**Shenzhen Asia Test Technology Co., Ltd.**

7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China
Tel: +86)-0755-23284990 Email: **att@att-lab.com** Http: // www.att-lab.cn

# FCC RADIO TEST REPORT
# FCC ID: BOOKP-810-30XX

**Product**： Smart Remote control

**Trade Name**： iPazzPort

**Model Name**： KP-810-30

**Serial Model**： KP-810-30XX

## Prepared for

Unisen Limited

Room 907, Fook Hong Industrial Bldg., 19 Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

## Prepared by

Shenzhen Asia Test Technology Co.,Ltd.

7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China

Tel: +(86)-0755-23284990 Fax: +(86)-0755-23284990

Http: www.att-lab.cn

# TEST RESULT CERTIFICATION

**Applicant's name** ..... Unisen Limited

Address ..... Room 907, Fook Hong Industrial Bldg., 19 Sheung Yuet Road, Kowloon Bay, Kowloon, Hong Kong

**Manufacture's Name**..... Unisen Limited

Address ..... Shichang Rd. Yuanjiangyuan Village, Changping Town, Dongguan City Guangdong Prov. China

**Product description**

Product name ..... Smart Remote control

Model and/or type reference ..... KP-810-30

Additional Model ..... KP-810-30XX

**Standards** ..... FCC Part15.247

Test procedure ..... ANSI C63.4-2014

This device described above has been tested by ATT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test** .....

Date (s) of performance of tests ..... Apr. 02 2015 ~Apr. 15 2015

Date of Issue..... Apr. 15 2015

Test Result..... **Pass**

Testing Engineer : Jack Yu

(Jack Yu)

Technical Manager : Jerry You

(Jerry You)

Authorized Signatory : Can Liu

(Can Liu)

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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Standard Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | PASS | |
| 15.247(a)(1) | Hopping Channel Separation | PASS | |
| 15.247(b)(1) | Peak Output Power | PASS | |
| 15.247(c) | Radiated Spurious Emission | PASS | |
| 15.247(a)(iii) | Number of Hopping Frequency | PASS | |
| 15.247(a)(iii) | Dwell Time | PASS | |
| 15.247(a)(1) | Bandwidth | PASS | |
| 15.205 | Band Edge Emission | PASS | |
| 15.203 | Antenna Requirement | PASS | |

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

## 1.1 TEST FACILITY

Asia Institute Technology (DongGuan) Limited
No. 22,JinQianLing Street 3, JiTiGang Village, Huang-Jiang Town, DongGuan, Guangdong, 523757 China
FCC Registration No.: 248337

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

| No. | Item | Uncertainty |
|---|---|---|
| 1 | Conducted Emission Test | ±1.38dB |
| 2 | RF power,conducted | ±0.16dB |
| 3 | Spurious emissions,conducted | ±0.21dB |
| 4 | All emissions,radiated(<1G) | ±4.68dB |
| 5 | All emissions,radiated(>1G) | ±4.89dB |
| 6 | Temperature | ±0.5°C |
| 7 | Humidity | ±2% |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| Equipment | Smart Remote control |
| Model Name | KP-810-30 |
| Serial number | K0092004 |
| Serial Model | KP-810-30XX |
| Model Difference | All models are identical except model name. |
| Product Description | The EUT is a Smart Remote control<br>Operation Frequency: 2402~2480 MHz<br>Modulation Type: GFSK<br>Bit Rate of Transmitter 250Kbps<br>Number Of Channel 79 CH<br>Antenna Designation: Please see Note 3.<br>Output Power(Conducted): -4.08 dBm PK<br><br>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual. |
| Channel List | Please refer to the Note 2. |
| Ratings | 5.0Vdc (for charge)<br>3.7Vdc (Li-ion battery) |
| Adapter | N/A |
| Battery | DC 3.7V, 400mAh |
| Connecting I/O Port(s) | Please refer to the User's Manual |
| hardware version | MA251_20150204V1.1 |
| Software version | V1.0 |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.

| Channel List | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 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 | | |

3.

Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE |
|---|---|---|---|---|---|---|
| 1 | N/A | N/A | PCB Antenna | N/A | -3 | |

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|---|---|
| Mode 1 | CH00 |
| Mode 2 | CH39 |
| Mode 3 | CH78 |
| Mode 4 | Link Mode |

| For Conducted Emission | |
|---|---|
| Final Test Mode | Description |
| Mode 4 | Link Mode |

| For Radiated Emission | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | CH00 |
| Mode 2 | CH39 |
| Mode 3 | CH78 |

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) Measurements are performed according to the Public Notice-DA 00-705.

(3) The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitter signals.

Example:
Frequency used:2402 - 2480 MHz
79 Channels (Ch 0 - Ch 78)
Hopping Sequence in Data Mode

55,48,26,33,52,35,50,65,54,67,15,08,64,49,66,53,22,25,63,04,41,05,24,43,73,07,75,28,56,37,60,39,58,69,16,40,21,44
23,42,13,17,46,02,51,03,11,29,77,47,62,27,71,10,68,32,57 12,59,72,30,76,31,18,74,61,14,70,36,06,09,45,19,20,34,38
78,00,01

From the hopping sequence, each frequency has be used equally on the average by each transmitter.
RX bandwidth=1MHz

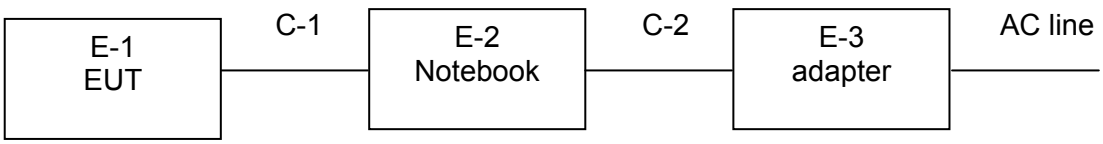
## 2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

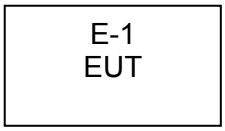
| Test software Version | Test program: Broadcom | | |
|---|---|---|---|
| Frequency | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters(250kbps) | DEF | DEF | DEF |

## 2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

CE




RE



## 2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| E-1 | Smart Remote control | iPazzPort | KP-810-30 | N/A | EUT |
| E-2 | Notebook | Lenovo | LENC213 | N/A | |
| E-3 | Adapter | Lenovo | LP0192000VE | N/A | |
| | | | | | |
| | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|---|---|---|---|---|
| C-1 | NO | NO | 80cm | |
| C-2 | NO | NO | 80cm | |
| | | | | |
| | | | | |
| | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

## 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

| NO | Equipment Name | Model | Serial Number | Manufacturer | Cal DUE Date | Cal Period |
|---|---|---|---|---|---|---|
| 1 | EMI Receiver | ESCI | 100124 | R&S | 2015.06.26 | 1 year |
| 2 | Spectrum Analyzer | FSP40 | 100378 | R&S | 2015-12-20 | 1 year |
| 3 | L.I.S.N.#1 | KNW-242 | 8-837-4 | Kyoritsu | 2015.06.26 | 1 year |
| 4 | L.I.S.N.#2 | KNW-407 | 8-1789-4 | Kyoritsu | 2015.06.26 | 1 year |
| 5 | Signal Generator | SMR40 | 100541 | R&S | 2015-12-20 | 1 year |
| 6 | Horn Ant | BBHA 9170 | 9170-181 | Schwarzbeck | 2015-05-29 | 1 year |
| 7 | Bilog Antenna | VULB9160 | 3206 | SCHWARZBECK | 2015.12.03 | 1 year |
| 8 | Horn Antenna | BBHA 9120D | 452 | SCHWARZBECK | 2015.12.03 | 1 year |
| 9 | Loop Antenna | HLA6120 | 35779 | TESEQ | 2015-05-29 | 1 year |
| 10 | RF Cable | AIT001 | R001 | N/A | 2015-07-10 | 1 year |
| 11 | Coaxial Switch | MP59B | 6200264417 | Anritsu | 2015.06.26 | 1 year |
| 12 | Spectrum Analyzer | R3182 | 150900201 | ADVANTEST | 2015.06.26 | 1 year |
| 13 | EMI Measuring Receiver | ESR | 101160 | R&S | 2015.06.26 | 1 year |
| 14 | Preamplifier | MLA-10K01-B01-27 | 1205323 | Tsj | 2015.06.26 | 1 year |
| 15 | Preamplifier | MLA-0120-A02-34 | 2648A04738 | Tsj | 2015.06.26 | 1 year |
| 16 | temporary antenna connector | KYS-0944 | 22550510 | DOKMA | 2015.06.26 | 1 year |

## 3. EMC EMISSION TEST

### 3.1 CONDUCTED EMISSION MEASUREMENT

#### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | | Standard |
|---|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average | |
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | CISPR |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | CISPR |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | CISPR |

| | | | | | |
|---|---|---|---|---|---|
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | FCC |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

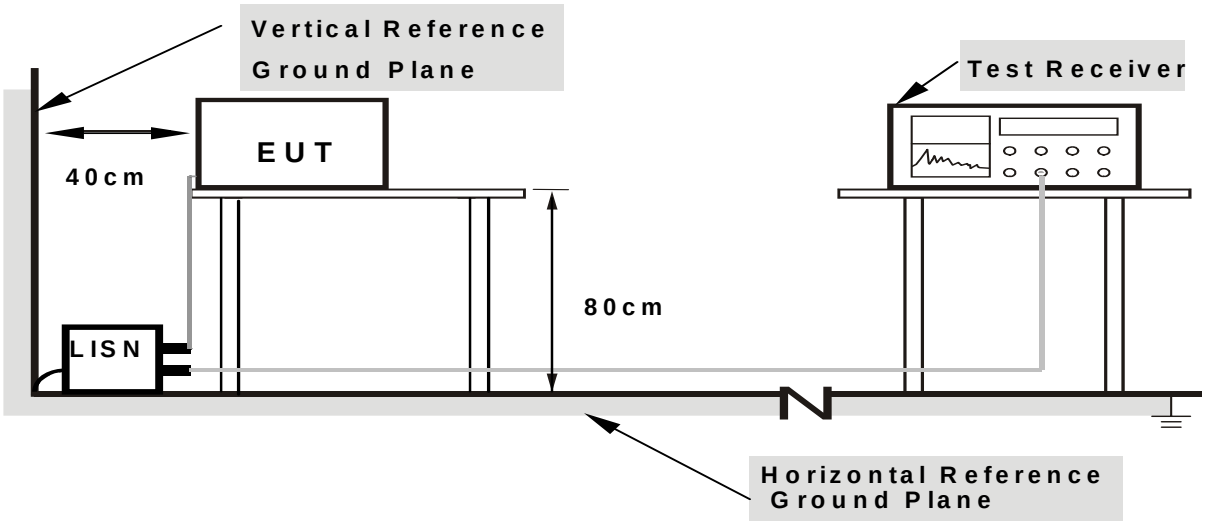
### 3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP




Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

### 3.1.5 EUT OPERATING CONDITIONS

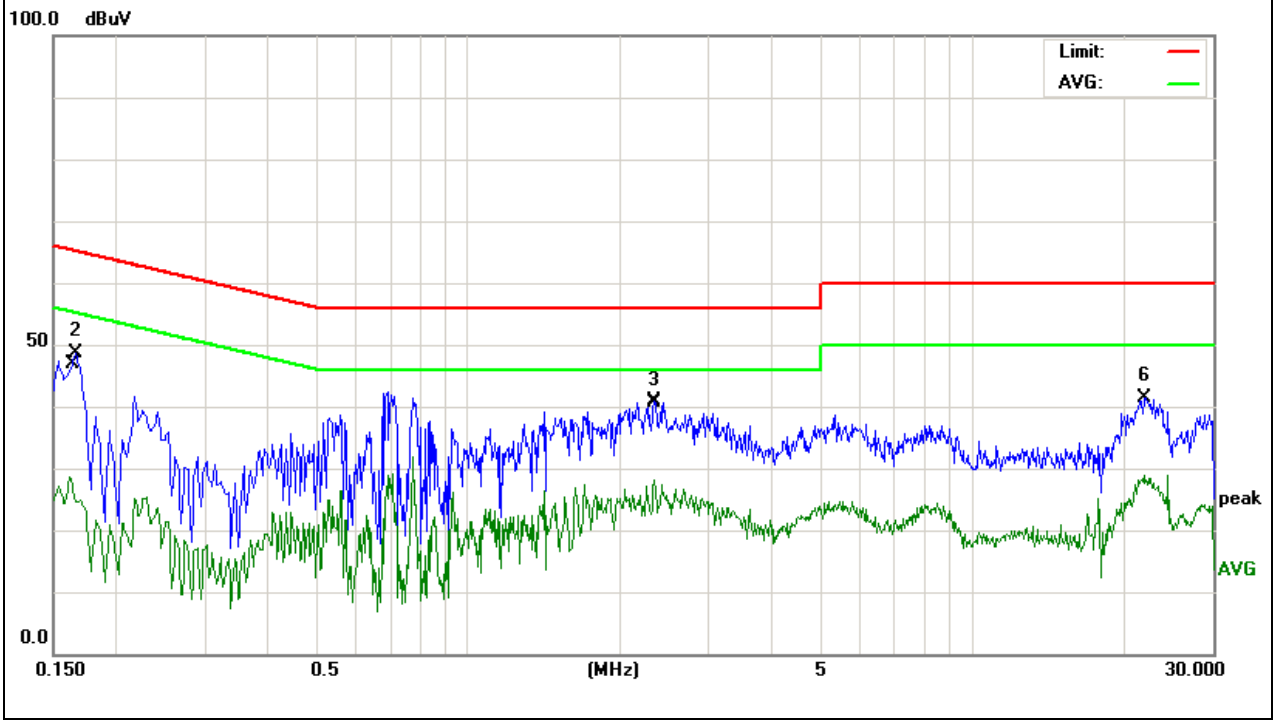
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.1.6 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | L |
| Test Voltage ： | DC 5V from PC AC 120V/60Hz | Test Mode： | 4 |

| Freq. (MHz) | Reading (dBuV) | Factor (dBuV) | Measurement (dBuV) | Limit (dBuV) | Over (dB) | Detector |
|---|---|---|---|---|---|---|
| 0.162 | 26.02 | 2.64 | 28.66 | 55.36 | -26.7 | AVG |
| 0.166 | 45.98 | 2.57 | 48.55 | 65.15 | -16.6 | peak |
| 2.338 | 30.75 | 10 | 40.75 | 56 | -15.25 | peak |
| 2.338 | 18.11 | 10 | 28.11 | 46 | -17.89 | AVG |
| 21.886 | 26.9 | 2.07 | 28.97 | 50 | -21.03 | AVG |
| 21.97 | 39.3 | 2.07 | 41.37 | 60 | -18.63 | peak |

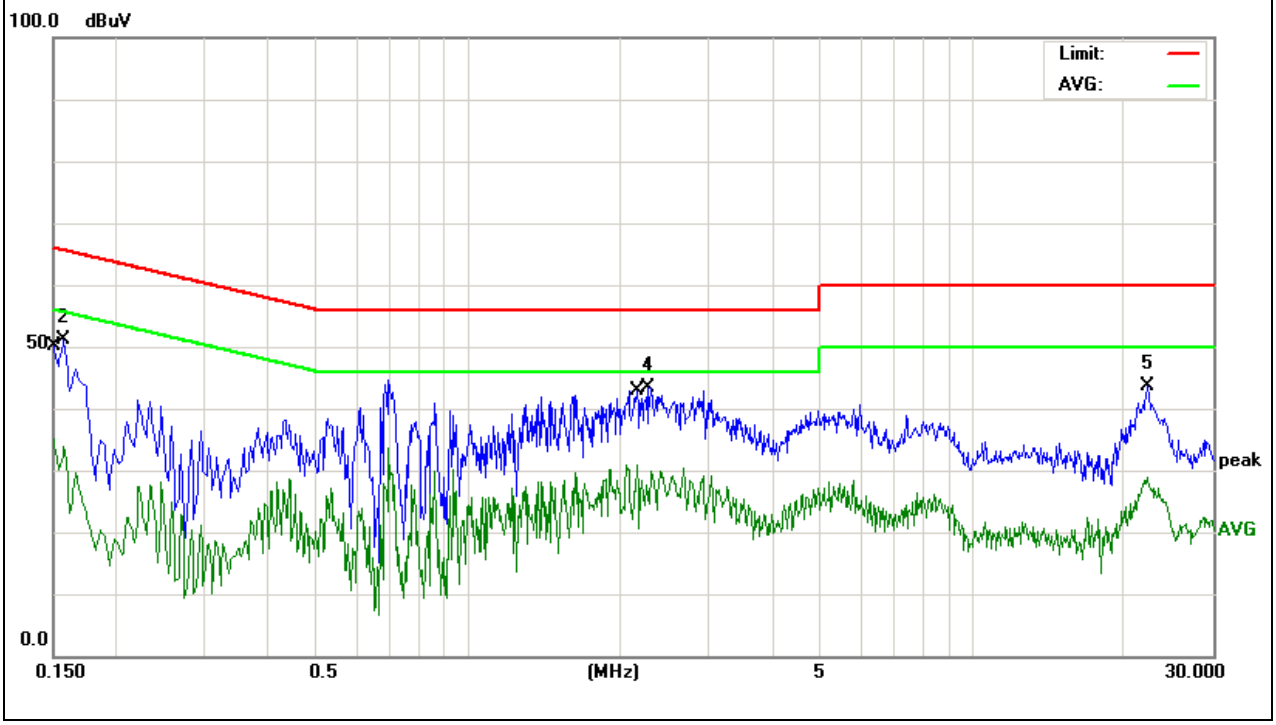
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit



| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Phase： | N |
| Test Voltage ： | DC 5V from PC AC 120V/60Hz | Test Mode： | 4 |

| Freq. (MHz) | Reading (dBuV) | Factor (dBuV) | Measurement (dBuV) | Limit (dBuV) | Over (dB) | Detector |
|---|---|---|---|---|---|---|
| 0.15 | 31.22 | 4.03 | 35.25 | 55.99 | -20.74 | AVG |
| 0.158 | 48.23 | 2.94 | 51.17 | 65.56 | -14.39 | peak |
| 2.166 | 20.88 | 10 | 30.88 | 46 | -15.12 | AVG |
| 2.282 | 33.34 | 10 | 43.34 | 56 | -12.66 | peak |
| 22.182 | 41.5 | 2.07 | 43.57 | 60 | -16.43 | peak |
| 22.182 | 26.78 | 2.07 | 28.85 | 50 | -21.15 | AVG |

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit



## 3.2 RADIATED EMISSION MEASUREMENT

### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/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 |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average |

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

### 3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

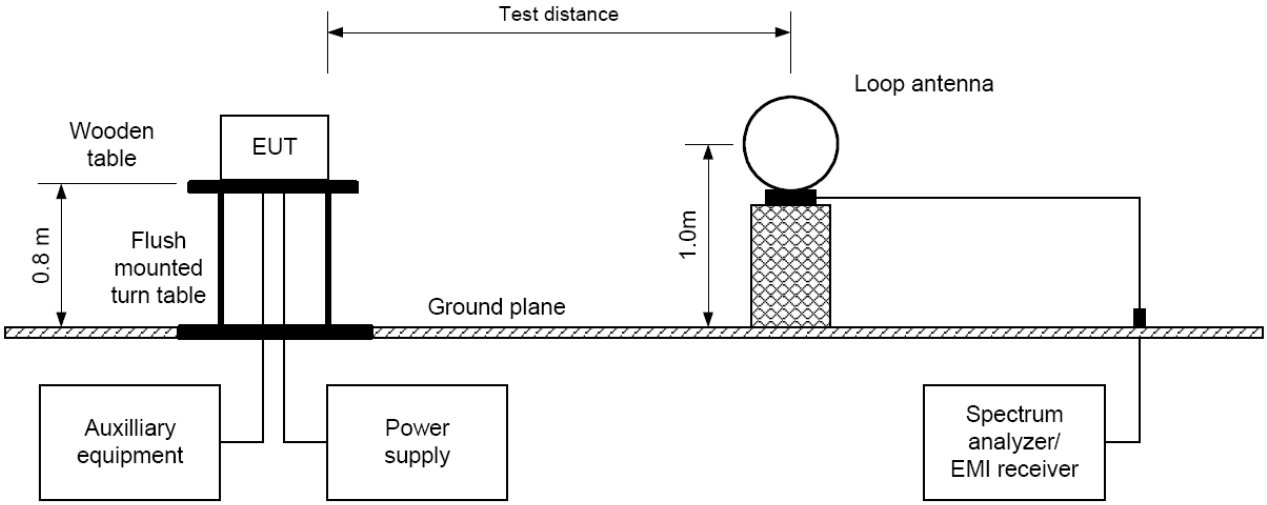
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

