

TEST REPORT

Reference No...... : WTD17S0375269E
FCC ID : W6JTH30
Applicant..... : TIMOTION Technology Co.,Ltd
Address..... : Shiyong Minying Industrial Zone, Hengli Town, Dongguan City
Guangdong Province 523465, China
Manufacturer : The same as above
Address..... : The same as above
Product Name..... : Handset
Model No..... : TH30
Standards : FCC CFR47 Part 15 Section 15.249: 2016
Date of Receipt sample : Mar. 31, 2017
Date of Test : Mar. 31 – Apr. 05, 2017
Date of Issue..... : Apr. 11, 2017
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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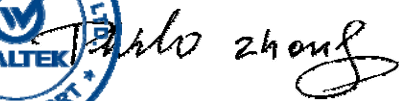
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Approved by:



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3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD17S0375269E	Mar. 31, 2017	Mar. 31 – Apr. 05, 2017	Apr. 11, 2017	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product Name	:Handset
Model No.	:TH30
Model Differences	:N/A
Type of Modulation	:GFSK
Frequency Range	:2420MHz-2480MHz, 3 Channels in total
The Lowest Oscillator	:16MHz
Antenna installation	:PCB Printed Antenna

4.2 Details of E.U.T.

Technical Data	: DC 3V by batteries (2* 1.5V size "AAA")
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4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2420	2	2450	3	2480

4.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **IC – Registration No.:7760A-1**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A-1, Oct 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests carried out under FCC part 15.249

Test mode	Low channel	Middle channel	High channel
Transmitting	2420MHz	2450MHz	2480MHz

Table 2 Tests carried out under FCC part 15.209

Test Item	Test Mode
Radiated Emissions	Transmitting

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions at Mains Terminals Disturbance Voltage(1#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	100947	Sep.12, 2016	Sep.11, 2017
2	LISN	R&S	ENV216	100115	Sep.12, 2016	Sep.11, 2017
3	Cable	Top	TYPE16(3.5M)	-	Sep.12, 2016	Sep.11, 2017
Conducted Emissions at Mains Terminals Disturbance Voltage(2#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	101155	Sep.12, 2016	Sep.11, 2017
2	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12, 2016	Sep.11, 2017
3	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12, 2016	Sep.11, 2017
4	Cable	Laplace	RF300	-	Sep.12, 2016	Sep.11, 2017
3m Semi-anechoic Chamber for Radiation(1#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	Apr. 29, 2016	Apr. 28, 2017
2	Amplifier	Agilent	8447D	2944A10178	Jan. 12, 2017	Jan. 11, 2018
3	Active Loop Antenna	Beijing Dazhi	ZN30900A	0703	Oct. 17, 2016	Oct. 16, 2017
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr. 07, 2016	Apr. 06, 2017
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12, 2016	Sep.11, 2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr. 07, 2016	Apr. 06, 2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr. 07, 2016	Apr. 06, 2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	Apr. 07, 2016	Apr. 06, 2017
3m Semi-anechoic Chamber for Radiation(2#)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Apr. 06, 2016	Apr. 05, 2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr. 06, 2016	Apr. 05, 2017
3	Amplifier	ANRITSU	MH648A	M43381	Apr. 06, 2016	Apr. 05, 2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr. 06, 2016	Apr. 05, 2017

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	N/A
Radiated Emission	15.249(a) 15.209 15.205(a)	C
Outside of Band Emission	15.249 15.205 15.209	C
20dB Bandwidth	15.215(c)	C
Antenna Requirement	15.203	C
SAR	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable		

7 Radiation Emission Test

Test Requirement: FCC Part15 Paragraph 15.249&15.209&15.205

Test Method: ANSI 63.10: 2010;ANSI 63.4: 2014

Measurement Distance: 3m

Test Result: PASS

15.249(a)Limit:

Fundamental frequency	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928 MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25 GHz	250	108	2500	68

15.209 Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Note: RF Voltage(dBuV)= $20 \log_{10}$ RF Voltage(uV)

