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## FCC PART 74H Test Report

**Report Reference No.**.....: **CTL1603040567-WF**

Compiled by

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Name of the organization performing the tests

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*Tracy Qi*

Date of issue.....: Mar. 15, 2016

**Testing Laboratory Name** .....: **Shenzhen CTL Testing Technology Co., Ltd.**

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

**Applicant's name**.....: **Shenzhen DSQN Investment Co., Ltd**

Address.....: 703 Room, Rujun Mansion, Banxuegang Road, Longgang District, Shenzhen, Guangdong Province, China

### Test specification:

Standard .....: **FCC Part 74 Subpart H—Low Power Auxiliary Stations**

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

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

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**Test item description** .....: Wireless microphone

Trade Mark .....:



Model/Type reference.....: UwMic10

Modulation.....: FM

Power Supply.....: DC 3.0V from battery(2\*AA)

Operating Frequency Range.....: From 614 MHz to 696 MHz

Result.....: **Positive**

**TEST REPORT**

<b>Test Report No. :</b>	<b>CTL1603040567-WF</b>	Mar. 15, 2016
		Date of issue

Equipment under Test : Wireless microphone

Model /Type : UwMic10

**Applicant** : **Shenzhen DSQN Investment Co., Ltd**

Address : 703 Room, Rujun Mansion, Banxuegang Road, Longgang District, Shenzhen, Guangdong Province, China

**Manufacture** : **Shenzhen DSQN Investment Co., Ltd**

Address : 703 Room, Rujun Mansion, Banxuegang Road, Longgang District, Shenzhen, Guangdong Province, China

<b>Test Result</b> according to the standards on page 4:	<b>Positive</b>
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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 74 Subpart H—Low Power Auxiliary Stations**

**TIA-603-C(2004)-Land Mobile FM or PM Communications Equipment Measurement and Performance Standards**

**FCC Part 2: FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS**

**ANSI C63.10-2013**

**ANSI C63.4-2014**



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Mar. 04, 2016
Testing commenced on	:	Mar. 04, 2016
Testing concluded on	:	Mar. 15, 2016

### 2.2. Equipment Under Test

#### Power supply system utilised

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

DC 3.0 V from battery (2\*AA)

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

The Wireless microphone, Model: UwMic10 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Wireless microphone
Model Number	UwMic10
FCC ID	2AHMBUWMIC10
Modulation Type	FM
Antenna Type	External
Frequency Range	From 614 MHz to 696 MHz

#### Channel list

Channel	Frequency (MHz)
1	614.560
2	614.970
3	615.380
...	....
94	652.690
95	653.100
96	653.510
97	656.510
98	656.920
99	657.330
...	...
196	694.640
197	695.050
198	695.460

**Test frequency list**

Channel	Frequency (MHz)
1	614.560
96	653.510
97	656.510
198	695.460

**2.4. EUT operation mode**

The EUT has been tested under typical operating condition.

**2.5. EUT configuration**

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

- - supplied by the manufacturer
- - supplied by the lab

**2.6. Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended for FCC ID: **2AHMBUWMIC10** filing to comply with the FCC Part 74H Rules.

**2.7. Modifications**

No modifications were implemented to meet testing criteria.





### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Shenzhen CTL Testing Technology Co., Ltd.  
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

#### **3.2. Test Facility**

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

##### **IC Registration No.: 9618B**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

##### **FCC-Registration No.: 970318**

Shenzhen CTL Testing Technology 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 970318, December 19, 2013.

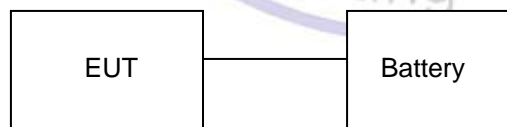
#### **3.3. Environmental conditions**

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

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

#### **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 Shenzhen CTL Electromagnetic Technology Co., 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 CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	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

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
ULTRA-ROADBAND ANTENNA	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Spectrum Analyzer	Agilent	N9020A	US46220290	2016/01/17	2017/01/16
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	Daze	ZN30900A	N/A	2015/05/19	2016/05/18
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
ISN	FCC	F-071115-1057-1-09	11229	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Transient Limiter	SCHWARZCECK	VTSD 9561F	9666	2015/06/02	2016/06/01
Radio Communication Tester	R&S	CMU200	115419	2015/05/22	2016/05/21
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2015/05/20	2016/05/19
Radio Communication Testset	HP	8920A	116250	2016/01/19	2017/01/18
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2015/05/20	2016/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19

**3.7. General Technical Requirements and Summary of Test Results**

FCC Rules	Description of Test	Test Result
FCC section 74.861(e)(1), FCC part 2, section 2.1046	RF Output Power	Complies
FCC section 74.861(e)(3) , FCC part 2, section 2.1047	Modulation Characteristic	Complies
FCC section 74.861(e)(5) , FCC part 2, section 2.1049	Emission Bandwidth	Complies
FCC section 74.861(e)(6) , FCC part 2, section 2.1051	Spurious Emission at Antenna Terminals	Complies
FCC section 74.861(e)(6) , FCC part 2, section 2.1053	Field Strength of Spurious Emission	Complies
Frequency Stability	FCC section 74.861(e)(4) , FCC part 2, section 2.1055	Complies



## 4. TEST CONDITIONS AND RESULTS

### 4.1. OUTPUT POWER MEASUREMENT

#### Measurement Procedure

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all test transmit frequencies were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as ( $P_r$ ).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier may be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss ( $P_{cl}$ ), the Substitution Antenna Gain ( $G_a$ ) and the Amplifier Gain ( $P_{Ag}$ ) should be recorded after test.  
The measurement results are obtained as described below:  
$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

#### Test Configuration

Figure 1 : Frequencies measured below 1 GHz configuration

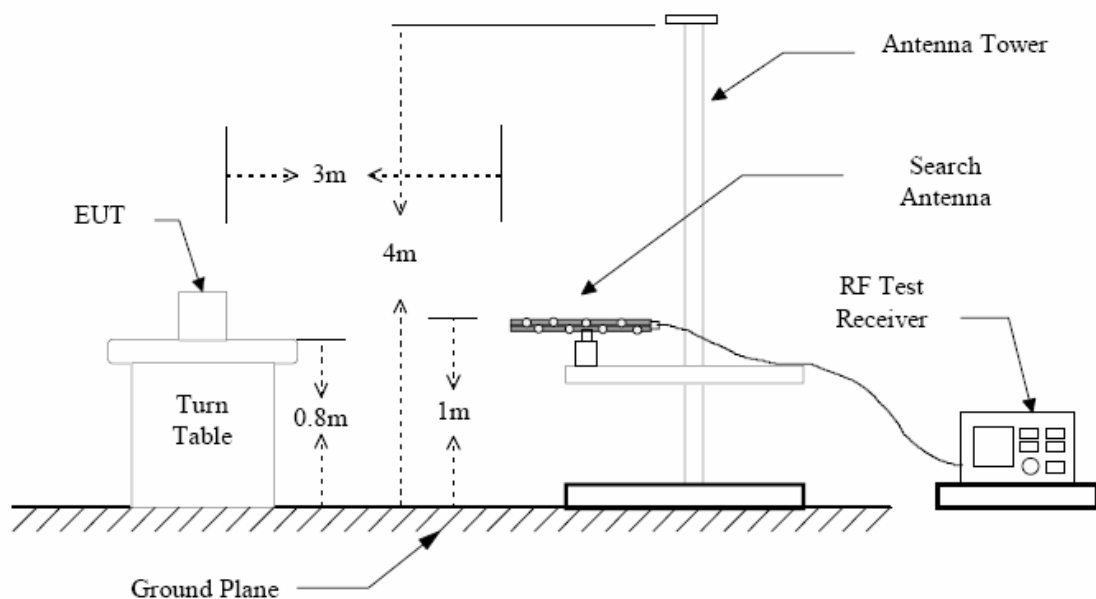
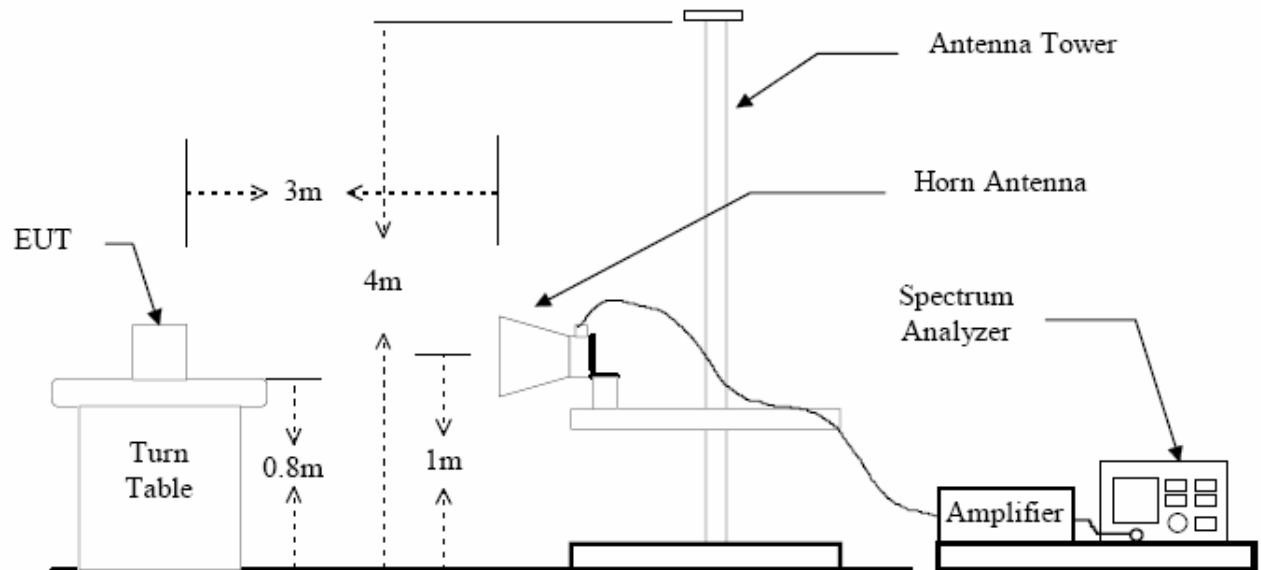


