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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No.....: **CTL1306281044-WF**

Compiled by

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Tracy Qi

Date of issue.....: August 05, 2013

Representative Laboratory Name : **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

Address: Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China.

Test Firm: **Bontek Compliance Testing Laboratory Ltd**

Address: 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

Applicant's name: **SHEN ZHEN XING YAO HUA INDUSTRIAL CO., LTD**

Address: NO.1601-1607, 16th Floor, Global Logistic Building, China South City, Pinghu Town, Longgang District, Shenzhen City, Guangdong Province, China

Test specification:

Standard: FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

TRF Originator.....: Shenzhen CTL Electromagnetic Technology Co., Ltd.

Master TRF.....: Dated 2011-01

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Test item description: **2.4G Remote Control**

FCC ID.....: **2AARTT6AH-2400**

Trade Mark: ZD(智达)

Model/Type reference: T6AH-2400, T7AH-2400, T9AH-2400, T3GMN-2400,
T3G-2400LED

Transmit: 2403~2480MHz

Type of modulation.....: GFSK

Antenna Gain: 2.0 dBi

Antenna type: Monopole antenna(non-detachable)

Result: **Positive**

TEST REPORT

Test Report No. :	CTL1306281044-WF	August 05, 2013
		Date of issue

Equipment under Test : 2.4G Remote Control

Model /Type : T6AH-2400

Listed Models : T7AH-2400, T9AH-2400, T3GMN-2400, T3G-2400LED
(only model's name difference with T6AH-2400 for marketing requirement, all of the models have same electrical design.)

Applicant : SHEN ZHEN XING YAO HUA INDUSTRIAL CO., LTD

Address : NO.1601-1607, 16th Floor, Global Logistic Building, China South City, Pinghu Town, Longgang District, Shenzhen City, Guangdong Province, China

Manufacturer : Xianning City Xing Yao Hua Model Co., Ltd

Address : Phoenix East Road, Phoenix Industrial Park, Xian'an District, Xian Ning City, Hubei Province, China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.

ANSI C63.4-2003

KDB Publication No. 558074 Guidance on Measurements for Digital Transmission Systems



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	June 28, 2013
Testing commenced on	:	June 28, 2013
Testing concluded on	:	August 05, 2013

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input checked="" type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input type="radio"/> Other (specified in blank below)	

Description of the test mode

78 channels are provided to the EUT
Channels list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		
27	2429	54	2456		

2.3. Short description of the Equipment under Test (EUT)

A 2.4G Remote Control (T6AH-2400) work from 2403MHz to 2480MHz.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel low (2403MHz), mid (2441MHz) and high (2480MHz) with highest data rate are chosen for full testing.
3. Test Mode:

Test Mode(TM)	Description	Remark
TM1	Bottom Channel Transmitting	/
TM2	Middle Channel Transmitting	/
TM3	Top Channel Transmitting	/

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- supplied by the manufacturer
- supplied by the lab

Manufacturer :

Model No. :

2.6. NOTE

1. The EUT is a 2.4G Remote Control, The functions of the EUT listed as below:

	Test Standards	Reference Report
Wireless DMX Transceiver	FCC Part 15 Subpart C (Section15.247)	CTL130407507-WF
Wireless DMX Transceiver	FCC Per 47 CFR 2.1091(b)	CTL130407507-MPE

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
2403-2480	✓	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

3. The EUT incorporates a SISO function, Physically, the EUT provides two completed transmitter and two completed receivers.

Modulation Mode	TX Function
GFSK	1TX

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AARTT6AH-2400** filing to comply with of the FCC Part 15.247 Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory 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 338263, March 24, 2008.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

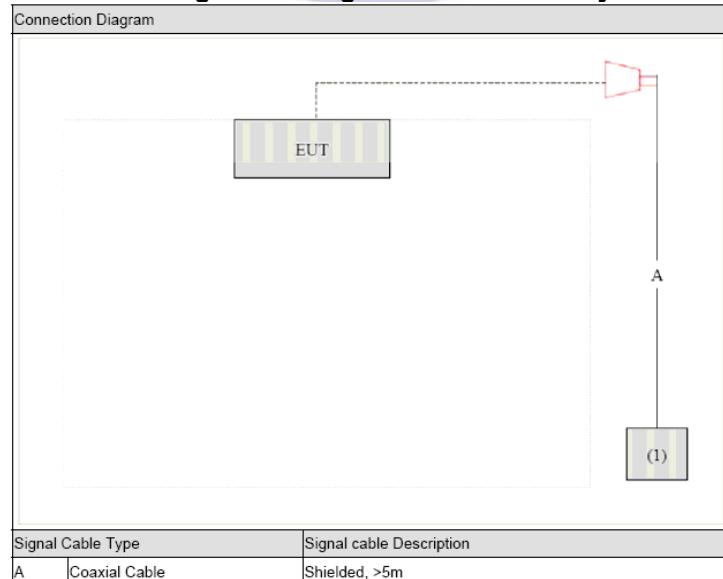
Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



3.6. Equipments Used during the Test

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date	Calibration due date
1	EMI Test Receiver	R&S	ESCI	100687	2013-4-5	2014-4-4
3	Amplifier	HP	8447D	1937A02492	2013-4-5	2014-4-4
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2013-4-5	2014-4-4
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2013-4-5	2014-4-4
6	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
7	Signal generator	Rhode & Schwarz	SMIQ 03HD + option SM-B1, SMIQB11, SMIQB12, SMIQB14, SMIQB17, SMIQB20	1125.5555.46	2013-4-5	2014-4-4
8	Spectrum Analyzer	Agilent	E4404B	US41192833	2013-4-5	2014-4-4
9	6dB Attenuator	Atten	Attenuator	DC-4GHz	2013-4-5	2014-4-4
10	Digital Multimeter	Fluke	15B	91280239	2013-4-5	2014-4-4
11	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2013-4-9	2014-4-8
12	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2012-11-27	2013-11-26
13	Horn Antenna	SCHWARZBECK	BBHA9170	1562	2012-11-27	2013-11-26
14	Active Loop Antenna	DAZE	ZN30900A	1200	2013-4-5	2014-4-4
15	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2013-4-5	2014-4-4
16	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2013-4-5	2014-4-4
17	Spectrum Analyzer	R&S	FSP	100397	2012-11-2	2013-11-1
18	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2013-4-5	2014-4-4
19	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2013-4-5	2014-4-4
20	Wideband Peak Power Meter	Anritsu	ML2495A	0905011	2013-4-5	2014-4-4

3.7. Summary of Test Result

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	N/A
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS
FCC Per 47 CFR 2.1091(b)	MPE Evaluation	PASS

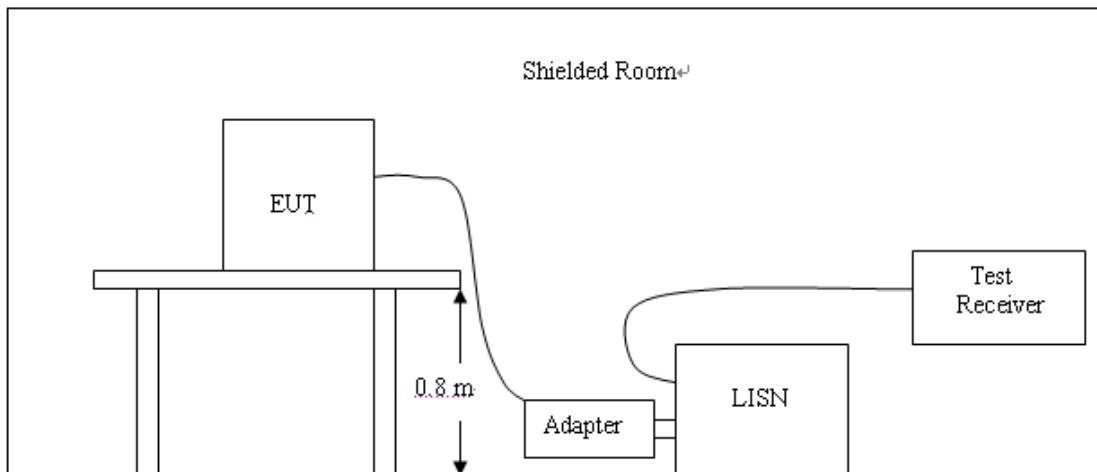
Remark: The measurement uncertainty is not included in the test result.



4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

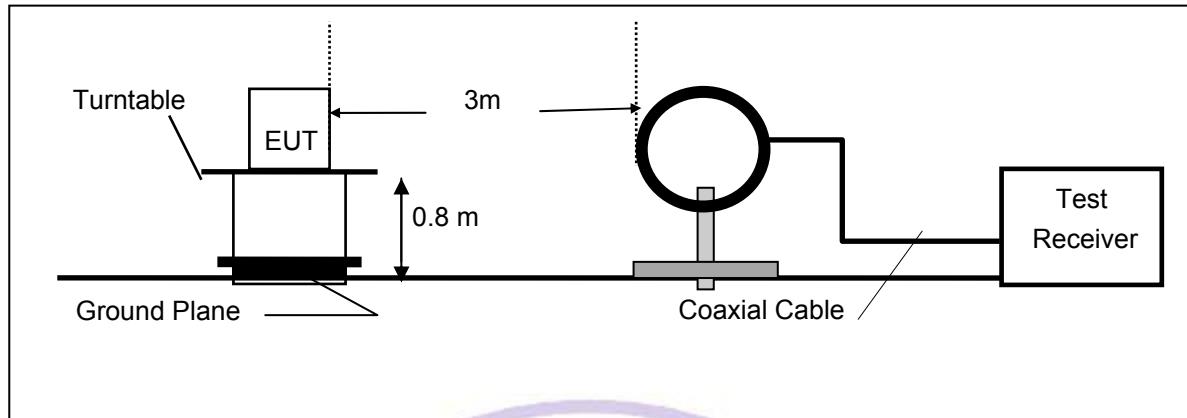
TEST RESULTS

Owing the device is powered by AA battery, not applicable to this device.

