

# Variant FCC RF Test Report

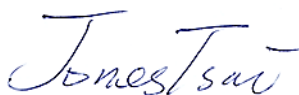
**APPLICANT** : Yulong Computer Telecommunication  
Scientific (Shenzhen) Co., Ltd  
**EQUIPMENT** : mobile phone  
**BRAND NAME** : Coolpad  
**MODEL NAME** : Coolpad 801EM  
**FCC ID** : R38YL801EM  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

This is a variant report which is only valid together with the original test report. The product was received on Aug. 09, 2013 and testing was completed on Aug. 23, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL (SHENZHEN) INC.**

No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.



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### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(b)(1)	Peak Output Power	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 15.11 dB at 2483.530 MHz
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

# 1 General Description

## 1.1 Applicant

**Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd**

Coolpad Information Harbor, 2nd Mengxi Road, Northern Part of Science&Technology Park, Nanshan district, Shenzhen, P.R.China

## 1.2 Manufacturer

**Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd**

Coolpad Information Harbor, 2nd Mengxi Road, Northern Part of Science&Technology Park, Nanshan district, Shenzhen, P.R.China

## 1.3 Feature of Equipment Under Test

Product Feature	
<b>Equipment</b>	mobile phone
<b>Brand Name</b>	Coolpad
<b>Model Name</b>	Coolpad 801EM
<b>FCC ID</b>	R38YL801EM
<b>EUT supports Radios application</b>	CDMA/EV-DO/LTE/WLAN 2.4GHz 802.11b/g/n HT20 Bluetooth v3.0 + EDR Bluetooth v4.0 + LE
<b>HW Version</b>	P0
<b>SW Version</b>	4.1.003.P0.130809.801EM
<b>EUT Stage</b>	Identical Prototype

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
<b>Tx/Rx Frequency Range</b>	2402 MHz ~ 2480 MHz
<b>Number of Channels</b>	40
<b>Carrier Frequency of Each Channel</b>	40 Channel(37 hopping + 3 advertising channel)
<b>Maximum Output Power to Antenna</b>	0.98 dBm (0.00125 W)
<b>Antenna Type</b>	PIFA Antenna with gain 0.80 dBi
<b>Type of Modulation</b>	Bluetooth 4.0 - LE : GFSK



### 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

### 1.6 Testing Site

<b>Test Site</b>	SPORTON INTERNATIONAL (SHENZHEN) INC.		
<b>Test Site Location</b>	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
<b>Test Site No.</b>	<b>Sporton Site No.</b>		<b>FCC Registration No.</b>
	TH01-SZ	03CH01-SZ	831040

The test site complies with ANSI C63.4 2003 requirement.

### 1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
- ANSI C63.4-2003

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

### 2.1 Descriptions of Test Mode

The RF output power was recorded in the following table:

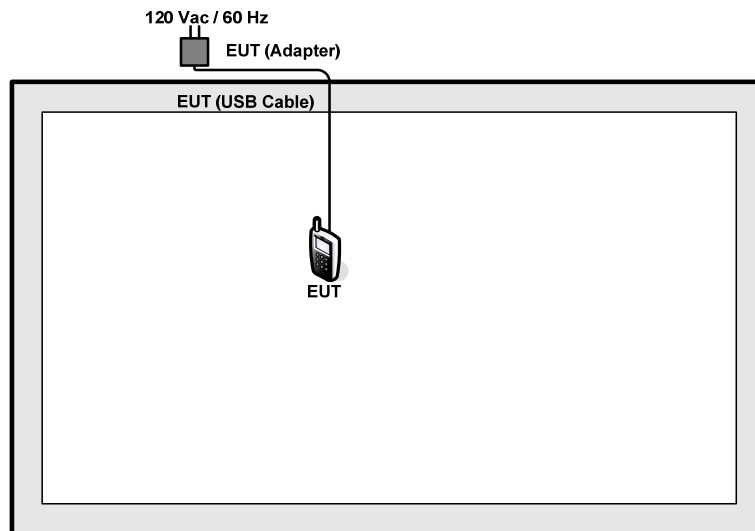
Channel	Frequency	Bluetooth 4.0 – LE RF Output Power	
		Data Rate / Modulation	
		GFSK	
		1Mbps	
Ch00	2402MHz	-0.12 dBm	
Ch19	2440MHz	0.98 dBm	
Ch39	2480MHz	-1.35 dBm	

### 2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	Bluetooth 4.0 – LE / GFSK
Radiated TCs	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps

## 2.3 Connection Diagram of Test System



## 2.4 EUT Operation Test Setup

For Bluetooth 4.0-LE function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.