Figure 2 : Frequencies measured above 1 GHz configuration

**Limit**

According to §74.861(e)(1)(ii), the output power shall not exceed 250 milliwatts.

**TEST RESULTS**

Note: 1. The field strength of radiation emission was measured in the following position: EUT stand-up position (Zaxis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis was reported.

Test Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dBi)	Correction (dB)	P <sub>Ag</sub> (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
614.560	-31.07	2.42	8.01	2.15	36.13	8.50	24.00	15.50	H
	-30.02	2.42	8.01	2.15	36.13	9.55	24.00	14.45	V
653.510	-31.15	2.53	8.48	2.15	36.82	9.47	24.00	14.53	H
	-30.74	2.53	8.48	2.15	36.82	9.88	24.00	14.12	V
656.510	-30.88	2.53	8.53	2.15	36.82	9.79	24.00	14.21	H
	-30.18	2.53	8.53	2.15	36.82	10.49	24.00	13.51	V
695.460	-30.47	2.78	8.86	2.15	37.05	10.51	24.00	13.49	H
	-30.04	2.78	8.86	2.15	37.05	10.94	24.00	13.06	V

Remark:

- $EIRP = P_{Mea}(dBm) + P_{Ag}(dB) - P_{cl}(dB) + G_a(dBi)$
- $ERP = EIRP - 2.15dBi$  as EIRP by subtracting the gain of the dipole.

## 4.2. MODULATION CHARACTERISTICS

### Measurement Procedure

#### A) Modulation Limit

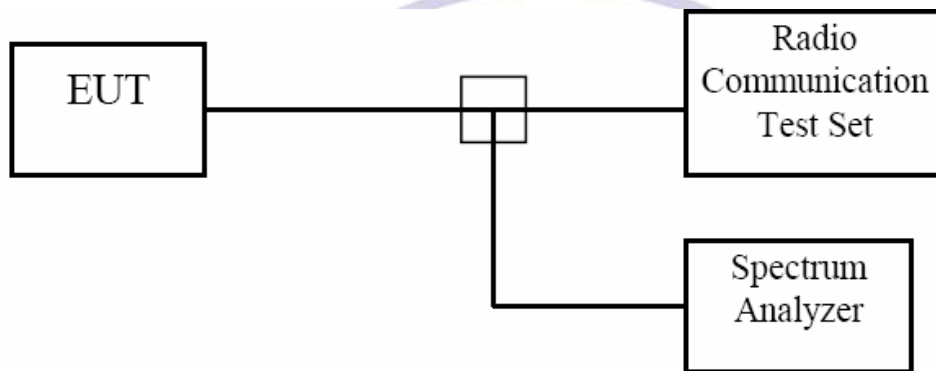
1. Position the EUT as shown in figure 3, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

#### B) Frequency response of all circuits

1. Position the EUT as shown in figure 3.
2. Vary the modulating frequency from 100 Hz to 15000 Hz with constant input voltage (derived from 4.3 of this test report), and observe the change in output.

### Test Configuration

Figure 3: Modulation characteristic measurement configuration



### Limit

Test Standard: FCC Part 74.861(e)(3)

Any form of modulation may be used. A maximum deviation of  $\pm 75$  kHz is permitted when frequency modulation is employed.

Test Standard: FCC Part 2.1047(a) & (b)

(a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

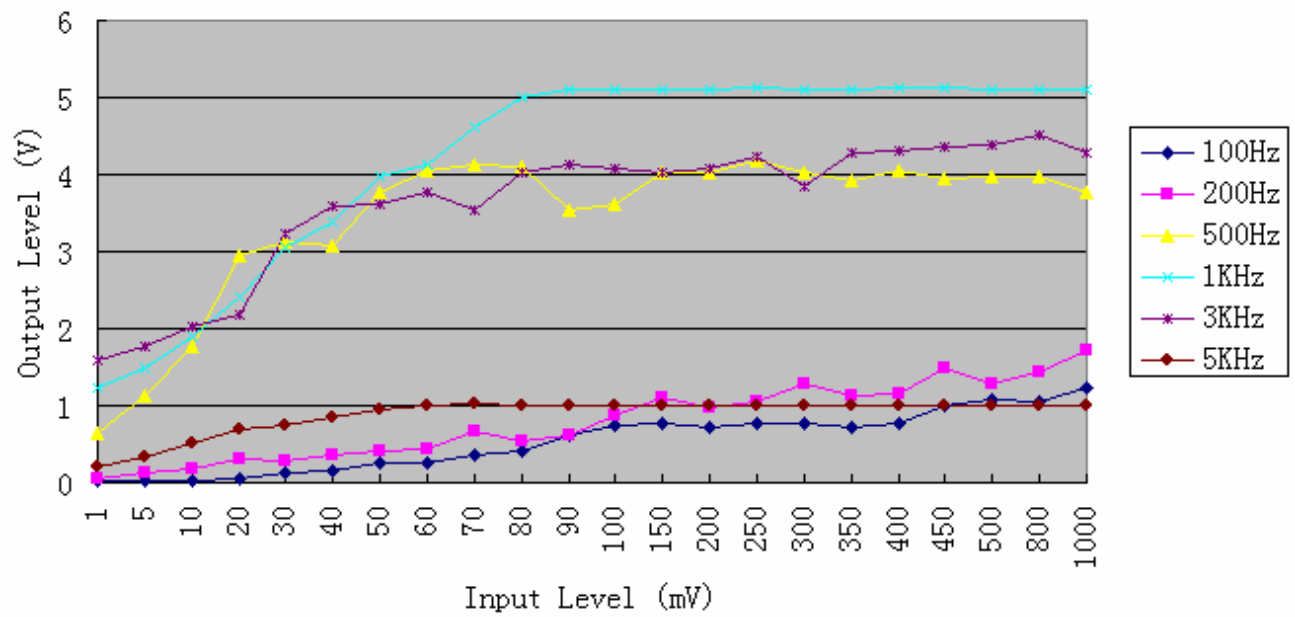
(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