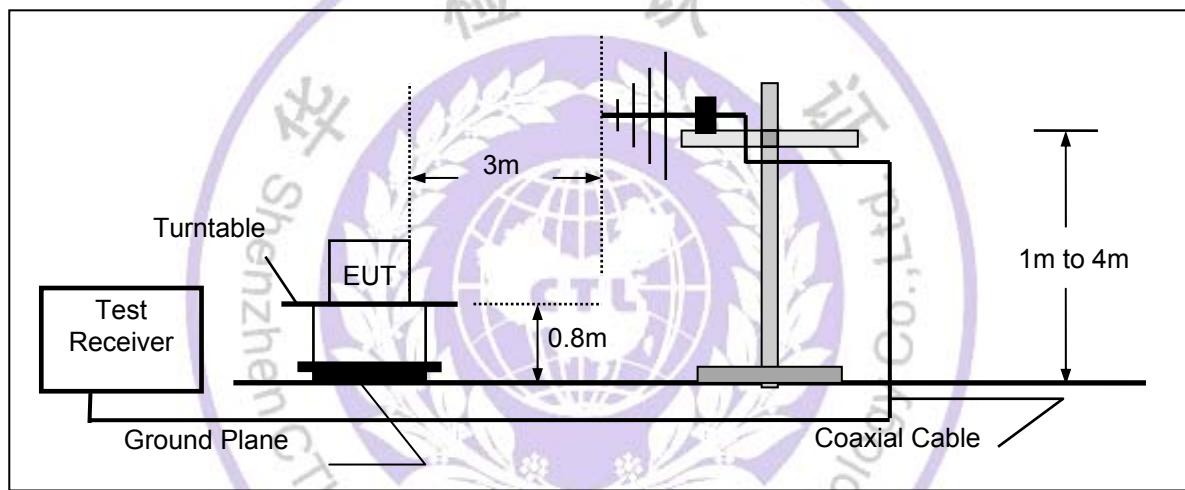
4.2. Radiated Emission Test

TEST CONFIGURATION

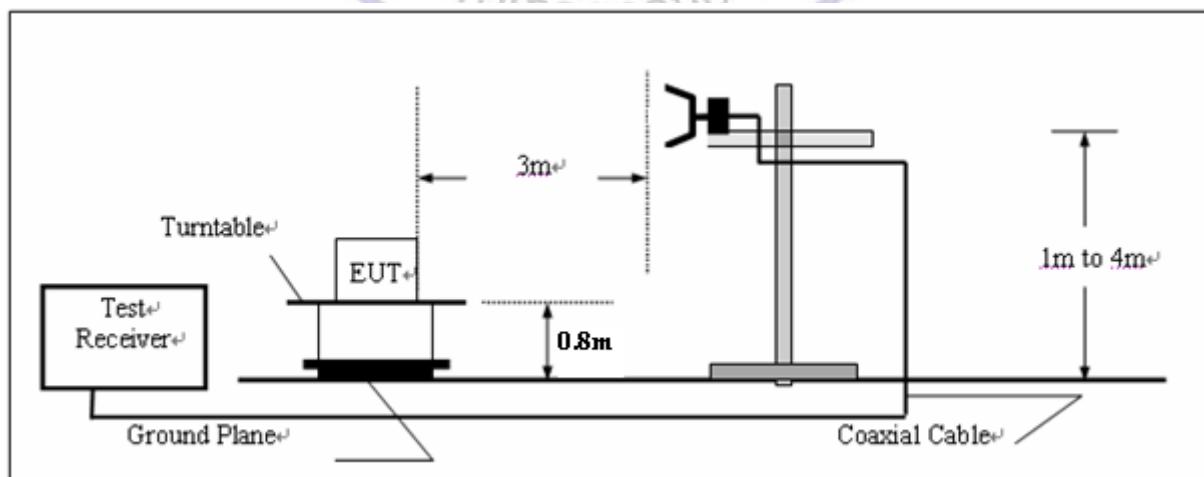
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS), the EUT was setup according to ANSI C63.4: and tested according to ANSI C63.10 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f > 1 GHz, 120 kHz for f < 1 GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Repeat above procedures until all frequency measurements have been completed.

Note:

When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60 degrees for H-plane and 90 degrees for E-plane.

LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

TEST RESULTS

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
01	H	2402.8	54.8	35.7	90.5	Fundamental	/	PK
	V	354.0	6.7	16.4	23.1	46	-22.9	QP
	V	539.3	4.9	20.9	25.8	46	-20.2	QP
	H	3122.5	44.3	-1.7	42.6	54(Note)	-11.4	PK
	V	4804.0	40.5	2.3	42.8	54(Note)	-11.2	PK
	V	7213.5	54.0	8.8	62.8	72.2	-9.4	PK
	V	7209.1	46.3	8.7	55.0	62.2	-7.2	AV
	H	24000.0	59.9	-8.9	51.0	54(Note)	-3.0	PK
39	H	2440.9	58.3	36.1	94.4	Fundamental	/	PK
	V	365.1	1.9	16.7	18.6	46	-27.4	QP
	V	539.3	4.0	21.0	25.0	46	-21.3	QP
	H	3122.5	44.8	-1.7	43.1	54(Note)	-10.9	PK
	H	4882.0	42.3	2.5	44.8	54(Note)	-9.2	PK
	V	7324.0	54.6	8.7	63.3	74	-10.7	PK
	V	7326.0	43.7	8.7	52.4	54	-1.6	AV
	H	24000.0	59.0	-8.9	50.1	54(Note)	-3.9	PK
78	H	2480.0	60.7	37.1	97.7	Fundamental	/	PK
	V	439.8	3.1	18.5	21.6	46	-24.4	QP
	V	539.3	3.9	20.9	24.8	46	-21.2	QP
	H	3122.5	44.0	-1.7	42.3	54(Note)	-11.7	PK
	H	4944.0	43.8	2.9	46.7	54(Note)	-7.3	PK
	V	7434.5	50.4	8.7	59.1	74	-14.9	PK
	V	7437.0	42.6	8.6	51.2	54	-2.8	AV
	H	24000.0	56.3	-8.9	47.4	54(Note)	-6.6	PK

Note

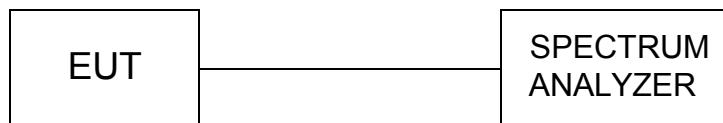
1: The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz, therefore no data appear in the report).

2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: According to FCC Part15.247(d). Radiated emission which don't fall in the restricted bands, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.3. 6dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

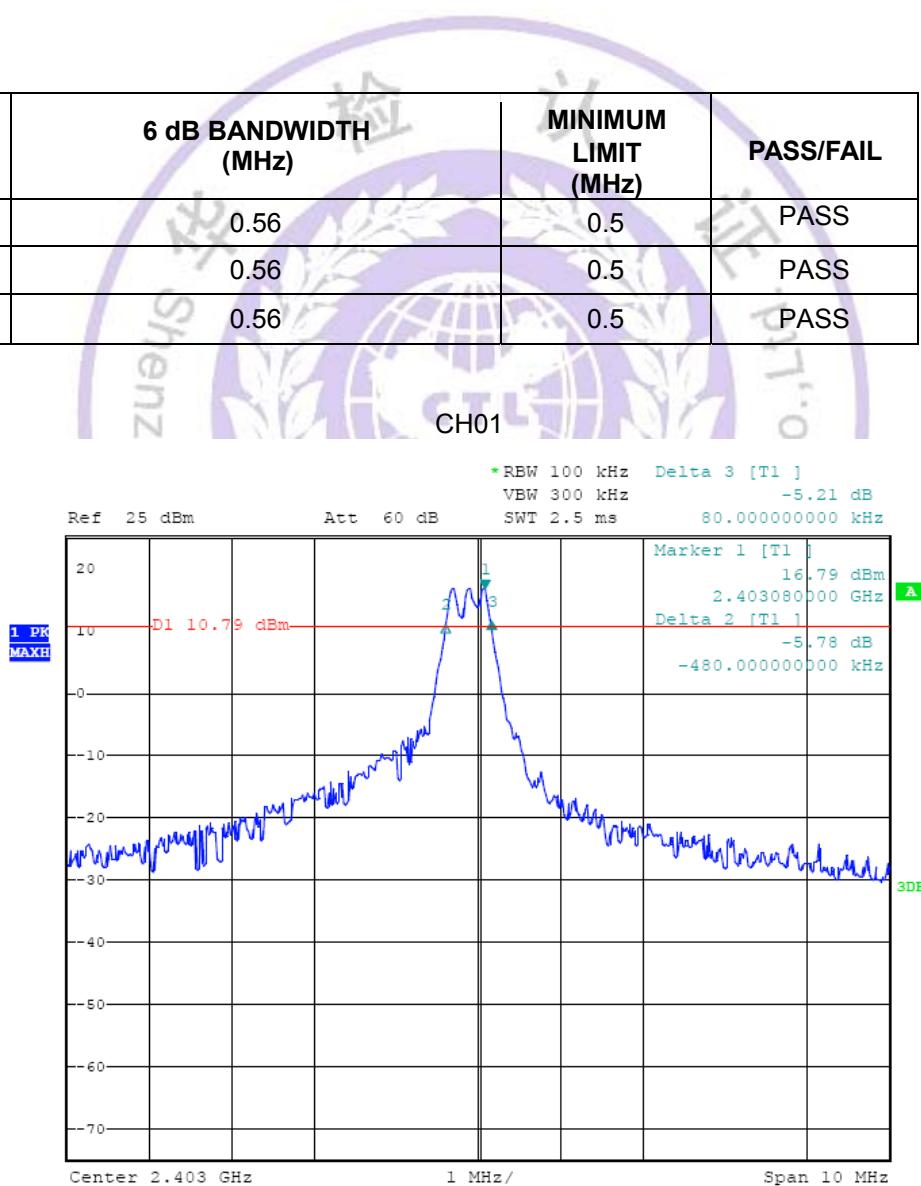
1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

LIMIT

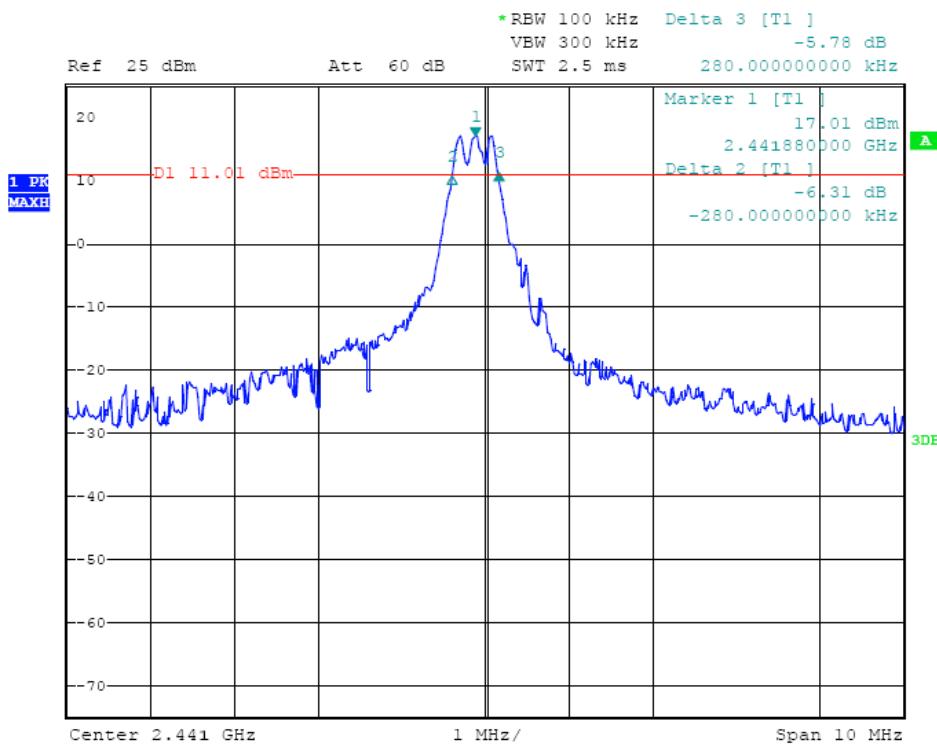
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