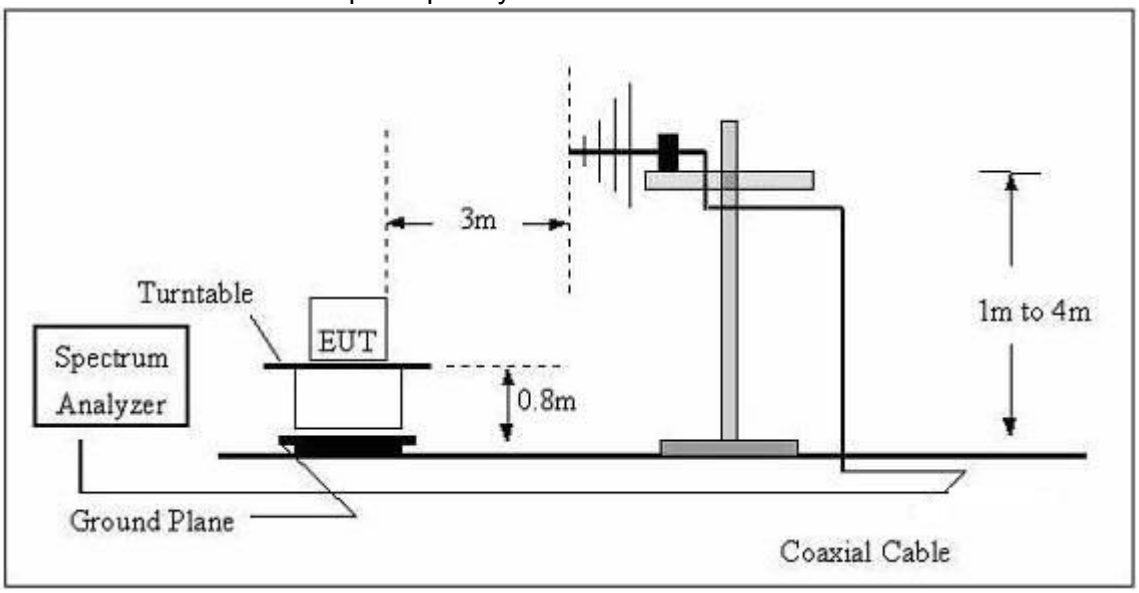
No deviation

### 3.2.4 TEST SETUP

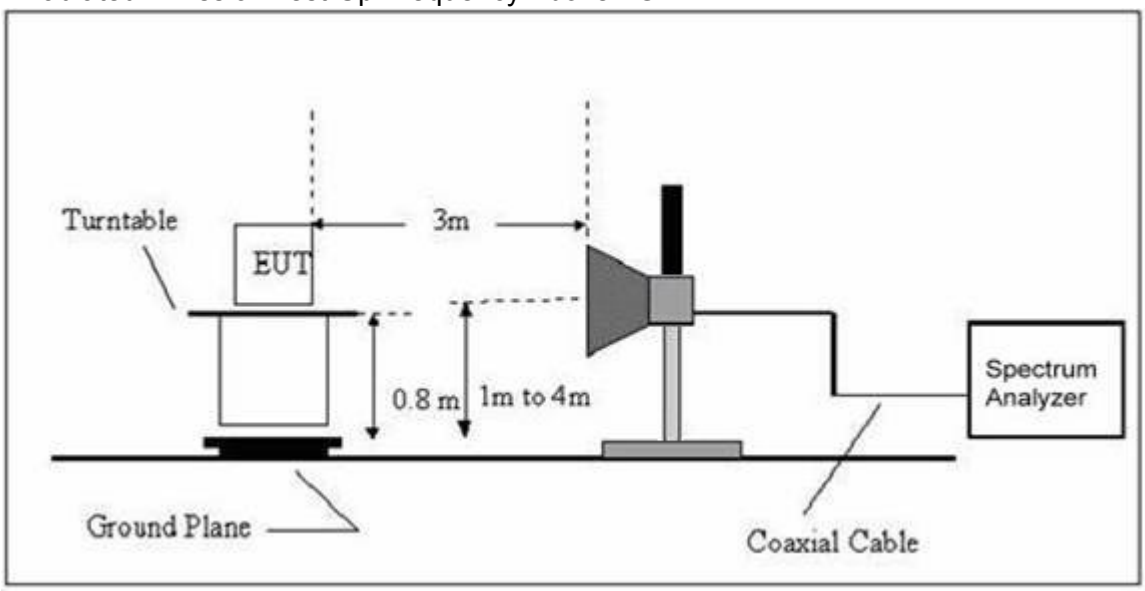
（A）Radiated Emission Test-Up Frequency Below 30MHz




（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz




### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.2.6 TEST RESULTS (BELOW 30 MHZ)

| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | TX | Polarization : | --- |

| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | P |
| -- | -- | -- | -- | P |

**NOTE:**
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

### 3.2.7 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 24 ℃ | Relative Humidity： | 54% |
| Pressure： | 1010hPa | Test Mode： | TX 2402 |
| Test Voltage ： | DC 3.7V | | |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|
| V | 35.67 | 23.53 | 8.68 | 32.21 | 40 | -7.79 | QP |
| V | 76.87 | 19.64 | 9.54 | 29.18 | 40 | -10.82 | QP |
| V | 257.49 | 24.54 | 14.77 | 39.31 | 47 | -7.69 | QP |
| V | 369.72 | 20.74 | 19.74 | 40.48 | 47 | -6.52 | QP |
| V | 466.16 | 20.15 | 13.37 | 33.52 | 47 | -13.48 | QP |
| V | 664.84 | 18.48 | 17.15 | 35.63 | 47 | -11.37 | QP |
| H | 38.67 | 19.33 | 8.53 | 27.86 | 40 | -12.14 | QP |
| H | 122.53 | 18.48 | 8.66 | 27.14 | 43.5 | -16.36 | QP |
| H | 228.65 | 23.64 | 9.49 | 33.13 | 47 | -13.87 | QP |
| H | 318.69 | 21.36 | 12.38 | 33.74 | 47 | -13.26 | QP |
| H | 582.68 | 21.64 | 15.73 | 37.37 | 47 | -9.63 | QP |
| H | 699.86 | 17.54 | 19.95 | 37.49 | 47 | -9.51 | QP |

**Remark:**

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

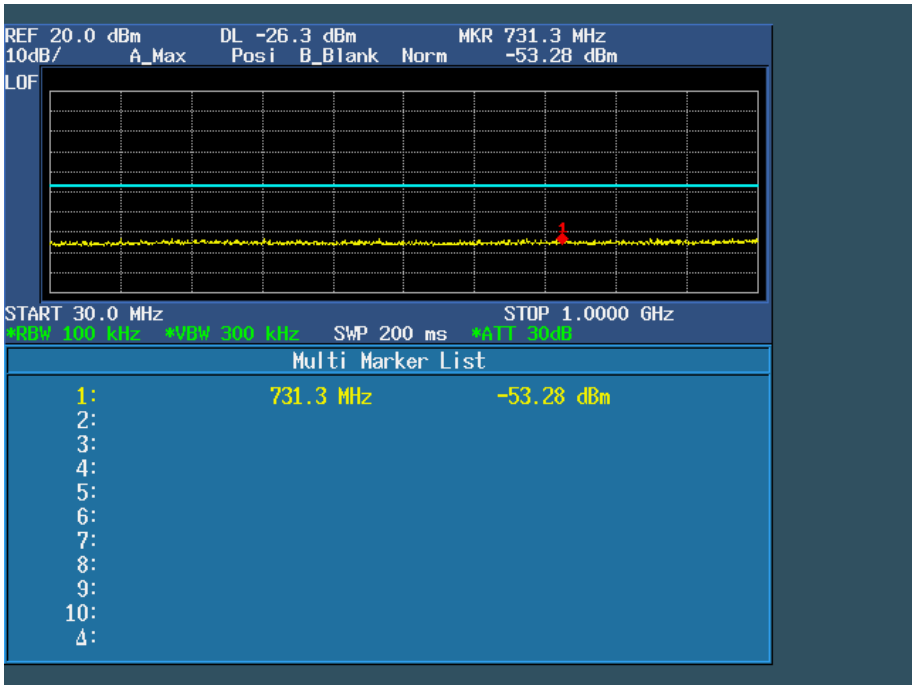
### 3.2.8 TEST RESULTS (Above 1GHz~ 10th harmonic)

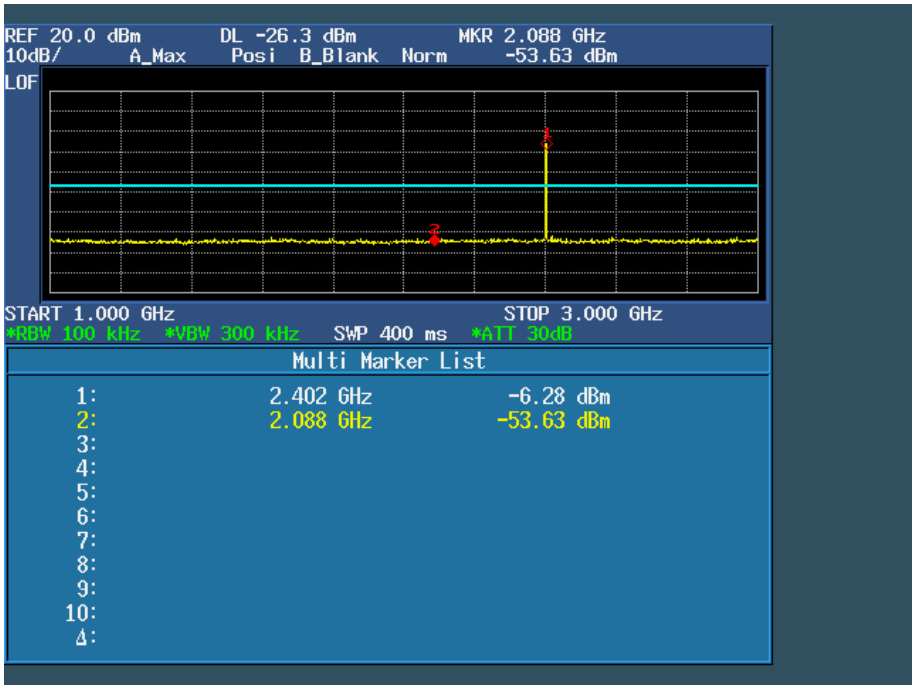
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
|---|---|---|---|
| Temperature： | 24 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010hPa | Test Mode： | TX |
| Test Voltage： | DC 3.7V | | |