### TEST RESULTS

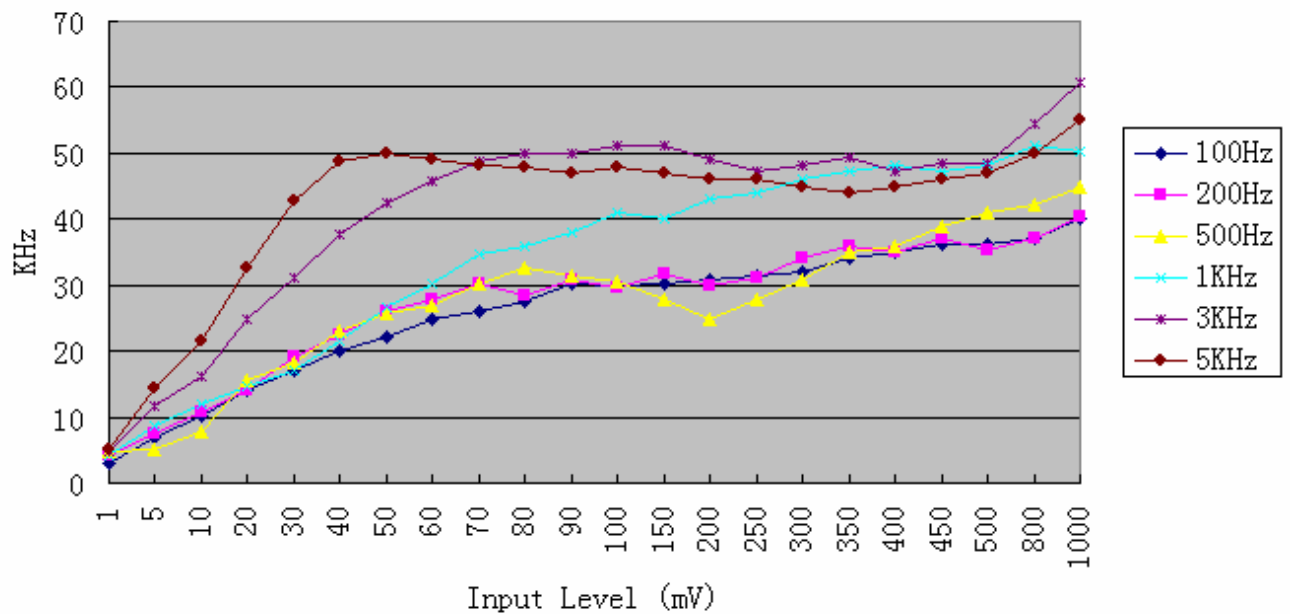
**RF Frequency: 614.560MHz**

**Frequency response:**



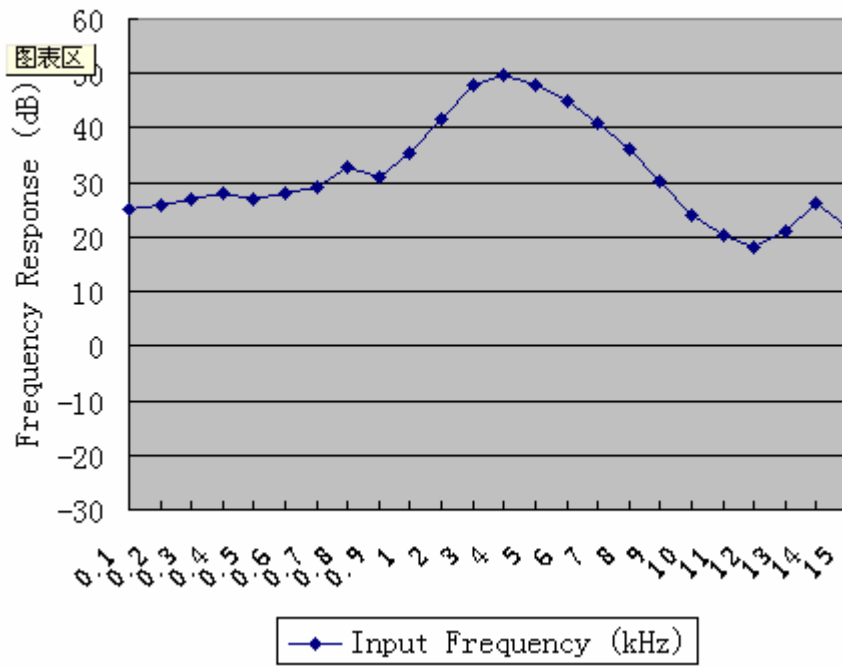


Modulation Limit:





## Frequency response of all circuits:



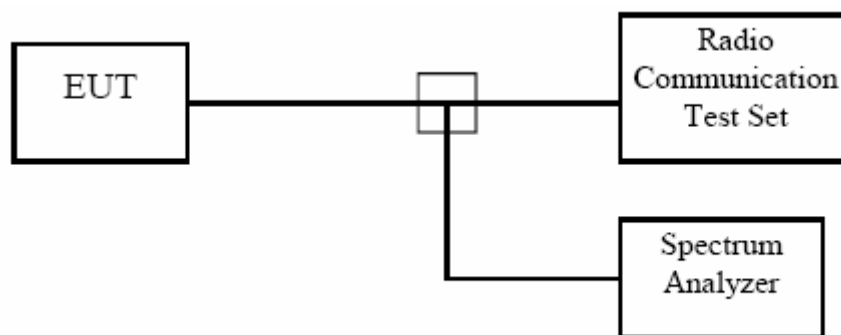
### 4.3. OCCUPIED BANDWIDTH OF EMISSION

#### Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4, and Install new batteries in the EUT. Turn on the EUT and set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Apply a 2.5 kHz modulation signal to EUT and measure the frequencies of the modulated signal from the EUT where it is the specified number of dB below the reference level set in step 2. This is the occupied bandwidth specified.

#### Test Configuration

Figure 4: Occupied bandwidth measurement configuration



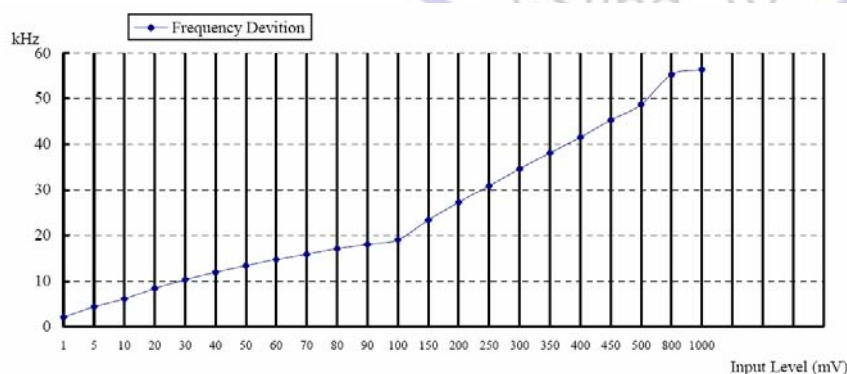
#### Limit

According to §2.1049 (c)(1), For radiotelephone transmitter, other than single sideband or independent sideband transmitter, when modulated by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. According to §74.861 (e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

#### TEST RESULTS

**RF Frequency : 615.560MHz**

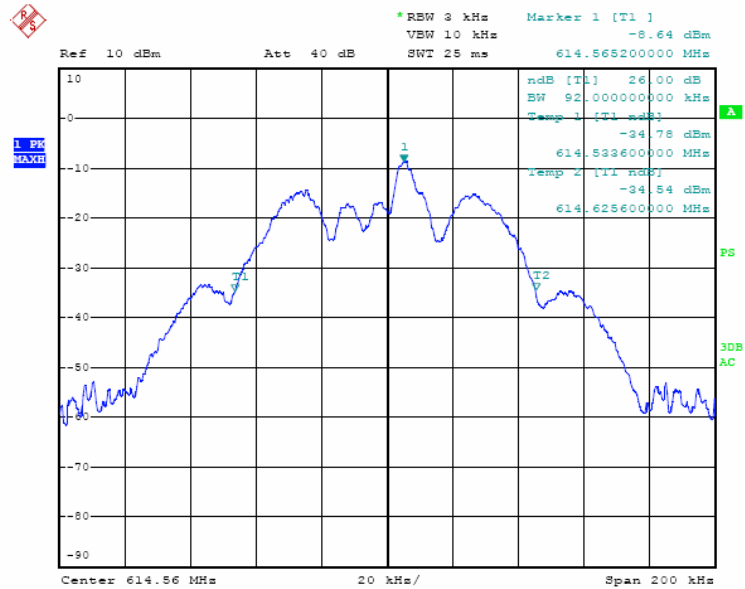
**Input Audio Frequency: 2.5 kHz, Sine Wave**