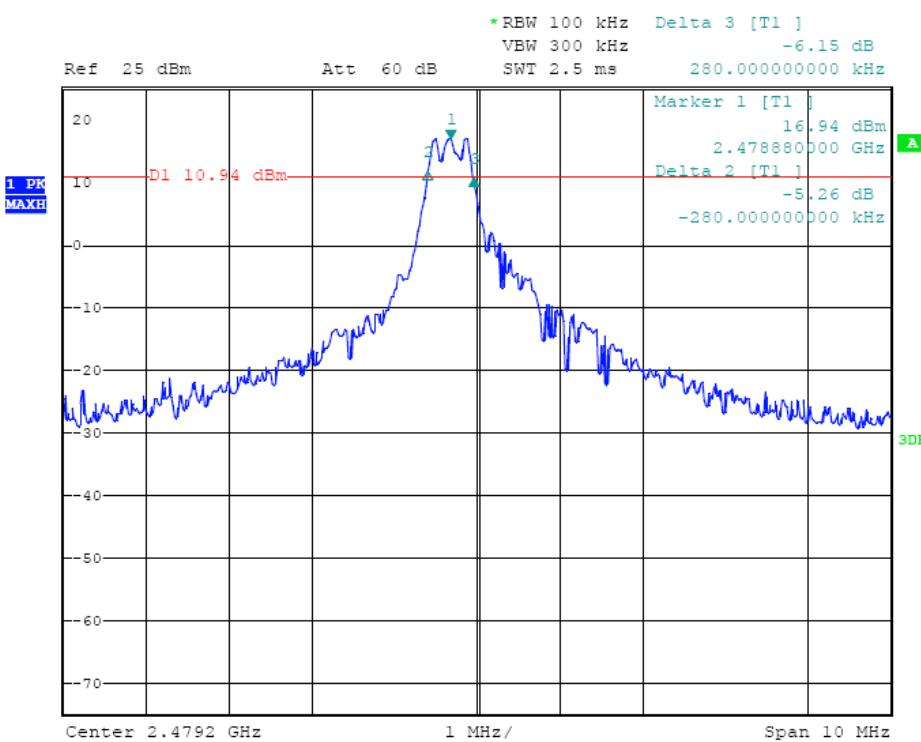
CHANNEL	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
01	0.56	0.5	PASS
39	0.56	0.5	PASS
78	0.56	0.5	PASS



CH39

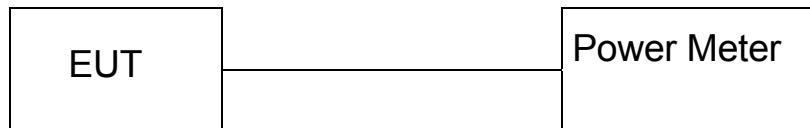


CH78



4.4. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2009 and KDB558074, The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the power meter to test peak power and record the result.

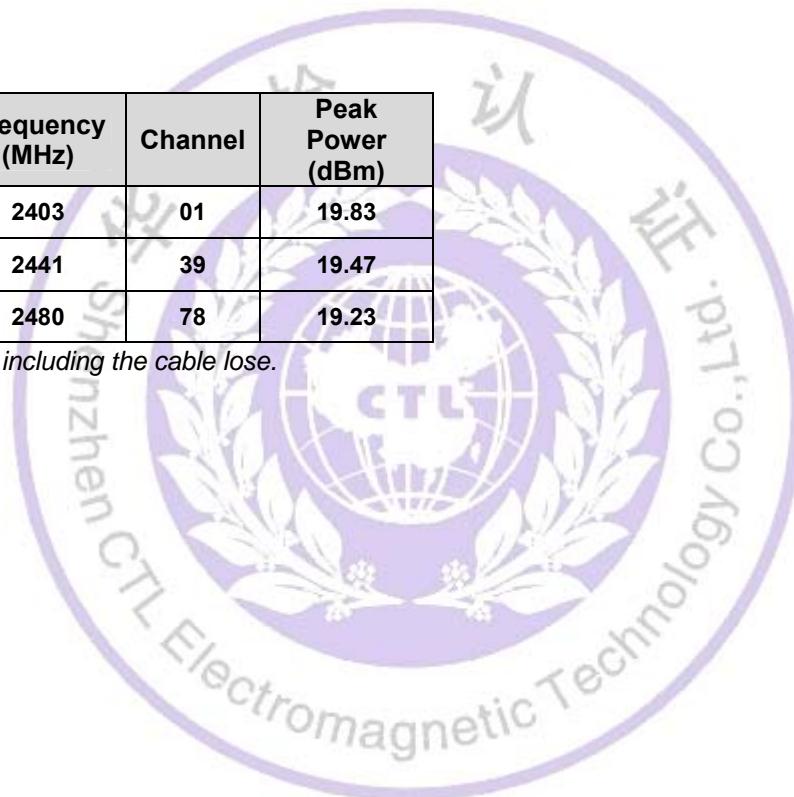
LIMIT

The Peak Output Power Measurement limits are 30dBm.

TEST RESULTS

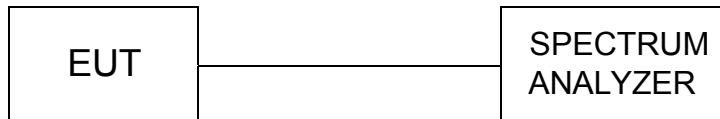
Test Mode	Frequency (MHz)	Channel	Peak Power (dBm)
TM1	2403	01	19.83
TM2	2441	39	19.47
TM3	2480	78	19.23

Note: The test results including the cable loss.



4.5. Band Edge Measurement

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS) with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100 kHz, to measure the conducted peak band edge.

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: Set Span for minimum 50 MHz - Reference Level: 110 dB μ V (corrected for gains and losses of test antenna factor, preamp gain and cable loss) - Attenuation: 10 dB
- Sweep Time: Coupled - Resolution Bandwidth: Up to and including 1 GHz = ≥ 100 kHz
- Resolution Bandwidth: Above 1 GHz = 1 MHz - Video Bandwidth: Below 1 GHz = 300 kHz
- Video Bandwidth: Up to and including 1 GHz = ≥ 3 MHz for peak and 10 Hz for average
- Detector: Peak

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

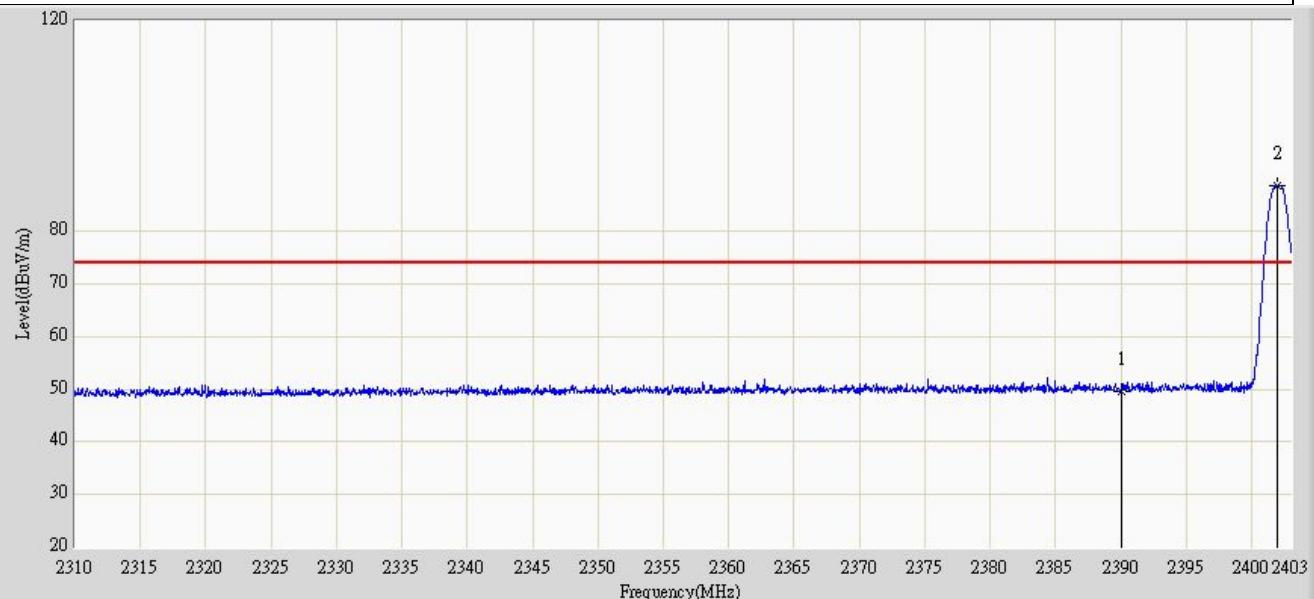
LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

Frequency (MHz)	Limit Average (dB μ V/m)	Limit Peak (dB μ V/m)
Below 2390 or Above 2483.5	54	74

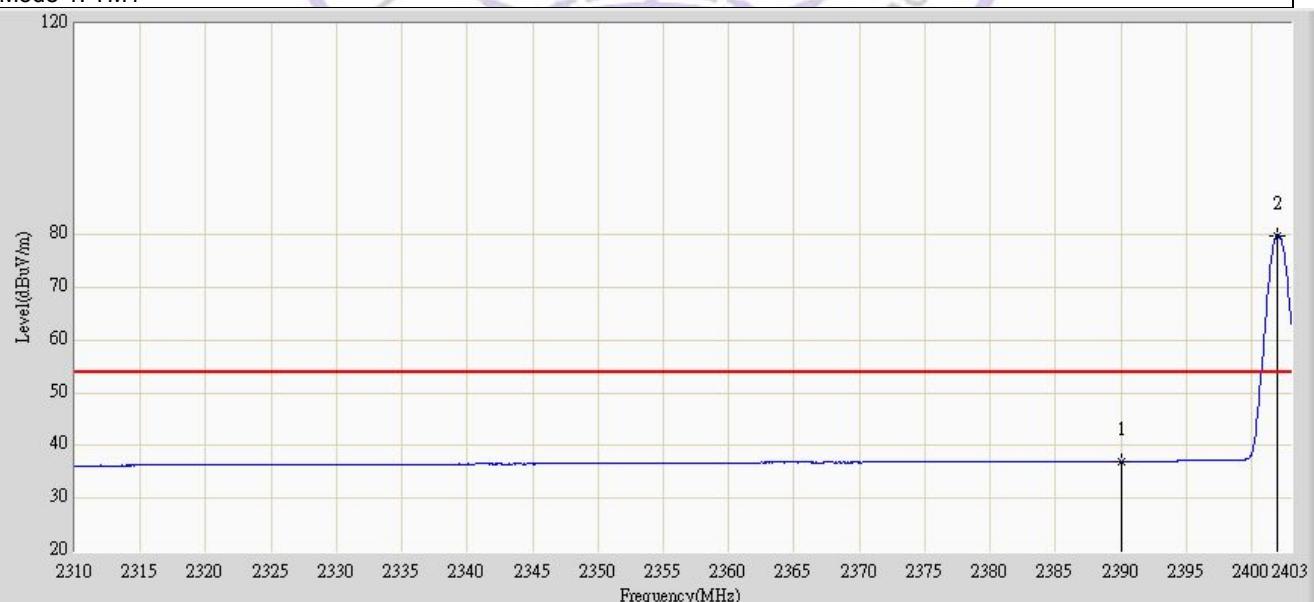
TEST RESULTS

Engineer: Brgant	Time: 2013/07/22 - 17:13
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM1	