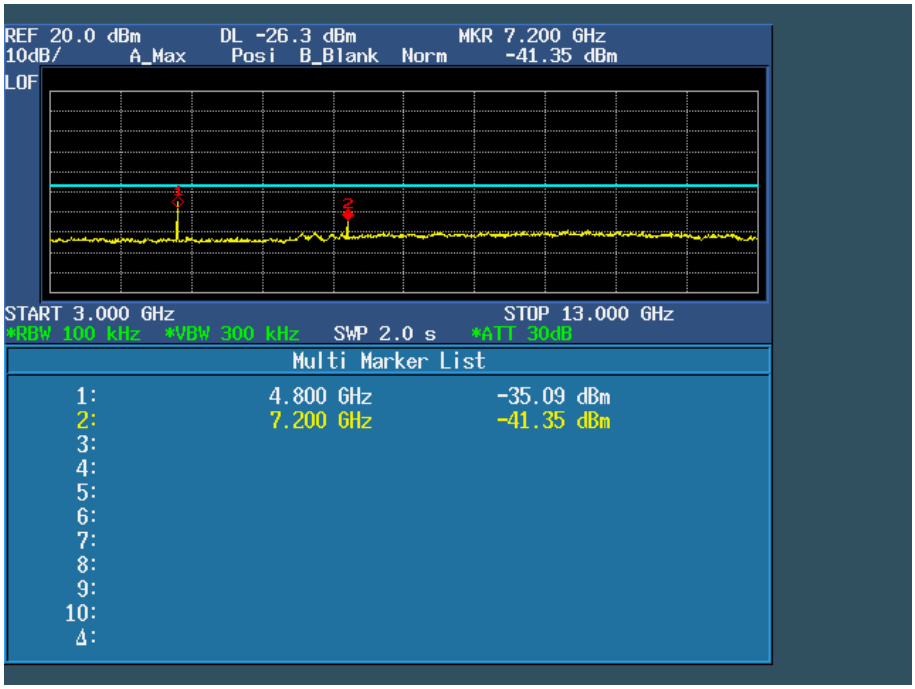
| Low Channel (2402 MHz)-Above 1G | | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Meter Reading (dBuV) | Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detect or Type | Polar (H/V) |
| 4804.31 | 53.46 | -3.26 | 50.2 | 74 | -23.8 | Pk | Vertical |
| 4804.35 | 40.2 | -3.26 | 36.94 | 54 | -17.06 | Av | Vertical |
| 7206.55 | 51.37 | -2.31 | 49.06 | 74 | -24.94 | Pk | Vertical |
| 7206.55 | 38.75 | -2.31 | 36.44 | 54 | -17.56 | Av | Vertical |
| 4804.28 | 49.63 | -3.18 | 46.45 | 74 | -27.55 | Pk | Horizontal |
| 4804.28 | 36.73 | -3.18 | 33.55 | 54 | -20.45 | Av | Horizontal |
| 7206.47 | 45.36 | -2.28 | 43.08 | 74 | -30.92 | Pk | Horizontal |
| 7206.47 | 33.16 | -2.28 | 30.88 | 54 | -23.12 | Av | Horizontal |
| Mid Channel (2441 MHz)-Above 1G | | | | | | | |
| 4882.2 | 55.63 | -3.55 | 52.08 | 74 | -21.92 | Pk | Vertical |
| 4882.2 | 41.16 | -3.55 | 37.61 | 54 | -16.39 | Av | Vertical |
| 7324.4 | 52.72 | -0.76 | 51.96 | 74 | -22.04 | Pk | Vertical |
| 7324.4 | 39.75 | -0.76 | 38.99 | 54 | -15.01 | Av | Vertical |
| 4882.3 | 48.75 | -3.82 | 44.93 | 74 | -29.07 | Pk | Horizontal |
| 4882.3 | 38.63 | -3.82 | 34.81 | 54 | -19.19 | Av | Horizontal |
| 7324.8 | 46.37 | -0.91 | 45.46 | 74 | -28.54 | Pk | Horizontal |
| 7324.8 | 35.84 | -0.91 | 34.93 | 54 | -19.07 | Av | Horizontal |
| High Channel (2480MHz)- Above 1G | | | | | | | |
| 4960.4 | 50.47 | -3.67 | 46.8 | 74 | -27.2 | Pk | Vertical |
| 4960.4 | 40.85 | -3.67 | 37.18 | 54 | -16.82 | Av | Vertical |
| 7440.1 | 51.54 | -0.73 | 50.81 | 74 | -23.19 | Pk | Vertical |
| 7440.1 | 39.86 | -0.73 | 39.13 | 54 | -14.87 | Av | Vertical |
| 4960.1 | 48.75 | -3.47 | 45.28 | 74 | -28.72 | Pk | Horizontal |
| 4960.1 | 36.83 | -3.47 | 33.36 | 54 | -20.64 | Av | Horizontal |
| 7440.5 | 45.73 | -0.54 | 45.19 | 74 | -28.81 | Pk | Horizontal |
| 7440.5 | 34.17 | -0.54 | 33.63 | 54 | -20.37 | Av | Horizontal |

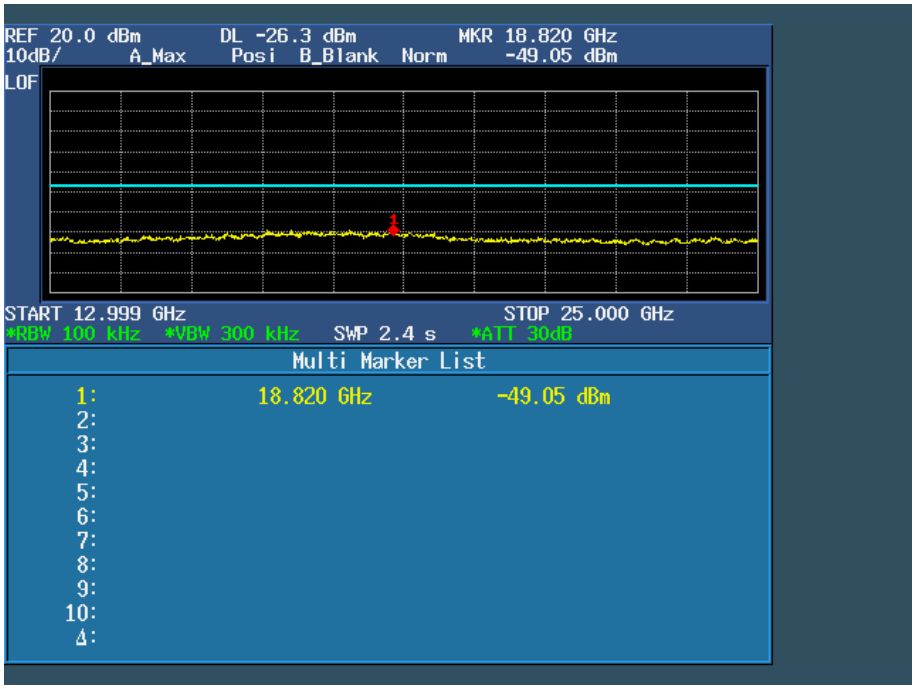
Conducted Spurious Emissions at Antenna Port
(there are 150001 points are used for each measurement plot)