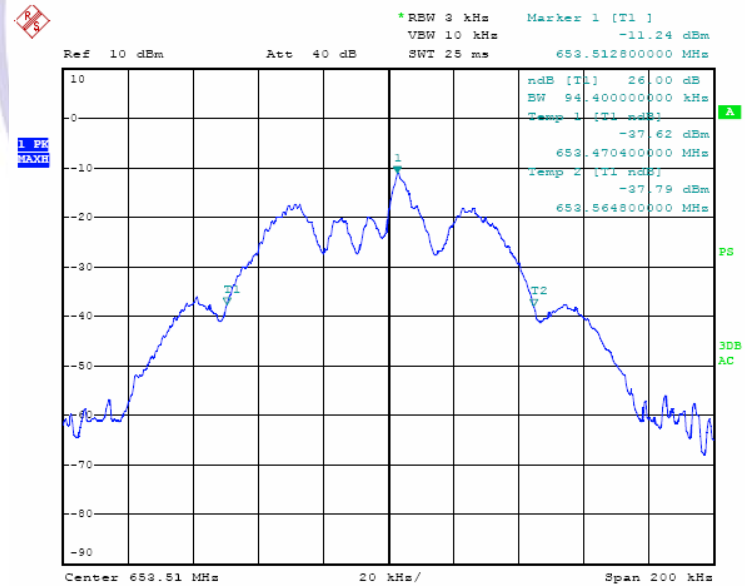
The Level input to produce 50% modulation is 150 mV, therefore the magnitude 16 dB greater than it is 946 mV.

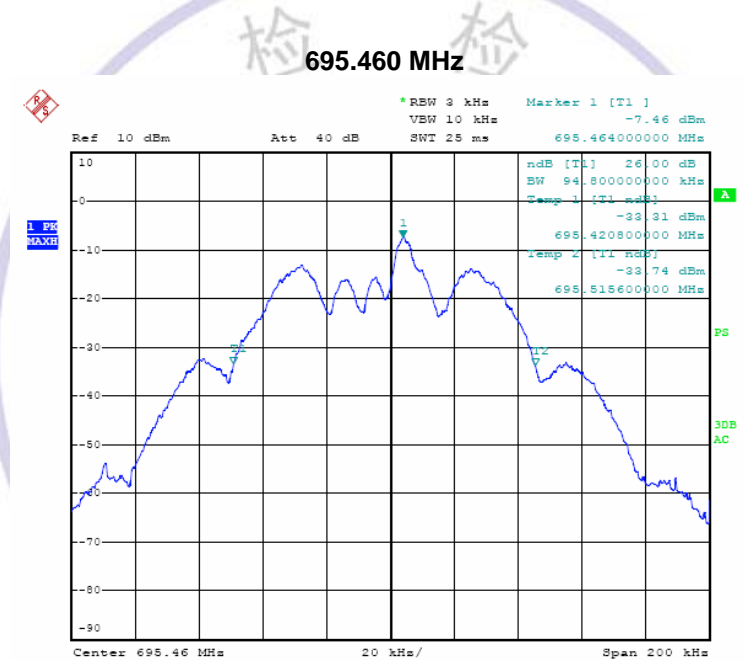
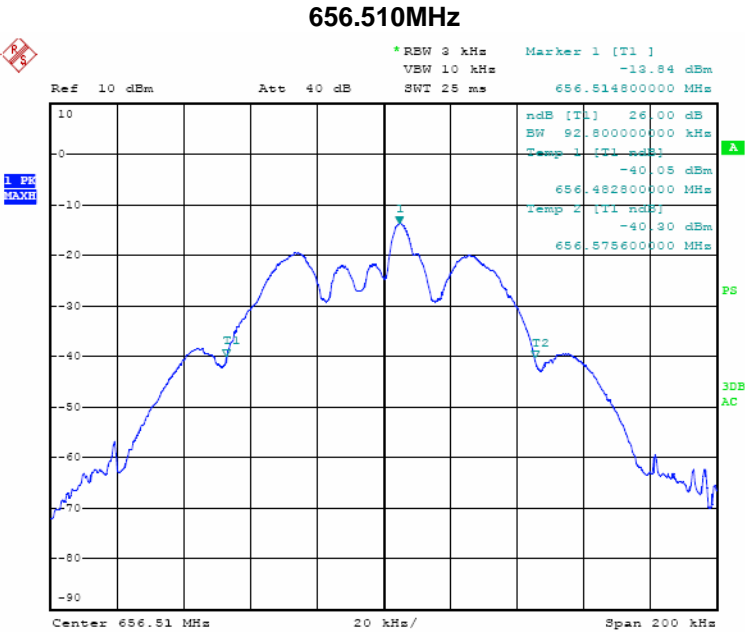
RF Frequency (MHz)	26 dB Bandwidth (kHz)
614.560	92.00
653.510	94.40
656.510	92.80
695.460	94.80

## 614.560MHz



## 653.510MHz





#### 4.4. FIELD STRENGTH OF EMISSION

##### Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in chapter 3.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0. to 360 . , and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.
7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

##### Test Configuration

Same as Figure 1 and Figure 2

##### Limit

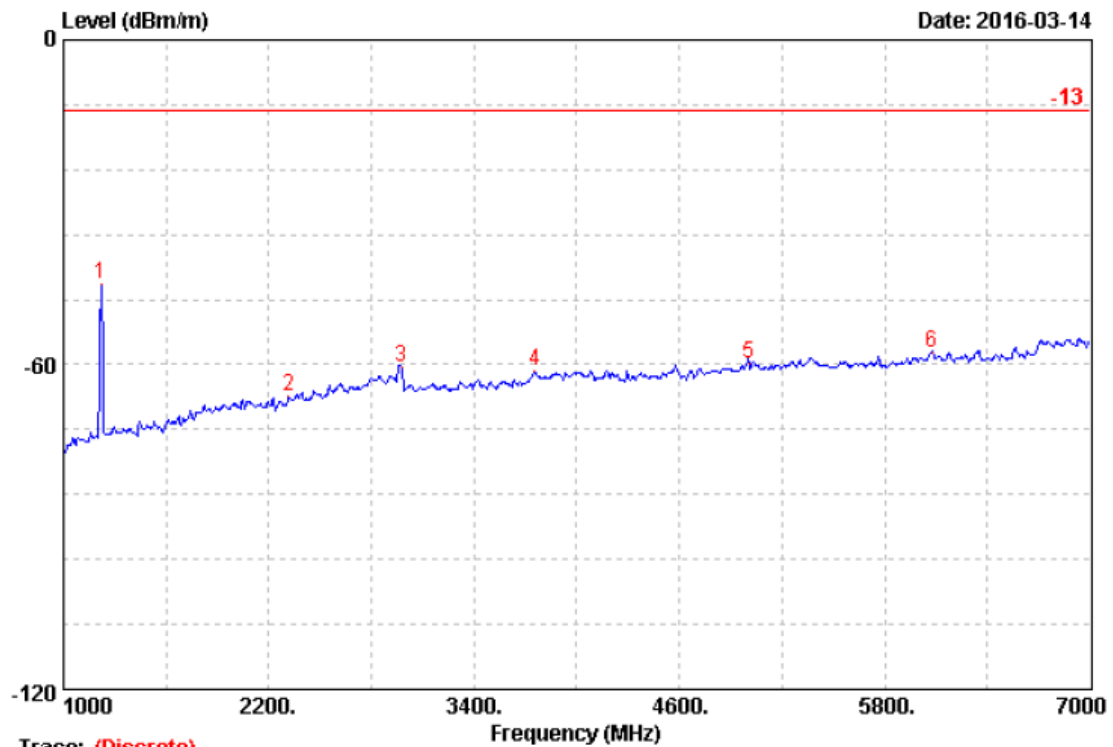
According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule: (i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB. (ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB. (iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

Unmodulated carrier output power is 10.94 dBm , or 12.42mW (ERP). The limit of spurious or harmonics is calculated as following :  $10.94-[43+10\log(\text{carrier output power in W})]$ , or -13dBm

##### **Emission Test Data:**

The Radiated Measurement are performed to the four channels, the datum recorded below is the worst case (channel 1).



