output Power	15.247(b)	Pass	-3.4 dBm
2	-4		Power spectral Density (PSD)	15.247(d)	Pass	-3.4 dBm/3MHz
3	-4		Minimum 6dB Bandwidth	15.247(a)	Pass	0.88 MHz
3	-4		99% Bandwidth	RSS GEN	-	1.897 MHz
4	-4		Spurious emissions	15.247(b)	Pass	All emisisons > 20 dB below the fundamental

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

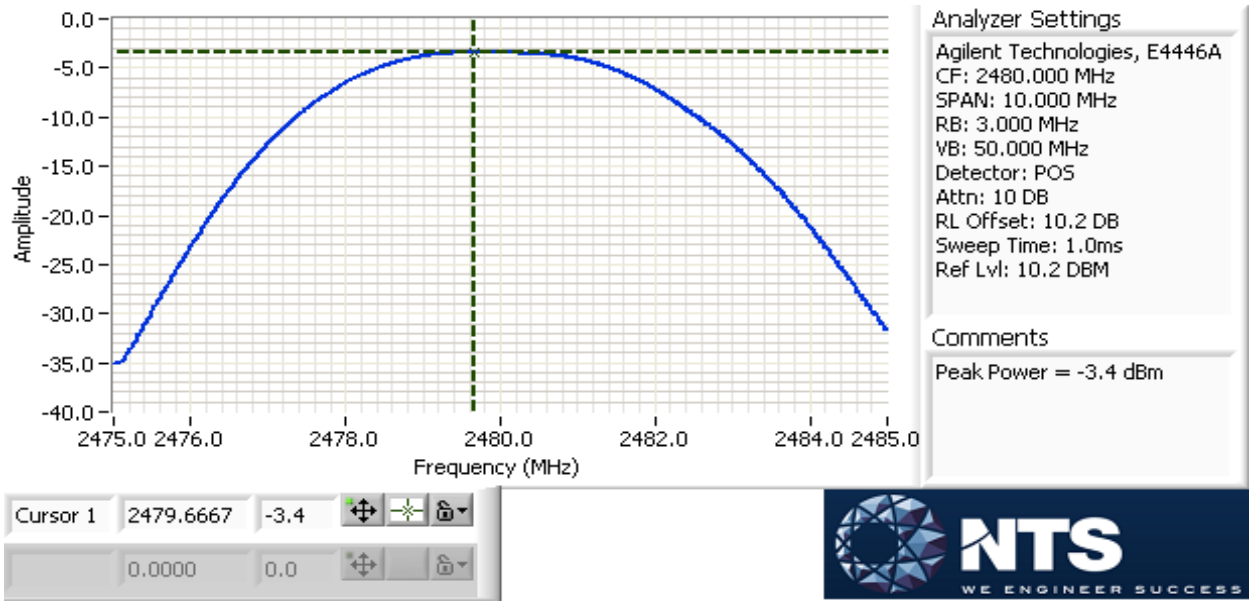
Sample Notes

Sample S/N: DVT-FCC-2
Driver: Radio Test V1

Run #1: Output Power

Power Setting[2]	Frequency (MHz)	Output Power (dBm)[1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W	Output Power (dBm)[3]	Output Power mW
-4	2402	-4.3	0.37	-1.5	Pass	-5.8	0.00026		
-4	2440	-3.7	0.43	-1.5	Pass	-5.2	0.00030		
-4	2480	-3.4	0.46	-1.5	Pass	-4.9	0.00032		

Note 1:	Output power measured using a peak measurment using spectrum analyzer with RBW > OBW, spurious limit is -20dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.



Run #2: Power spectral Density

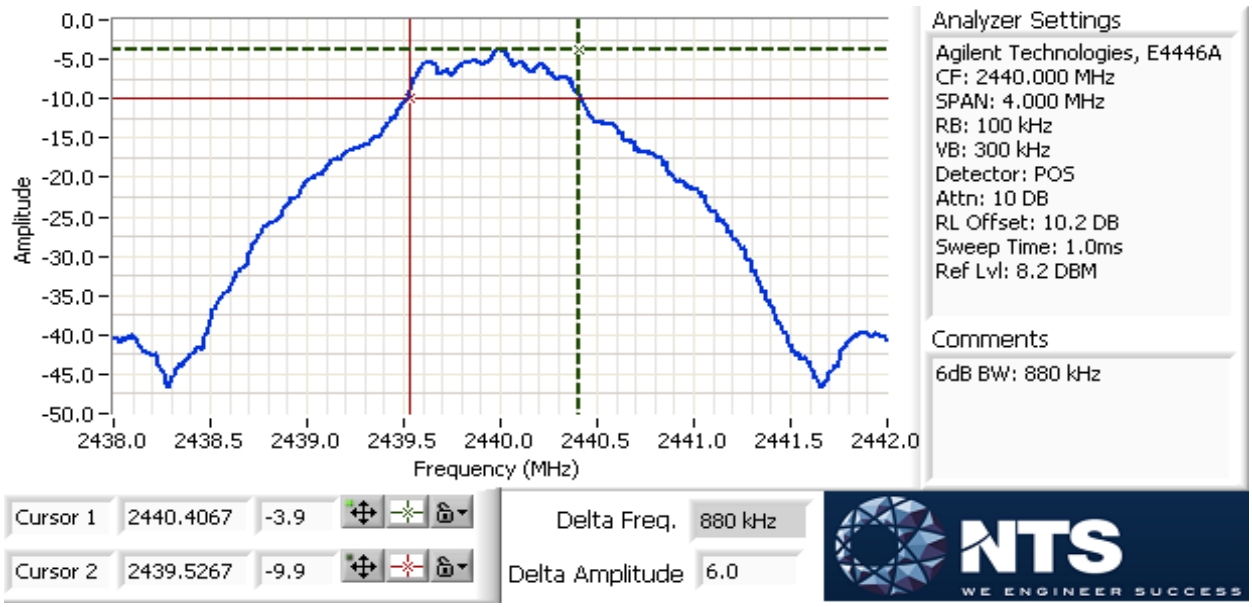
Since power is below the limit for PSD, separate PSD testing is not necessary.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