### 3 Test Result

#### 3.1 Peak Output Power Measurement

##### 3.1.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

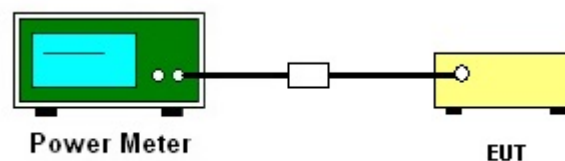
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

##### 3.1.4 Test Setup





3.1.5 Test Result of Peak Output Power

Test Mode :	Bluetooth 4.0 - LE	Temperature :	24~26°C
Test Engineer :	Henry Chen	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	-0.12	30.00	Pass
19	2440	0.98	30.00	Pass
39	2480	-1.35	30.00	Pass



### 3.2 Radiated Band Edges and Spurious Emission Measurement

#### 3.2.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

#### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.



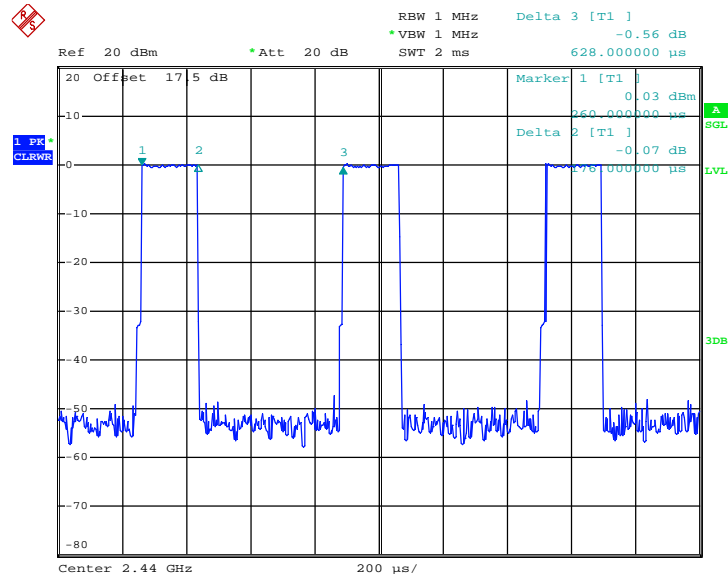
### 3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - $VBW = 10$  Hz, when duty cycle is no less than 98 percent.
    - $VBW \geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Bluetooth 4.0 - LE	28.03	0.176	5.68	10Khz



Bluetooth 4.0\_LE Duty Cycle



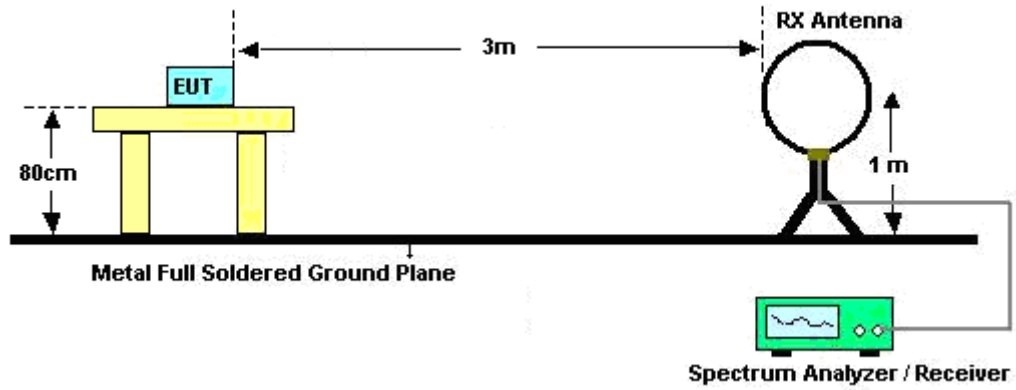
Date: 23.AUG.2013 16:50:48

Note:

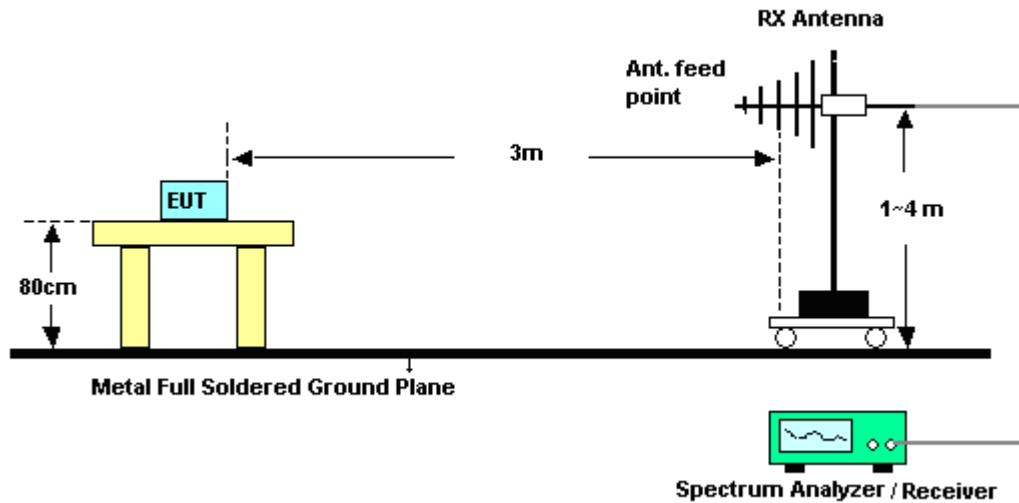
The total loss is 17.5dB of the RF cable and attenuator, and has been compensated to the spectrum analyzer by setting into the amplitude level offset. That means the measured result shown on the spectrum analyzer has added the total loss and been compliance with the limit line.

### 3.2.4 Test Setup

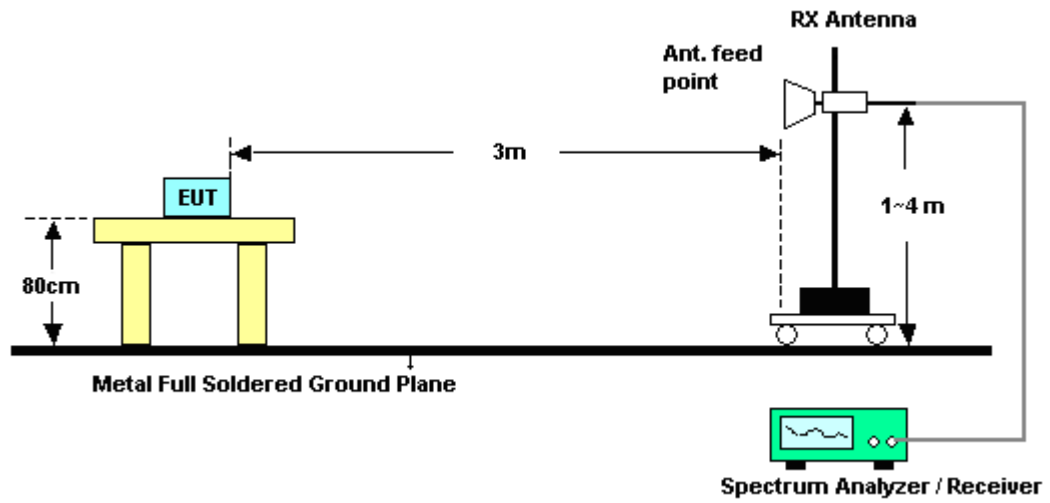
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.



3.2.6 Test Result of Radiated Spurious at Band Edges

Test Mode :	Mode 3	Temperature :	25~28°C
Test Channel :	39	Relative Humidity :	49~52%
		Test Engineer :	Robin Luo

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level (dBμV /m)	Over Limit ( dB )	Limit Line (dBμV /m)	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.53	49.54	-24.46	74	41.32	32.27	5.71	29.76	100	329	Peak
2483.53	38.89	-15.11	54	30.67	32.27	5.71	29.76	100	329	Average

ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level (dBμV /m)	Over Limit ( dB )	Limit Line (dBμV /m)	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2487.25	47.37	-26.63	74	39.15	32.27	5.71	29.76	133	114	Peak
2484.34	38.39	-15.61	54	30.17	32.27	5.71	29.76	133	114	Average