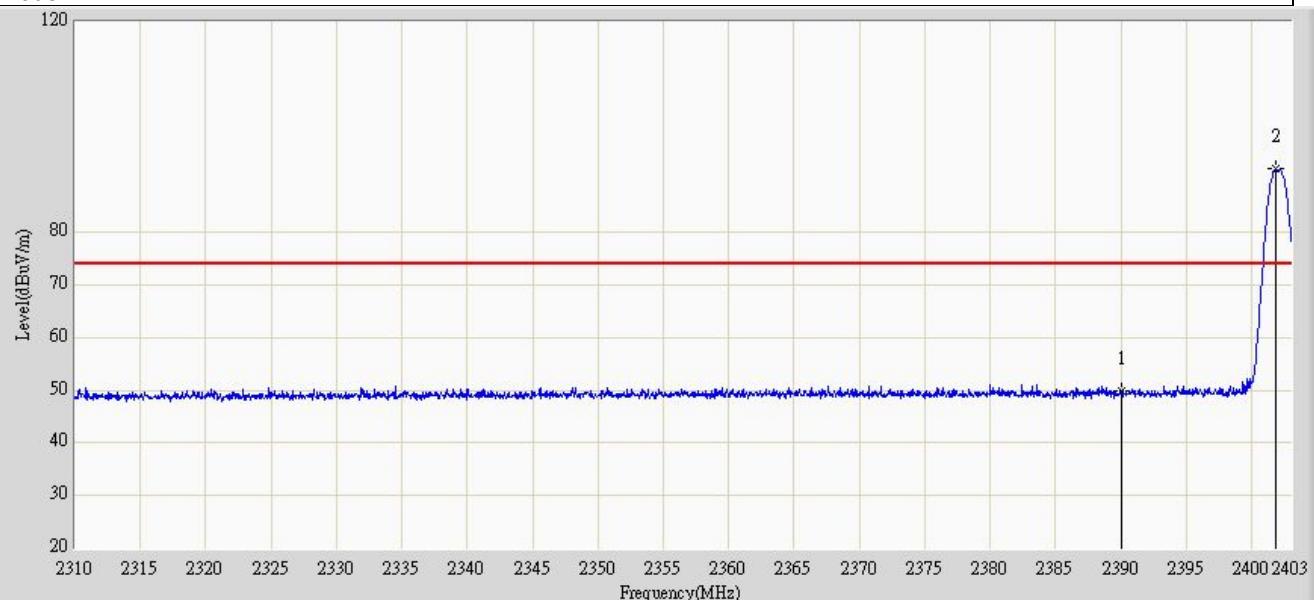
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	49.450	13.148	-24.550	74.000	36.302	PK
2	*	2402.930	89.641	53.241	N/A	N/A	36.400	PK

Engineer: Brgant	Time: 2013/07/22 - 17:31
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM1	



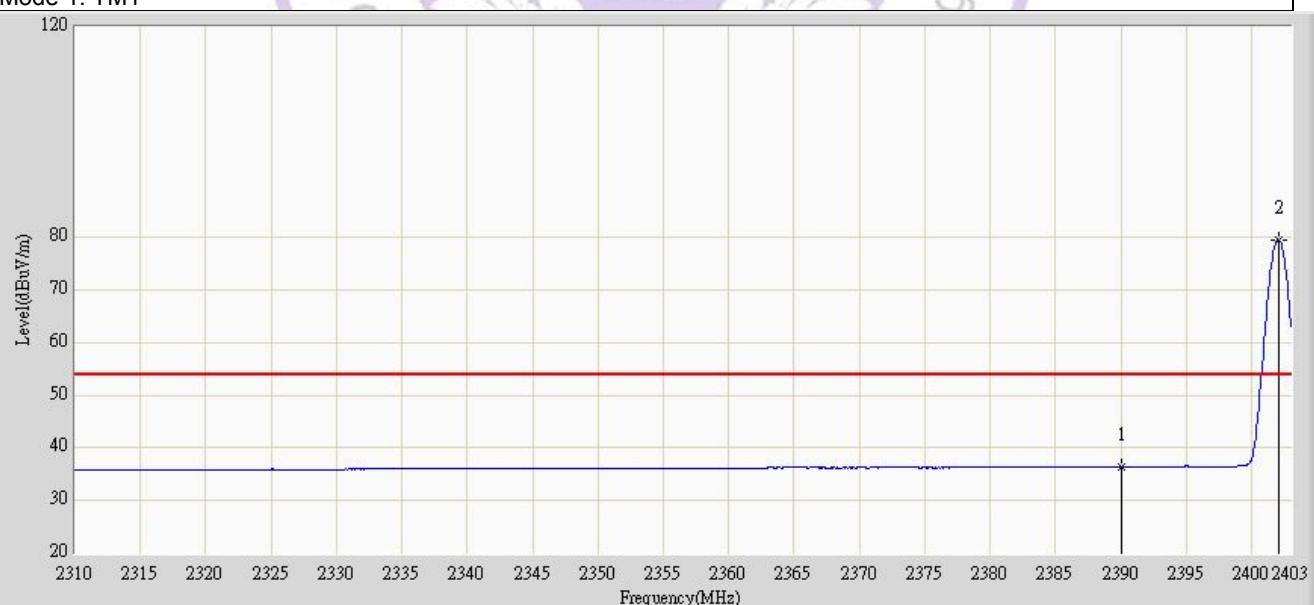
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	37.035	0.733	-16.965	54.000	36.302	AV
2	*	2402.930	79.382	42.982	N/A	N/A	36.400	AV

Engineer: Brgant	Site: AC5	Time: 2013/07/22 - 17:35
Limit: FCC_Part15.209_RE(3m)	Margin: 0	
Probe: BBHA_9120D_499(1-18GHz)	Polarity: Vertical	
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)	
Note: Mode 1: TM1		



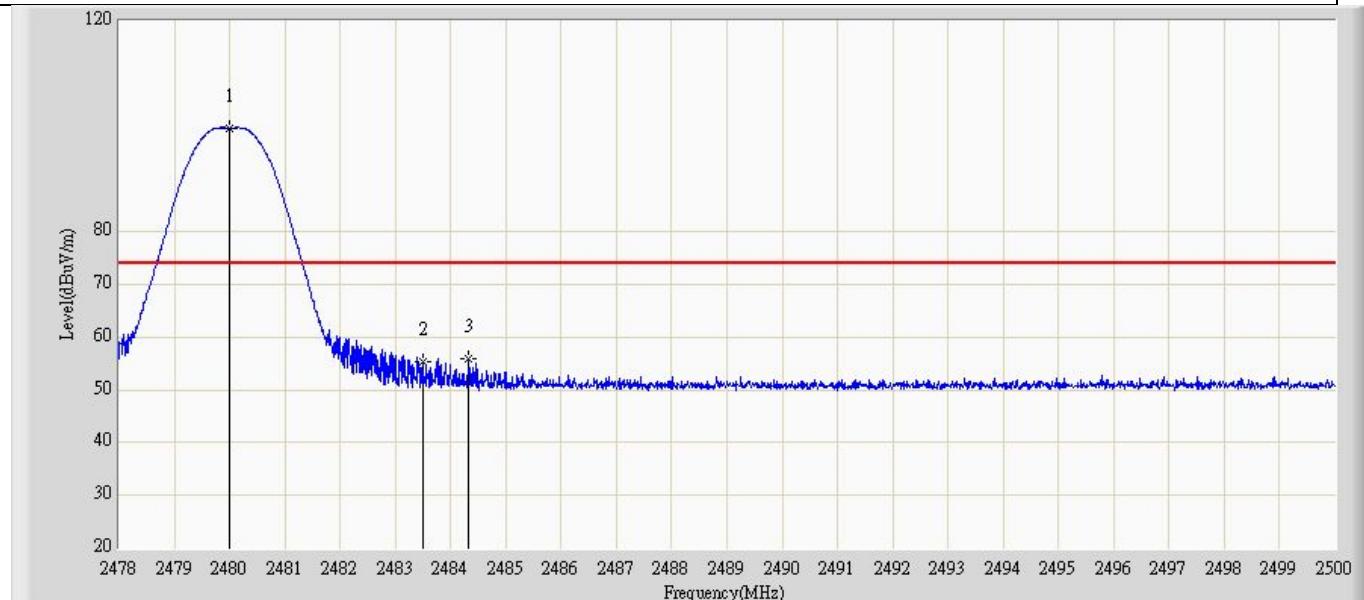
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	48.751	13.109	-25.249	74.000	35.642	PK
2	*	2402.837	93.218	57.526	N/A	N/A	35.692	PK

Engineer: Brgant	Site: AC5	Time: 2013/07/22 - 17:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0	
Probe: BBHA_9120D_499(1-18GHz)	Polarity: Vertical	
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)	
Note: Mode 1: TM1		



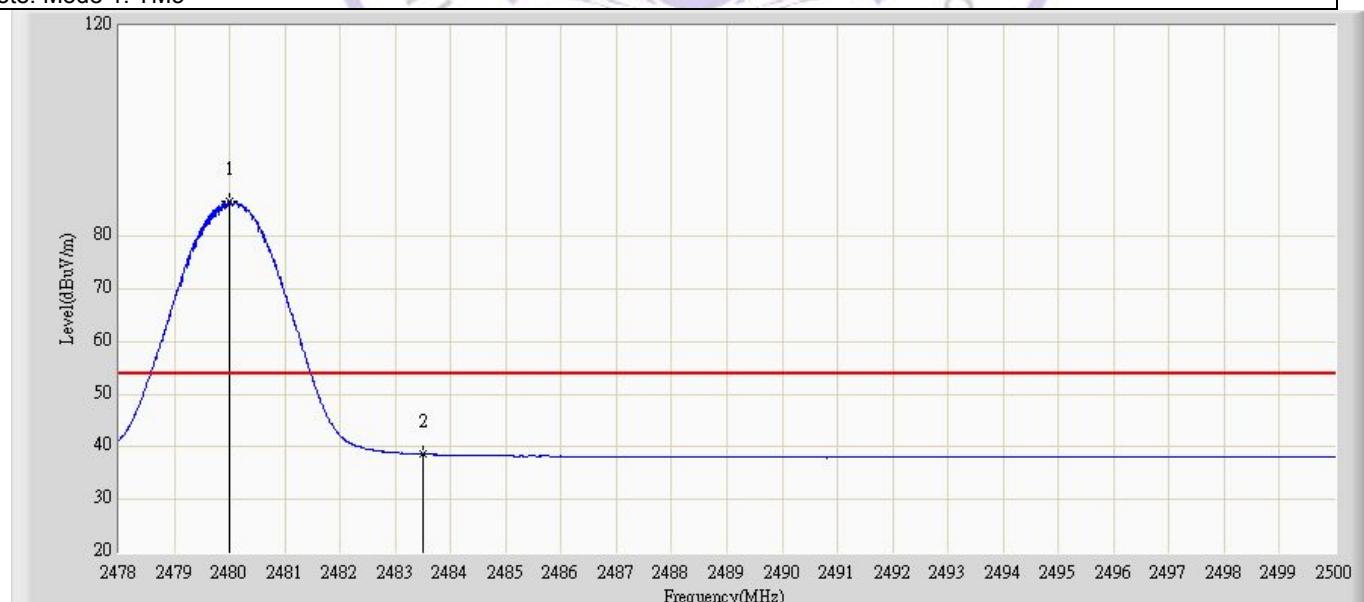
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	36.345	0.703	-17.655	54.000	35.642	AV
2	*	2403.070	78.563	42.871	N/A	N/A	35.692	AV