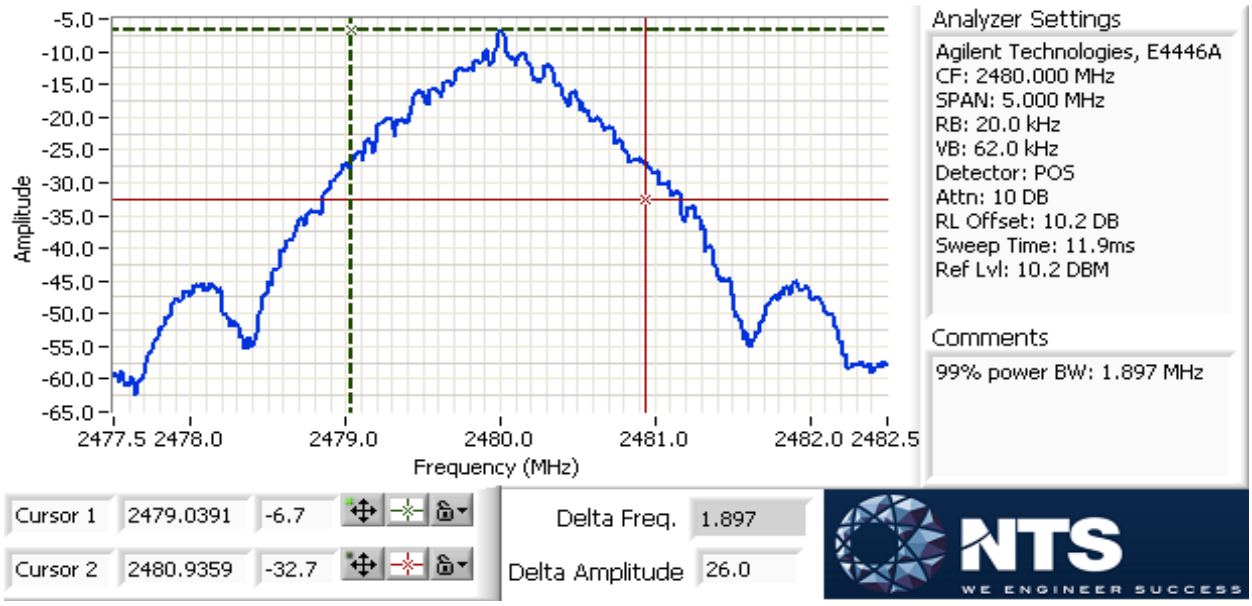
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (kHz)	
		6dB	99%	6dB	99%
-4	2402	0.913	1.839	100	20
-4	2440	0.880	1.847	100	20
-4	2480	0.907	1.897	100	20

Note 1:	DTS BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW. 99% BW: RBW=1-5% of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. Span 1.5-5 times OBW.



Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A



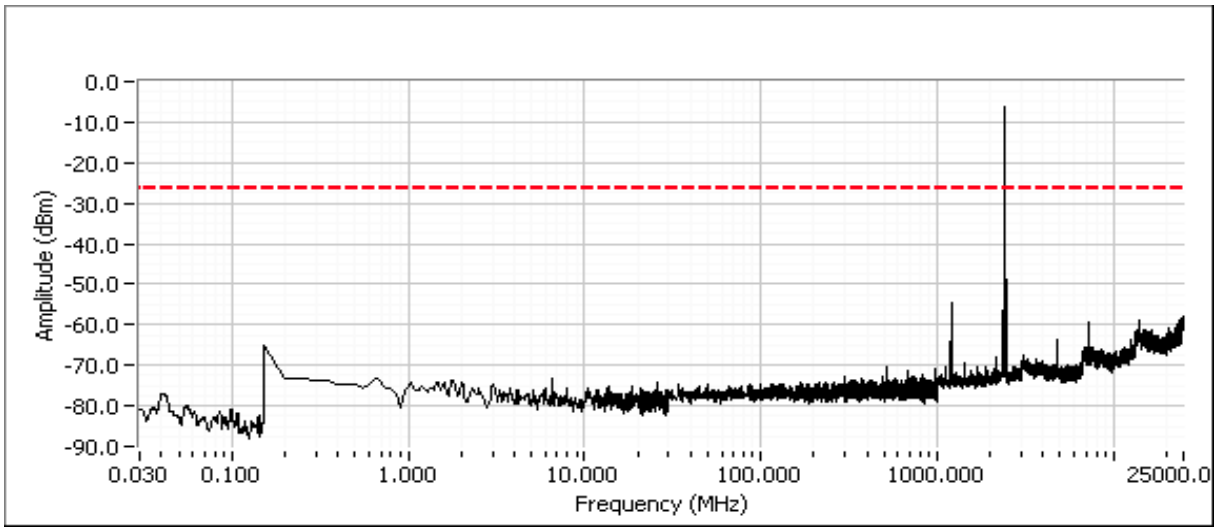
Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #4a: Out of Band Spurious Emissions

Frequency (MHz)	Power Setting	Mode	Limit	Result
2402	-4	BLE	-20dBc	Pass
2440	-4	BLE	-20dBc	Pass
2480	-4	BLE	-20dBc	Pass

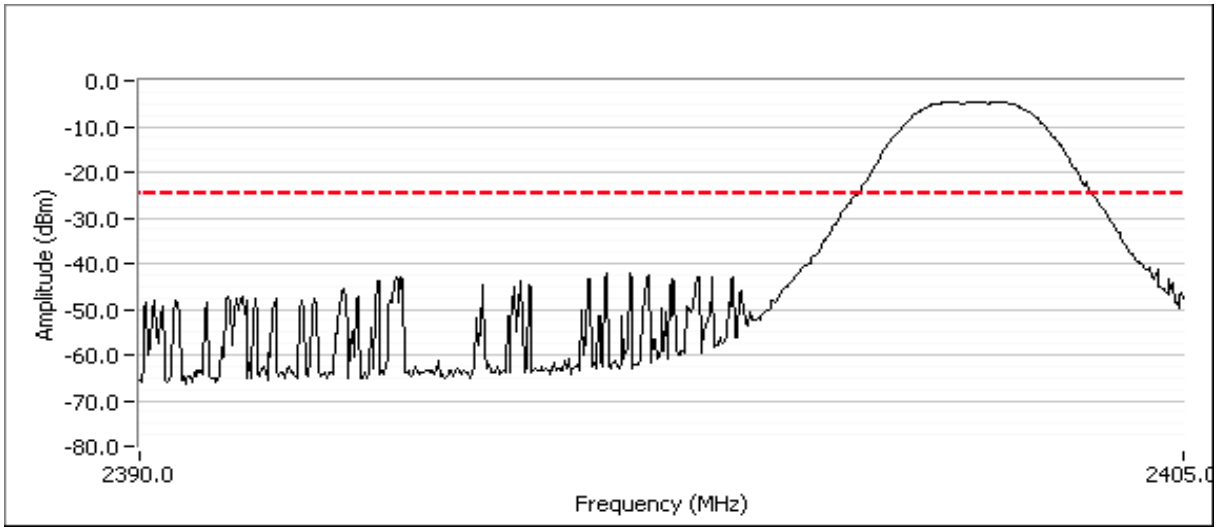
RBW = 100 kHz and VBW = 300 kHz for all plots except below 150 kHz where 10 kHz RBW was used to avoid seeing DC.

