

**Test Report  
Application for  
Certification  
on Behalf of**

**45deg Electronic Systems**

**EUT: REMOTE HEAT-TROLLER  
Model Number: TX**

**FCC ID: 2AF9Z45DEGTX00**

**Prepared for:  
45deg Electronic Systems  
348 Vegas Drive, #602, Las Vegas, NV 89108**

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## 1. CERTIFICATION

Applicant : 45deg Electronic Systems  
Applicant Address : 348 Vegas Drive, #602, Las Vegas, NV 89108  
EUT Description : REMOTE HEAT-TROLLER  
Model Number : TX  
Serial Number : N/A  
Brade Name : 45deg  
Tested Power Supply : DC 3V by 2 AAA batteries  
Manufacturer : 45deg Electronic Systems  
Manufacturer Address : 5348 Vegas Drive, #602, Las Vegas, NV 89108

### MEASUREMENT PROCEDURES USED:

- ☒ **CFR 47, Part 15** Radio Frequency Device Subpart C Intentional Radiators: 2012
- ☒ **ANSI C63.4** Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9kHz To 40GHz: 2009

THE MEASUREMENT SHOWN IN THE ATTACHMENT WAS MADE IN ACCORDANCE WITH THE PROCEDURES INDICATED, AND THE MAXIMUM ENERGY EMITTED BY THE EQUIPMENT WAS FOUND TO BE WITHIN THE ABOVE LIMITS APPLICABLE.


**Sample Received Date : August 18, 2015**

**Date of Test : August 19, 2015 – August 20, 2015**

**Issue Date : August 29, 2015**


In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from Global EMC Standard Tech. Corp.

**Documented By :**



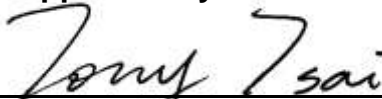
Mandy Chen / Report Author

**Tested By :**



Albert Tzeng / Eng. Dept. Engineer

**Approved By :**



Tony Tsai / eng. Dept. Manager

## 2. GENERAL INFORMATION

### 2.1 PRODUCTION DESCRIPTION

<b>Product Name</b>	: REMOTE HEAT-TROLLER
<b>Model Number</b>	: TX
<b>Serial Number</b>	: N/A
<b>Brade Name</b>	: 45deg
<b>Modulation Type</b>	: GFSK
<b>Antenna Gain</b>	: 0.8dBi
<b>Antenna Type</b>	: Chip Antenna
<b>Type of antenna joint</b>	Soldered on PCB
<b>Frequencg Range</b>	: 2402MHz only
<b>Channel Control</b>	: Single Channel
<b>Data Rate</b>	: 1Mbps only
<b>Working Voltage</b>	: DC 3V by 2 AAA batteries
<b>Hardware version</b>	: Version 001
<b>Software version</b>	: Version 001

#### **Frequency of Each Channel:**

Ch 01 : 2402MHz (single channel)

#### **Note:**

1. This device is a REMOTE HEAT-TROLLER include GFSK function and this report is for transmitter.
2. Test of channel only a single channel (2402MHz) in highest data rate and to perform the test, then record on this report.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.

## 2.2 OPERATIONAL DESCRIPTION

The device is REMOTE HEAT-TROLLER have GFSK function and can link with Remote Receiver (RX).

Another information please refer to users manual.

## 2.3 TEST MODES & EUT COMPONENTS DESCRIPTION

EUT: REMOTE HEAT-TROLLER, M/N: TX	
Test Mode	Mode 1- TX

## 2.4 SUMMARY OF TEST PROCEDURE AND TEST RESULTS

Test Item	Applied Standard Section	Test Result
Radiated Emission	15.209,15.249 ANSI C63.4 Section 8,13 Annex I	Pass (refer to section 3.7)
Band Edge	15.249(d)	Pass (refer to section 4.6)
Occupied Bandwidth	ANSI C63.4 Section 13 & Annex I	Pass (refer to section 5.4)

## 2.5 CONFIGURATION OF THE TESTED SYSTEM

The FCC IDs/Types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

★No additional component applied★

## 2.6 LAB AMBIENT

Items	Range Requirement
Temperature (°C)	10-40
Humidity (%RH)	10-90
Barometric pressure (mbar)	860-1060

## 2.7 TEST FACILITY AUTHORIZATION AND ACCREDITATION

Global EMC Standard Tech. Corp. is accredited in respect of laboratory and the accreditation criteria is ISO/IEC 17025: 2005.

AUTHORIZATION	
<b>FCC SITE DESCRIPTION</b>	Aug. 10, 1995 /Aug. 25, 1998 File on FCC Engineering Laboratory Federal Communication Commission 7435 Oakland Mills Road Columbia, MD 21046 Reference 31040/SIT1300F2 Designation Number: TW1031 (No. 15, Neighborhood 3, Ruishukeng, Linkou Dist., New Taipei City, Taiwan) Designation Number: TW1032 (No.3, Baodoucuokeng, Linkou Dist., New Taipei City, Taiwan)

ACCREDITATION	
<b>Taiwan Accreditation Foundation (TAF)</b>	Recognized by the Council of Taiwan Accreditation Foundation and confirmed to meet the requirements of ISO/IEC 17025. Registration No.: 1082 Registration on TAF effective through Sep. 18, 2018

## 2.8 TEST SETUP

### BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

**EUT : REMOTE  
HEAT-TROLLER  
(TX)**

## 2.9 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1. Setup the EUT as shown on 2.8.
2. Turn on the power of all equipments.
3. EUT continuous transmitted signal.
4. Test it.
5. Repeat the above steps.

### 3. RADIATION EMISSION DATA

#### 3.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

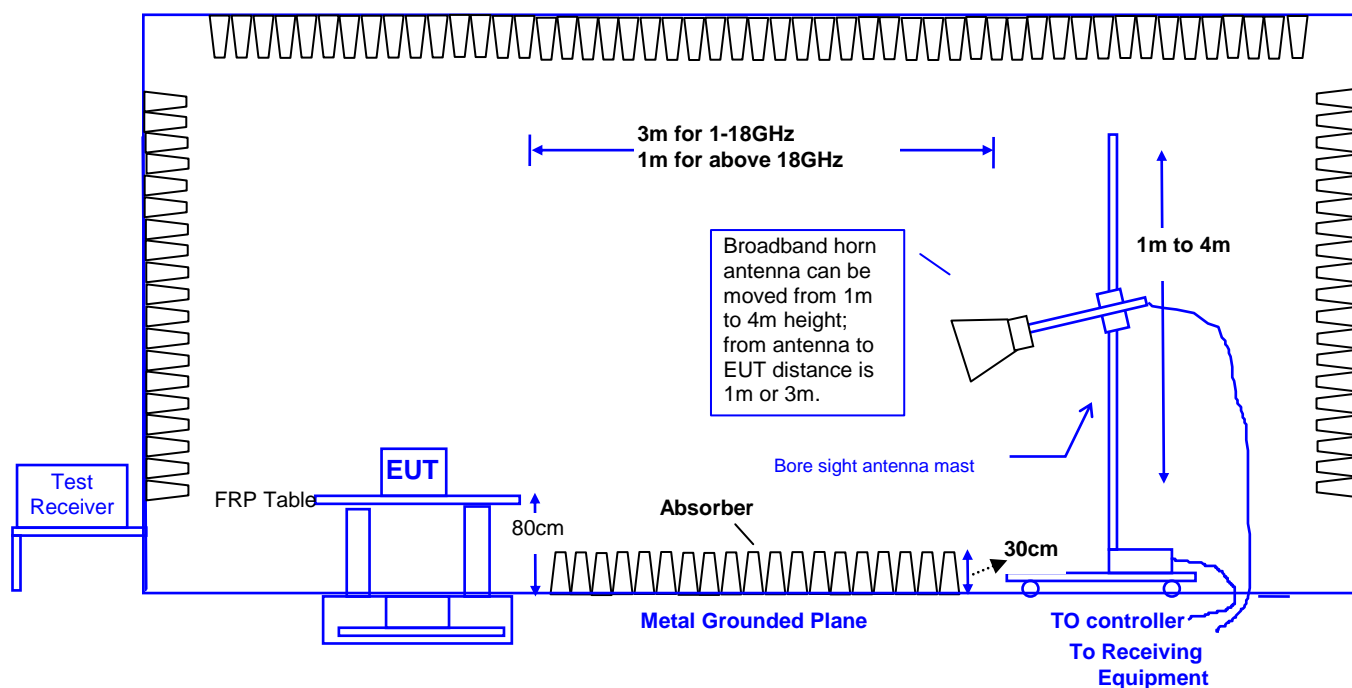
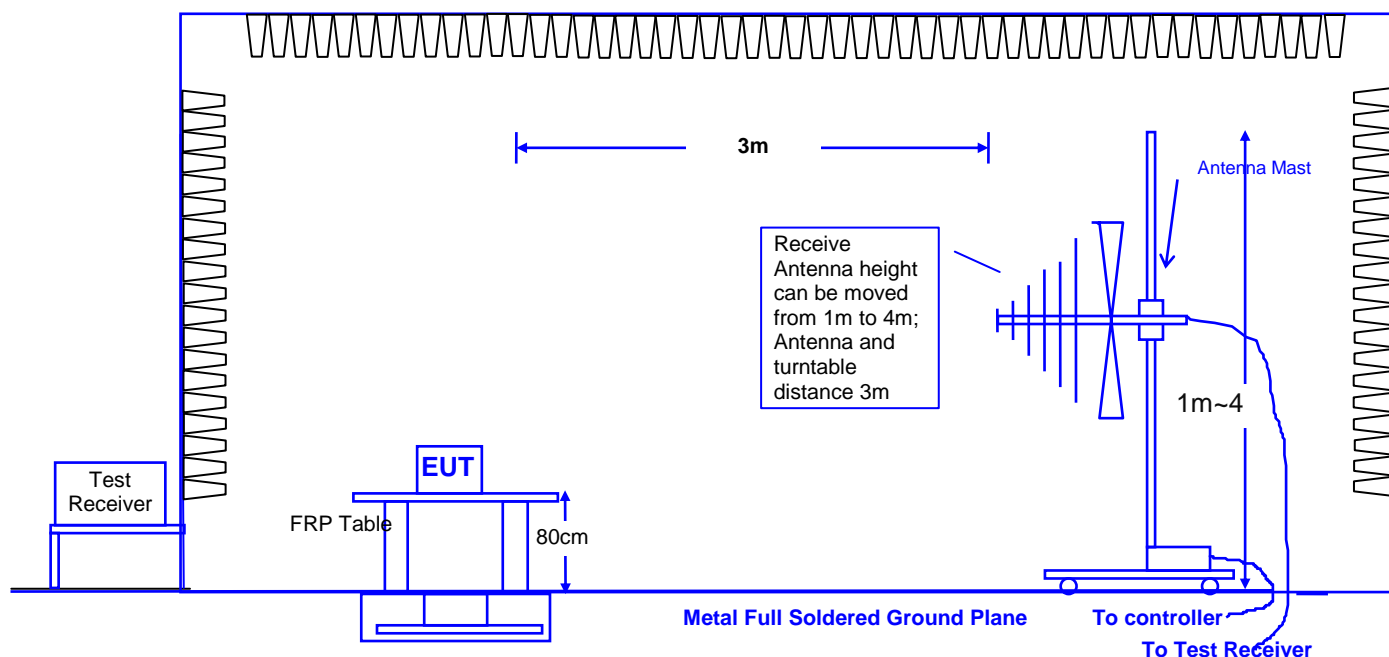
Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSU26	200882	2016.08.18
2	Active Loop	EMCO	6507	95101353	2016.04.07
3	Pre-Amplifier	HP	8449B	3008A01263	2016.04.08
4	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-253	2016.03.25
5	HORN ANTENNA	SCHWARZBECK	BBHA 9120	D243	2016.01.09
6	BOARD-BAND ANTENNA	SCHWARZBECK	BBHA 9170	BBHA9170164	2016.01.08
7	CABLE	INSULATED WIRE INC.	SPS-2801-3940-NPS	03262012	2016.04.07
8	CABLE	SUHNER	SUCOFLEX 102	23538/2	2016.06.02
9	Test Program Software	Hotlife	CSR BC4	N/A	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Chamber A6 (Under 1GHz) and Chamber A6 (Above 1GHz).