Engineer: Brgant	Time: 2013/07/22 - 17:33
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM3	



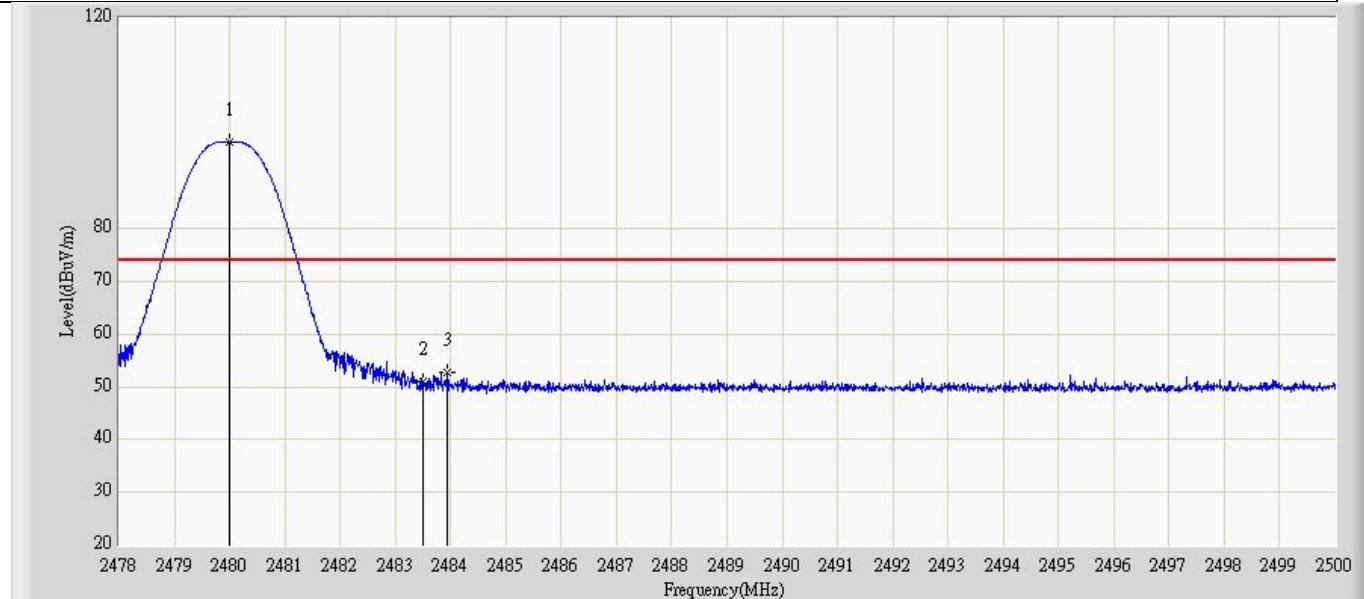
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.002	99.400	62.341	N/A	N/A	37.059	PK
2		2483.500	55.659	18.570	-18.341	74.000	37.089	PK
3		2484.325	55.530	18.470	-18.011	74.000	37.097	PK

Engineer: Brgant	Time: 2013/07/22 - 17:39
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM3	



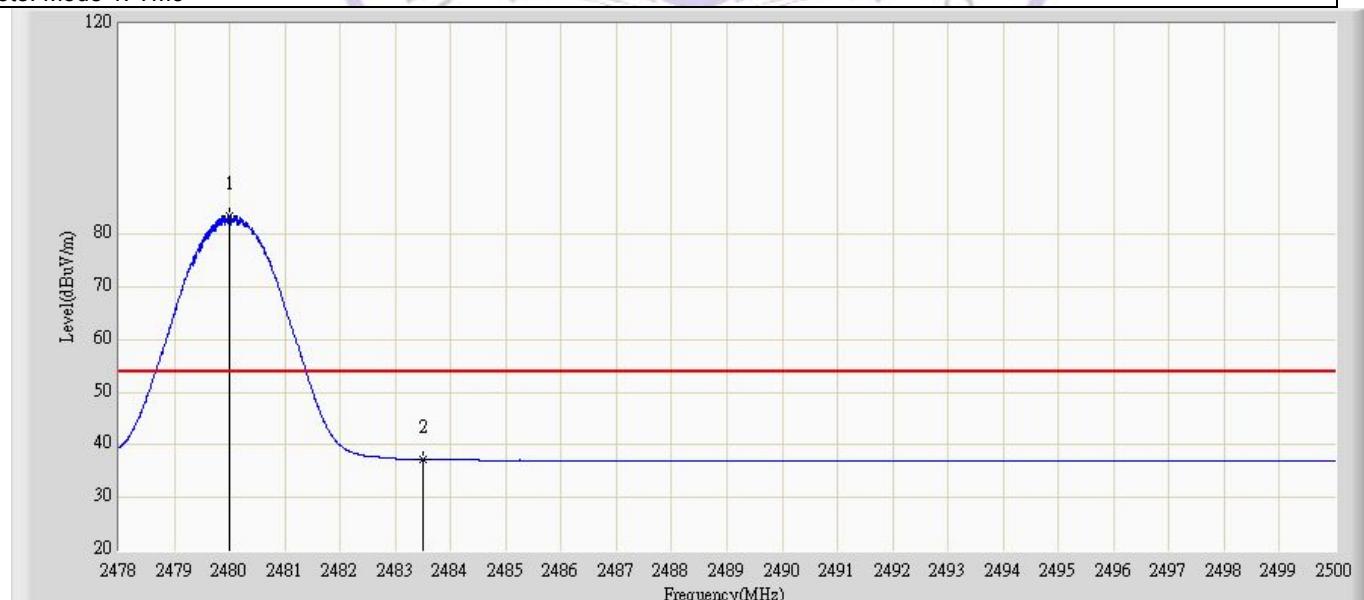
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.002	87.257	50.198	N/A	N/A	37.059	AV
2		2483.500	38.638	1.549	-15.362	54.000	37.089	AV

Engineer: Brgant	Time: 2013/07/22 - 17:39
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA_9120D_499(1-18GHz)	Polarity: Vertical
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM3	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.002	95.942	59.903	N/A	N/A	36.039	PK
2		2483.500	50.819	14.764	-23.181	74.000	36.055	PK
3		2483.929	52.871	16.813	-21.129	74.000	36.058	PK

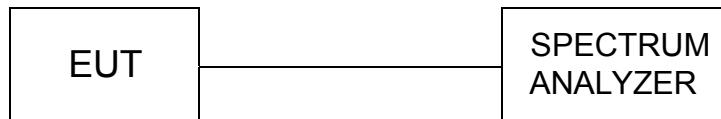
Engineer: Brgant	Time: 2013/07/22 - 17:43
Site: AC5	
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA_9120D_499(1-18GHz)	Polarity: Vertical
EUT: 2.4GHz Remote Control	Power: By battery(AA*8)
Note: Mode 1: TM3	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.002	81.762	45.723	N/A	N/A	36.039	AV
2		2483.500	36.997	0.942	-17.003	54.000	36.055	AV

4.6. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 V02 10/04/2012 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, VBW \geq 10KHz, SPAN to 1.5 times greater than the EBW,.

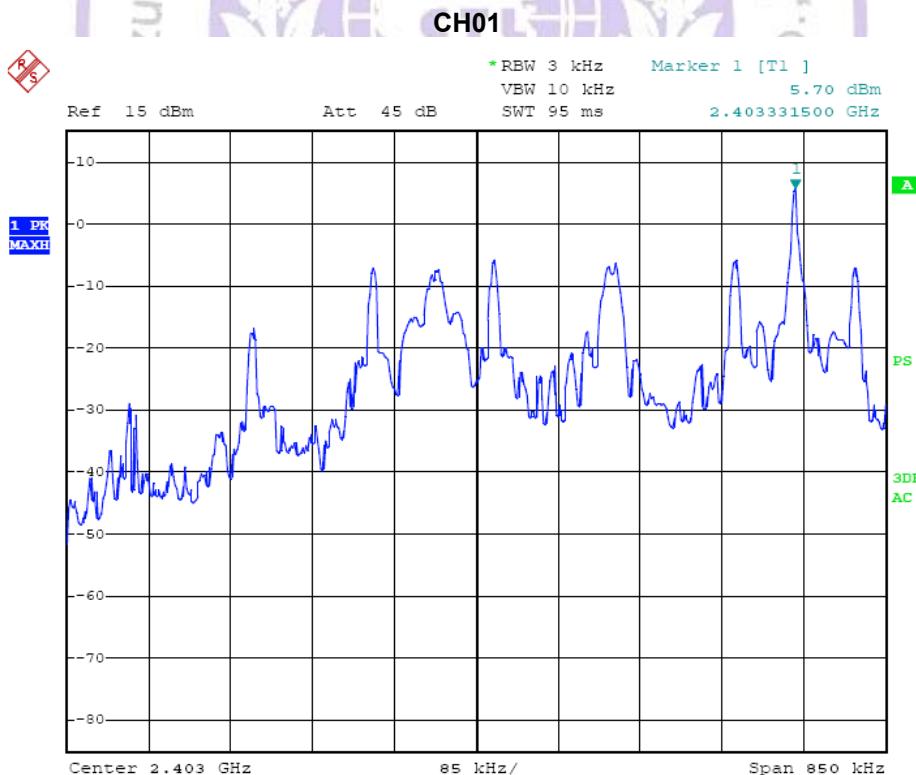
LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