7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

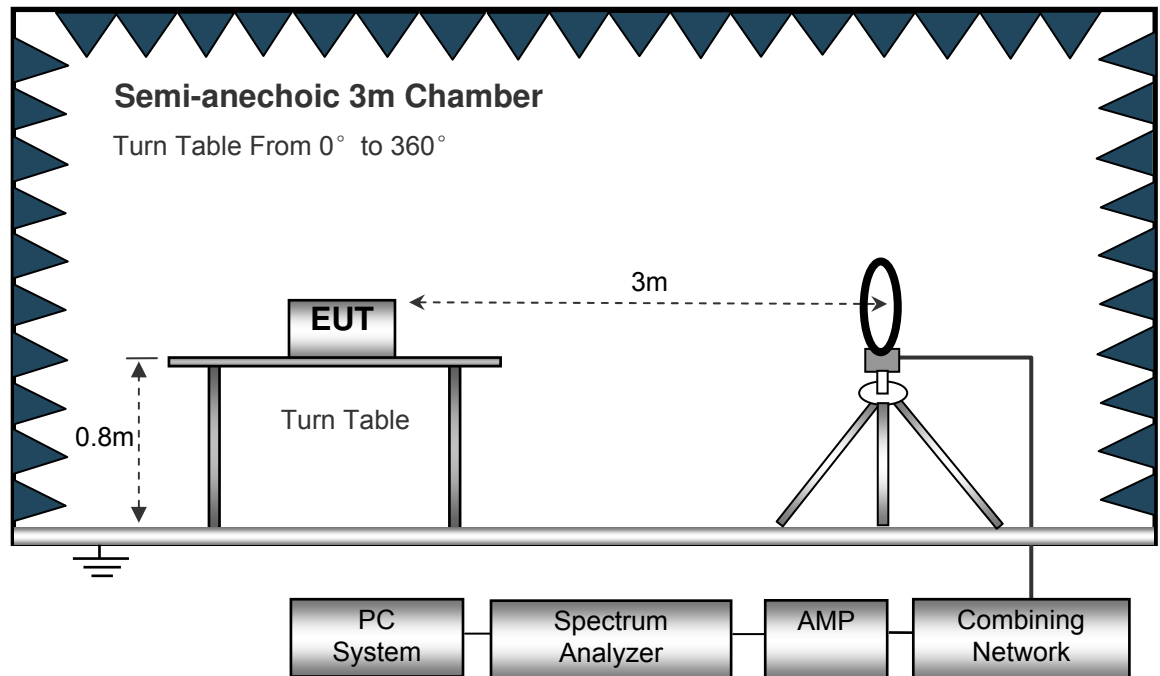
EUT Operation :

Refer to section 4.5.

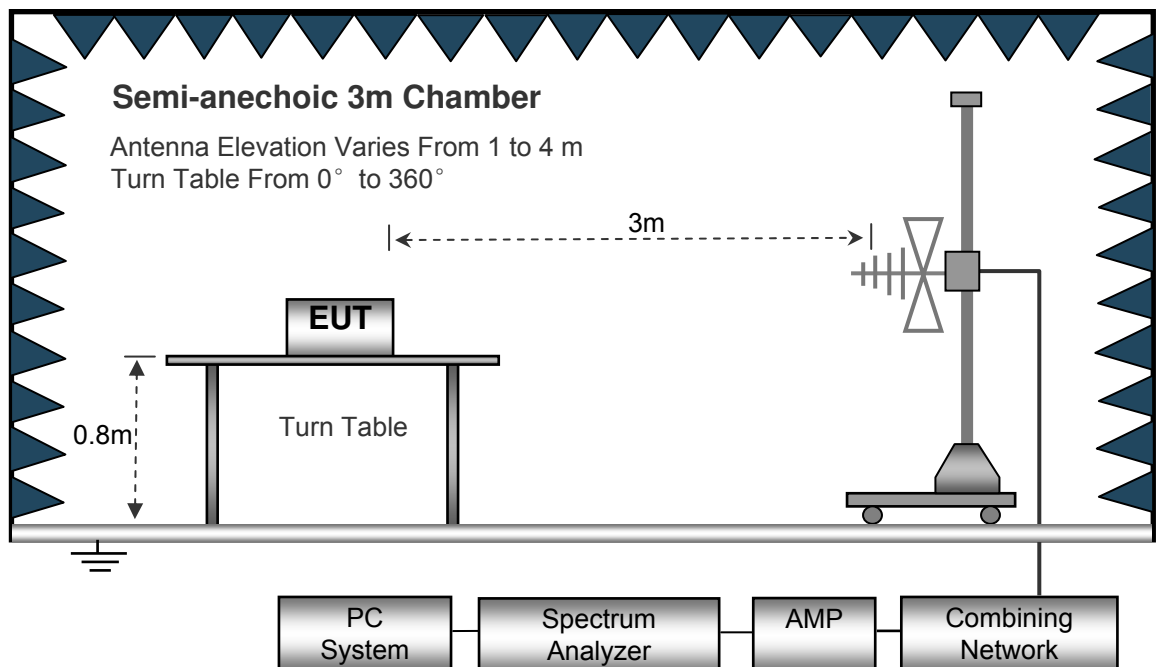
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