### 3.2 SETUP DIAGRAM



Note: This is a representative setup diagram for Table-top EUT.  
For Floor-standing EUT, the table will be removed with all the other setup conditions remain the same.

### 3.3 RADIATED EMISSION LIMIT

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209 (a) (see Section 15.205(c)).

#### ☒ FCC 15.209 Limit

Frequency	Distance	Field Strength	
MHz	Meter	$\mu\text{V}/\text{M}$	$\text{dB}\mu\text{V}/\text{M}$
0.009 – 0.490	300	$2400/\text{F}$ (KHz)	97.0 – 27.6
0.490 – 1.705	30	$24000/\text{F}$ (KHz)	67.6 – 45.9
1.705 – 30.0	30	30	59.0
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0

Note : The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above the maximum permitted average limit.

#### ☒ FCC 15.249 Limit

Fundamental frequency	Field strength of fundamental		Field strength of harmonics	
	(millivolts/meter)	$\text{dB}\mu\text{V}/\text{m}$	(microvolts/meter)	$\text{dB}\mu\text{V}/\text{m}$
902 - 928 MHz	50	94	500	114
2400 - 2483.5 MHz	50	94	500	114
5725 - 5875 MHz	50	94	500	114
24.0 - 24.25 GHz	250	108	2500	128

Note 1 : Field strength limits are specified at a distance of 3 meters.

Note 2 : Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § FCC 15.209, whichever is the lesser attenuation.

Note 3 : As shown in § FCC 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

### 3.4 TEST CONFIGURATION

The equipment which is listed 3.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 3.2, was placed on a non-conductive table whose total height equaled 80 cm. This table can be rotated 360 degree. The measurement antenna was mounted to a non-conductive mast capable of moving the antenna vertically. Antenna height was varied from 1 meter to 4 meters and the system under test was rotated from 0 degree through 360 degrees relative to the antenna position and polarization (Horizontal and Vertical). Also the I/O cable position was investigated to find the maximum emission condition.

In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT.

Thus, exploratory tests shall be carried out for various axes orientations to determine the orientation (attitude) having maximum or near-maximum emission level.

### 3.5 OPERATING CONDITION OF EUT

Same as section 2.9.

### 3.6 RADIATED EMISSION DATA

The measurement range of radiated emission, which is from **9 kHz to 10th Harmonics**, was investigated. All readings below 1GHz are quasi-peak values with a resolution bandwidth of 120 KHz. Above 1GHz are peak and avg. values with a resolution bandwidth of 1MHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scans of the measurement range for all the test modes with the orientation (attitude) of the three orthogonal axes of the EUT and then use test receiver for final measurement. Then the worst modes were reported the following data pages.

The measured results between 9kHz and 30MHz are 20dB lower than the allowed limit already, therefore the test results are not recorded in this report.

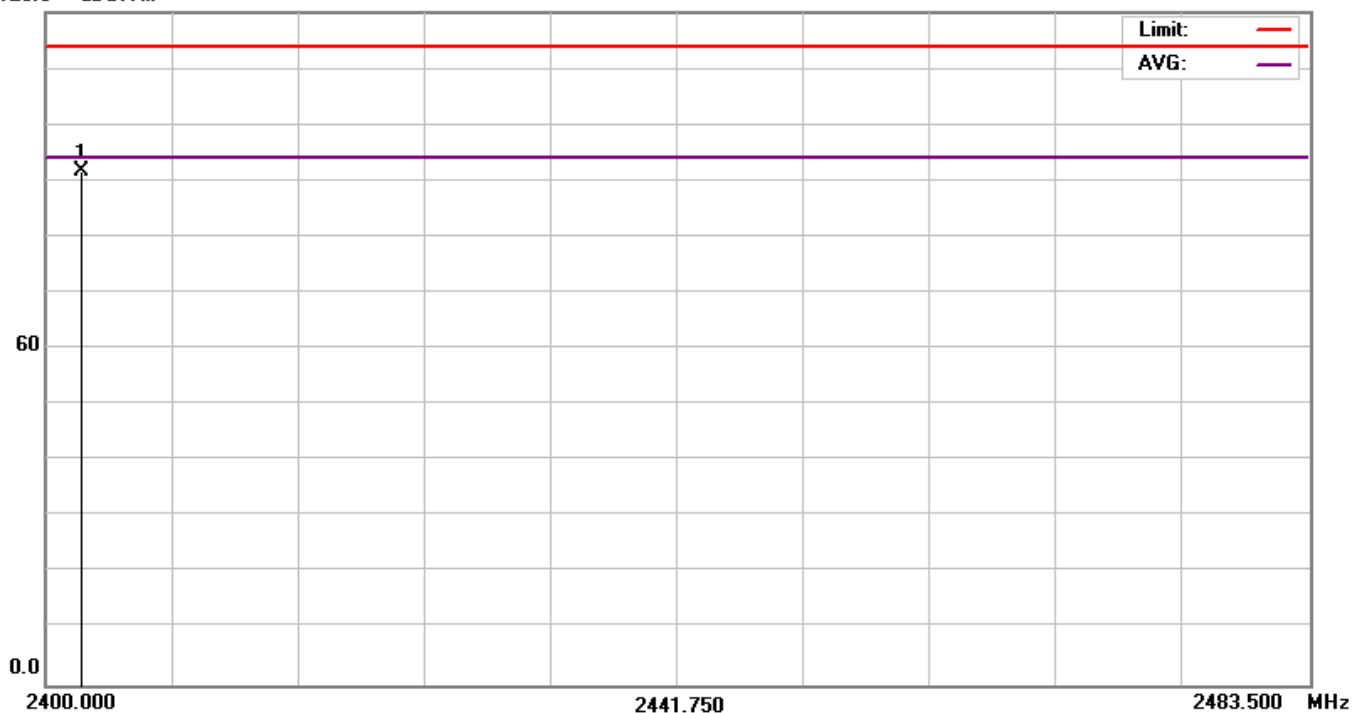
### 3.7 RADIATED EMISSIONS MEASUREMENT RESULTS

Date of Test	August 19, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Horizontal	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	★2402.4080	95.99	-4.26	91.73	114.00	-22.27	peak

#### Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. “★” means that this data is the worse case measurement level.
6. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
7. The measurement uncertainty is 3.88 dB.