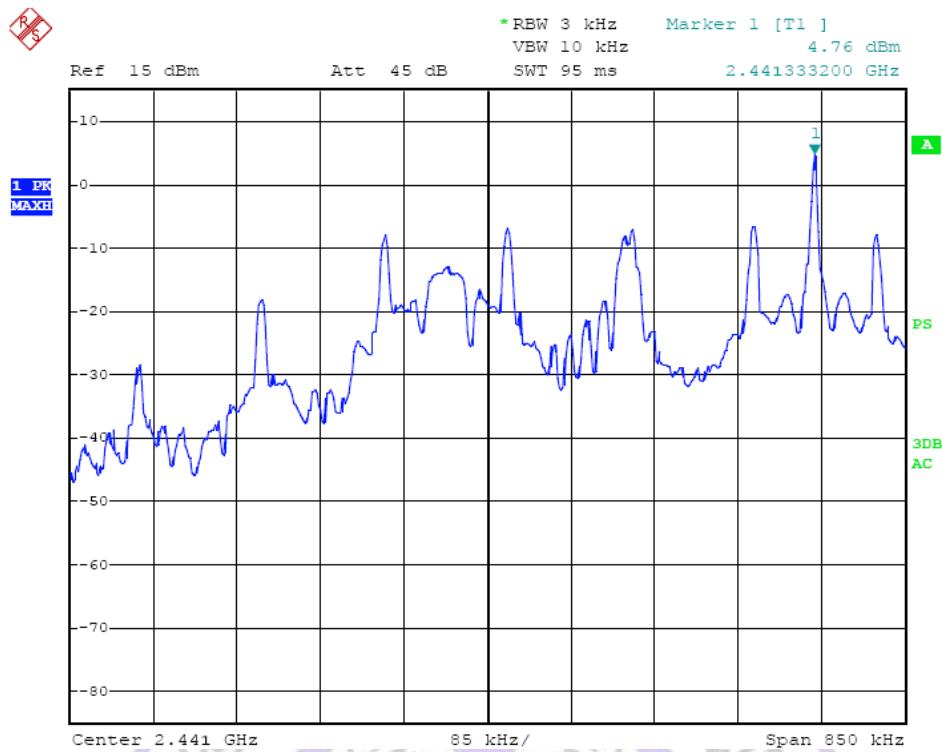
TEST RESULTS

Channel	Channel Frequency (MHz)	PSD (dBm/3KHz)	Maximum limit (dBm/3KHz)	PASS / FAIL
01	2403	5.70	8	PASS
39	2441	4.76	8	PASS
78	2480	3.49	8	PASS

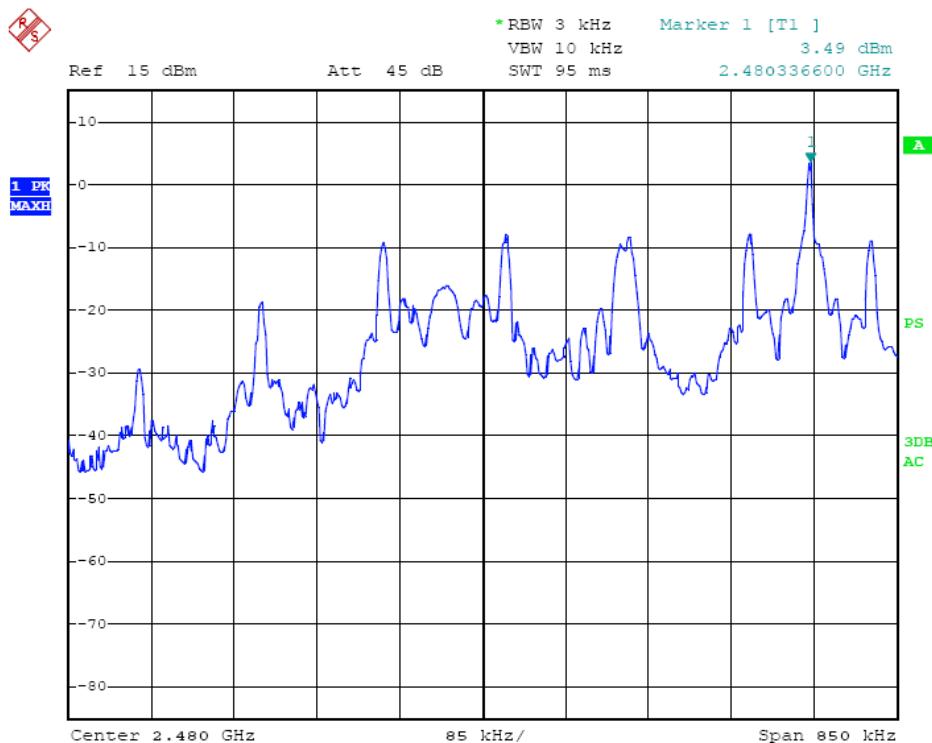
Note: The test result include cable loss.



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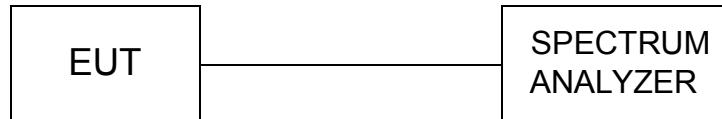


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4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 V02 10/04/2012 for compliance to FCC 47CFR 15.247 requirements.

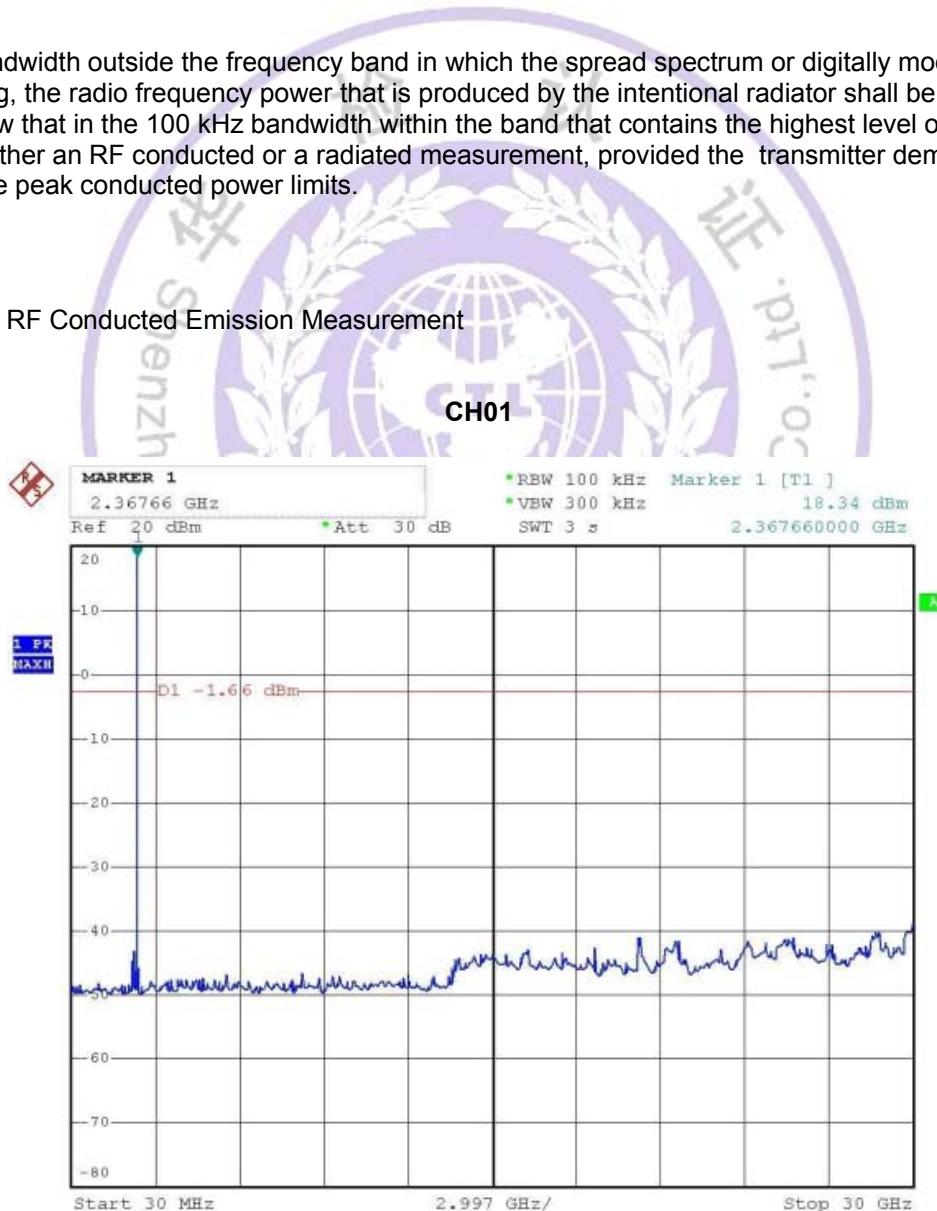
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequeny range from 30MHz to 26.5GHz.

LIMIT

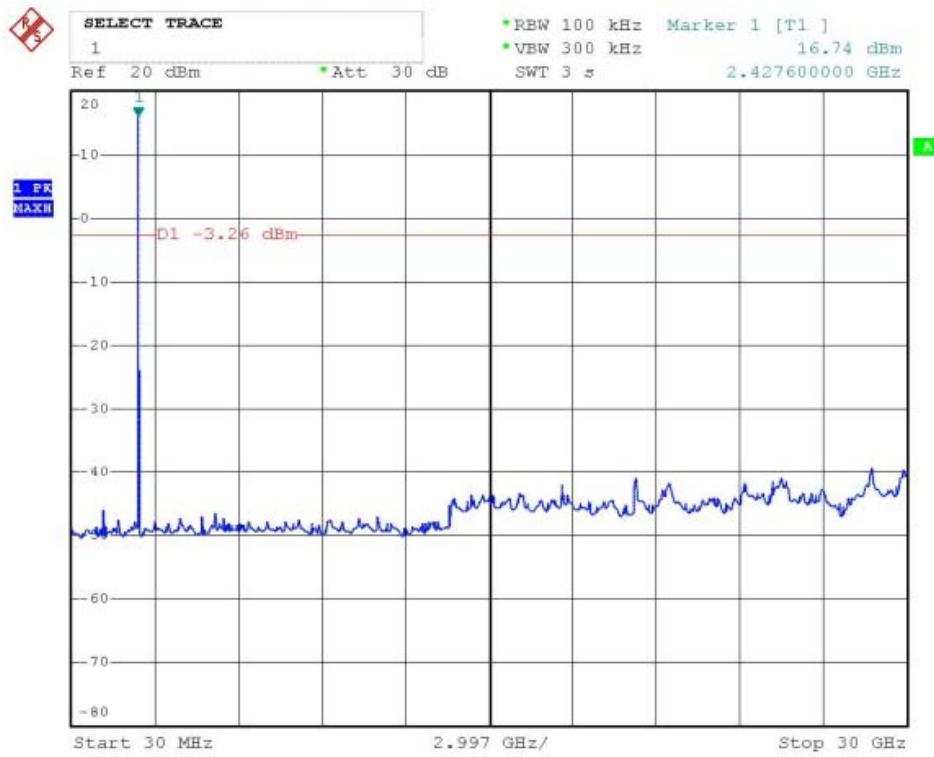
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