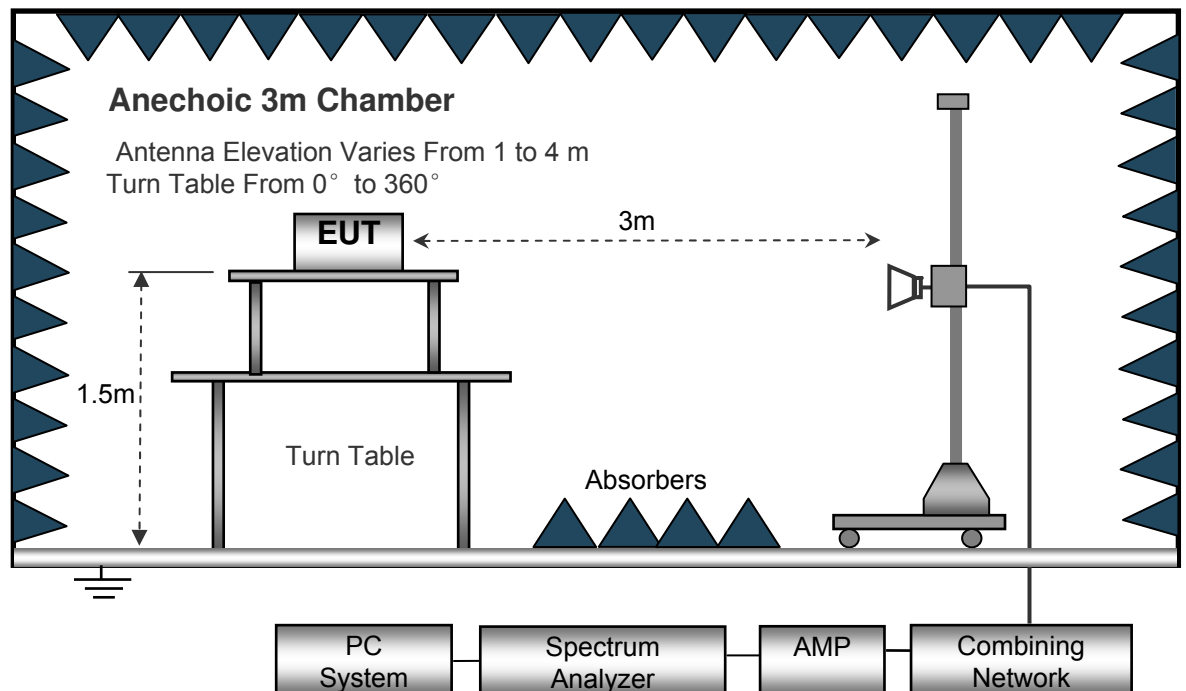
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

Sweep SpeedAuto
 IF Bandwidth.....10kHz
 Video Bandwidth10kHz
 Resolution Bandwidth10kHz

30MHz ~ 1GHz

Sweep SpeedAuto
 DetectorPK
 Resolution Bandwidth.....100kHz
 Video Bandwidth300kHz

Above 1GHz

Sweep SpeedAuto
 DetectorPK
 Resolution Bandwidth.....1MHz
 Video Bandwidth3MHz
 DetectorAve.
 Resolution Bandwidth.....1MHz
 Video Bandwidth10Hz

7.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane; For above 1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

7.5 Test Result

Test Frequency: 9 KHz ~ 30 MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel									
897.00	35.23	QP	78	1.8	H	-2.82	32.41	46.00	-13.59
897.00	28.86	QP	6	1.4	V	-2.82	26.04	46.00	-19.96
2420.00	92.00	PK	25	1.7	H	-15.27	76.73	114.00	-37.27
2420.00	79.85	Ave	25	1.7	H	-15.27	64.58	94.00	-29.42
4840.00	64.84	PK	35	1.7	H	-2.09	62.75	74.00	-11.25
4840.00	51.62	Ave	35	1.7	H	-2.09	49.53	54.00	-4.47
7260.00	46.89	PK	152	1.7	H	1.22	48.11	74.00	-25.89
7260.00	35.78	Ave	152	1.7	H	1.22	37.00	54.00	-17.00
2340.19	46.39	PK	103	1.6	V	-13.19	33.20	74.00	-40.80
2340.19	39.80	Ave	103	1.6	V	-13.19	26.61	54.00	-27.39
2350.34	44.44	PK	131	1.2	H	-13.14	31.30	74.00	-42.70
2350.34	38.26	Ave	131	1.2	H	-13.14	25.12	54.00	-28.88
2485.21	44.92	PK	25	2.0	V	-13.08	31.84	74.00	-42.16
2485.21	36.90	Ave	25	2.0	V	-13.08	23.82	54.00	-30.18

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Middle Channel									
897.00	33.95	QP	230	1.7	H	-2.82	31.13	46.00	-14.87
897.00	27.98	QP	68	2.0	V	-2.82	25.16	46.00	-20.84
2450.00	89.09	PK	124	1.6	H	-15.33	73.76	114.00	-40.24
2450.00	74.32	Ave	124	1.6	H	-15.33	58.99	94.00	-35.01
4900.00	64.75	PK	223	1.1	H	-1.63	63.12	74.00	-10.88
4900.00	50.18	Ave	223	1.1	H	-1.63	48.55	54.00	-5.45
7350.00	44.81	PK	117	1.5	H	1.24	46.05	74.00	-27.95
7350.00	34.85	Ave	117	1.5	H	1.24	36.09	54.00	-17.91
2321.33	45.38	PK	92	1.7	V	-13.19	32.19	74.00	-41.81
2321.33	39.90	Ave	92	1.7	V	-13.19	26.71	54.00	-27.29
2371.30	44.33	PK	276	1.1	H	-13.14	31.19	74.00	-42.81
2371.30	37.10	Ave	276	1.1	H	-13.14	23.96	54.00	-30.04
2487.81	44.17	PK	324	1.9	V	-13.08	31.09	74.00	-42.91
2487.81	38.90	Ave	324	1.9	V	-13.08	25.82	54.00	-28.18