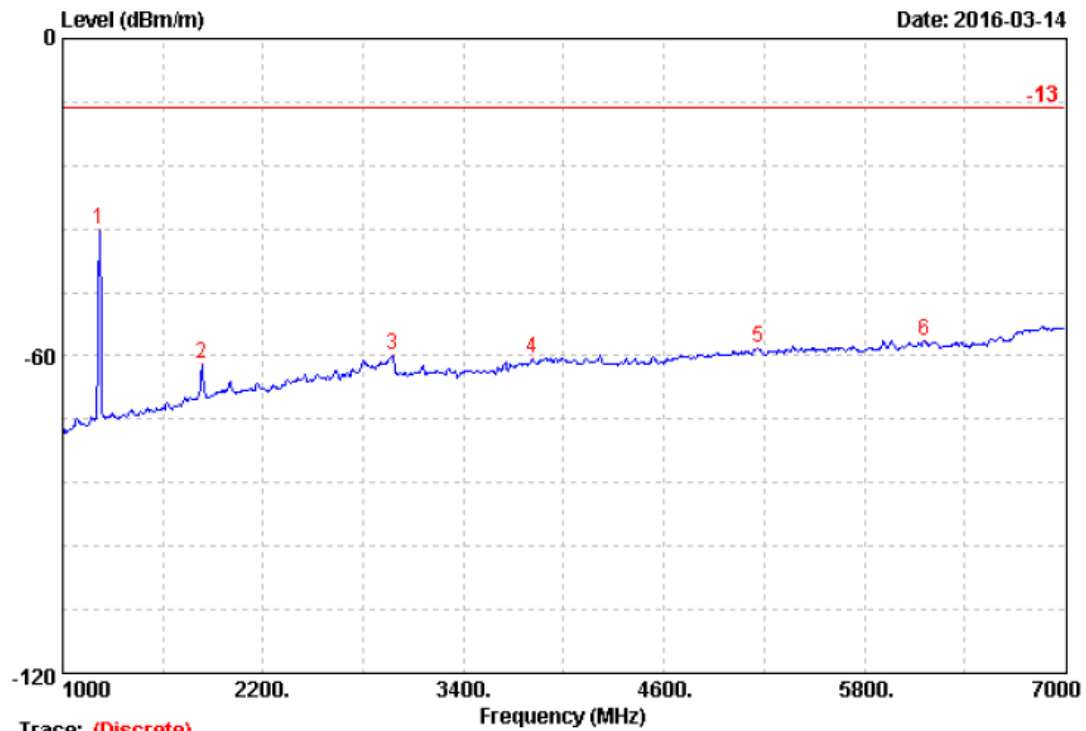
Trace: (Discrete)

Site no.	: 3m Chamber	Data no.	: 269
Dis. / Ant.	: 3m DRH-118	Ant. pol.	: VERTICAL
Limit	: -13		
Env. / Ins.	: MKF-2		
Engineer	: CTL		
EUT	: TX		
Power	: CTL 3m Chamber		
M/N	: Nice		
Test Mode	: /		

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBm)	Site Loss (dB)	Emission Level (dBm)	Limits (dBm)	Margin (dB)
1	1222.00	25.47	3.49	35.99	-38.10	0.00	-45.13	-13.00	32.13
2	2314.00	28.26	4.52	35.34	-63.28	0.00	-65.84	-13.00	52.84
3	2974.00	30.43	5.22	35.48	-60.69	0.00	-60.52	-13.00	47.52
4	3754.00	32.96	6.12	34.97	-65.38	0.00	-61.27	-13.00	48.27
5	5008.00	34.03	7.04	34.23	-66.72	0.00	-59.88	-13.00	46.88
6	6076.00	35.19	7.72	34.63	-65.99	0.00	-57.71	-13.00	44.71

Remarks: 1. Emission Level= Reading+Antenna Factor+Cable Loss-Amp Factor+Site Loss  
 2. The emission levels that are 20dB below the official limit are not reported.





Trace: (Discrete)

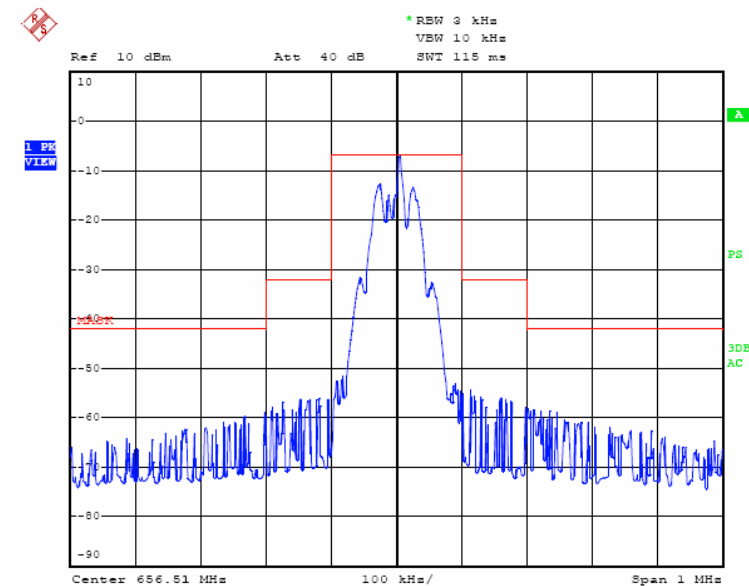
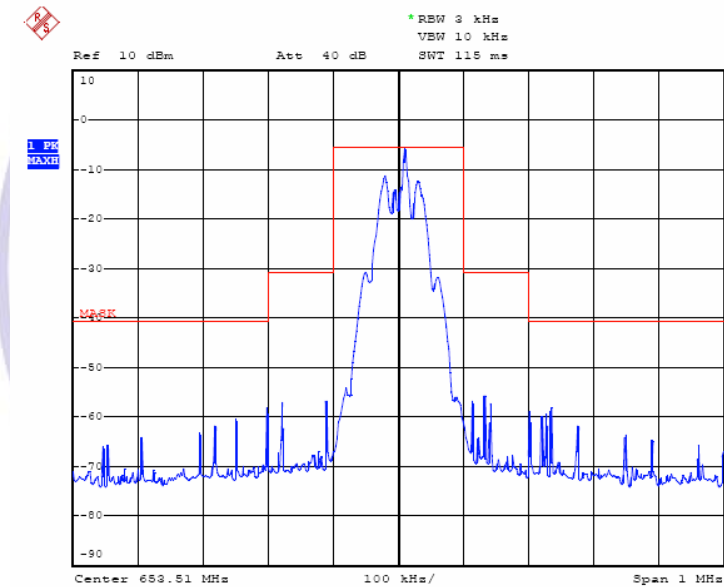
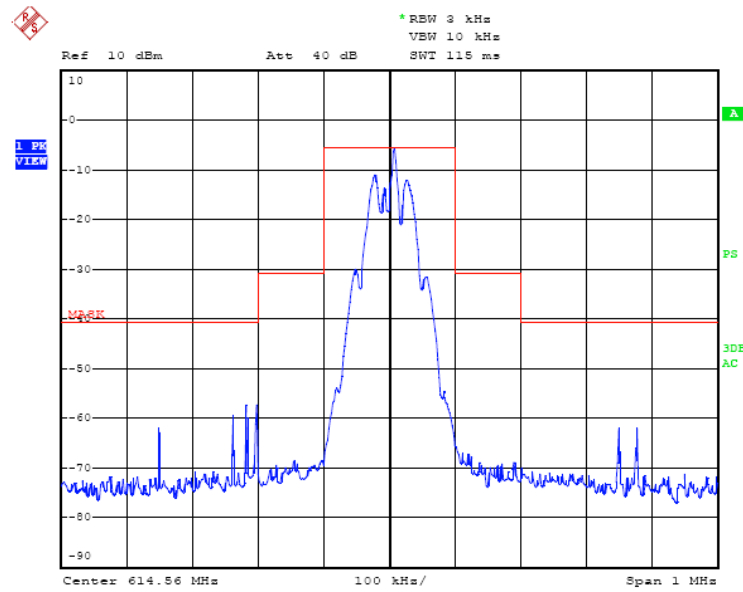
Site no. : 3m Chamber  
 Dis. / Ant. : 3m DRH-118  
 Limit : -13  
 Env. / Ins. : MKF-2  
 Engineer : CTL  
 EUT : TX  
 Power : CTL 3m Chamber  
 M/N : Nice  
 Test Mode : /