CH00

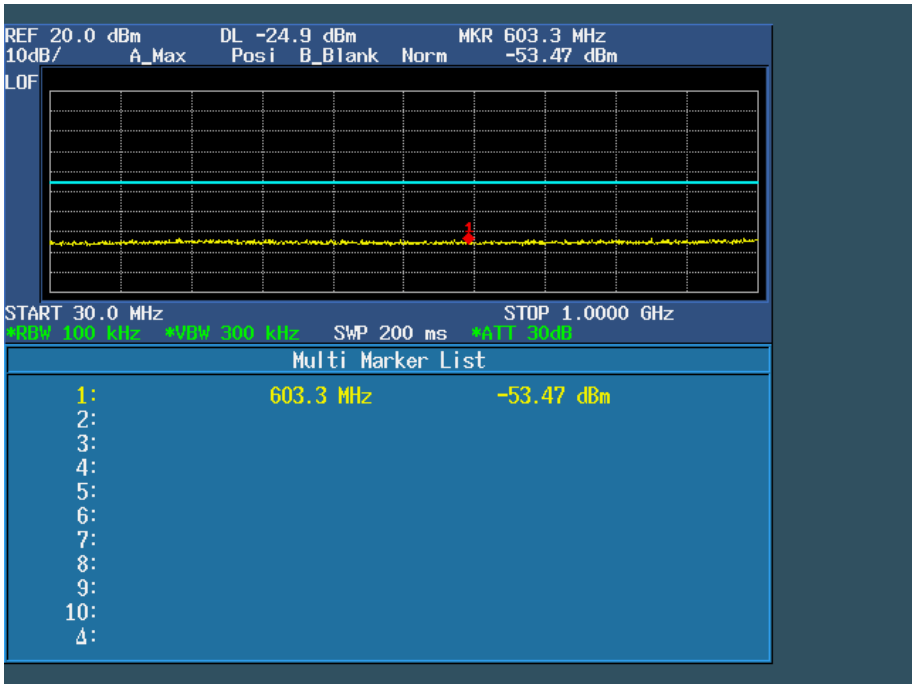


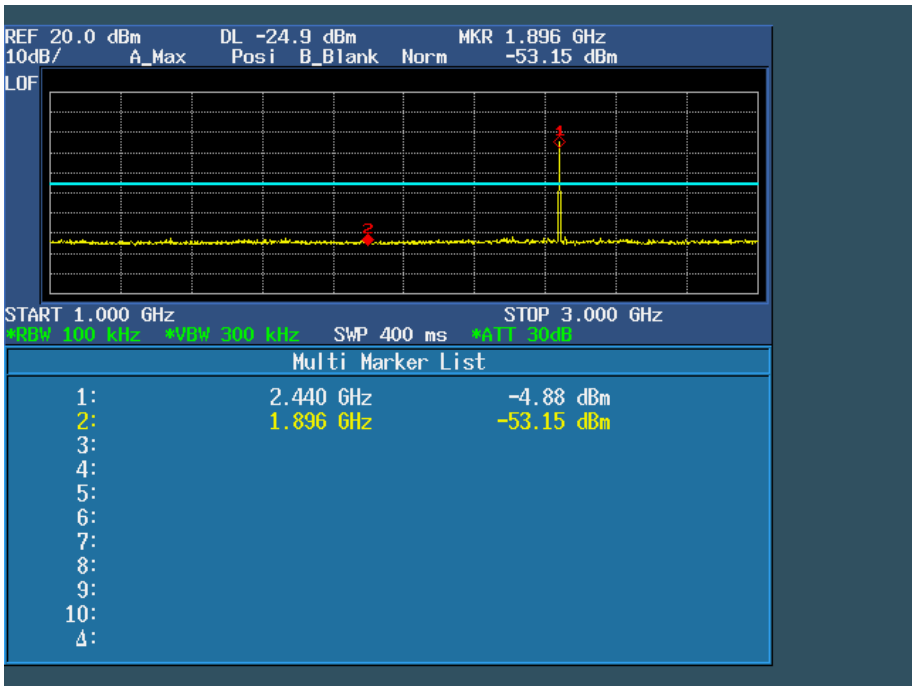



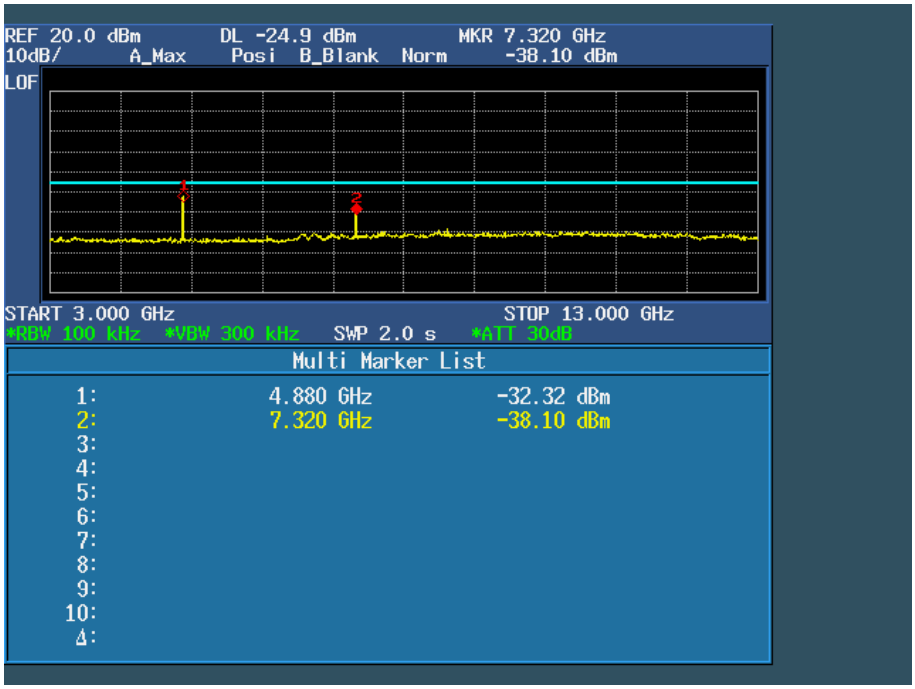


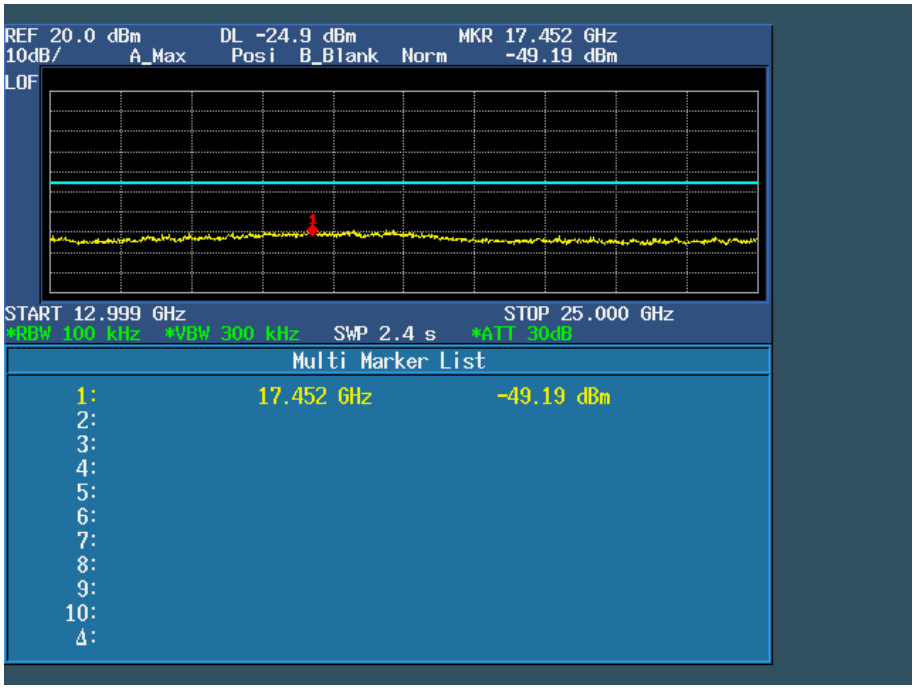



CH39

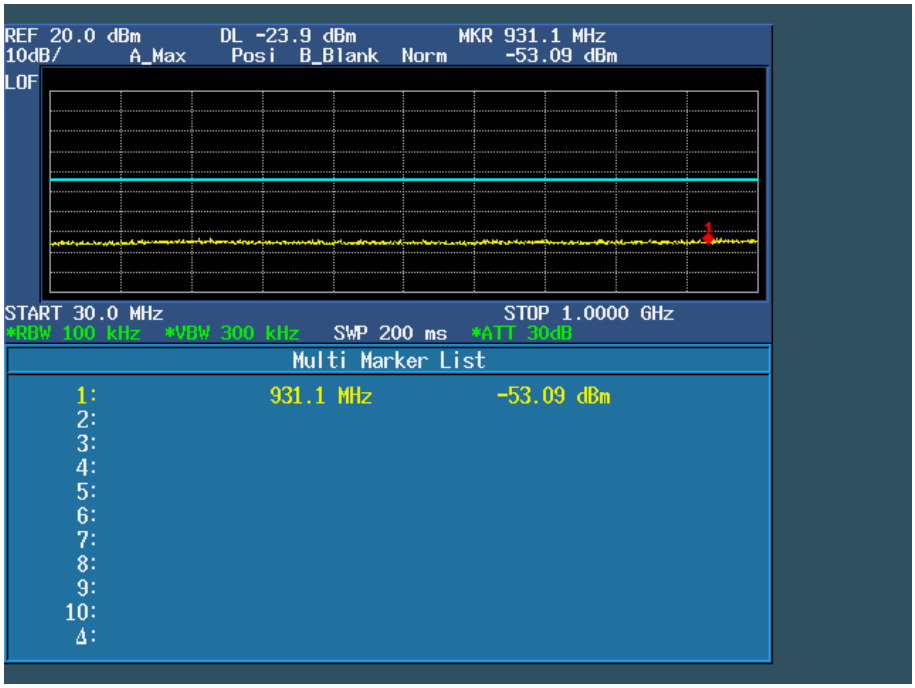


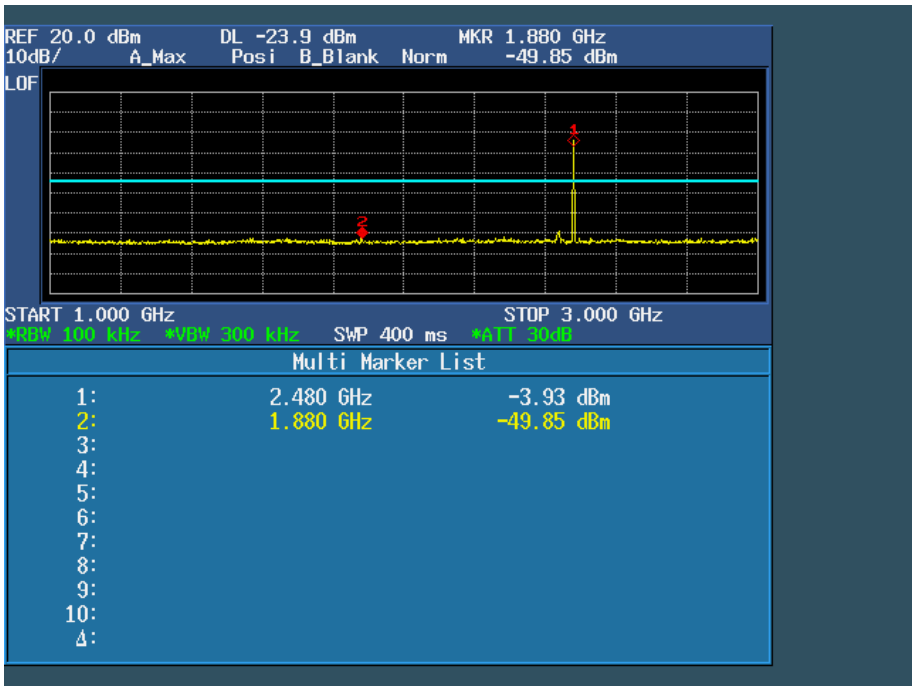



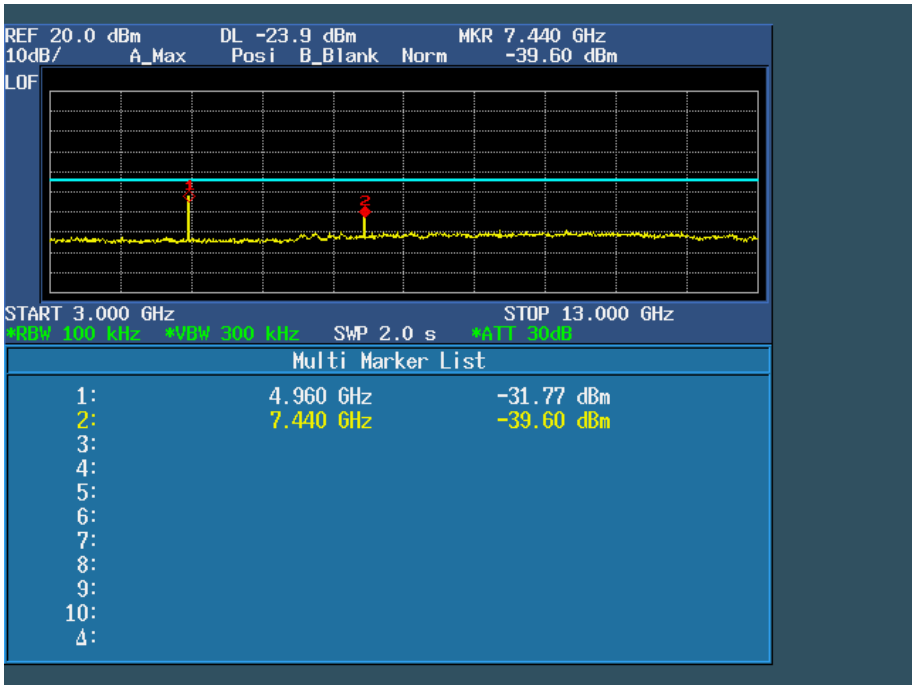


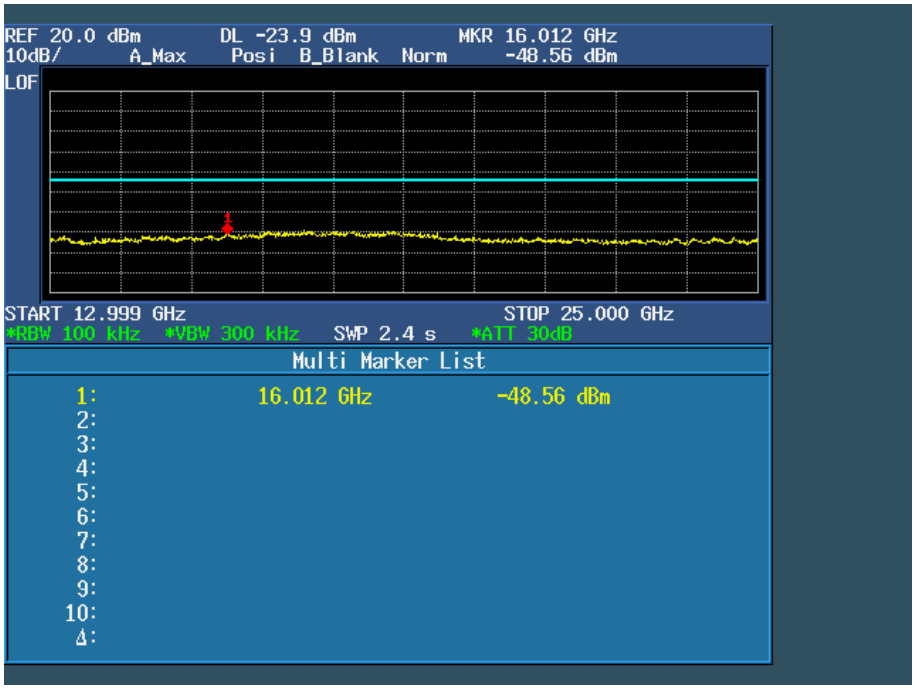



CH78





## 4. NUMBER OF HOPPING CHANNEL

### 4.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1)(iii) | Number of Hopping Channel | ≥15 | 2400-2483.5 | PASS |

| Spectrum Parameters | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | = the frequency band of operation |
| RB | RBW =100kHz |
| VB | VBW ≥ RBW |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

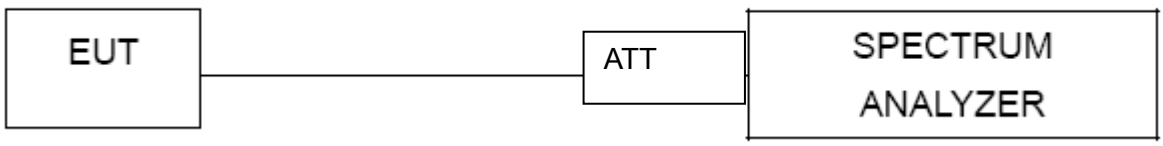
#### 4.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100kHz, VBW=300kHz, Sweep time = Auto.