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK High Channel									
897.00	34.53	QP	49	1.5	H	-2.82	31.71	46.00	-14.29
897.00	28.66	QP	210	1.7	V	-2.82	25.84	46.00	-20.16
2480.00	90.64	PK	123	0.9	H	-15.38	75.26	114.00	-38.74
2480.00	75.41	Ave	123	0.9	H	-15.38	60.03	94.00	-33.97
4960.00	63.01	PK	196	1.1	H	-1.16	61.85	74.00	-12.15
4960.00	51.07	Ave	196	1.1	H	-1.16	49.91	54.00	-4.09
7440.00	46.11	PK	101	1.8	H	1.28	47.39	74.00	-26.61
7440.00	32.26	Ave	101	1.8	H	1.28	33.54	54.00	-20.46
2339.14	46.21	PK	99	1.0	V	-13.19	33.02	74.00	-40.98
2339.14	39.19	Ave	99	1.0	V	-13.19	26.00	54.00	-28.00
2359.10	43.67	PK	70	1.1	H	-13.14	30.53	74.00	-43.47
2359.10	38.16	Ave	70	1.1	H	-13.14	25.02	54.00	-28.98
2487.53	44.47	PK	338	1.3	V	-13.08	31.39	74.00	-42.61
2487.53	37.69	Ave	338	1.3	V	-13.08	24.61	54.00	-29.39

Test Frequency: From 18GHz to 25GHz

The measurements were more than 20 dB below the limit and not reported.

8 Outside of Band Emission

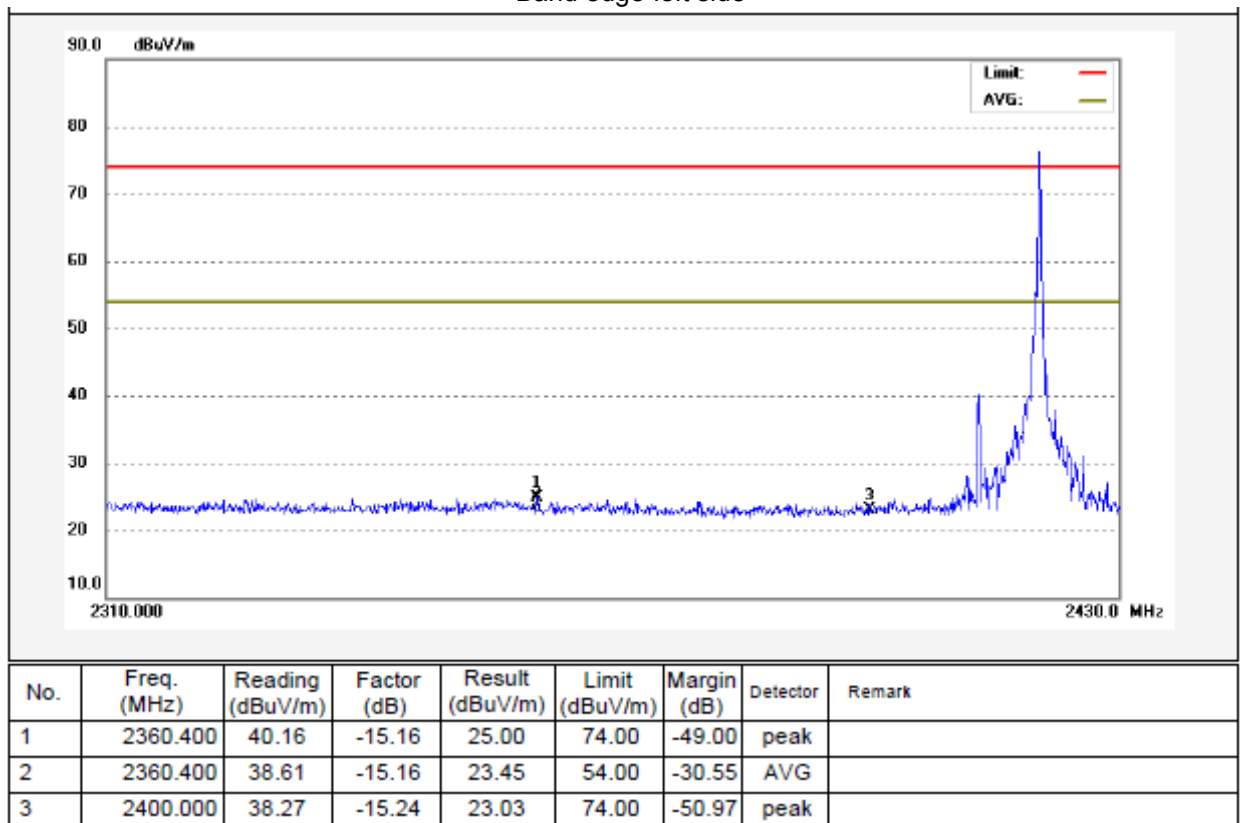
Test Requirement:	15.249(d):Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
Test Method:	ANSI C63.10:2010
Test Mode:	Transmitting

8.1 Test Procedure

Refer to section 8.4 of this test report.