### 3.2.7 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

**Note:** Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	25~28°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~52%
<b>Test Engineer :</b>	Robin Luo	<b>Polarization :</b>	Horizontal
<b>Remark :</b>	1. 2480 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line (dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
33.51	15.93	-24.07	40	32.7	13	0.8	30.57	-	-	Peak
129.36	15.85	-27.65	43.5	32.66	12.37	1.39	30.57	-	-	Peak
294.87	18.02	-27.98	46	32.57	13.47	2	30.02	-	-	Peak
361.6	25.3	-20.7	46	37.81	15.1	2.18	29.79	-	-	Peak
643	28.54	-17.46	46	35.78	19.06	2.84	29.14	-	-	Peak
748.7	29.77	-16.23	46	34.91	20.8	3.06	29	100	0	Peak
2480	100.96	-	-	92.74	32.27	5.71	29.76	100	329	Peak
2480	99.95	-	-	91.73	32.27	5.71	29.76	100	329	Average
4960	38.45	-35.55	74	52.97	34.01	8.49	57.02	150	135	Peak
7440	40.01	-33.99	74	51.59	35.37	10.04	56.99	175	260	Peak

**Note:** Other harmonics are lower than background noise.



<b>Test Mode :</b>	Mode 3	<b>Temperature :</b>	25~28°C
<b>Test Channel :</b>	39	<b>Relative Humidity :</b>	49~52%
<b>Test Engineer :</b>	Robin Luo	<b>Polarization :</b>	Vertical
<b>Remark :</b>	1. 2480 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
41.61	14.25	-25.75	40	34.22	9.7	0.87	30.54	-	-	Peak
132.33	16.38	-27.12	43.5	33.29	12.25	1.4	30.56	-	-	Peak
258.69	17.63	-28.37	46	32.45	13.43	1.89	30.14	-	-	Peak
451.2	24.06	-21.94	46	34.27	16.88	2.41	29.5	-	-	Peak
636.7	30.43	-15.57	46	37.72	19.04	2.82	29.15	100	0	Peak
755	28.28	-17.72	46	33.65	20.55	3.07	28.99	-	-	Peak
2480	97.35	-	-	89.13	32.27	5.71	29.76	132	114	Peak
2480	96.18	-	-	87.96	32.27	5.71	29.76	132	114	Average
4960	39.3	-34.7	74	53.82	34.01	8.49	57.02	150	135	Peak
7440	40.18	-33.82	74	51.76	35.37	10.04	56.99	175	260	Peak

**Note:** Other harmonics are lower than background noise.



### **3.3 Antenna Requirements**

#### **3.3.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 FCC rule.

#### **3.3.2 Antenna Anti-Replacement Construction**

Non-standard antenna connector is used.

#### **3.3.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Mar. 28, 2013	Aug. 23, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	N/A	Mar. 28, 2013	Aug. 23, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Power Sensor	Anritsu	MA2411B	1207253	N/A	Mar. 28, 2013	Aug. 23, 2013	Mar. 27, 2014	Conducted (TH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	Apr. 04, 2013	Aug. 23, 2013	Apr. 03, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 12, 2012	Aug. 23, 2013	Oct. 11, 2013	Radiation (03CH01-SZ)
Bilog Antenna	SCHAFFNER	CBL6112B	2614	30MHz~2GHz	Nov. 03, 2012	Aug. 23, 2013	Nov. 02, 2013	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz-3000MHz GAIN 30db	Mar. 28, 2013	Aug. 23, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	Mar. 28, 2013	Aug. 23, 2013	Mar. 27, 2014	Radiation (03CH01-SZ)
SHF-EHF-Horn	Schwarzbeck	BBHA9170	BBHA9170249	14GHz~40GHz	Nov. 23, 2012	Aug. 23, 2013	Nov. 22, 2013	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz-30MHz	Oct. 22, 2012	Aug. 23, 2013	Oct. 21, 2013	Radiation (03CH01-SZ)
Turn Table	EM Electronic	EM 1000	N/A	0 ~ 360 degree	N/A	Aug. 23, 2013	N/A	Radiation (03CH01-SZ)
Antenna Mast	EM Electronic	EM 1000	N/A	1 m - 4 m	N/A	Aug. 23, 2013	N/A	Radiation (03CH01-SZ)



## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.54
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### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.72
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