#### 4.1.2 DEVIATION FROM STANDARD

No deviation.

#### 4.1.3 TEST SETUP



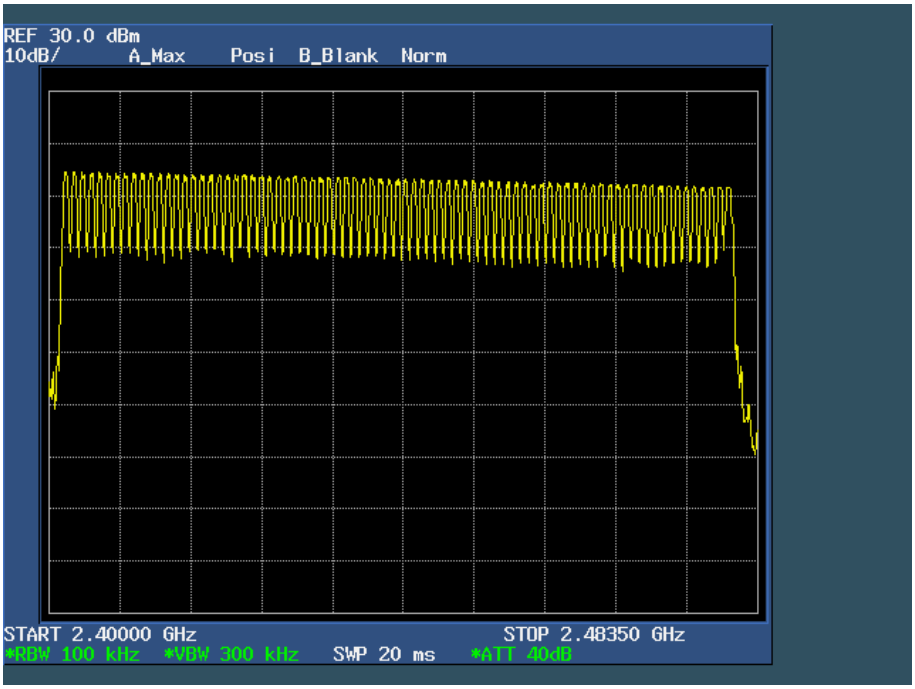

#### 4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 4.1.5 TEST RESULTS

| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
|---|---|---|---|
| Temperature： | 25 ℃ | Relative Humidity： | 60% |
| Pressure： | 1015 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | Hopping Mode | | |

| Number of Hopping Channel | 79 |
|---|---|



# 5. AVERAGE TIME OF OCCUPANCY

## 5.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1)(iii) | Average Time of Occupancy | 0.4sec | 2400-2483.5 | PASS |

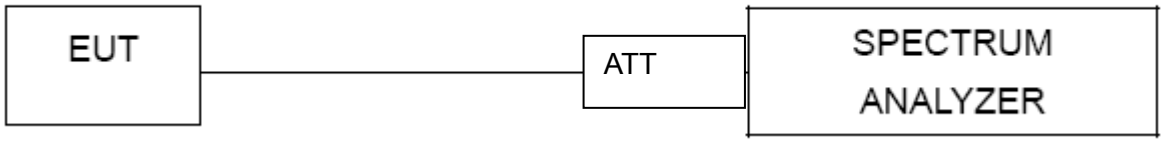
### 5.1.1 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. A Period Time = (channel number)*0.4
DH1 Time Slot: Reading * (1600/2)*31.6/(channel number)
DH3 Time Slot: Reading * (1600/4)*31.6/(channel number)
DH5 Time Slot: Reading * (1600/6)*31.6/(channel number)

### 5.1.2 DEVIATION FROM STANDARD

No deviation.

### 5.1.3 TEST SETUP




### 5.1.4 EUT OPERATION CONDITIONS

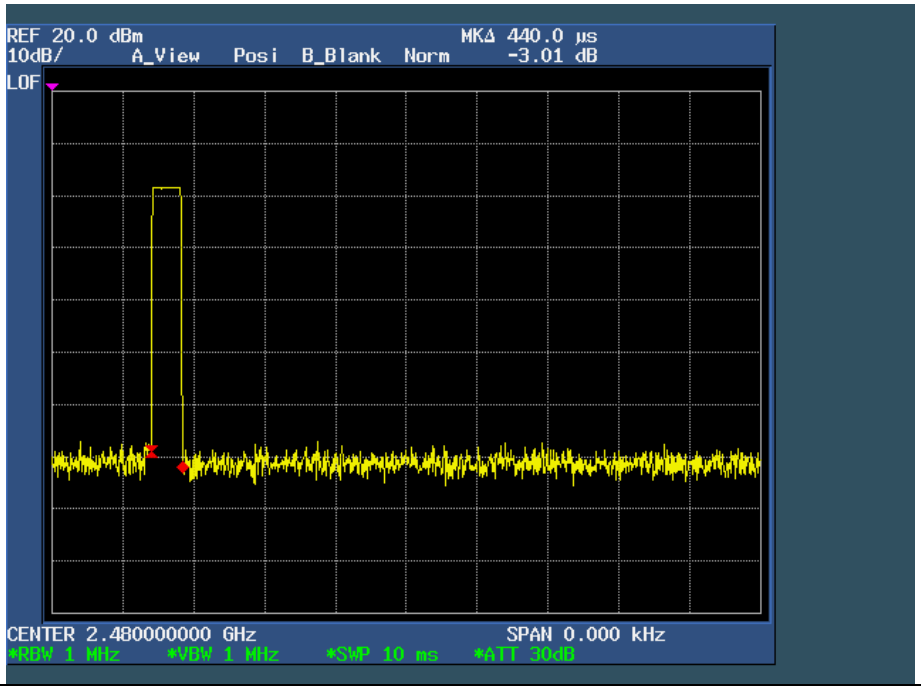
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 5.1.5 TEST RESULTS

| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
|---|---|---|---|
| Temperature： | 25 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | TX | | |

| Frequency | Plus Duration（ms） | Dwell Time（s） | Limits（s） |
|---|---|---|---|
| 2480MHz | 0.44 | 0.14 | 0.4 |

**CH00**



# 6. HOPPING CHANNEL SEPARATION MEASUREMENT

## 6.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 100 kHz |
| VB | 300 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

### 6.1.1 TEST PROCEDURE

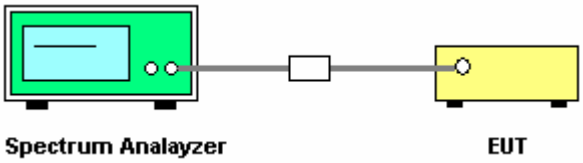
a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.

b. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

### 6.1.2 DEVIATION FROM STANDARD

No deviation.