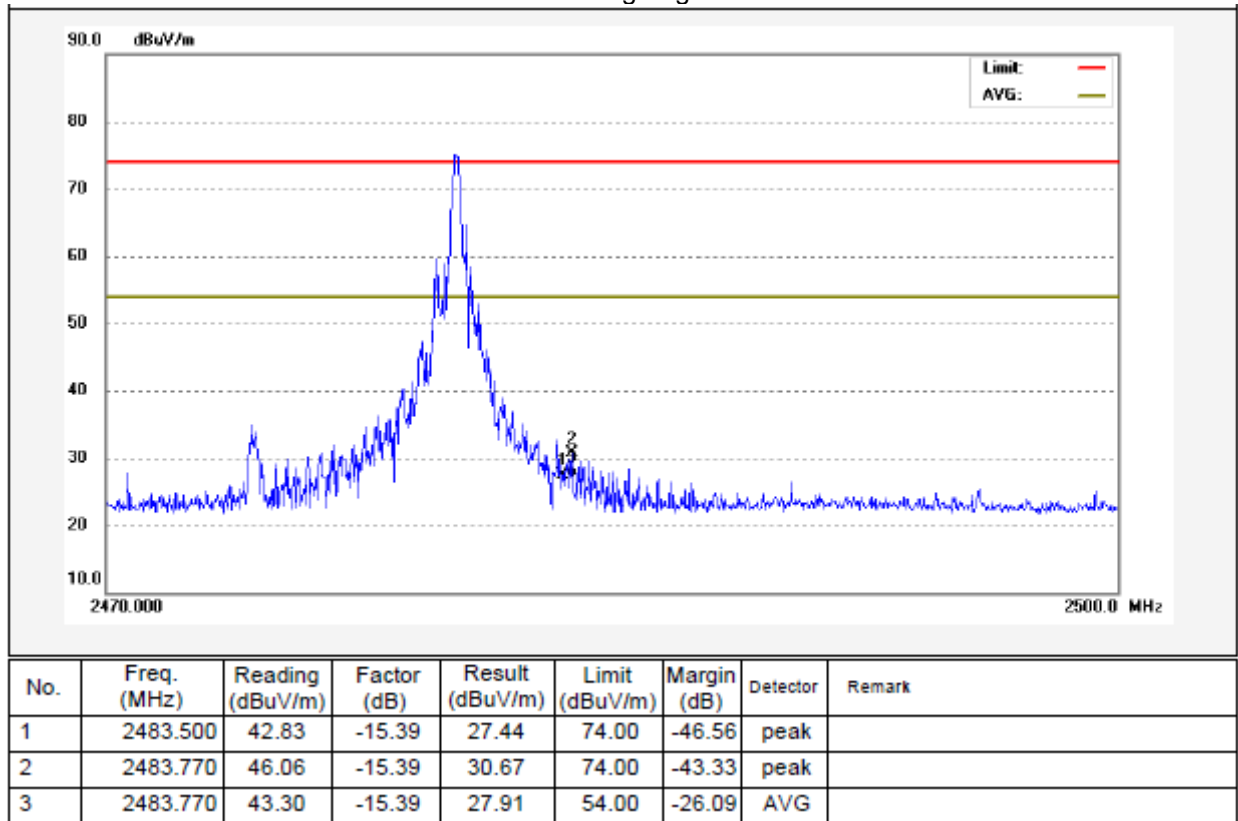
8.2 Test Result

Band edge-left side



Remark: The worst case (Horizontal) was recorded.

Band edge-right side



Remark: The worst case (Horizontal) was recorded.

9 Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.215(c)

Test Method:

ANSI C63.10:2010

Test Mode:

Transmitting

9.1 Test Procedure

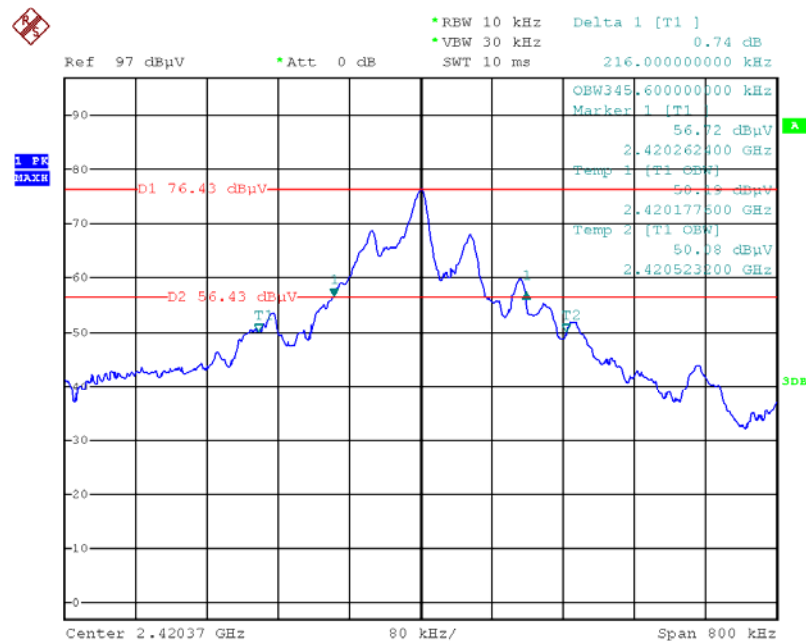
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 10 kHz, VBW = 30 kHz