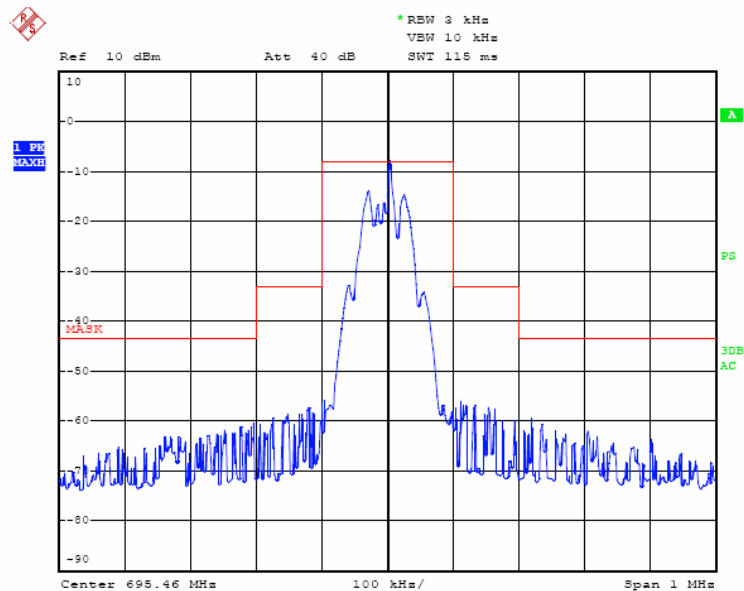
Data no. : 270  
 Ant. pol. : HORIZONTAL

	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBm)	Site Loss (dB)	Emission Level (dBm)	Limits (dBm)	Margin (dB)
1	1222.00	25.47	3.49	35.99	-28.99	0.00	-36.02	-13.00	23.02
2	1834.00	27.32	4.04	35.42	-57.37	0.00	-61.43	-13.00	48.43
3	2974.00	30.43	5.22	35.48	-59.93	0.00	-59.76	-13.00	46.76
4	3814.00	33.28	6.20	34.93	-64.89	0.00	-60.34	-13.00	47.34
5	5164.00	34.47	7.12	34.29	-65.76	0.00	-58.46	-13.00	45.46
6	6160.00	35.19	7.85	34.67	-65.61	0.00	-57.24	-13.00	44.24

Remarks: 1. Emission Level= Reading+Antenna Factor+Cable Loss-Amp Factor+Site Loss  
 2. The emission levels that are 20dB below the official limit are not reported.

## Emission mask plots:



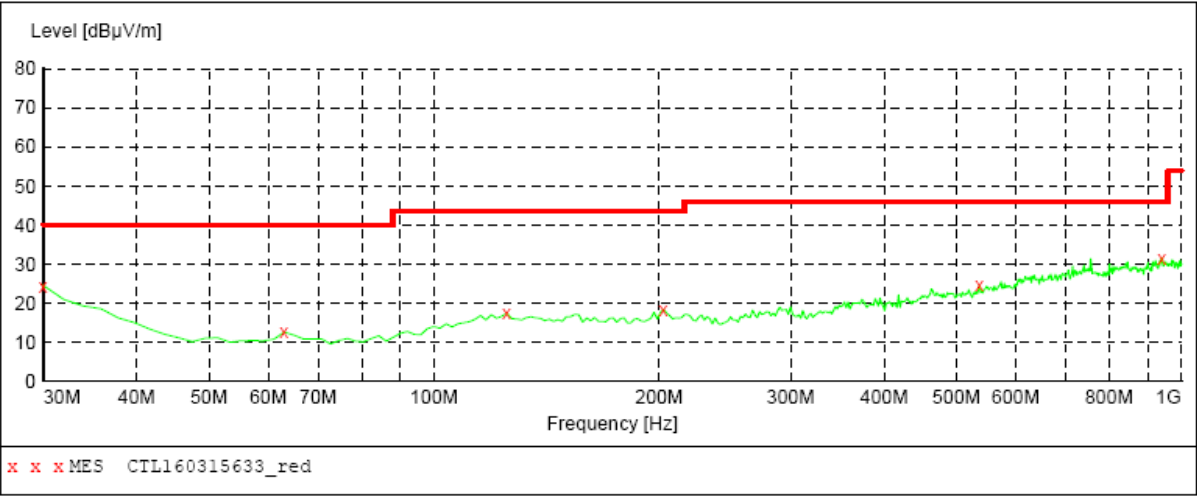


Other Emission:

Emission frequencies below 1 GHz

**SWEEP TABLE: "test (30M-1G)"**

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



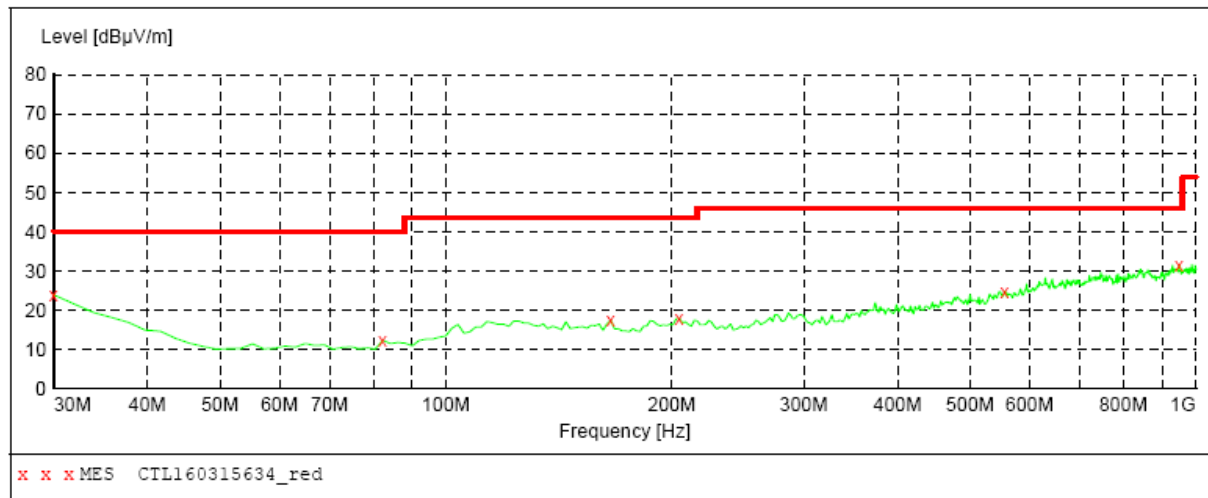
**MEASUREMENT RESULT: "CTL160315633\_red"**

3/15/2016 2:08PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.40	20.8	40.0	15.6	---	0.0	0.00	VERTICAL
62.980000	12.50	8.1	40.0	27.5	---	0.0	0.00	VERTICAL
125.060000	17.40	14.6	43.5	26.1	---	0.0	0.00	VERTICAL
202.660000	18.40	14.1	43.5	25.1	---	0.0	0.00	VERTICAL
536.340000	24.50	20.6	46.0	21.5	---	0.0	0.00	VERTICAL
941.800000	31.60	26.4	46.0	14.4	---	0.0	0.00	VERTICAL

***SWEEP TABLE: "test (30M-1G)"***

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1

***MEASUREMENT RESULT: "CTL160315634\_red"***

3/15/2016 2:10PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.80	20.8	40.0	16.2	---	0.0	0.00	HORIZONTAL
82.380000	12.30	8.7	40.0	27.7	---	0.0	0.00	HORIZONTAL
165.800000	17.40	13.5	43.5	26.1	---	0.0	0.00	HORIZONTAL
204.600000	17.90	14.1	43.5	25.6	---	0.0	0.00	HORIZONTAL
555.740000	24.80	21.1	46.0	21.2	---	0.0	0.00	HORIZONTAL
949.560000	31.60	26.5	46.0	14.4	---	0.0	0.00	HORIZONTAL