120.0 dB $\mu$ V/m

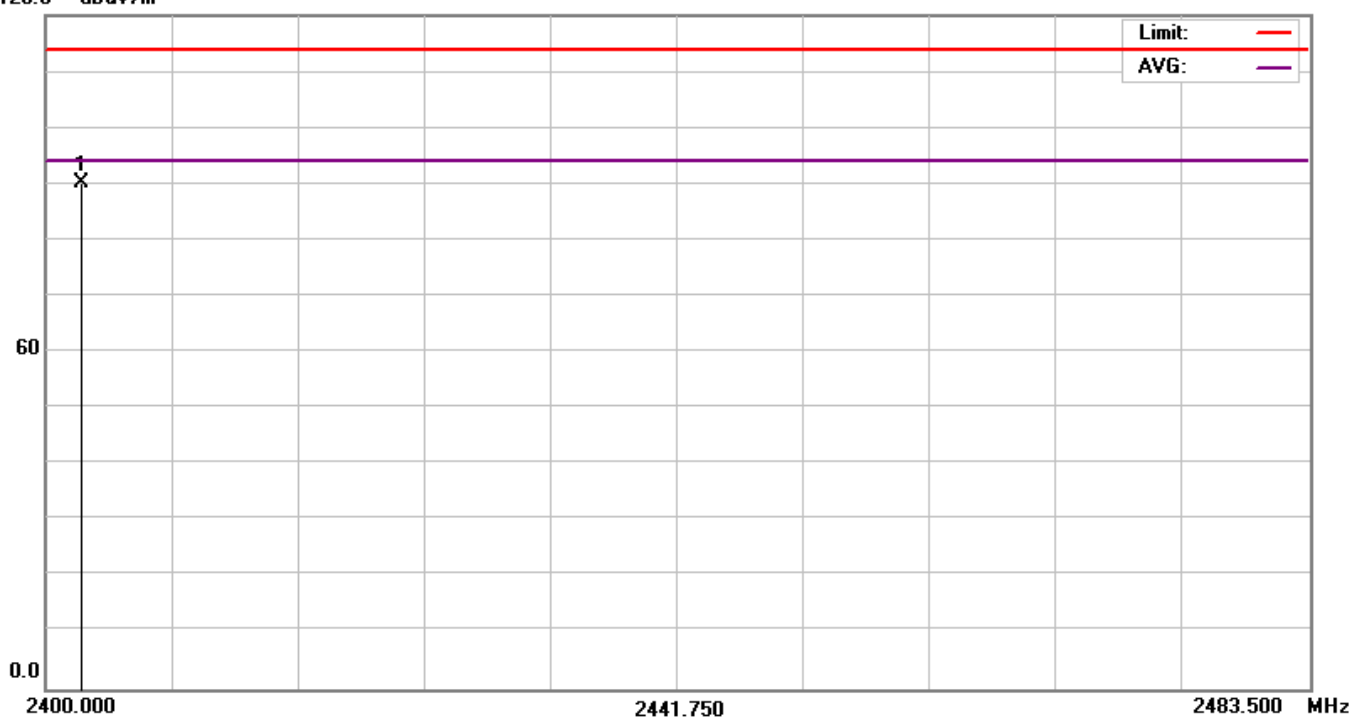
- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment. The tested frequency range is mention in above column of the test data table.

Date of Test	August 19, 2013	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Vertical	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	★2402.4080	94.42	-4.26	90.16	114.00	-23.84	peak

**Remarks:**

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. “★” means that this data is the worse case measurement level.
6. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
7. The measurement uncertainty is 3.88 dB.

120.0 dB $\mu$ V/m

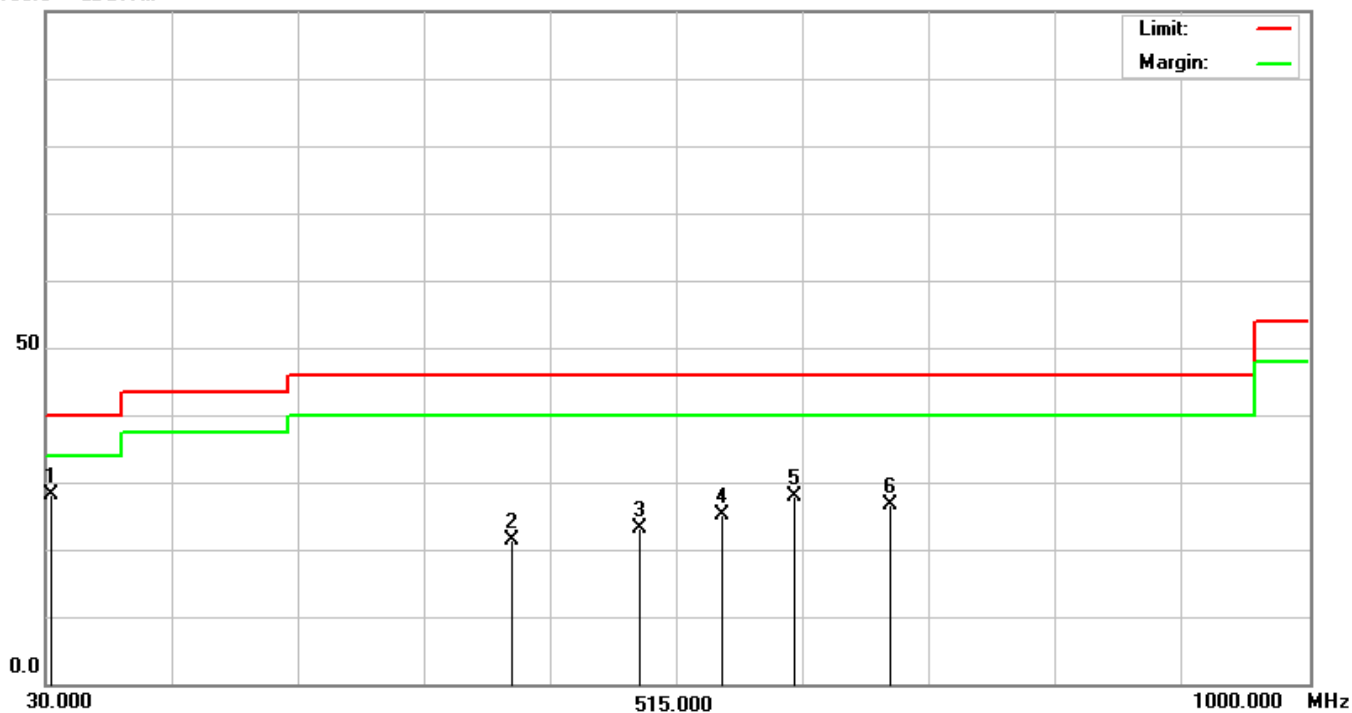
- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.  
The tested frequency range is mention in above column of the test data table.

Date of Test	August 20, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Horizontal	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	★34.6635	43.39	-15.30	28.09	40.00	-11.91	QP
2	389.0865	31.42	-9.93	21.49	46.00	-24.51	QP
3	487.0192	30.34	-7.31	23.03	46.00	-22.97	QP
4	550.7532	30.99	-5.88	25.11	46.00	-20.89	QP
5	606.7147	32.54	-4.73	27.81	46.00	-18.19	QP
6	679.7756	30.32	-3.60	26.72	46.00	-19.28	QP

**Remarks:**

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. “★” means that this data is the worse case measurement level.
6. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
7. The measurement uncertainty is 3.88 dB.