### 6.1.3 TEST SETUP




### 6.1.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

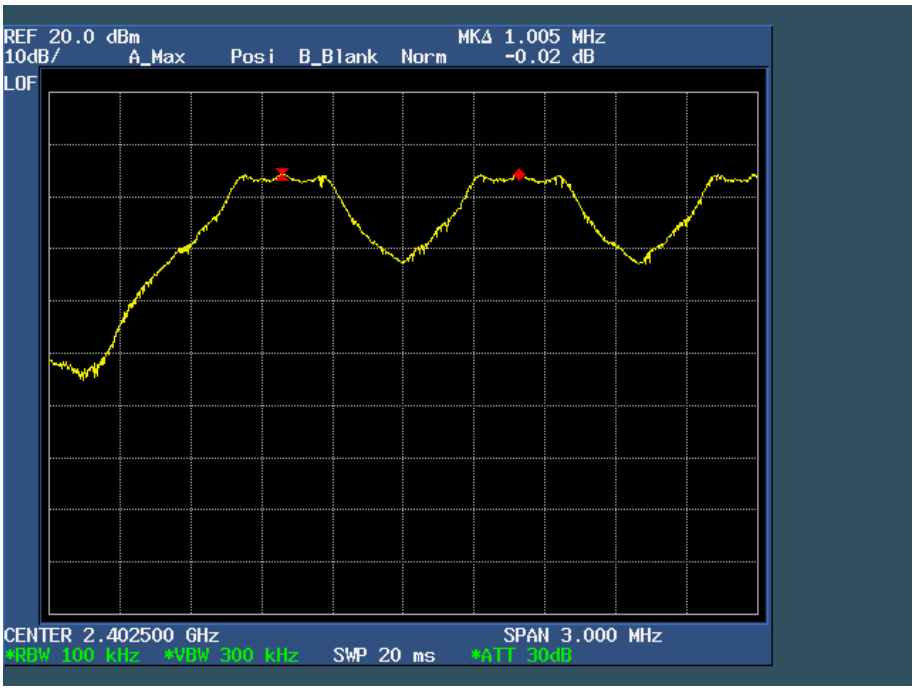
### 6.1.5 TEST RESULTS

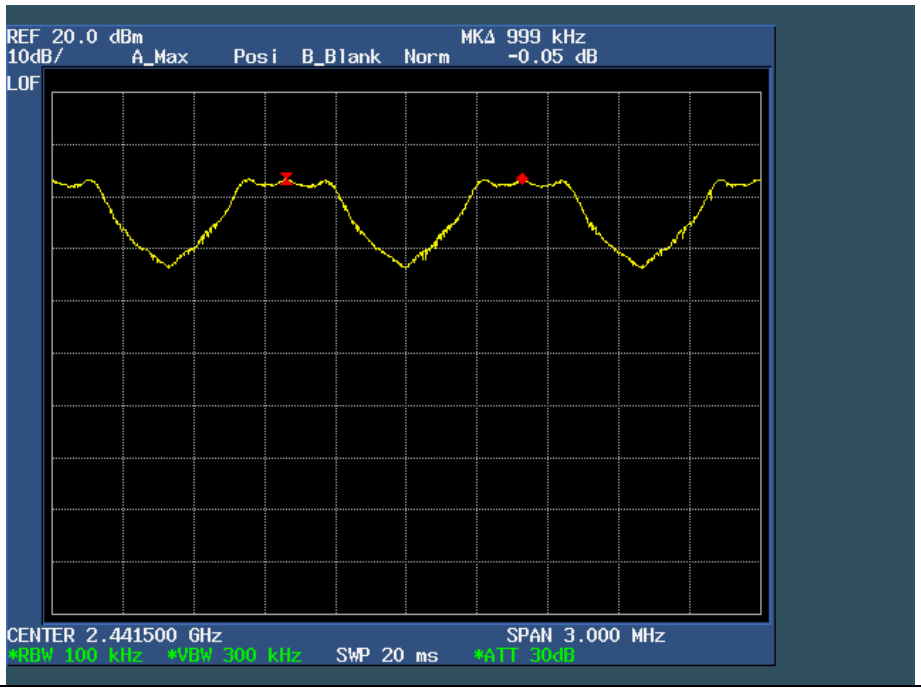
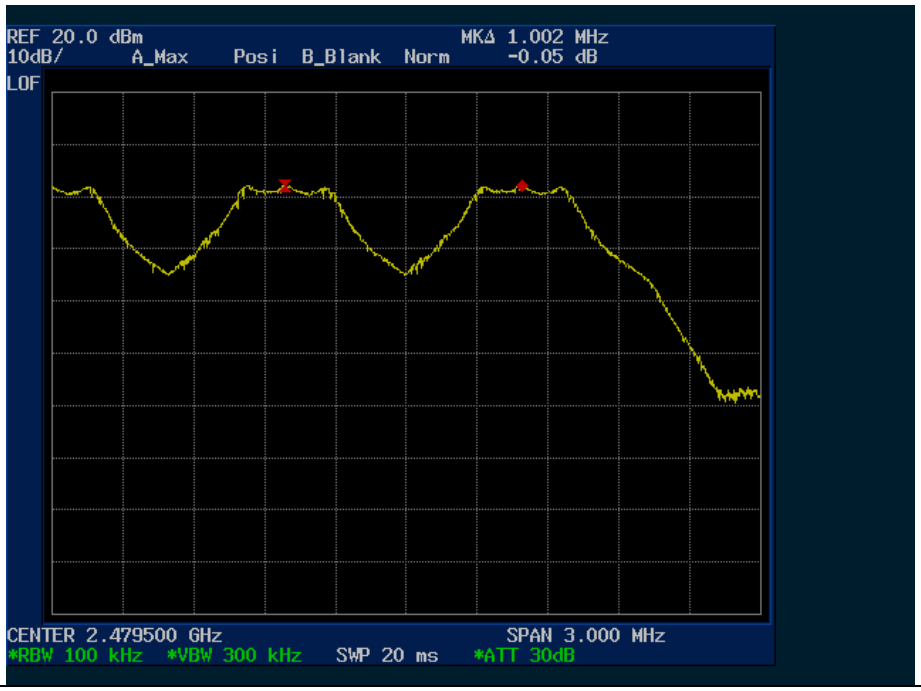
| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 24 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | CH00 / CH39 /CH78 (250kbps Mode) | | |

| Frequency | Ch. Separation (MHz) | Result |
|---|---|---|
| 2402 MHz | 1.005 | **Complies** |
| 2441 MHz | 0.999 | **Complies** |
| 2480 MHz | 1.002 | **Complies** |

**Ch. Separation Limits: >20dB bandwidth**

**CH00 -250kbps**



| CH39 -250kbps |
| --- |
|  |
| CH78 -250kbps |
|  |

# 7. BANDWIDTH TEST

## 7.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1) | Bandwidth | (20dB bandwidth) | 2400-2483.5 | PASS |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 100 kHz |
| VB | 300 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

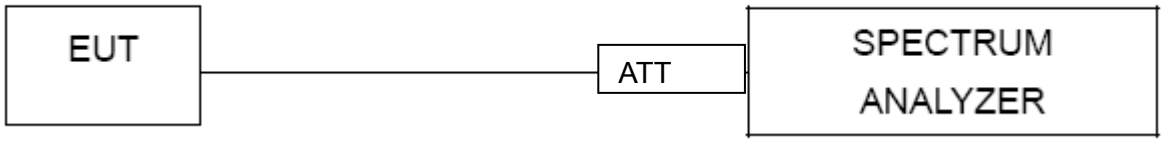
### 7.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

### 7.1.2 DEVIATION FROM STANDARD

No deviation.

### 7.1.3 TEST SETUP




### 7.1.4 EUT OPERATION CONDITIONS

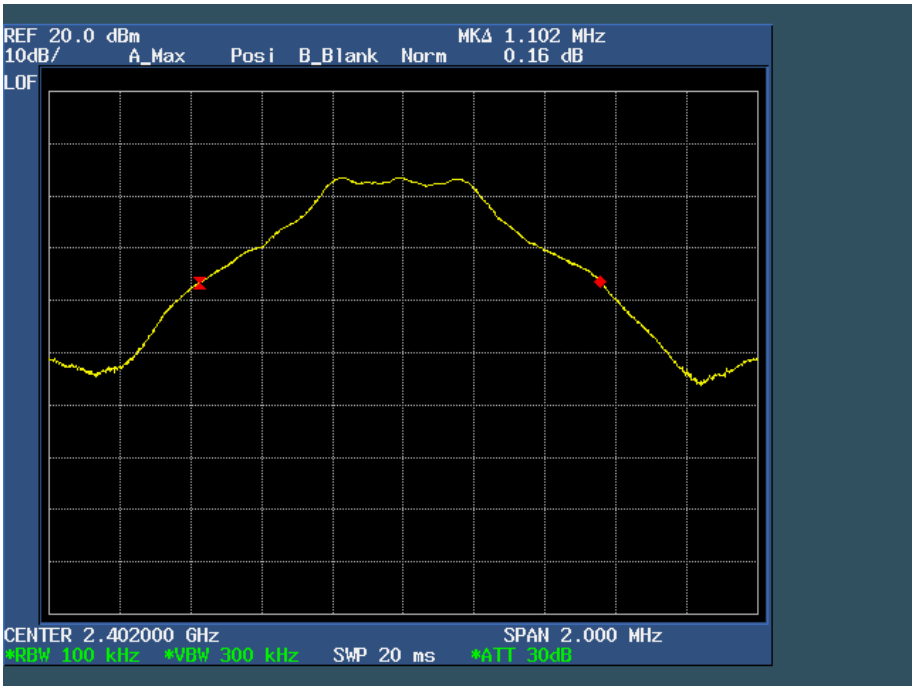
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 7.1.5 TEST RESULTS

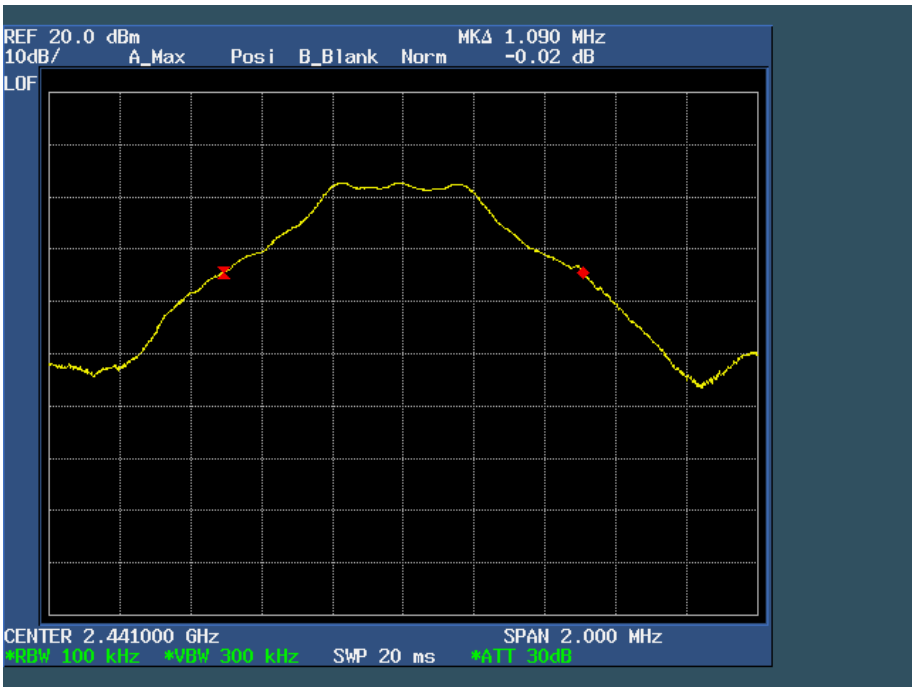
| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 25 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | CH00 / CH39 /C78**(250kbps)** | | |

| Frequency | 20dB Bandwidth (MHz) | Result |
|---|---|---|
| 2402 MHz | 1.102 | **PASS** |
| 2441 MHz | 1.090 | **PASS** |
| 2480 MHz | 1.142 | **PASS** |

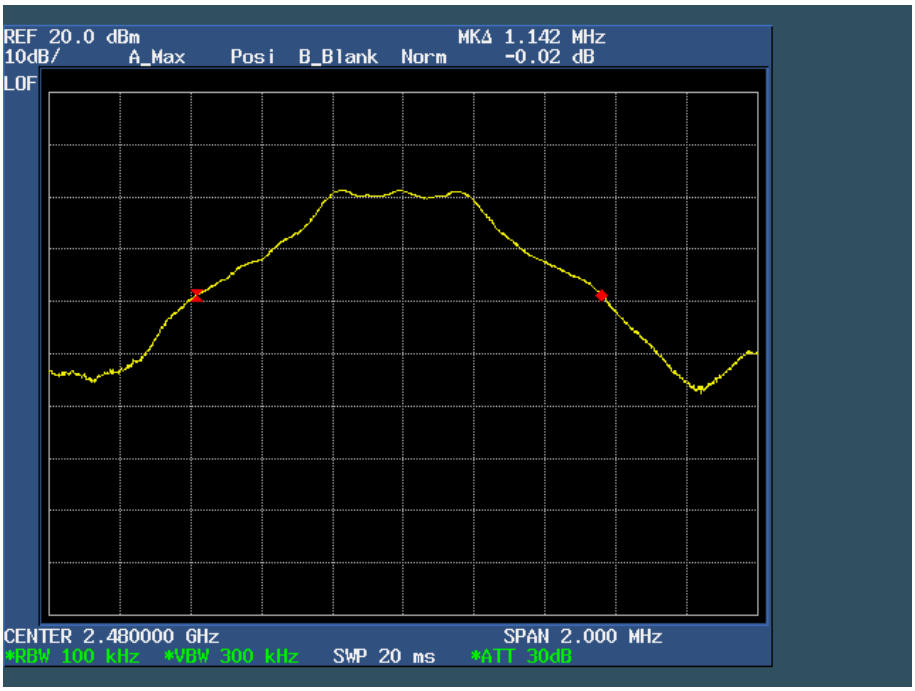
**CH00 -250kbps**



**CH39 -250kbps**




**CH78 -250kbps**



# 8. PEAK OUTPUT POWER TEST

## 8.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (b)(i) | Peak Output Power | 0.125 w or 1w | 2400-2483.5 | PASS |

### 8.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

b. Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

VBW ≥ RBW

Sweep = auto

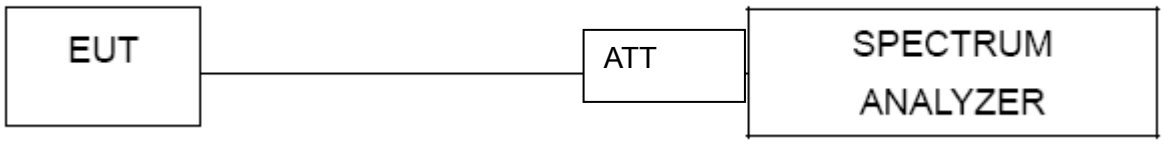
Detector function = peak

Trace = max hold

### 8.1.2 DEVIATION FROM STANDARD

No deviation.