**Emission frequencies above 1 GHz:**

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

## 4.5. FREQUENCY STABILITY MEASUREMENT

### Measurement Procedure

#### A) Frequency stability versus environmental temperature

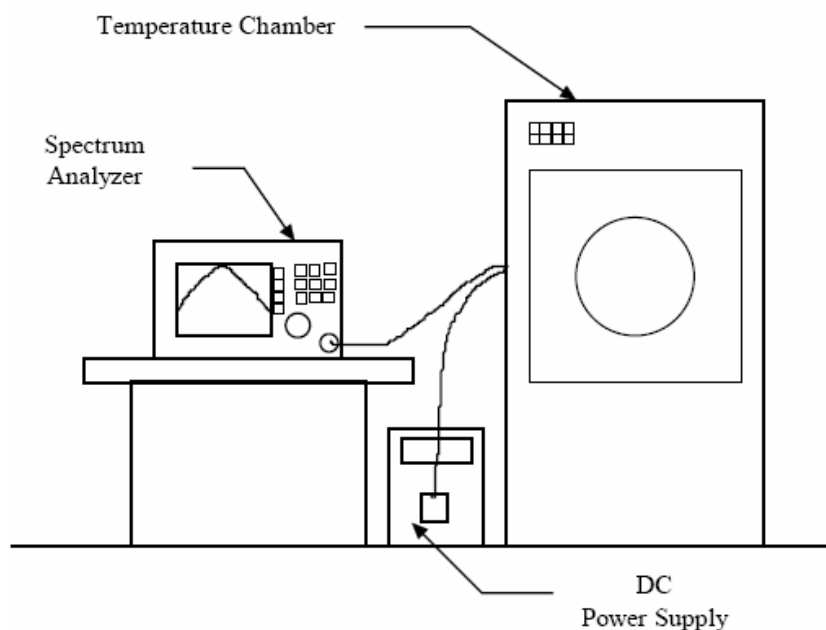
1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C shall be used.
2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Set the temperature of chamber to 50°C. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature 0°C is measured, record all measurement frequencies.

#### B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C shall be used. Install new batteries in the EUT.
2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. For non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

### Test Configuration

Figure 5 : Frequency stability measurement configuration



**TEST RESULTS**

A. Tx Frequency 614.560MHz

A1. Frequency stability versus environment temperature

Reference Frequency :614.560 MHz Limit: 0.005%							
Environment	Power	Frequency measured with time elapsed					
Temperature	Supplied	2 minutes		5 minutes		10 minutes	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.00	614.5643	0.000700	614.5694	0.001530	614.5671	0.001155
40		614.5658	0.000944	614.5635	0.000570	614.5622	0.000358
30		614.5617	0.000277	614.5608	0.000130	614.5615	0.000244
20		614.5602	0.000033	614.5612	0.000195	614.5606	0.000098
10		614.5669	0.001123	614.5647	0.000765	614.5636	0.000586
0		614.5691	0.001481	614.5628	0.000456	614.5695	0.001546

A2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 614.56 MHz Limit: 0.005%							
Environment	Power	Frequency measured with time elapsed					
Temperature	Supplied	2 minutes		5 minutes		10 minutes	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	614.5636	0.00058578	614.5677	0.0012529	614.5627	0.0004393
25	3.45	614.5643	0.00069969	614.5653	0.0008624	614.5619	0.0003092

B. Tx Frequency 695.460MHz

B1. Frequency stability versus environment temperature

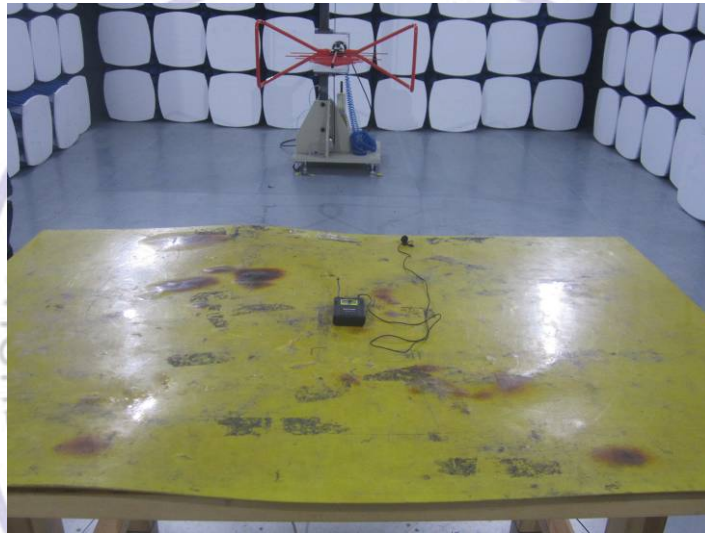
Reference Frequency :695.460 MHz Limit: 0.005%							
Environment	Power	Frequency measured with time elapsed					
Temperature	Supplied	2 minutes		5 minutes		10 minutes	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.00	695.4728	0.001841	695.4706	0.001524	695.4701	0.001452
40		695.4684	0.001208	695.4653	0.000762	695.4662	0.000891
30		695.4609	0.000129	695.4621	0.000302	695.4639	0.000561
20		695.4612	0.000173	695.4595	-0.000072	695.4604	0.000058
10		695.4628	0.000403	695.4618	0.000259	695.4617	0.000244
0		695.4673	0.001050	695.4664	0.000920	695.4646	0.000661

B2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 695.460 MHz Limit: 0.005%							
Environment	Power	Frequency measured with time elapsed					
Temperature	Supplied	2 minutes		5 minutes		10 minutes	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	695.4637	0.00053202	695.4672	0.0010353	695.4638	0.0005464
25	3.45	695.4698	0.00140914	695.4693	0.0013372	695.4668	0.0009778

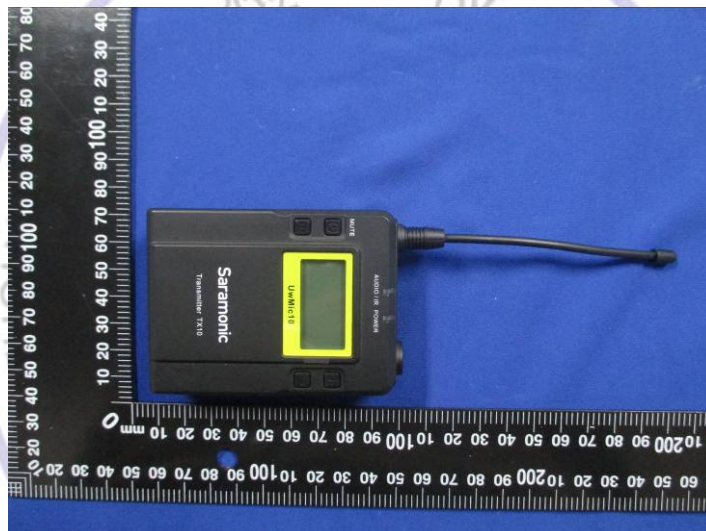


## 5. Test Setup Photos of the EUT



## 6. External and Internal Photos of the EUT

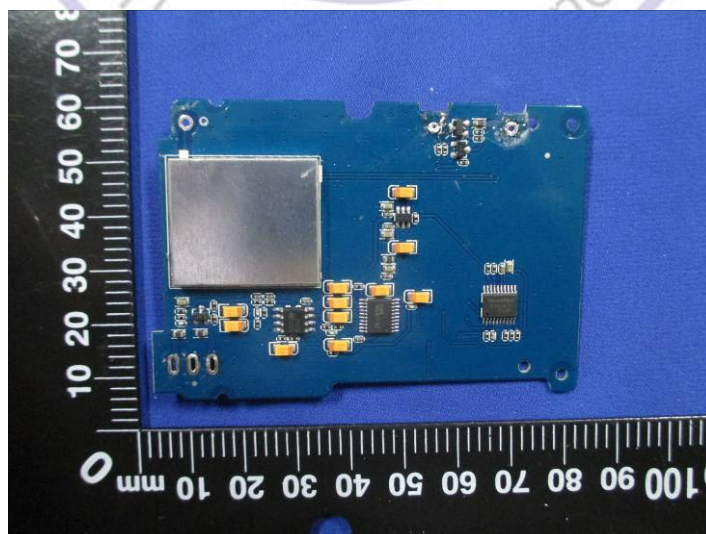
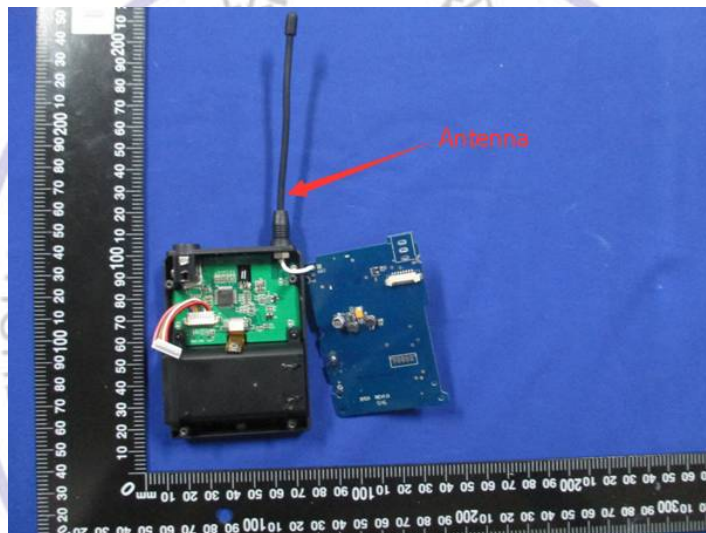
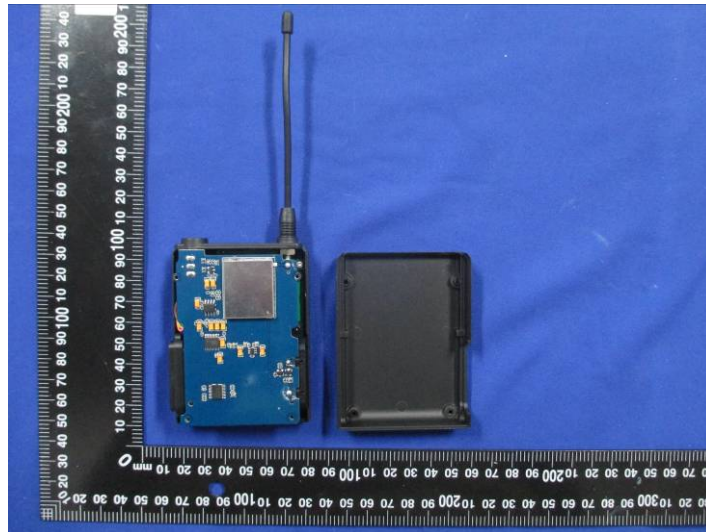
### External Photos