100.0 dB $\mu$ V/m

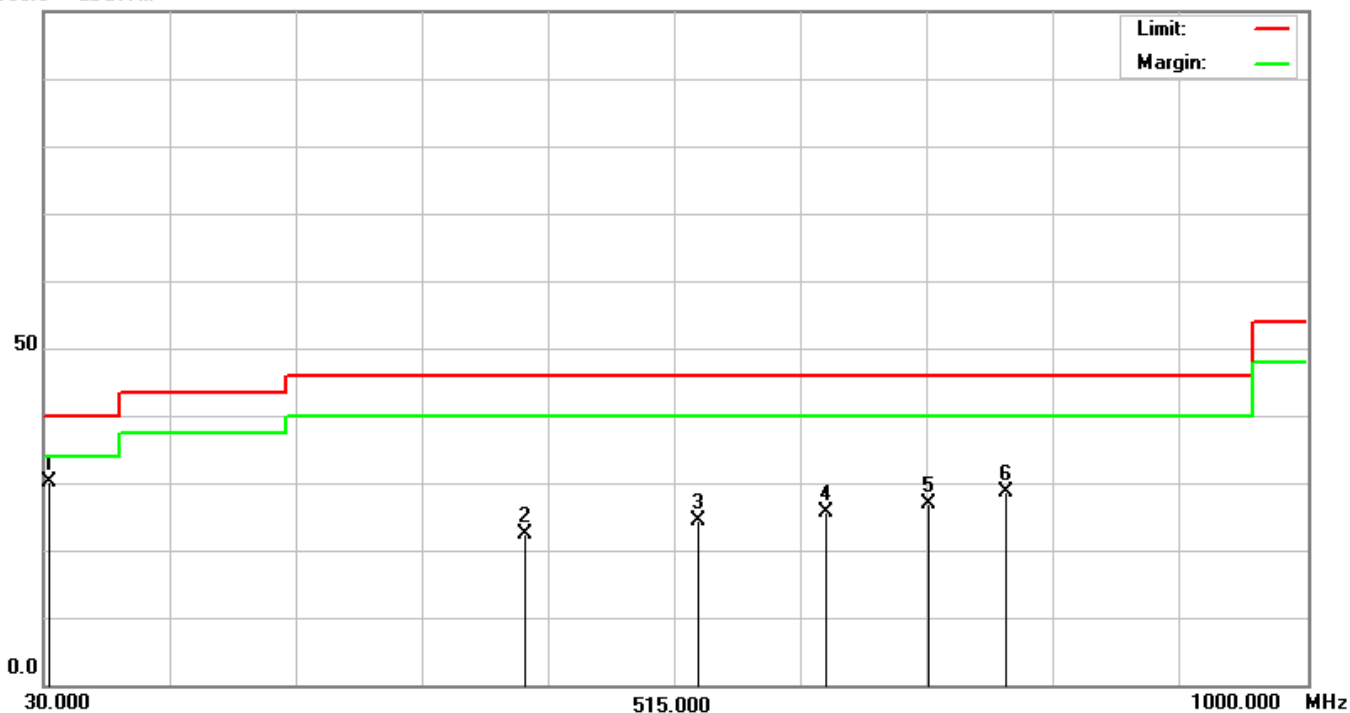
- Remark:
1. The Limit (The red line of the graph indicates the quasi -peak measurements).
  2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	August 20, 2013	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Vertical	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	★34.6635	45.39	-15.30	30.09	40.00	-9.91	QP
2	399.9679	31.95	-9.60	22.35	46.00	-23.65	QP
3	533.6538	30.75	-6.25	24.50	46.00	-21.50	QP
4	631.5865	29.85	-4.34	25.51	46.00	-20.49	QP
5	710.8654	30.10	-3.13	26.97	46.00	-19.03	QP
6	769.9359	30.89	-2.27	28.62	46.00	-17.38	QP

**Remarks:**

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. “★” means that this data is the worse case measurement level.
6. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
7. The measurement uncertainty is 3.88 dB.

100.0 dB $\mu$ V/m

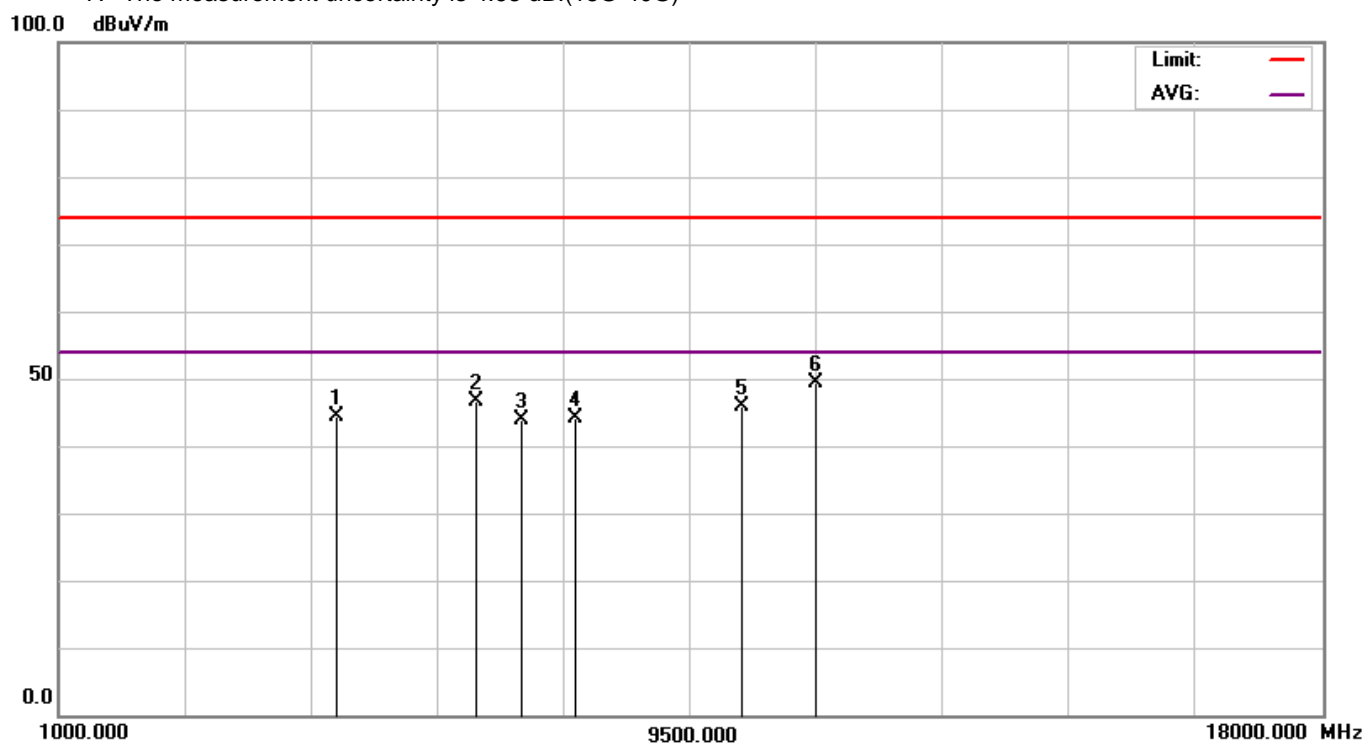
- Remark:
1. The Limit (The red line of the graph indicates the quasi -peak measurements).
  2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	August 19, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Horizontal	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	4732.3720	42.98	1.41	44.39	74.00	-29.61	peak
2	6639.4230	41.20	5.51	46.71	74.00	-27.29	peak
3	7211.5390	37.29	6.69	43.98	74.00	-30.02	peak
4	7974.3590	36.23	7.95	44.18	74.00	-29.82	peak
5	10181.0900	35.02	10.84	45.86	74.00	-28.14	peak
6	11189.1030	36.29	13.16	49.45	74.00	-24.55	peak

**Remarks:**

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 4.82 dB.(1G-18G)
7. The measurement uncertainty is 4.63 dB.(18G-40G)



- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.  
The tested frequency range is mention in above column of the test data table.