Plots for low channel

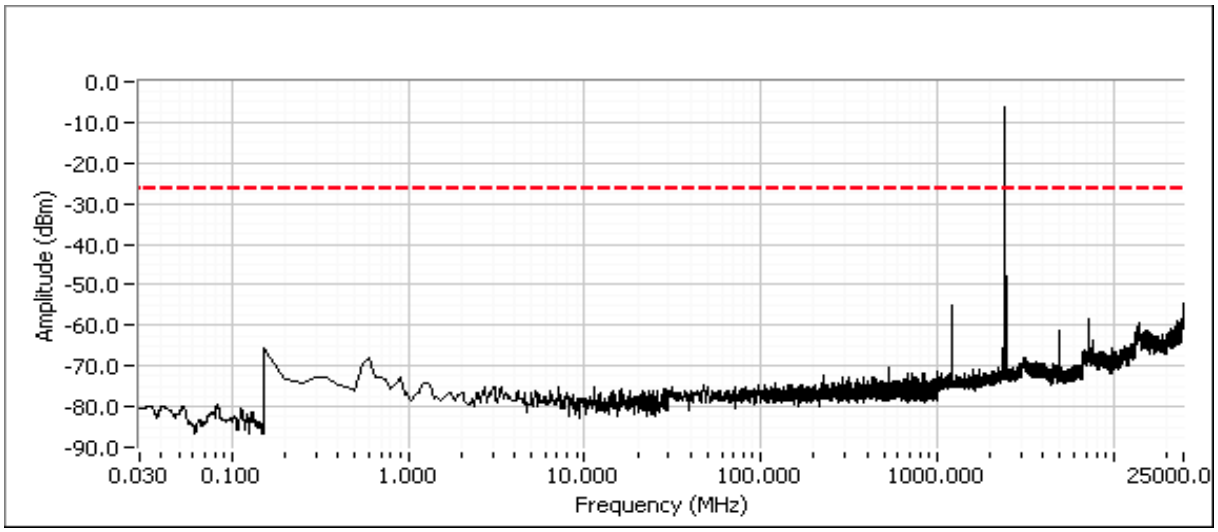


Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

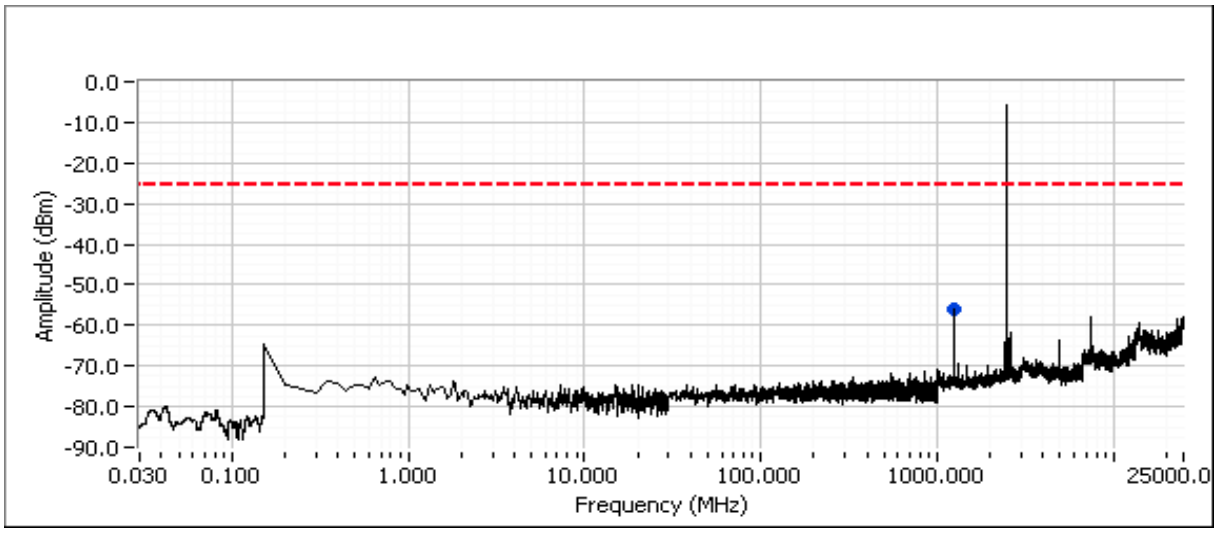


Plots for center channel



Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Plots for high channel



Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 19 °C
Rel. Humidity: 45 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel		Power Setting	Test Performed	Limit	Result / Margin
1	BLE	37 - 2402MHz		-4	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	56.8 dBµV/m @ 2379.5 MHz (-17.2 dB)
	BLE	39 - 2480MHz		-4	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	56.4 dBµV/m @ 2483.99 MHz (-17.6 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Sample Notes

Sample S/N: DVT-FCC-2
Driver: Radio Test V1
Antenna: Internal PCB

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has a duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
BLE	1 Mb/s	92.2%	Yes	1.083	0.350	0.701	923

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 4:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1: Radiated Bandedge Measurements

Date of Test: 11/14/2017 10:00 Config. Used: 1
Test Engineer: David Bare Config Change: None
Test Location: Fremont Chamber #4 EUT Voltage: Battery

Channel: 37 Mode: BLE
Data Rate: 1 Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Upright								
2379.430	32.1	V	54.0	-21.9	AVG	360	1.1	Vavg:100; RB 1 MHz; VB: 1 kHz
2379.500	53.3	V	74.0	-20.7	PK	360	1.1	POS; RB 1 MHz; VB: 3 MHz
EUT on side								
2379.080	32.1	H	54.0	-21.9	AVG	205	1.6	Vavg:100; RB 1 MHz; VB: 1 kHz
2379.540	52.4	H	74.0	-21.6	PK	205	1.6	POS; RB 1 MHz; VB: 3 MHz
EUT flat								
2379.530	32.6	H	54.0	-21.4	AVG	69	1.8	Vavg:100; RB 1 MHz; VB: 1 kHz
2379.500	56.8	H	74.0	-17.2	PK	69	1.8	POS; RB 1 MHz; VB: 3 MHz