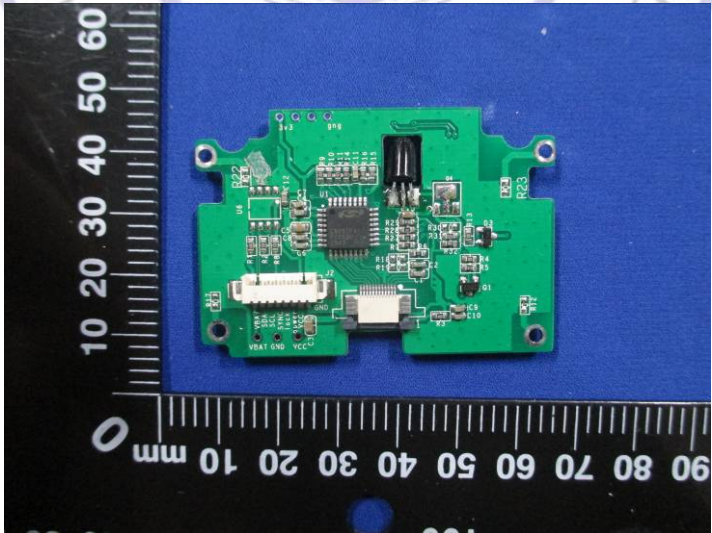
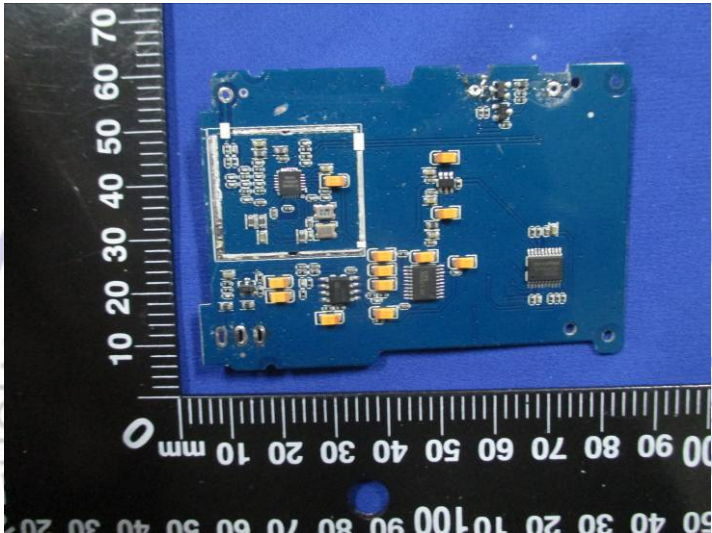
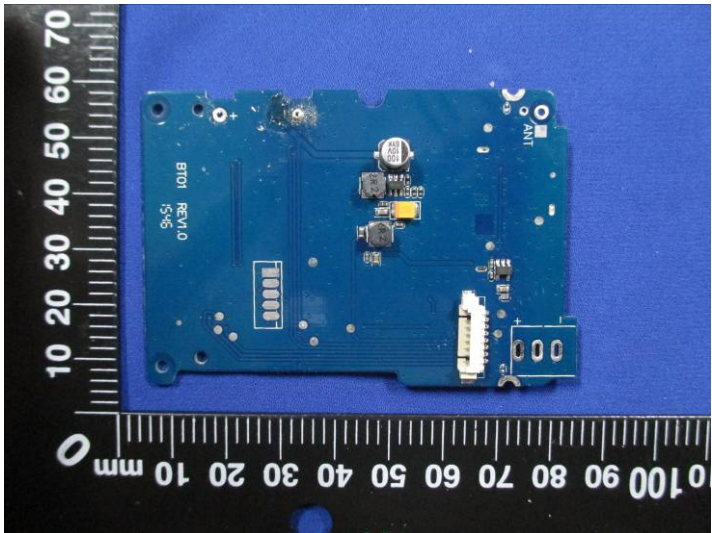




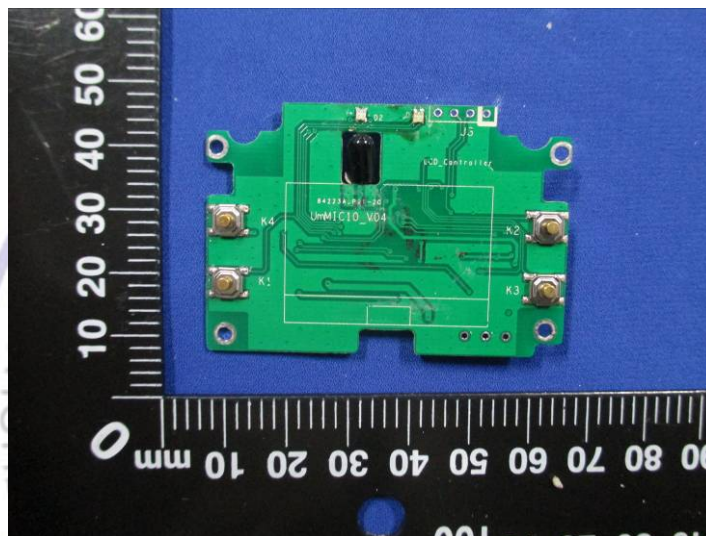
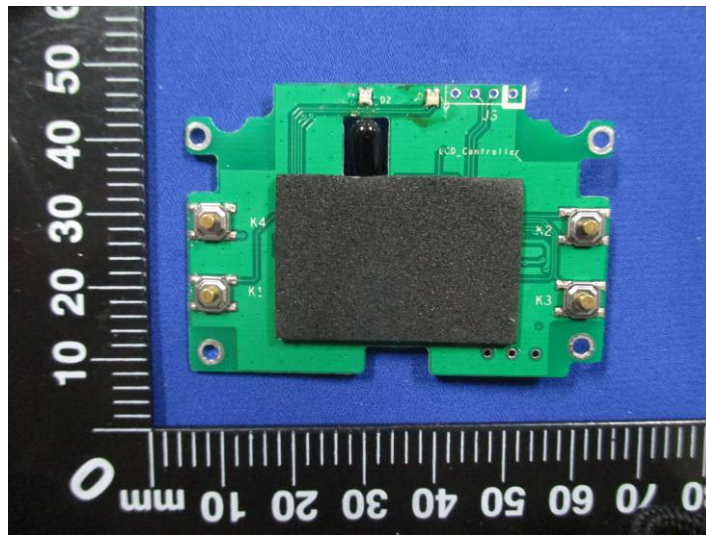




Internal Photos







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