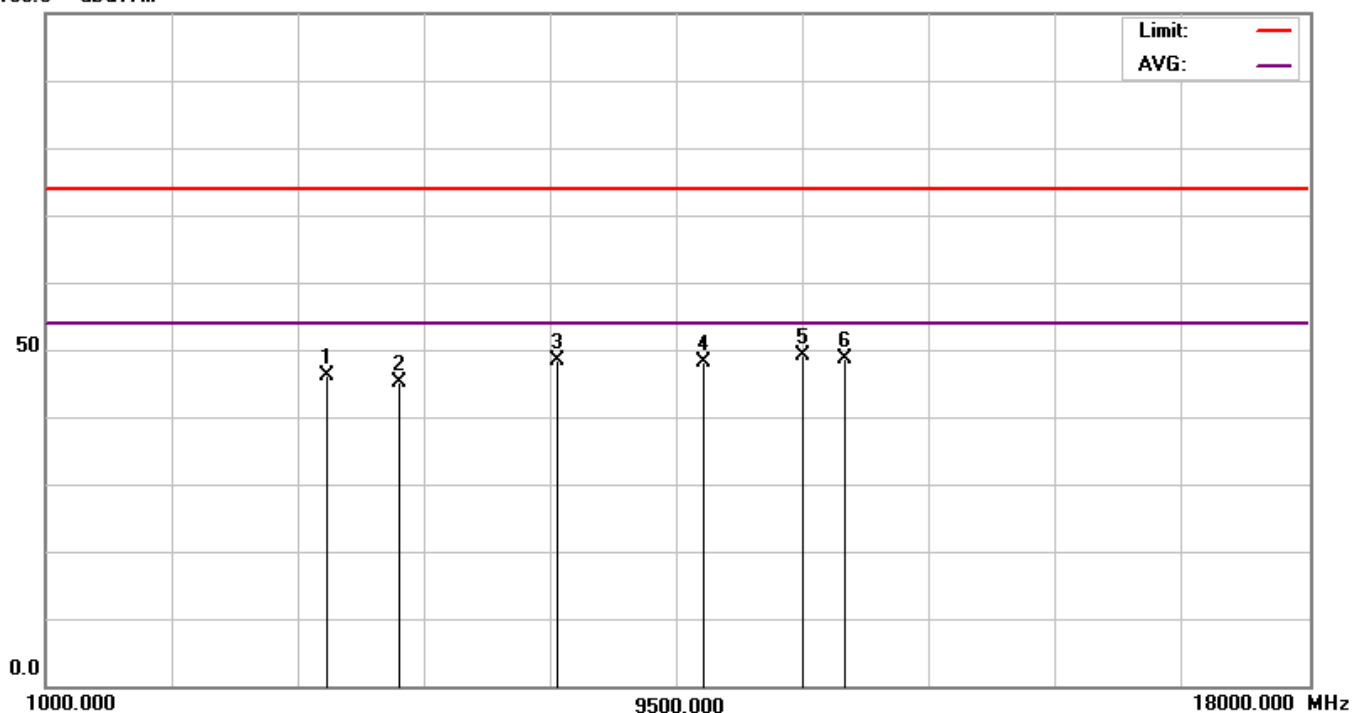


Date of Test	August 19, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Vertical	Fundamental	2402MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	4786.8590	44.71	1.54	46.25	74.00	-27.75	peak
2	5740.3850	42.00	3.01	45.01	74.00	-28.99	peak
3	7892.6280	40.55	7.83	48.38	74.00	-25.62	peak
4	9854.1670	38.28	9.86	48.14	74.00	-25.86	peak
5	11189.1030	35.90	13.16	49.06	74.00	-24.94	peak
6	11761.2180	35.63	12.97	48.60	74.00	-25.40	peak

**Remarks:**

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 4.82 dB.(1G-18G)
7. The measurement uncertainty is 4.63 dB.(18G-40G)

100.0 dB $\mu$ V/m

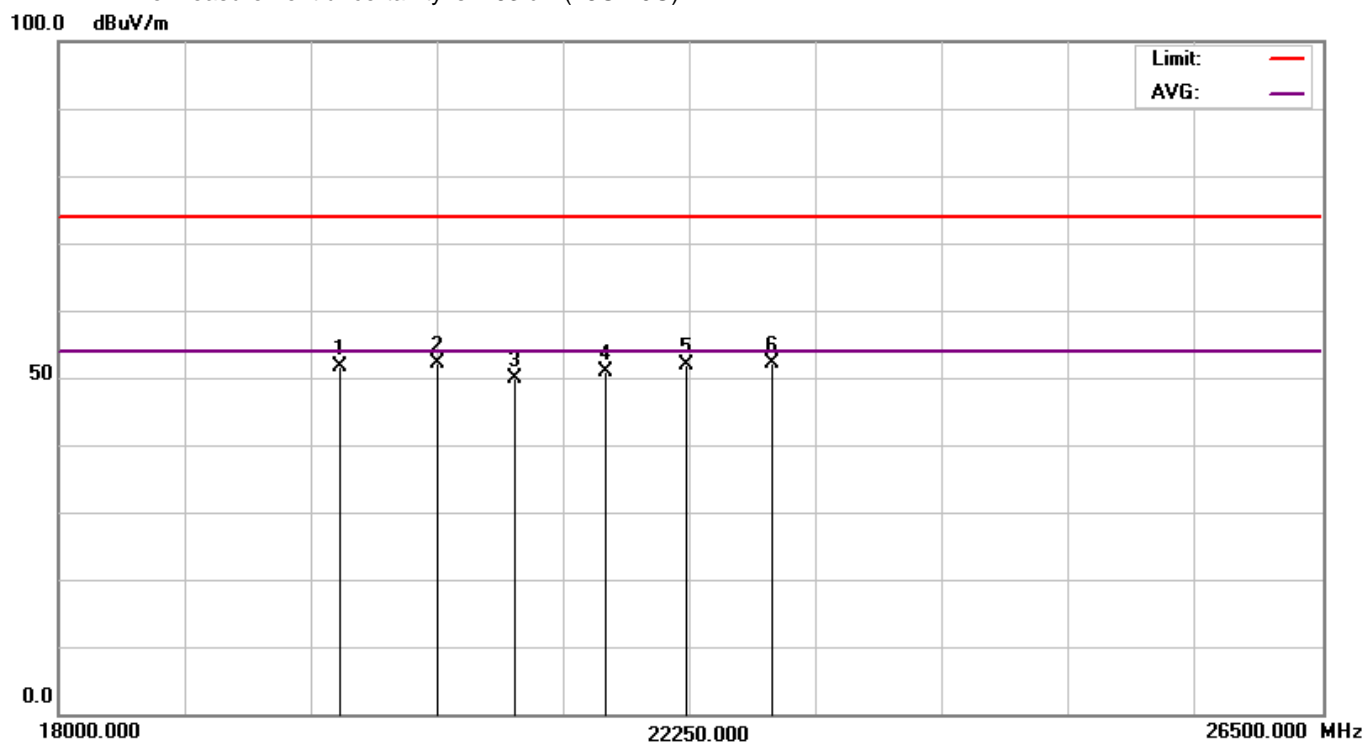
- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment. The tested frequency range is mention in above column of the test data table.

Date of Test	August 19, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	1m at Horizontal	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	19879.8080	30.06	21.57	51.63	74.00	-22.37	peak
2	20560.8970	30.70	21.49	52.19	74.00	-21.81	peak
3	21064.9040	28.41	21.46	49.87	74.00	-24.13	peak
4	21677.8850	28.88	21.89	50.77	74.00	-23.23	peak
5	22236.3780	29.51	22.25	51.76	74.00	-22.24	peak
6	22794.8720	29.26	22.78	52.04	74.00	-21.96	peak

**Remarks:**

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 4.82 dB.(1G-18G)
7. The measurement uncertainty is 4.63 dB.(18G-40G)



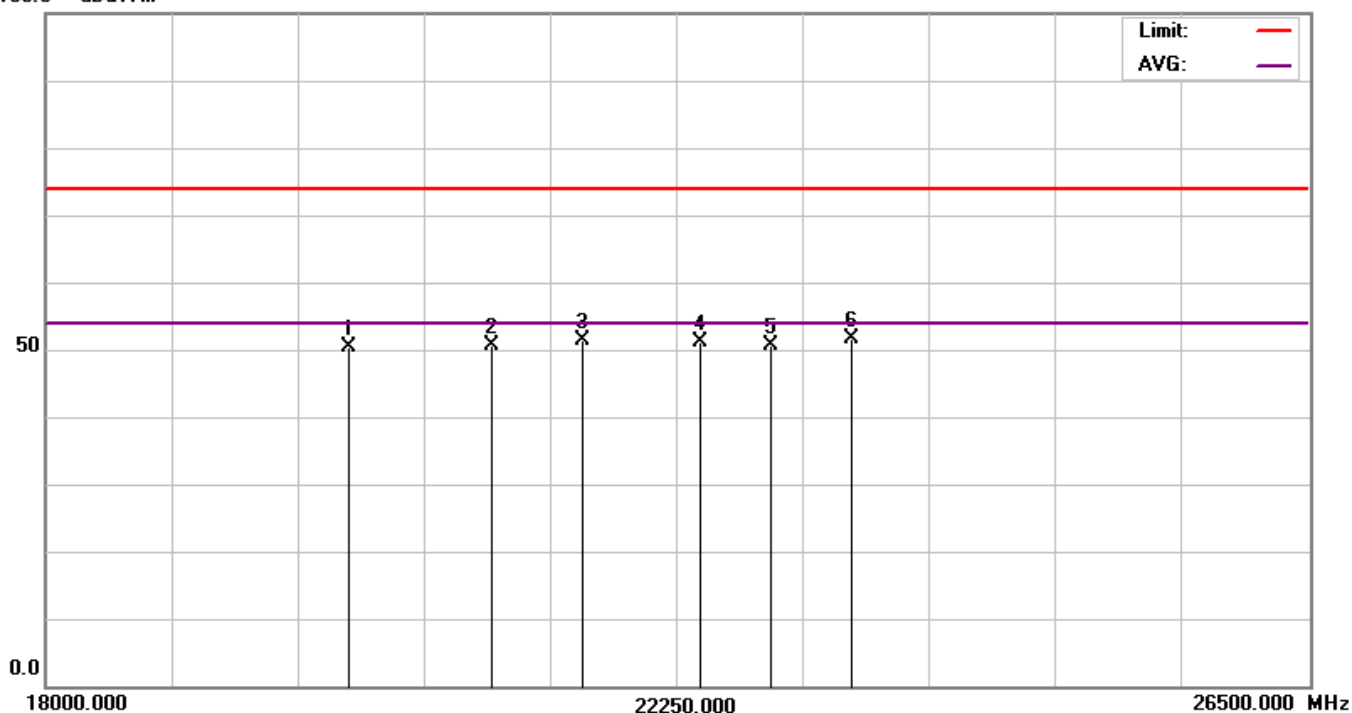
- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment. The tested frequency range is mention in above column of the test data table.