Channel: 39 Mode: BLE
Data Rate: 1 Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT Upright								
2483.860	33.8	V	54.0	-20.2	AVG	283	1.0	Vavg:100; RB 1 MHz; VB: 1 kHz
2484.020	52.5	V	74.0	-21.5	PK	283	1.0	POS; RB 1 MHz; VB: 3 MHz
EUT on side								
2483.780	34.7	H	54.0	-20.0	AVG	113	1.2	Vavg:100; RB 1 MHz; VB: 1 kHz
2483.990	56.4	H	74.0	-17.6	PK	113	1.2	POS; RB 1 MHz; VB: 3 MHz
EUT flat								
2484.000	34.8	H	54.0	-19.2	AVG	54	1.9	Vavg:100; RB 1 MHz; VB: 1 kHz
2484.010	56.3	H	74.0	-17.7	PK	54	1.9	POS; RB 1 MHz; VB: 3 MHz

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 18 °C
Rel. Humidity: 44 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel		Power Setting	Test Performed	Limit	Result / Margin
1	BLE	37 - 2402MHz		-4	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	Eval, see separate final measurements
	BLE	17 - 2440MHz		-4	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	Eval, see separate final measurements
	BLE	39 - 2480MHz		-4	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	Eval, see separate final measurements

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Sample Notes

Sample S/N: DVT-FCC-2
Driver: Radio Test V1
Antenna: Internal PCB

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.
2.4GHz band reject filter used

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
BLE	1 Mb/s	92.2%	Yes	1.083	0.350	0.701	923