9.2 Test Result

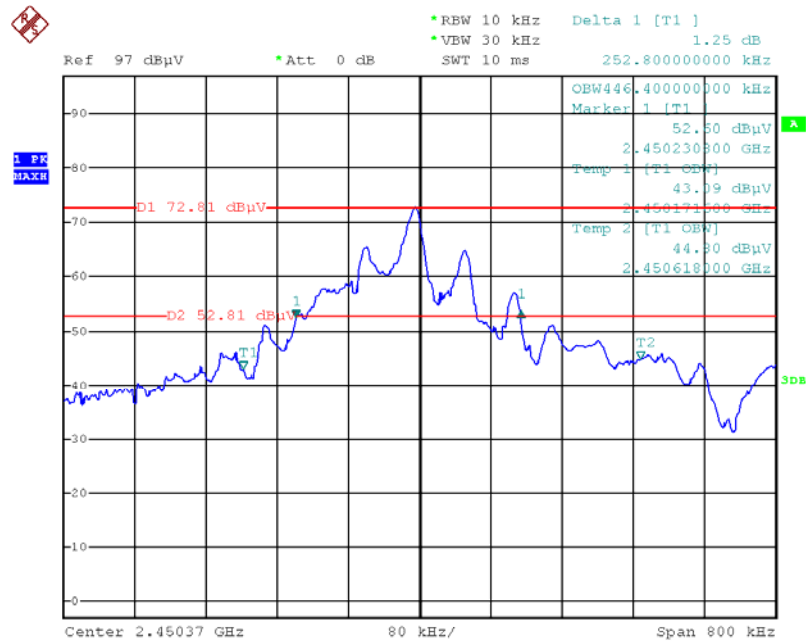
Operation mode	20dB Bandwidth (KHz)	99% Bandwidth (KHz)
Low channel	216.00	345.60
Middle channel	252.80	446.40
High channel	251.20	470.40

Test result plot as follows:

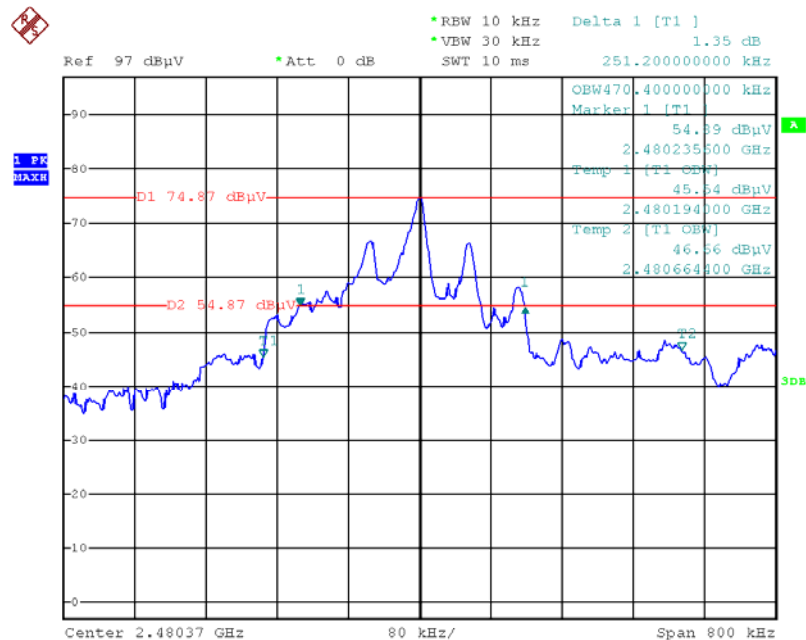
Mode: Low channel



Mode: Middle channel



Mode: High channel



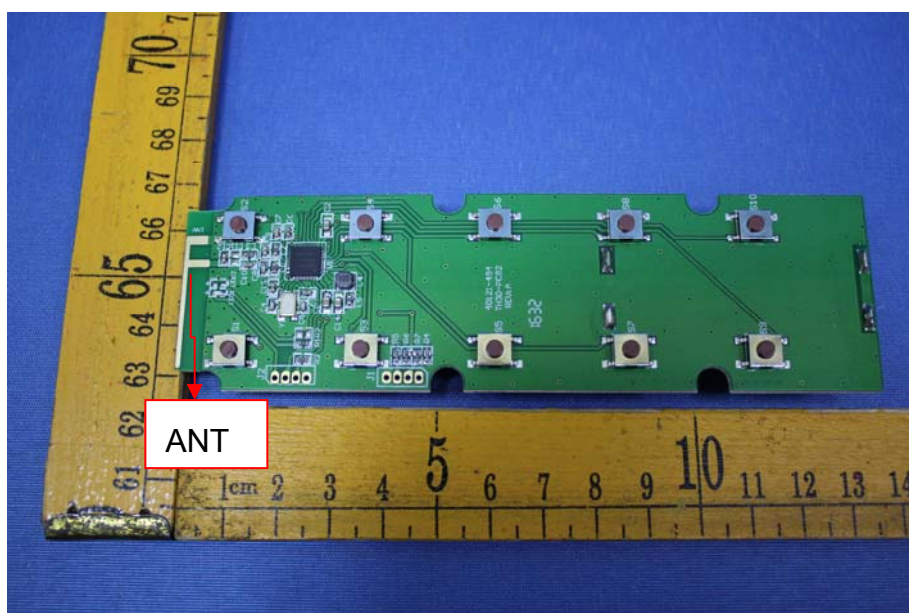
10 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT has one PCB Printed Antenna, the gain is 0dBi. meets the requirements of FCC 15.203.



11 SAR Evaluation

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part2.1093 & 447498 D01 General RF Exposure Guidance v06

11.1 Requirements

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR where}$$

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

11.2 The procedures / limit

Source-based time-averaged maximum output power(dBm)	Source-based time-averaged maximum output power(mW)	Minimum test separation distance required for the exposure conditions(mm)	SAR Test Exclusion Thresholds(mW)	Evaluation Result
-18.47	0.01422	5	9.525	Compliance

Note: the following is Source-based time-averaged maximum output power Calculation

Frequency	Source-based time-averaged maximum output power	Substituted (0dBm)	Source-based time-averaged maximum output power
(MHz)	(dBμV/m)	(dBμV/m)	(dBm)
2420	76.73	95.20	-18.47

11.3 Result: Compliance

No SAR measurement is required.

12 Photographs- Model TH30 Test Setup Photos

12.1 Photograph - Radiation Emission

Test frequency from 9 KHz to 30MHz at test site 2#



Test frequency from 30MHz to 1GHz at test site 2#





Test frequency above 1GHz at test site 1#





13 Photographs - Constructional Details

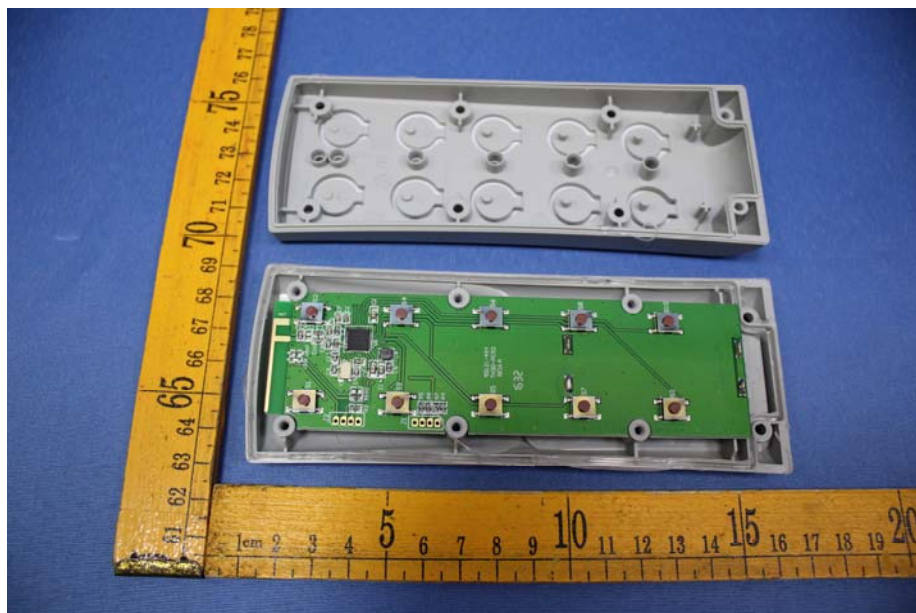
13.1 Photographs –Model TH30 External Photos