Date of Test	August 19, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	1m at Vertical	Fundamental	2402MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	20043.2690	28.92	21.53	50.45	74.00	-23.55	peak
2	20996.7950	29.16	21.41	50.57	74.00	-23.43	peak
3	21623.3970	29.51	21.86	51.37	74.00	-22.63	peak
4	22399.8400	28.75	22.38	51.13	74.00	-22.87	peak
5	22890.2240	27.64	22.89	50.53	74.00	-23.47	peak
6	23435.0960	28.09	23.52	51.61	74.00	-22.39	peak

**Remarks:**

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 4.82 dB.(1G-18G)
7. The measurement uncertainty is 4.63 dB.(18G-40G)

100.0 dB $\mu$ V/m

- Remark:
1. The Peak (The red line of the graph indicates the peak measurements).
  2. The AVG (The purple line of the graph indicates the average measurements).
  3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment. The tested frequency range is mention in above column of the test data table.

## 4. BAND EDGE

### 4.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSU26	200882	2016.08.18
2	Pre-Amplifier	HP	8449B	3008A01263	2016.04.08
3	HORN ANTENNA	SCHWARZBECK	BBHA 9120	D243	2016.01.09
4	CABLE	INSULATED WIRE INC.	SPS-2801-3940-NPS	03262012	2016.04.07
5	Test Program Software	Hotlife	CSR BC4	N/A	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Chamber A6 (Under 1GHz) and Chamber A6 (Above 1GHz).

### 4.2 BLOCK DIAGRAM OF TEST SETUP

#### RF Radiated Measurement:

Refer to Section 3.2

### 4.3 BAND EDGE LIMIT

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209 (a) (see Section 15.205(c)).

#### **4.4 EUT CONFIGURATION**

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120KHz, above 1GHz are 1MHz.

In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT.

Thus, exploratory tests shall be carried out for various axes orientations to determine the orientation (attitude) having maximum or near-maximum emission level.

#### **4.5 OPERATING CONDITION OF EUT**

Same as section 2.9.

#### **4.6 RADIATED EMISSION DATA**

Above 1GHz are peak and avg. values with a resolution bandwidth of 1MHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scans of the measurement range for all the test modes with the orientation (attitude) of the three orthogonal axes of the EUT and then use test receiver for final measurement. Then the worst modes were reported the following data pages.

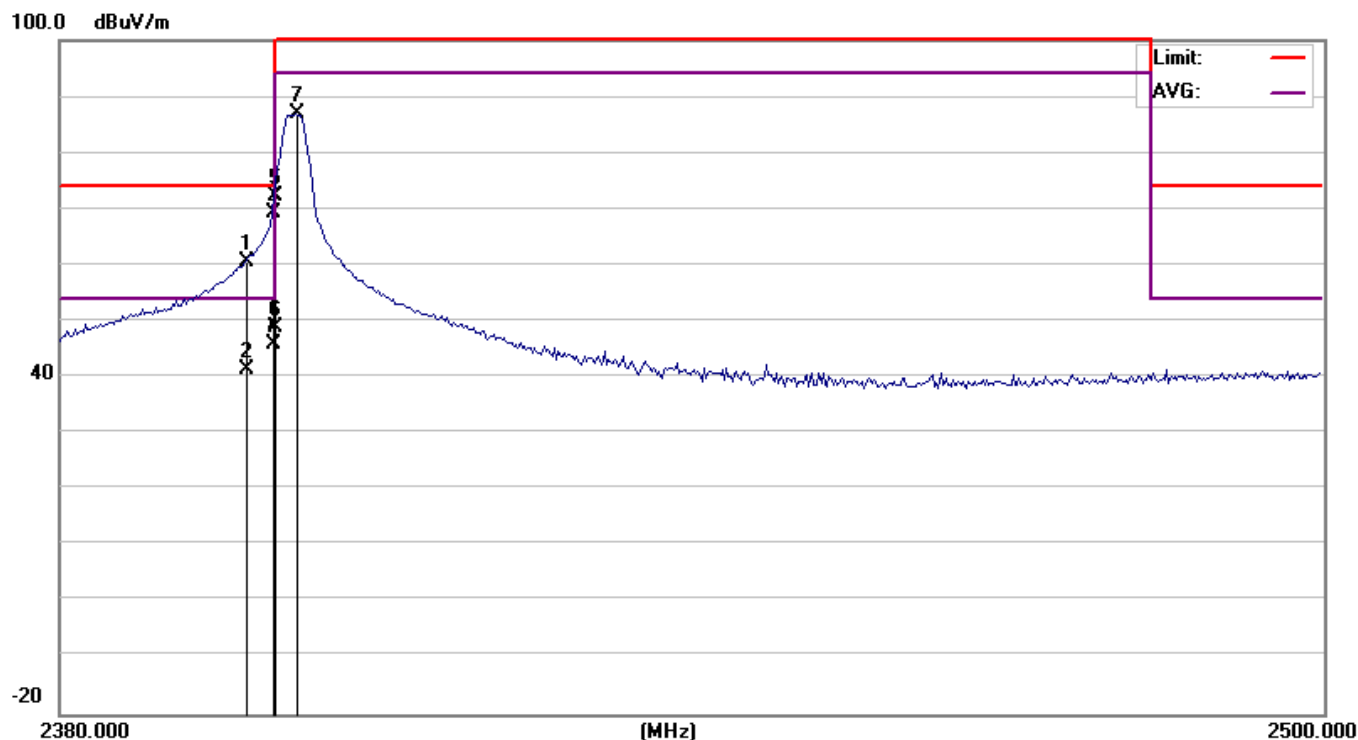
## 4.7 TEST RELULT

Date of Test	August 20, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Horizontal	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB/m	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	2397.500	64.96	-4.28	60.68	74.00	-13.32	peak
2	2397.500	45.77	-4.28	41.49	54.00	-12.51	AVG
3	2399.808	73.53	-4.27	69.26	74.00	-4.74	peak
4	2399.808	50.07	-4.27	45.80	54.00	-8.20	AVG
5	2400.000	76.42	-4.27	72.15	74.00	-1.85	peak
6	2400.000	53.16	-4.27	48.89	54.00	-5.11	AVG
7	2402.115	91.08	-4.26	86.82	114.00	-27.18	peak

### Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 1.19 dB.
7. The No.7 2402.115MHz is Carrier signal.

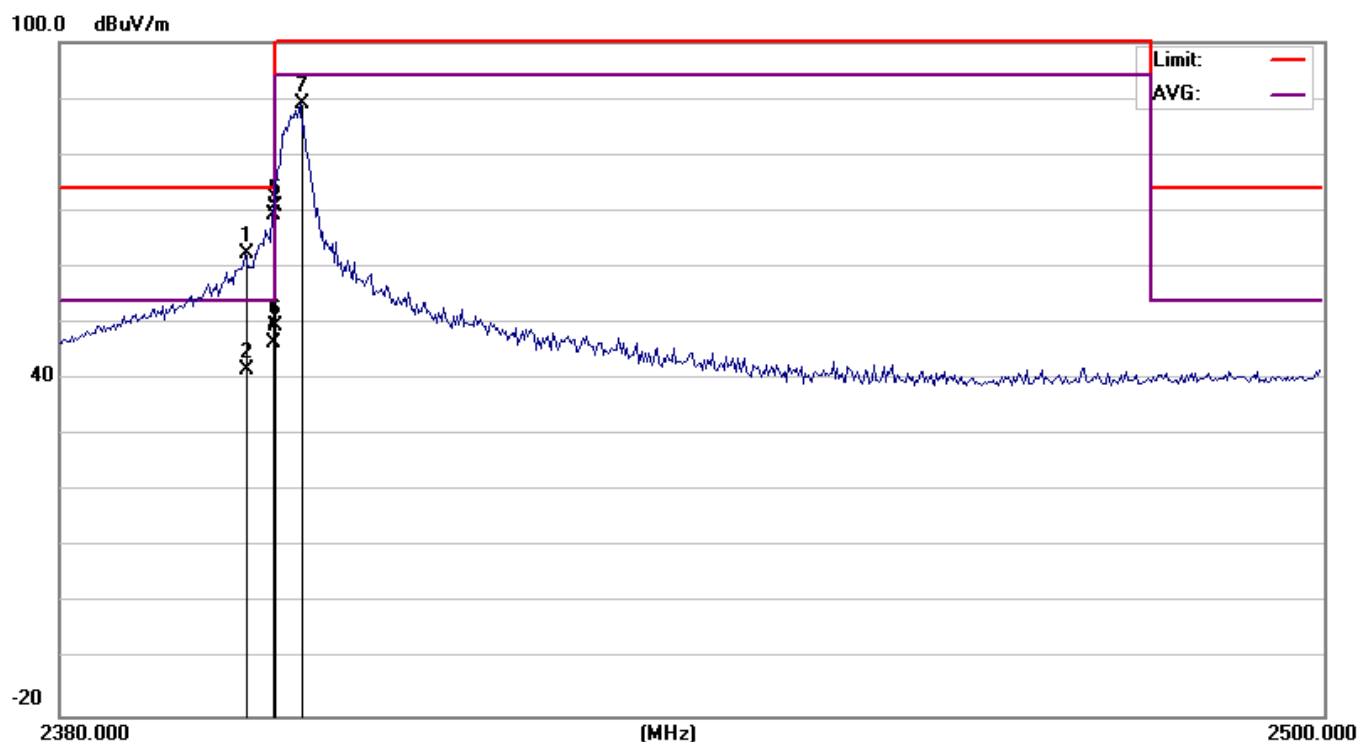


Date of Test	August 20, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Vertical	Fundamental	2402 MHz