TEST RESULTS

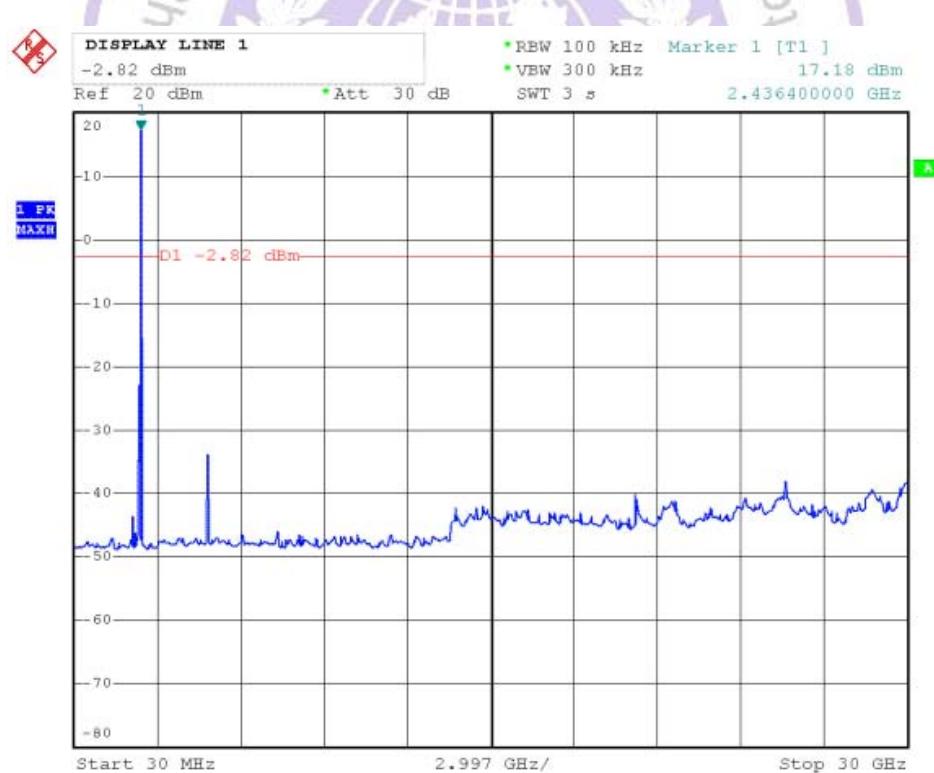
Photos of Spurious RF Conducted Emission Measurement



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4.8. Antenna Requirement

STANDARD APPLICABLE

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.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

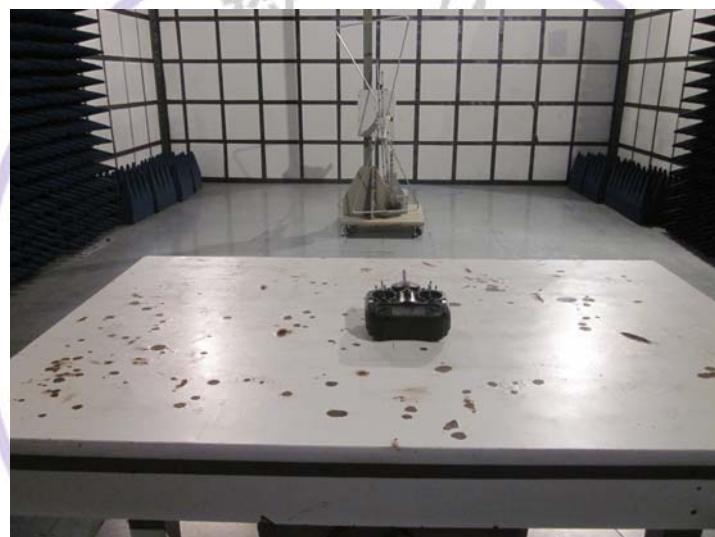
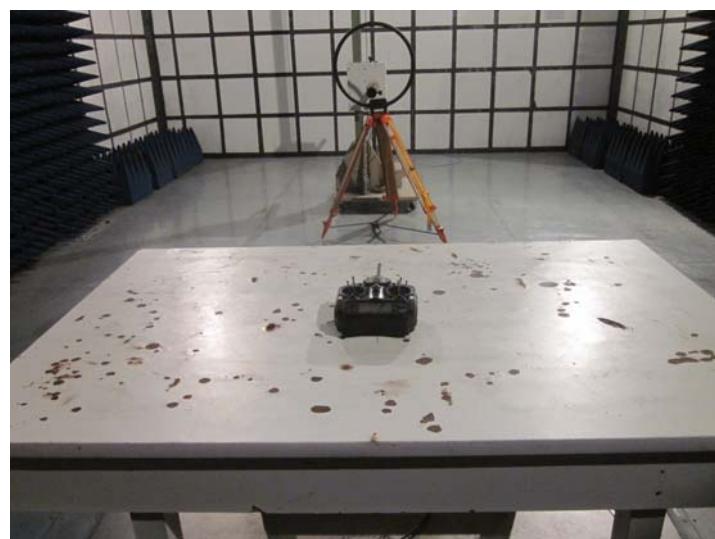
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

ANTENNA CONNECTED CONSTRUCTION

The directional gains of antenna used for transmitting is 2 dBi, and the antenna connector is designed as RP-SMA isotropic antenna and no consideration of replacement. Please see EUT photo for details.



5. Test Setup Photos of the EUT

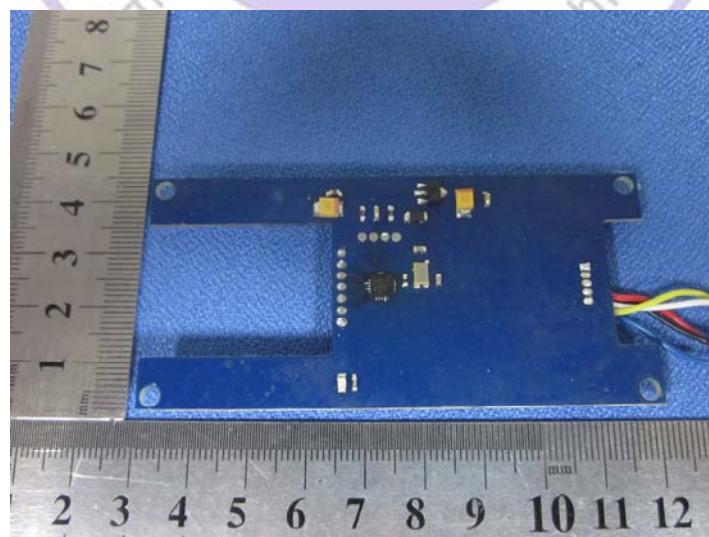
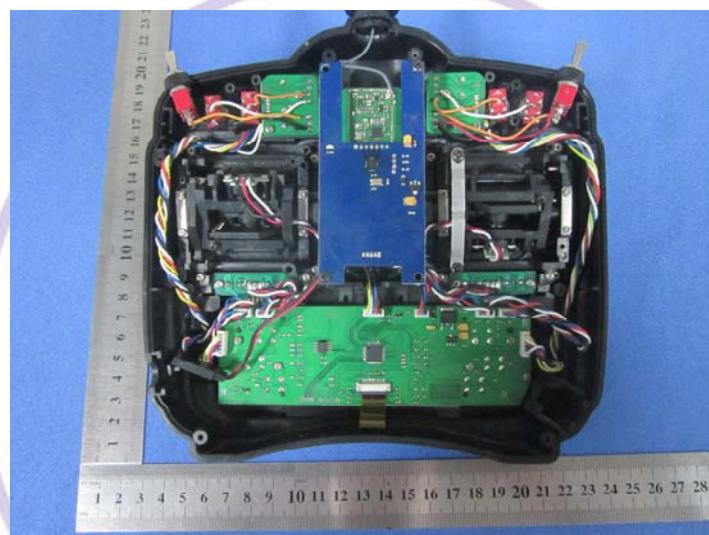


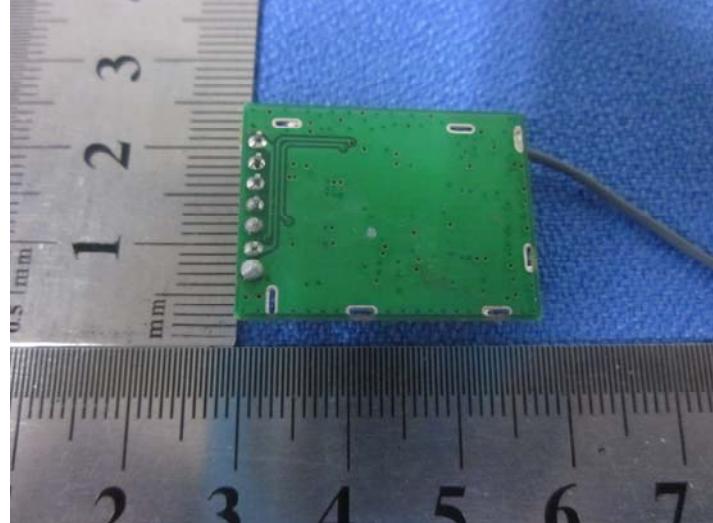
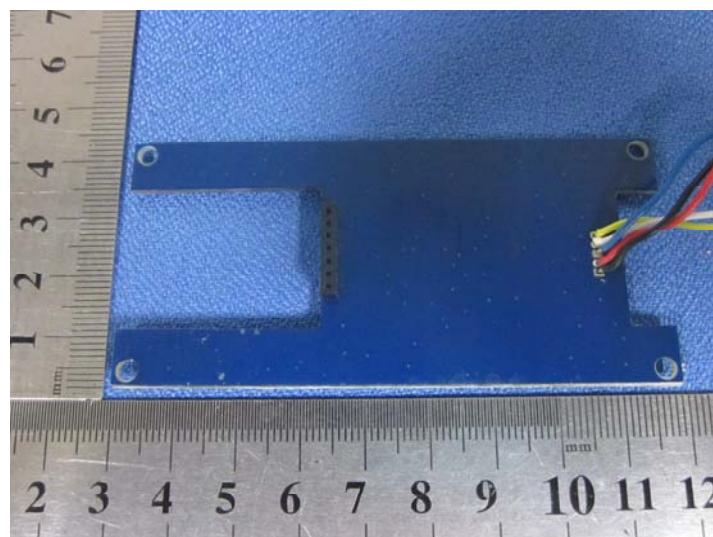
6. External and Internal Photos of the EUT