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz

Date of Test: 11/14/2017 0:00 Config. Used: 1

Test Engineer: David Bare Config Change: None

Test Location: Fremont Chamber #4 EUT Voltage: Battery

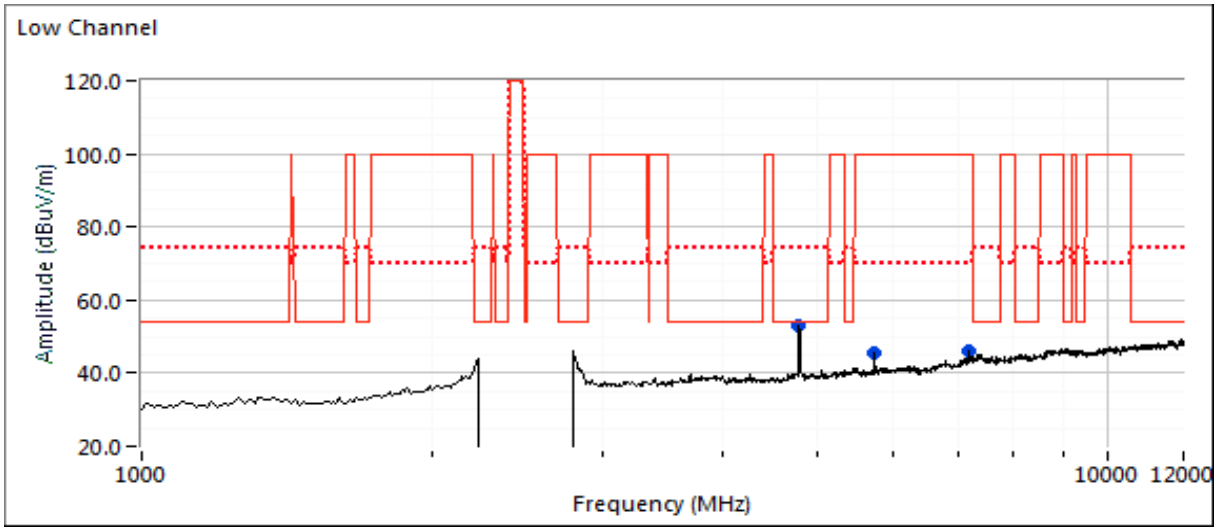
Run #1a: Low Channel

EUT uprignt

Channel: 37 Mode: BLE

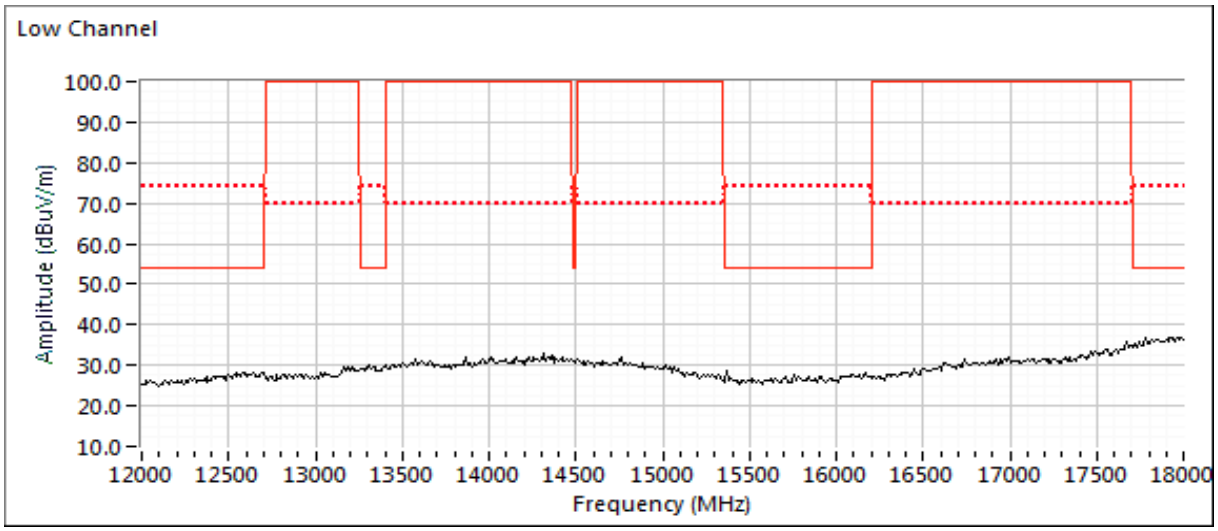
Data Rate: 1 Mb/s

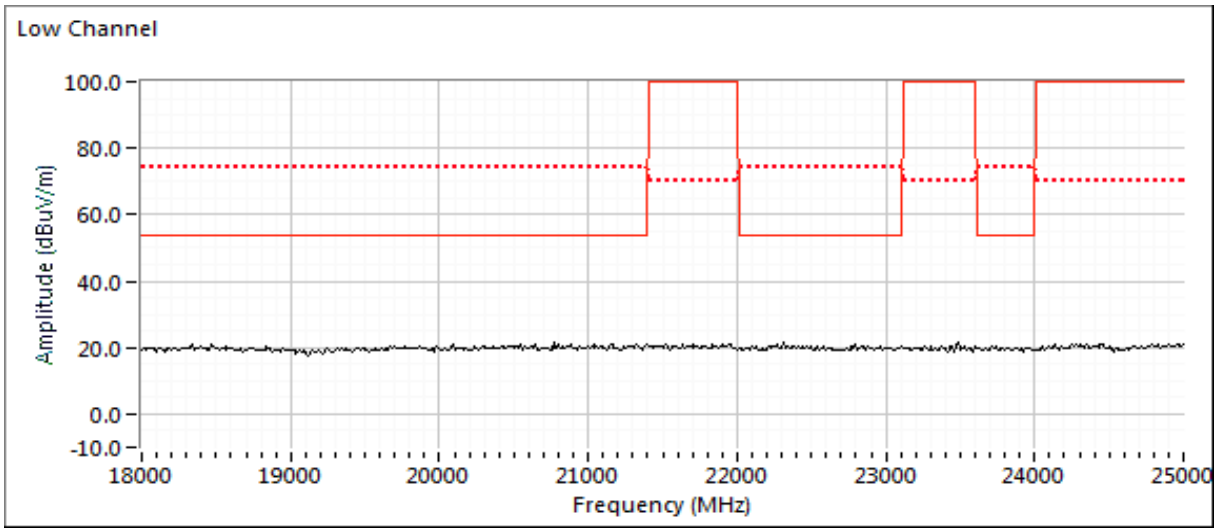
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.000	53.2	V	54.0	-0.8	Peak	169	1.3	Peak reading, Average Limit
5736.000	45.3	V	54.0	-8.7	Peak	107	1.0	Peak reading, Average Limit, Note 1
7208.000	46.1	V	54.0	-7.9	Peak	219	1.3	Peak reading, Average Limit, Note 1



Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the card and its antennas 30 cm from the device indicated there were no significant emissions in this frequency range. See below.



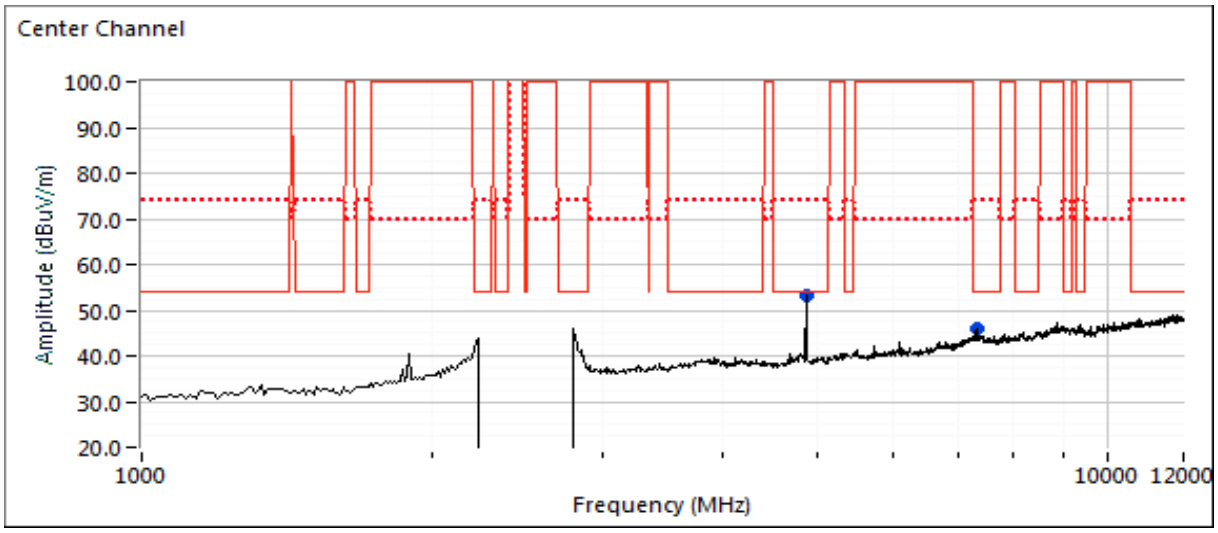


Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1b: Center Channel

Channel: 17 Mode: BLE
Data Rate: 1 Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4880.000	53.4	H	54.0	-0.6	Peak	346	1.6	Peak reading, Average Limit
7320.000	45.8	V	54.0	-8.2	Peak	198	1.3	Peak reading, Average Limit

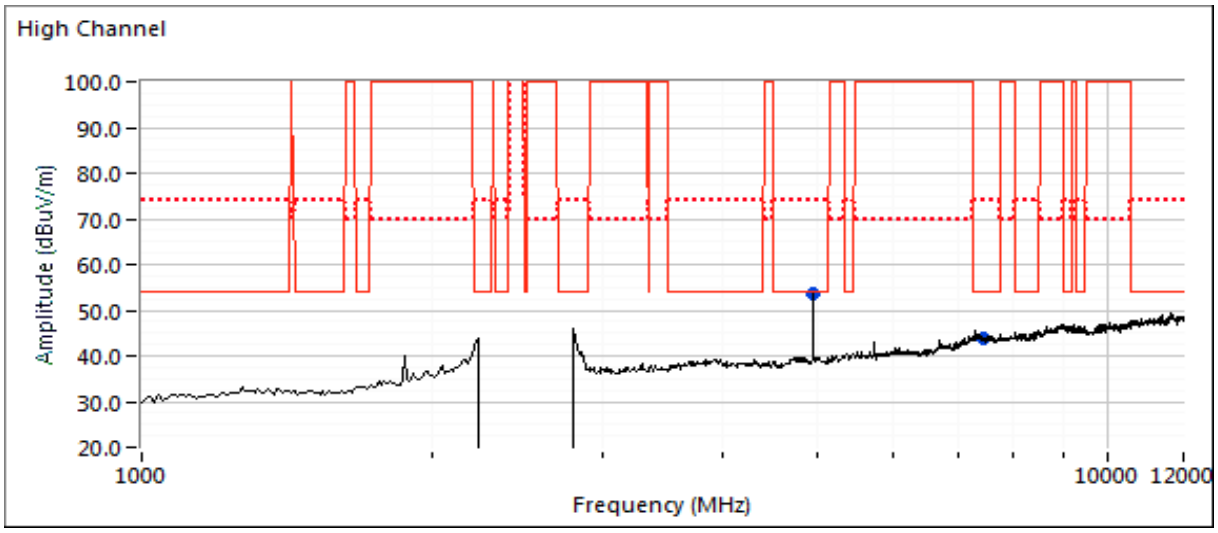


Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1c: High Channel

Channel: 39 Mode: BLE
Data Rate: 1 Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4960.000	53.5	V	54.0	-0.5	Peak	206	1.3	Peak reading, Average Limit
7440.000	43.8	H	54.0	-10.2	Peak	194	2.5	Peak reading, Average Limit



Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Radiated Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 11/10/2017
Test Engineer: David Bare
Test Location: Fremont Chamber #7
Config. Used: 1
Config Change: None
EUT Voltage: Battery