No.	Frequency MHz	Reading Level dB $\mu$ V	Factor dB/m	Measurement dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Detector
1	2397.5000	66.61	-4.28	62.33	74.00	-11.67	peak
2	2397.5000	45.83	-4.28	41.55	54.00	-12.45	AVG
3	2399.8080	73.66	-4.27	69.39	74.00	-4.61	peak
4	2399.8080	50.69	-4.27	46.42	54.00	-7.58	AVG
5	2400.0000	75.10	-4.27	70.83	74.00	-3.17	peak
6	2400.0000	53.72	-4.27	49.45	54.00	-4.55	AVG
7	2402.5000	93.17	-4.26	88.91	114.00	-25.09	peak

**Remarks:**

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have  $\pm 0.01$  tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have  $\pm 1$ cm tolerance and the turn table degree could have  $\pm 1^\circ$  tolerance.
6. The measurement uncertainty is 1.19 dB.
7. The No.7 2402.5000MHz is Carrier signal.



## 5. OCCUPIED BANDWIDTH

### 5.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSU26	200882	2016.08.18
2	Pre-Amplifier	HP	8449B	3008A01263	2016.04.08
3	HORN ANTENNA	SCHWARZBECK	BBHA 9120	D243	2016.01.09
4	CABLE	INSULATED WIRE INC.	SPS-2801-3940-NPS	03262012	2016.04.07
5	Test Program Software	Hotlife	CSR BC4	N/A	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Chamber A6 (Under 1GHz) and Chamber A6 (Above 1GHz).

### 5.2 BLOCK DIAGRAM OF TEST SETUP

**RF Radiated Measurement:**

Refer to Section 3.2

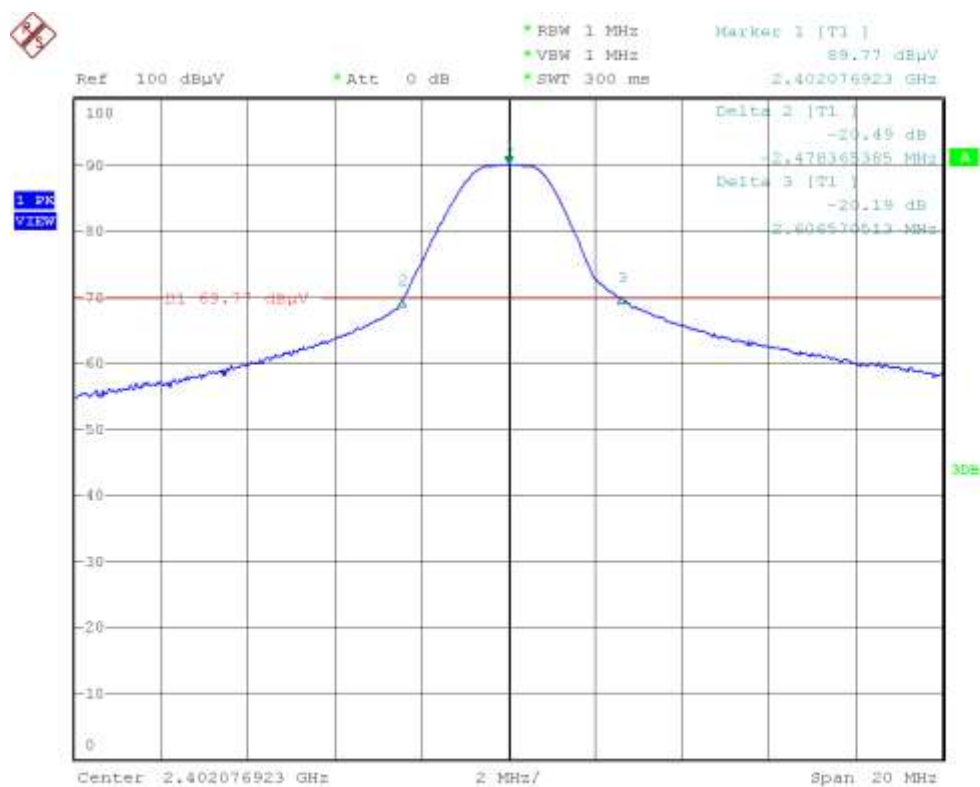
### 5.3 LIMIT

The maximum 20 dB bandwidth shall be measurement.



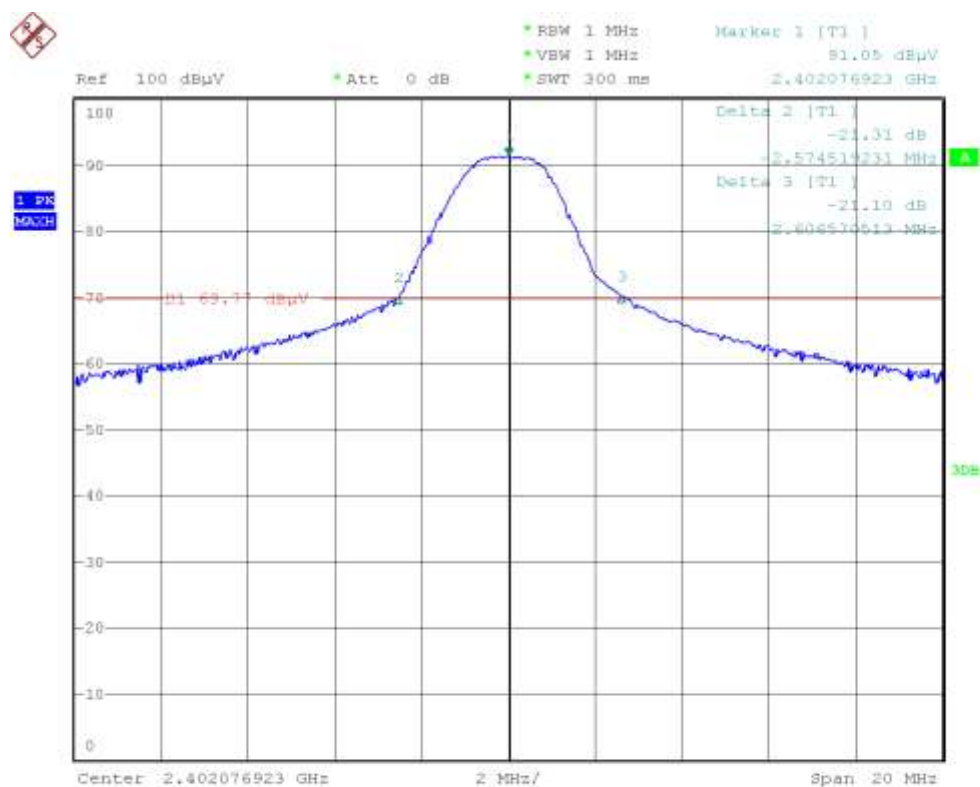
## 5.4 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Horizontal	Fundamental	2402 MHz



Date: 19.AUG.2015 19:53:55

Date of Test	August 20, 2015	Temperature	26 deg/C
EUT	REMOTE HEAT-TROLLER	Humidity	60 %RH
Working Cond.	Mode 1	Display Pattern	N/A
Antenna distance	3m at Vertical	Fundamental	2402 MHz



Date: 19.AUG.2015 19:57:15

## **6. EMI REDUCTION METHOD DURING COMPLIANCE TESTING**

No modification was made during testing.