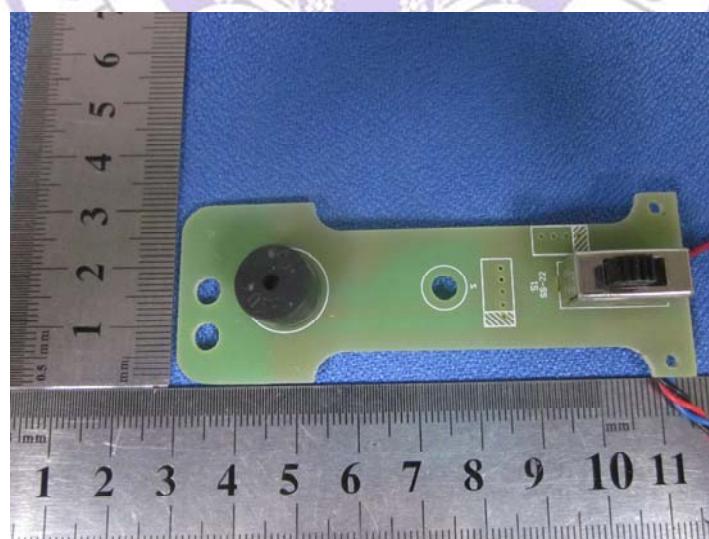
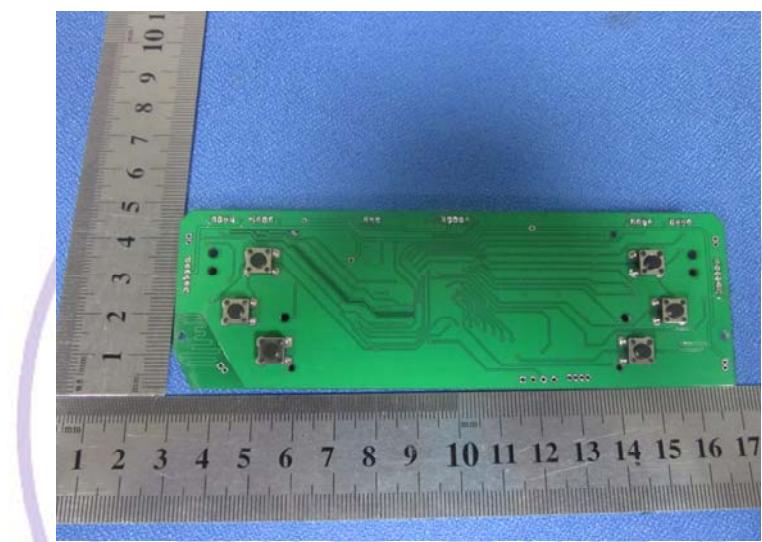
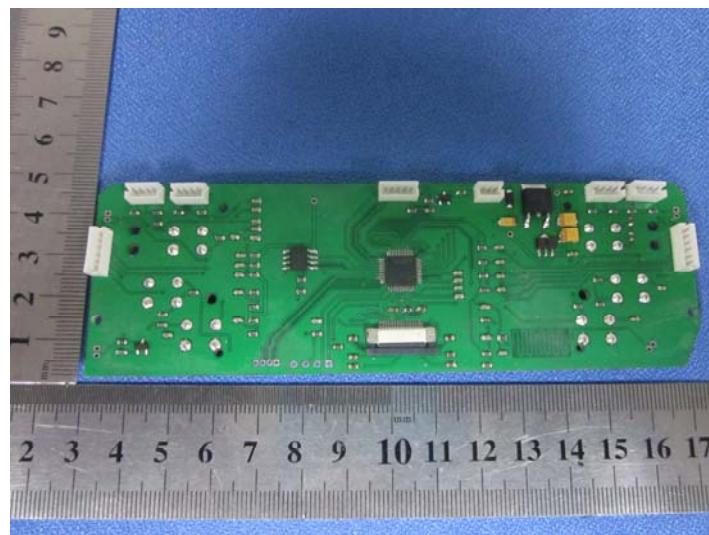
External Photos of EUT

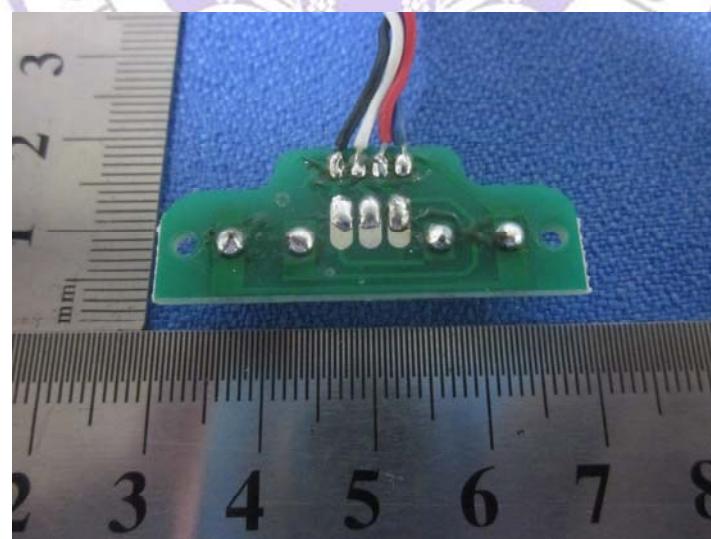
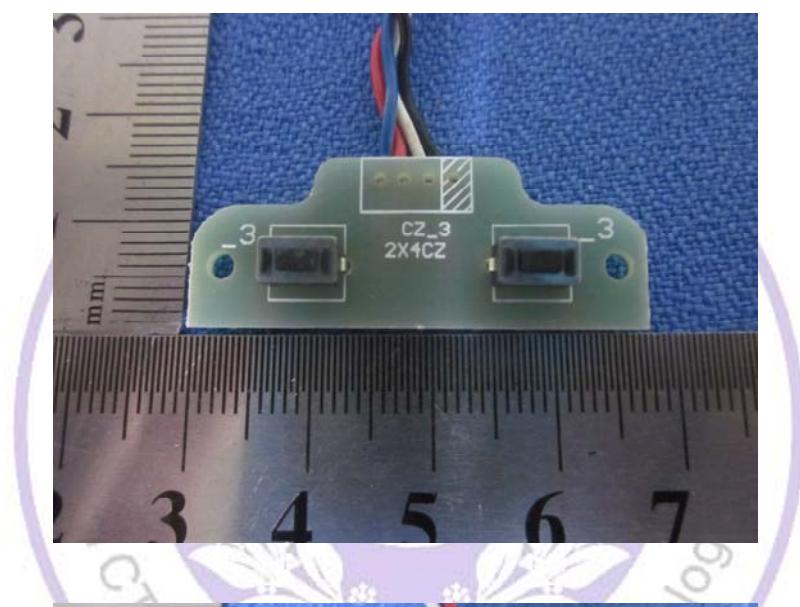
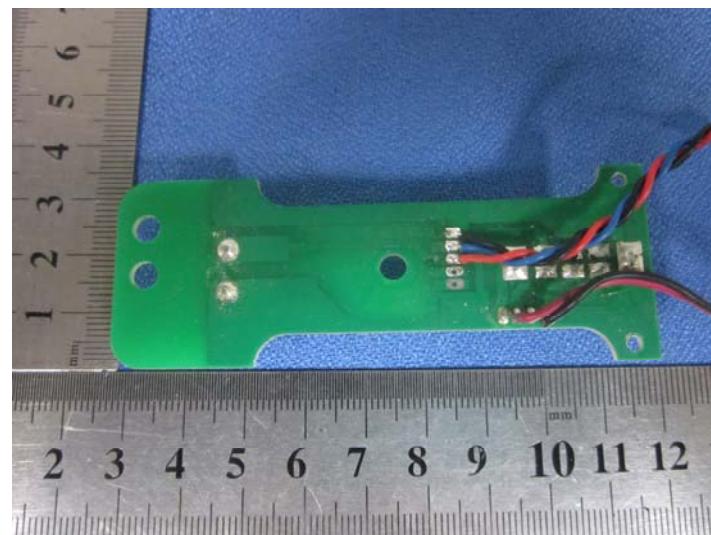


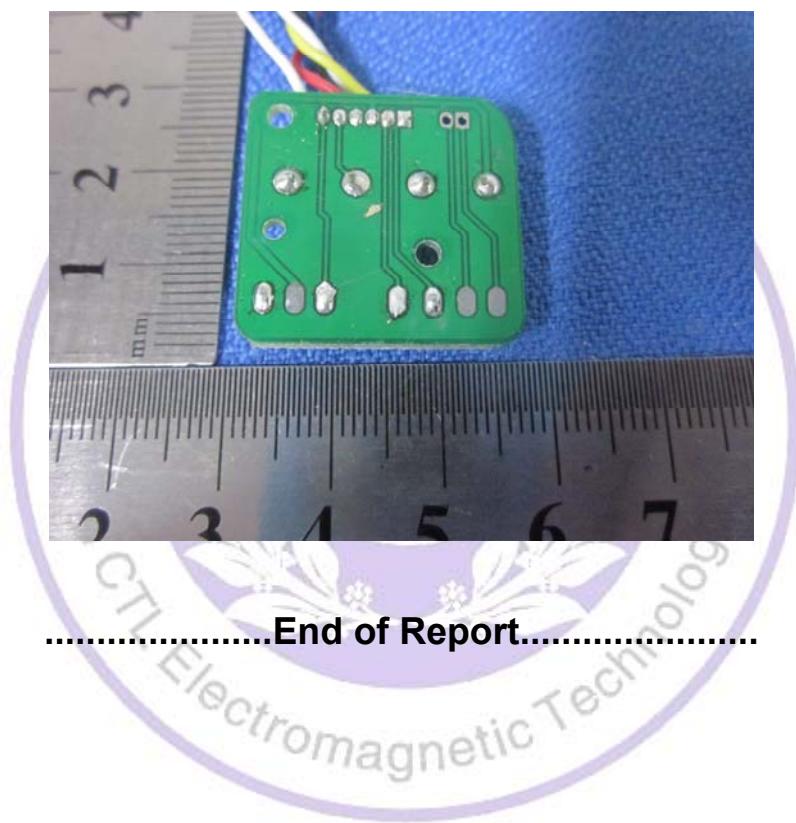
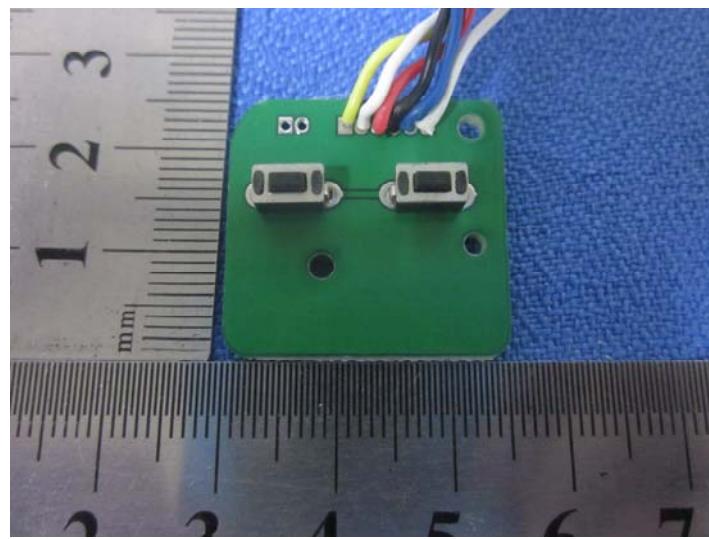


Internal Photos of EUT









.....End of Report.....