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz, Preliminary	Class B	Eval	Refer to individual runs
2	Radiated Emissions 30 - 1000 MHz, Maximized	Class B	Pass	26.2 dBµV/m @ 180.76 MHz (-17.3 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

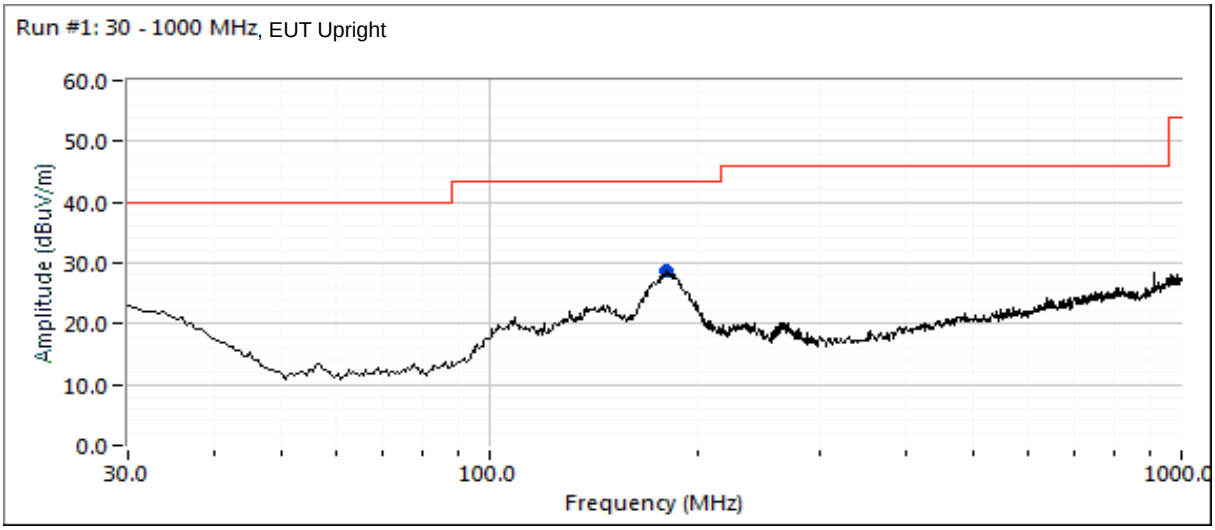
Deviations From The Standard

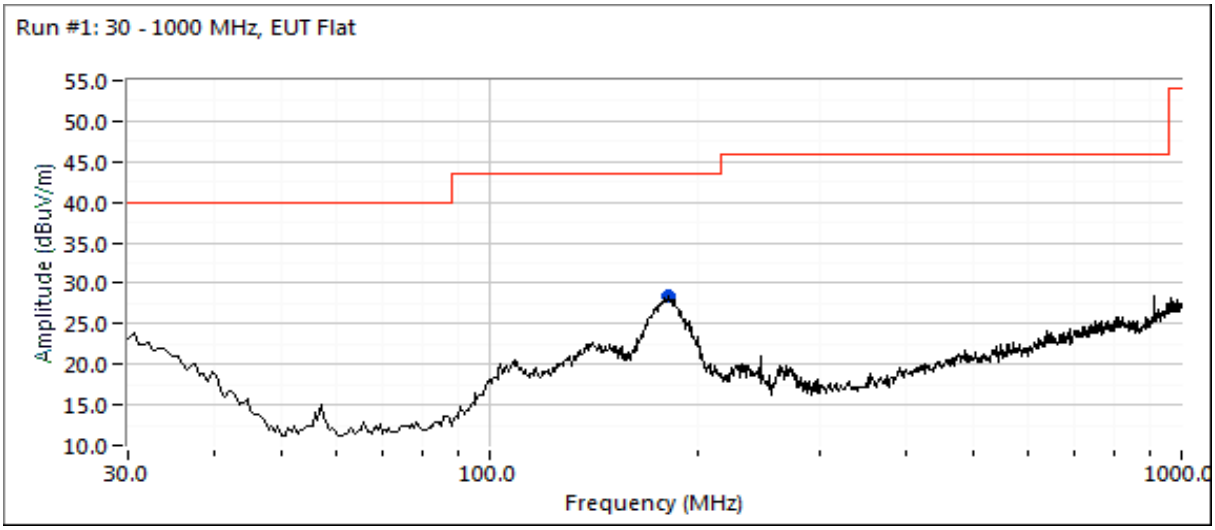
No deviations were made from the requirements of the standard.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1a: Preliminary Radiated Emissions, 30 - 1000 MHz
EUT operating at 2402 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0





Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

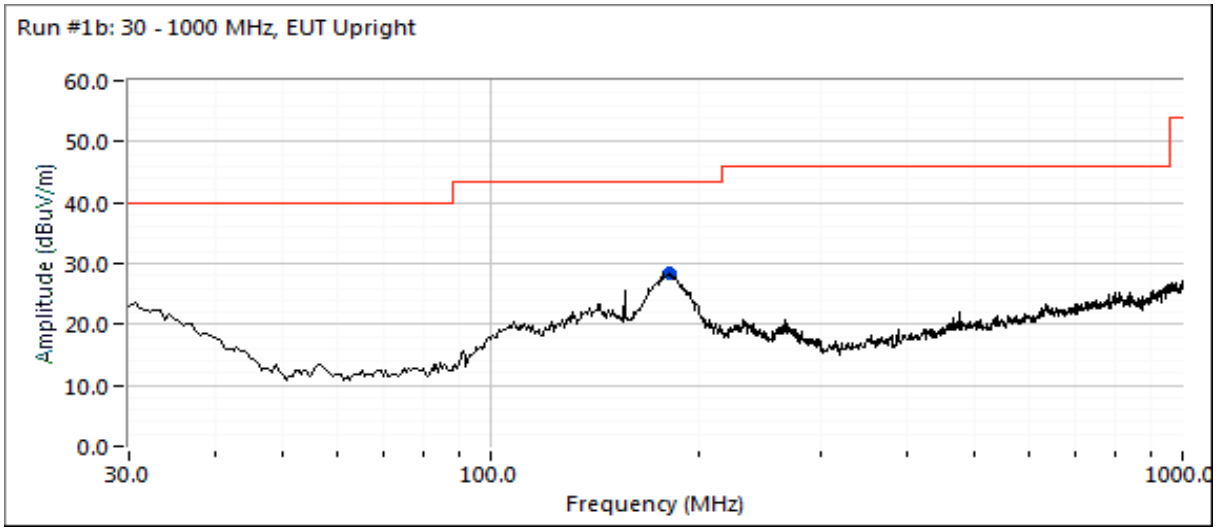
Preliminary peak readings captured during pre-scan
EUT operating at 2402 MHz