## 7. PHOTOGRAPHS FOR TEST

### 7.1 TEST PHOTOGRAPHS FOR RADIATION

30-1000MHz -



**Above 1GHz -**



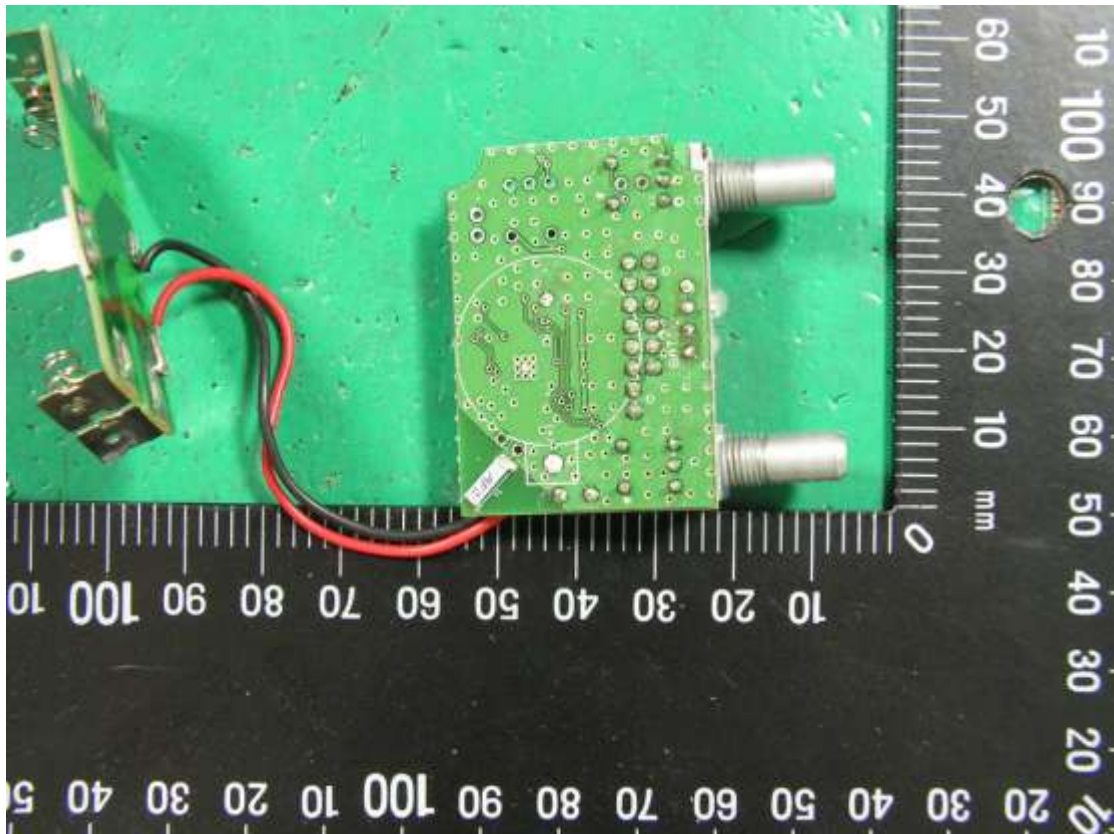
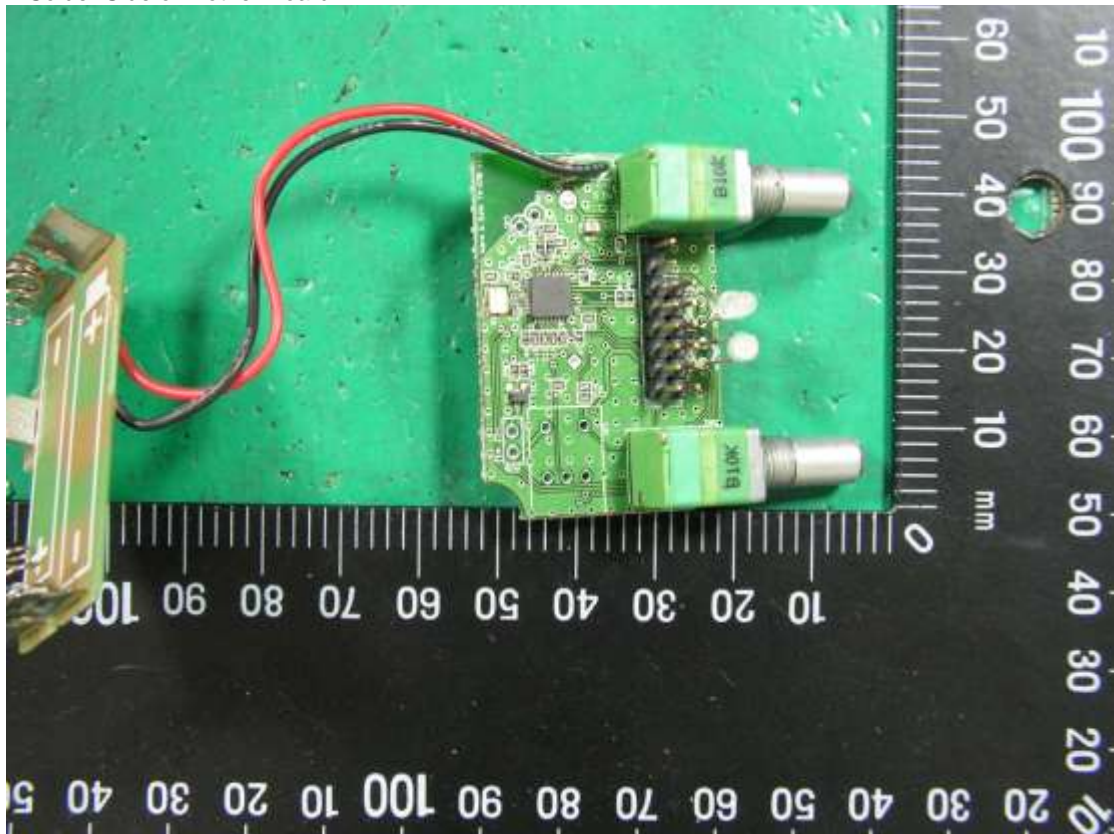


## 8. PHOTOGRAPHS FOR PRODUCT

1. Front View of REMOTE HEAT-TROLLER.
2. Back View of REMOTE HEAT-TROLLER.

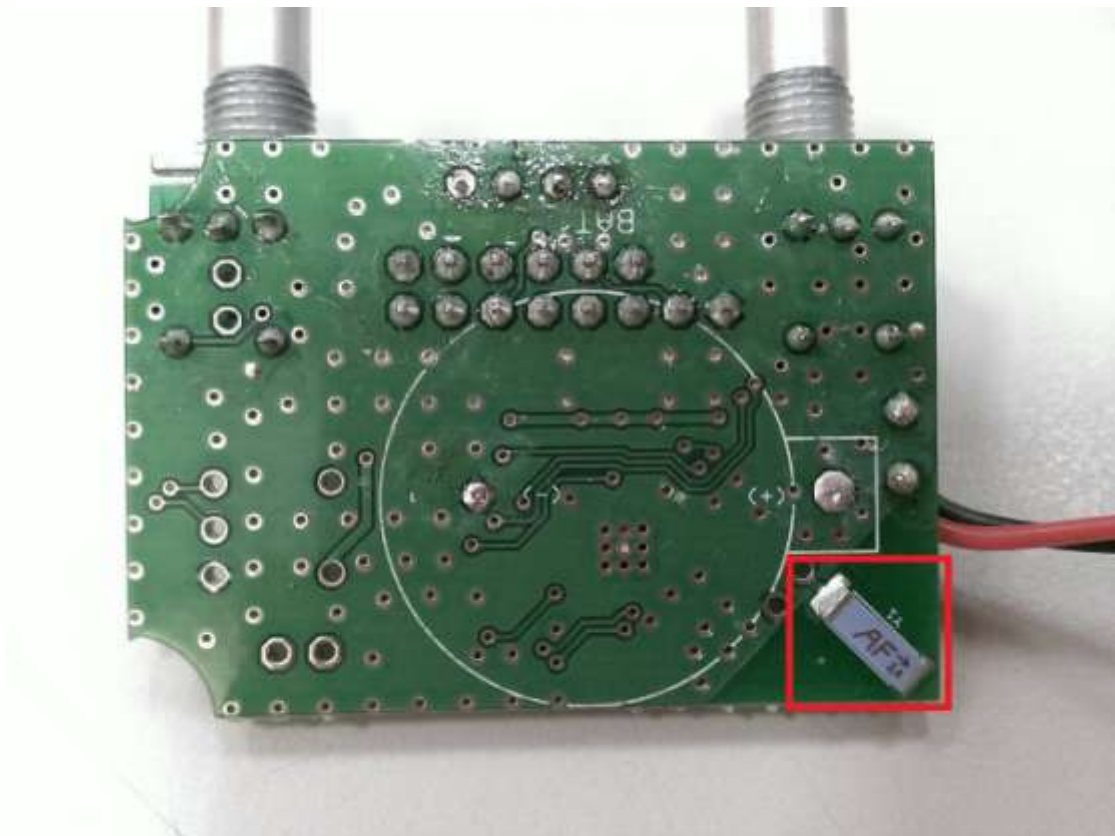


- 3.Component Side of Mother Board.  
4.Solder Side of Mother Board.





- 5.Component Side of Chipset.
- 6.Component Side of Antenna.





7.Inner

8.Inner



9.Inner



10. FCC ID LOCATION

11. Label.



the **HEAT-TROLLER™**

REMOTE HEAT-TROLLER

Model Number: TX

FCC ID: 2AF9Z45DEGTX00

by Warm & Safe Heated Gear, LLC  
[www.warmnsafe.com](http://www.warmnsafe.com)



Version X(i)-Dual Remote

Home of the authentic Heat-Troller