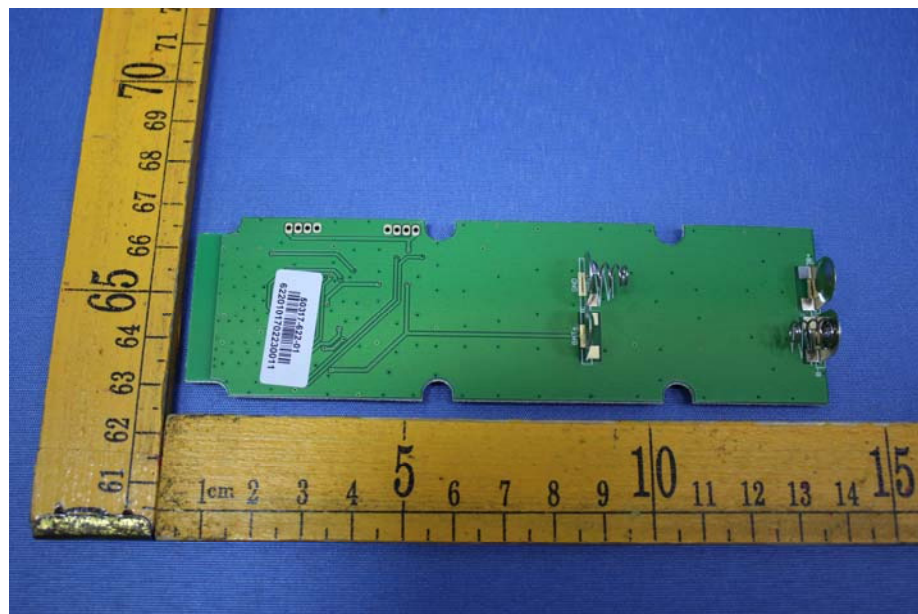
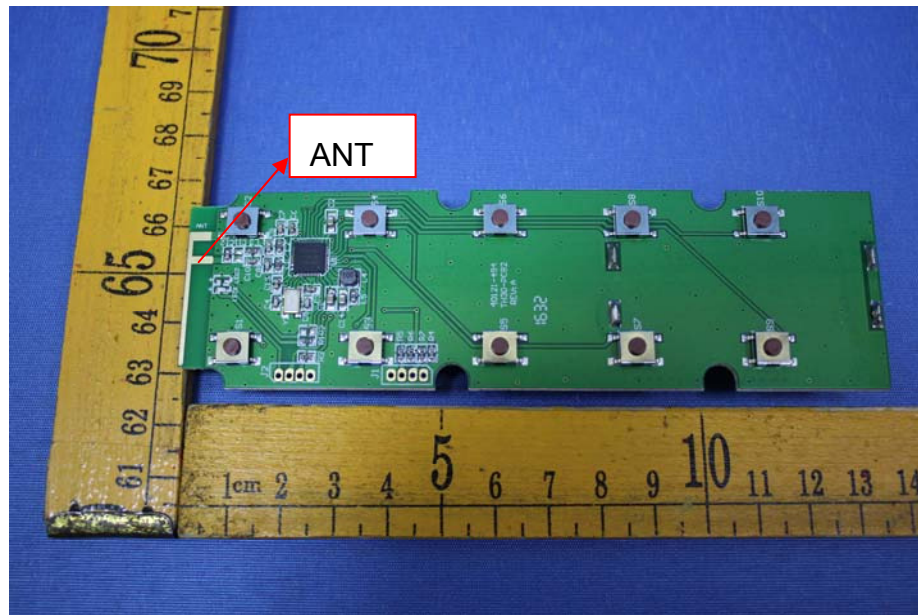


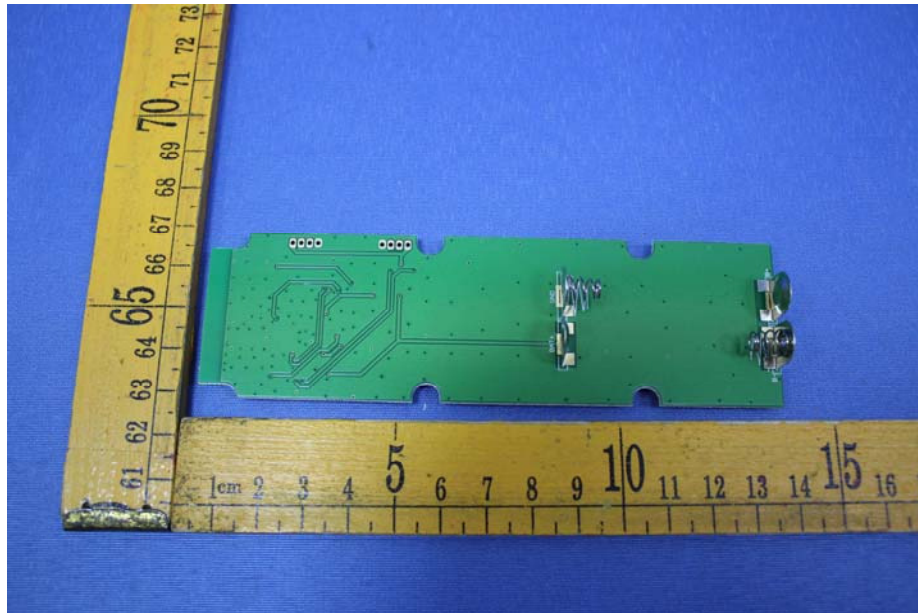




13.2 Photographs – Model TH30 Internal Photos







=====End of Report=====