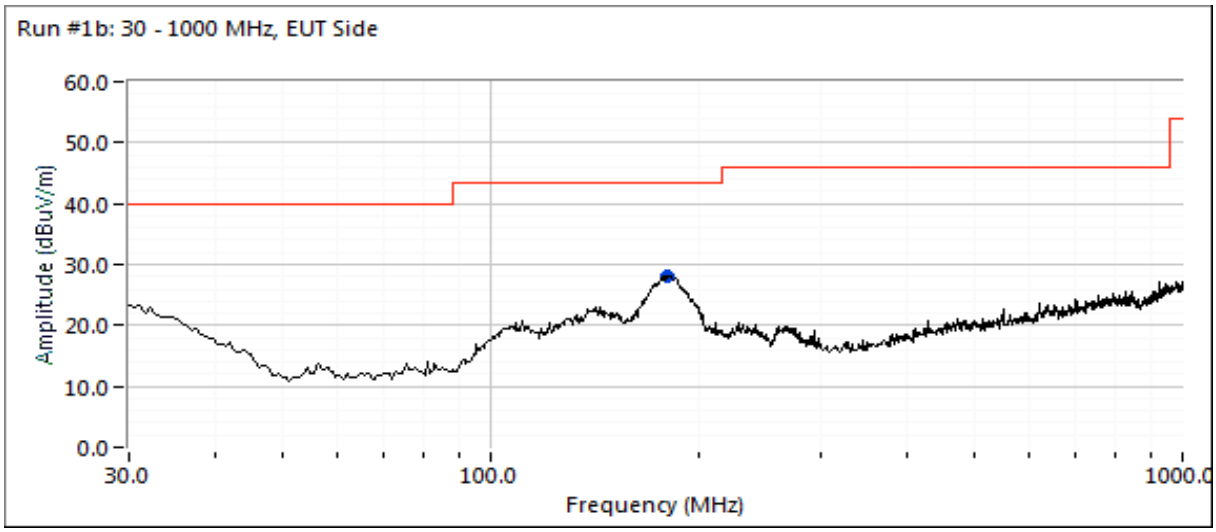
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT upright								
180.758	28.7	H	43.5	-14.8	Peak	117	2.0	
EUT Flat								
181.450	28.4	H	43.5	-15.1	Peak	188	2.0	

Note 1:	Plots only show the FCC §15.209 limits. The limits for CISPR 11 Group 1 Class B @ 3m is 40 dBuV/m from 30-230 MHz and 47 dBuV/m from 230-1000 MHz. All observed emisisons were also below this limit.
Note 2:	The emissions profile was the same for both upright and flat positions of the EUT and due to the small size of the EUT it therefore will be the same with EUT on its side as confirmed below.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1b: Preliminary Radiated Emissions, 30 - 1000 MHz
EUT operating at 2440 MHz





Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Preliminary peak readings captured during pre-scan
EUT operating at 2440 MHz

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT upright								
181.503	28.5	H	43.5	-15.0	Peak	310	2.0	
EUT Side								
180.795	28.2	H	43.5	-15.3	Peak	302	2.0	

Note 1:	Plots only show the FCC §15.209 limits. The limits for CISPR 11 Group 1 Class B @ 3m is 40 dBuV/m from 30-230 MHz and 47 dBuV/m from 230-1000 MHz. All observed emisisons were also below this limit.
Note 2:	The emissions profile was the same for both upright and side positions of the EUT and due to the small size of the EUT it therefore will be the same with EUT flat on the support as confirmed above.
Note 3:	No emissions were observed that are related to the radio transmissions with the EUT set for either 2402 MHz or 2440 MHz. Therefore, there will not be any observable emisisons in this frequency range with the EUT set for 2480 MHz.

Run #2: Maximized Highest Readings From Run #1

Test Parameters for Maximized Reading(s)			
Frequency Range (MHz)	Test Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Maximized quasi-peak readings

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
180.758	26.2	H	43.5	-17.3	QP	117	2.0	QP (1.00s) EUT upright

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 22-24 °C
Rel. Humidity: 35-38 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Frequency	Power Setting		Test Performed	Limit	Result / Margin
1	BLE	2402, 2440 & 2480	-4		Radiated Emissions, Selected Frequencies based on Prelim Scans	FCC Part 15.209 / 15.247(c)	See below

Modifications Made During Testing

See below for modifications made during testing.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
BLE	1 Mb/s	92.2%	Yes	1.083	0.350	0.701	923

Sample Notes

Sample S/N: DVT-FCC-2
Driver: Radio Test V1
Antenna: Internal PCB

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 4:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor

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Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Run #1: Radiated Spurious Emissions, Selected Frequencies
Other Spurious Emissions at center 2440MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT upright								
4879.920	51.7	H	54.0	-2.3	AVG	0	1.3	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4880.810	58.6	H	74.0	-15.4	PK	0	1.3	RB 1 MHz;VB 3 MHz;Peak
4880.000	50.0	V	54.0	-4.0	AVG	183	1.3	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4880.780	57.4	V	74.0	-16.6	PK	183	1.3	RB 1 MHz;VB 3 MHz;Peak
7318.880	43.2	V	54.0	-10.8	AVG	253	1.4	RB 1 MHz;VB 1 kHz;Peak
7320.790	54.4	V	74.0	-19.6	PK	253	1.4	RB 1 MHz;VB 3 MHz;Peak
7318.970	43.4	H	54.0	-10.6	AVG	4	1.4	RB 1 MHz;VB 1 kHz;Peak
7318.690	55.0	H	74.0	-19.0	PK	4	1.4	RB 1 MHz;VB 3 MHz;Peak
EUT side								
4879.690	49.0	H	54.0	-5.0	AVG	160	1.3	RB 1 MHz;VB 1 kHz;Peak
4880.690	56.1	H	74.0	-17.9	PK	160	1.3	RB 1 MHz;VB 3 MHz;Peak
4879.730	52.4	V	54.0	-1.6	AVG	359	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4879.300	58.9	V	74.0	-15.1	PK	359	1.4	RB 1 MHz;VB 3 MHz;Peak
7318.980	43.3	H	54.0	-10.7	AVG	150	1.4	RB 1 MHz;VB 1 kHz;Peak
7320.030	54.8	H	74.0	-19.2	PK	150	1.4	RB 1 MHz;VB 3 MHz;Peak
7318.790	43.3	V	54.0	-10.7	AVG	352	1.4	RB 1 MHz;VB 1 kHz;Peak
7319.070	54.3	V	74.0	-19.7	PK	352	1.4	RB 1 MHz;VB 3 MHz;Peak
EUT Flat								
4879.600	46.9	V	54.0	-7.1	AVG	122	1.3	RB 1 MHz;VB 1 kHz;Peak
4879.260	54.4	V	74.0	-19.6	PK	122	1.3	RB 1 MHz;VB 3 MHz;Peak
4879.580	47.8	H	54.0	-6.2	AVG	247	1.4	RB 1 MHz;VB 1 kHz;Peak
4879.260	55.5	H	74.0	-18.5	PK	247	1.4	RB 1 MHz;VB 3 MHz;Peak
7318.900	42.7	V	54.0	-11.3	AVG	360	1.4	RB 1 MHz;VB 1 kHz;Peak
7318.880	54.2	V	74.0	-19.8	PK	360	1.4	RB 1 MHz;VB 3 MHz;Peak
7318.940	42.7	H	54.0	-11.3	AVG	0	1.4	RB 1 MHz;VB 1 kHz;Peak
7321.130	53.8	H	74.0	-20.2	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak

Note:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Other Spurious Emissions at low 2402MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT upright								
4804.130	51.3	H	54.0	-2.7	AVG	0	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4803.340	58.4	H	74.0	-15.6	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak
4804.210	50.0	V	54.0	-4.0	AVG	194	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4804.720	57.4	V	74.0	-16.6	PK	194	1.4	RB 1 MHz;VB 3 MHz;Peak
7205.020	41.4	V	54.0	-12.6	AVG	206	1.3	RB 1 MHz;VB 1 kHz;Peak Note 1
7206.260	52.9	V	74.0	-21.1	PK	206	1.3	RB 1 MHz;VB 3 MHz;Peak Note 1
7207.040	41.6	H	54.0	-12.4	AVG	7	1.4	RB 1 MHz;VB 1 kHz;Peak Note 1
7206.430	53.2	H	74.0	-20.8	PK	7	1.4	RB 1 MHz;VB 3 MHz;Peak Note 1
EUT flat								
4804.000	48.3	H	54.0	-5.7	AVG	154	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4804.000	55.3	H	74.0	-18.7	PK	154	1.4	RB 1 MHz;VB 3 MHz;Peak
4804.860	48.5	V	54.0	-5.5	AVG	0	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4804.860	55.9	V	74.0	-18.1	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak
7205.180	40.2	H	54.0	-13.8	AVG	360	1.4	RB 1 MHz;VB 1 kHz;Peak Note 1
7207.040	53.0	H	74.0	-21.0	PK	360	1.4	RB 1 MHz;VB 3 MHz;Peak Note 1
7205.520	40.1	V	54.0	-13.9	AVG	0	1.4	RB 1 MHz;VB 1 kHz;Peak Note 1
7205.080	52.0	V	74.0	-22.0	PK	0	1.4	RB 1 MHz;VB 3 MHz;Peak Note 1
EUT side								
4804.140	51.2	V	54.0	-2.8	AVG	359	1.2	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4803.190	58.5	V	74.0	-15.5	PK	359	1.2	RB 1 MHz;VB 3 MHz;Peak
4804.000	49.9	H	54.0	-4.1	AVG	166	1.2	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4804.720	57.3	H	74.0	-16.7	PK	166	1.2	RB 1 MHz;VB 3 MHz;Peak
7204.830	41.2	V	54.0	-12.8	AVG	48	1.3	RB 1 MHz;VB 1 kHz;Peak Note 1
7206.870	53.7	V	74.0	-20.3	PK	48	1.3	RB 1 MHz;VB 3 MHz;Peak Note 1
7206.140	44.2	H	54.0	-9.8	AVG	148	1.3	RB 1 MHz;VB 1 kHz;Peak Note 1
7205.210	53.4	H	74.0	-20.6	PK	148	1.3	RB 1 MHz;VB 3 MHz;Peak Note 1

Client:	Kinsa Health	Job Number:	JD106182
Model:	QuickCare Thermometer	T-Log Number:	T106183
		Project Manager:	Christine Krebill
Contact:	David Gal	Project Coordinator:	-
Standard:	EN 60601-1-2, FCC 15B, FCC 15.247 & RSS-247	Class:	N/A

Other Spurious Emissions at high 2480MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
EUT upright								
4959.760	49.7	V	54.0	-4.3	AVG	181	1.3	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.150	57.5	V	74.0	-16.5	PK	181	1.3	RB 1 MHz;VB 3 MHz;Peak
4959.770	52.8	H	54.0	-1.2	AVG	340	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.040	59.6	H	74.0	-14.4	PK	340	1.4	RB 1 MHz;VB 3 MHz;Peak
7441.100	41.8	V	54.0	-12.2	AVG	204	1.4	RB 1 MHz;VB 1 kHz;Peak
7438.690	53.9	V	74.0	-20.1	PK	204	1.4	RB 1 MHz;VB 3 MHz;Peak
EUT side								
4959.870	52.3	V	54.0	-1.7	AVG	347	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.040	58.9	V	74.0	-15.1	PK	347	1.4	RB 1 MHz;VB 3 MHz;Peak
4959.880	50.1	H	54.0	-3.9	AVG	176	1.5	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.000	57.4	H	74.0	-16.6	PK	176	1.5	RB 1 MHz;VB 3 MHz;Peak
7439.110	42.0	H	54.0	-12.0	AVG	166	1.5	RB 1 MHz;VB 1 kHz;Peak
7438.710	54.0	H	74.0	-20.0	PK	166	1.5	RB 1 MHz;VB 3 MHz;Peak
7438.880	41.7	V	54.0	-12.3	AVG	0	1.5	RB 1 MHz;VB 1 kHz;Peak
7440.190	53.6	V	74.0	-20.4	PK	0	1.5	RB 1 MHz;VB 3 MHz;Peak
EUT flat								
4959.940	46.1	V	54.0	-7.9	AVG	71	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.600	54.0	V	74.0	-20.0	PK	71	1.4	RB 1 MHz;VB 3 MHz;Peak
4960.000	48.2	H	54.0	-5.8	AVG	187	1.4	RB 1 MHz;VB 1 kHz;Peak VAVG 100
4960.690	55.6	H	74.0	-18.4	PK	187	1.4	RB 1 MHz;VB 3 MHz;Peak
7438.880	42.0	V	54.0	-12.0	AVG	187	1.4	RB 1 MHz;VB 1 kHz;Peak
7438.620	53.4	V	74.0	-20.6	PK	187	1.4	RB 1 MHz;VB 3 MHz;Peak
7438.880	41.8	H	54.0	-12.2	AVG	314	1.4	RB 1 MHz;VB 1 kHz;Peak
7441.170	53.6	H	74.0	-20.4	PK	314	1.4	RB 1 MHz;VB 3 MHz;Peak

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