### 8.1.3 TEST SETUP




### 8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

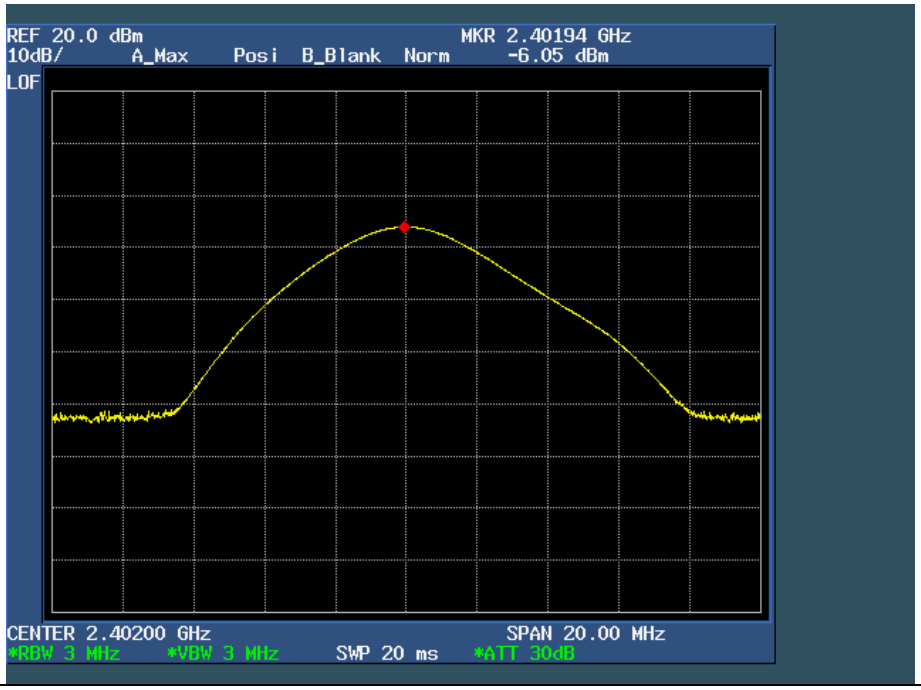
### 8.1.5 TEST RESULTS

| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
|---|---|---|---|
| Temperature： | 25 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 3.7V |
| Test Mode ： | CH00/ CH39 /CH78 | | |

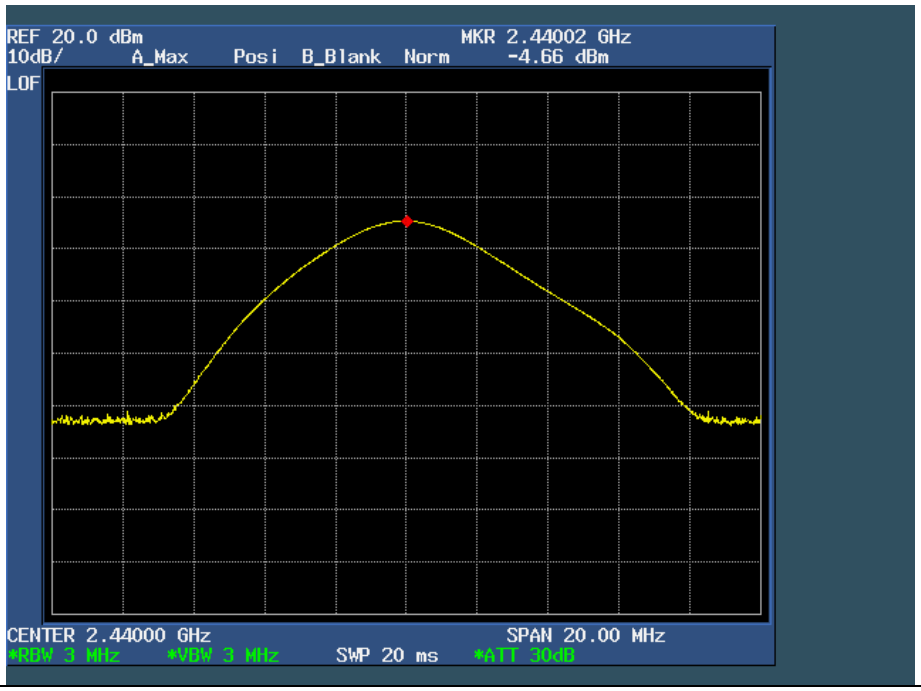
Note: The relevant measured result has the offset with cable loss already.

| 250kbps | | | |
|---|---|---|---|
| Test Channel | Frequency (MHz) | Peak Output Power (dBm) | LIMIT (dBm) |
| CH00 | 2402 | -6.05 | 30 |
| CH39 | 2440 | -4.66 | 30 |
| CH78 | 2480 | -4.08 | 30 |

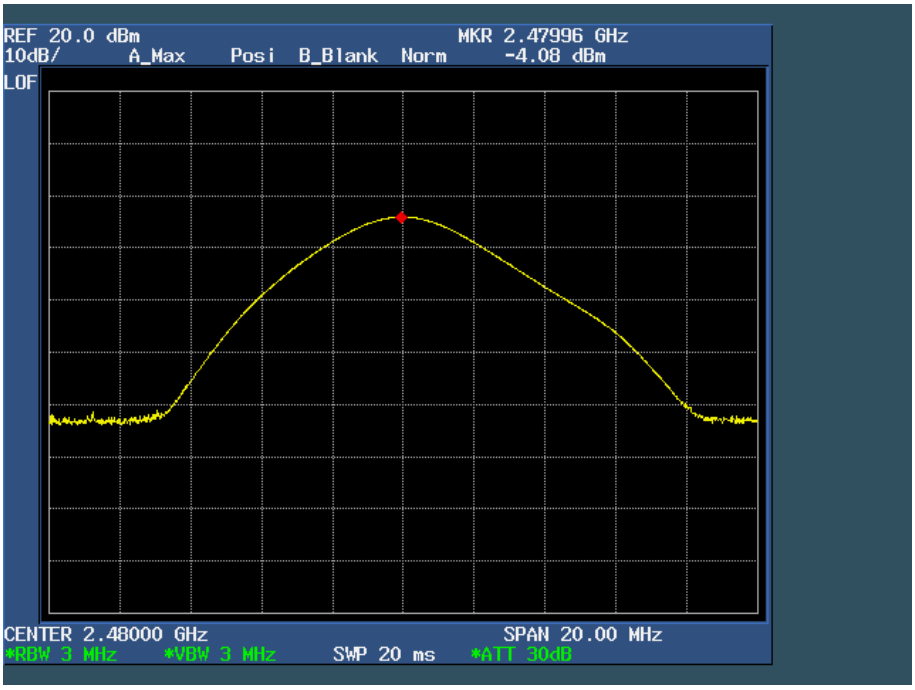
**CH00 -250kbps**



**CH39 -250kbps**




**CH78 -250kbps**



## 9. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### APPLICABLE STANDARD

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

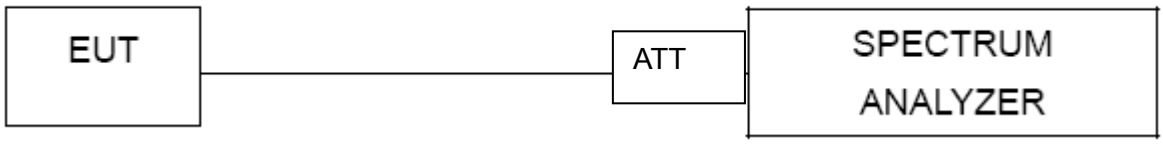
### TEST PROCEDURE

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

### 9.1 DEVIATION FROM STANDARD

No deviation.

**9.2 TEST SETUP**




**9.3 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 9.4 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | Smart Remote control | Model Name ： | KP-810-30 |
| Temperature： | 24 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 3.7V |

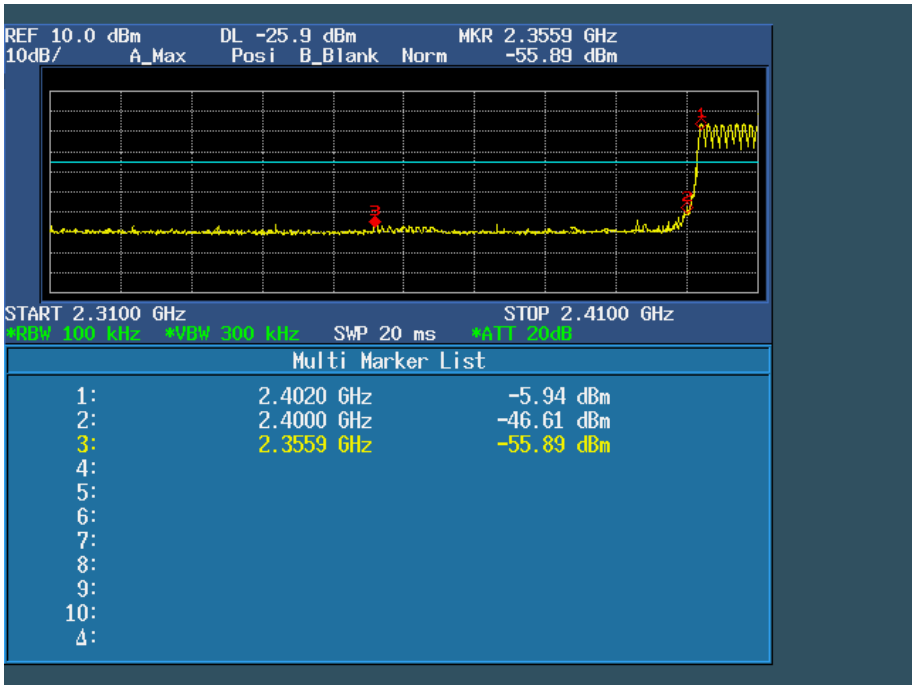
| Frequency Band | Delta Peak to band emission (dBc) | ＞Limit (dBc) | Result |
|---|---|---|---|
| 250kbps Non-hopping | | | |
| Left-band | 45.47 | 20 | Pass |
| Right-band | 50.79 | 20 | Pass |
| 250kbps hopping | | | |
| Left-band | 40.67 | 20 | Pass |
| Right-band | 48.42 | 20 | Pass |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|---|---|---|---|---|---|---|---|
| 250kbps Non-hopping | | | | | | | |
| 2390 | 53.37 | -13.06 | 40.31 | 54 | -13.69 | peak | Vertical |
| 2390 | 51.74 | -13.06 | 38.68 | 54 | -15.32 | peak | Horizontal |
| 2483.5 | 52.37 | -12.78 | 39.59 | 54 | -14.41 | peak | Vertical |
| 2483.5 | 50.74 | -12.78 | 37.96 | 54 | -16.04 | peak | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|---|---|---|---|---|---|---|---|
| 250kbps hopping | | | | | | | |
| 2390 | 50.24 | -13.06 | 37.18 | 54 | -16.82 | peak | Vertical |
| 2390 | 49.56 | -13.06 | 36.5 | 54 | -17.5 | peak | Horizontal |
| 2483.5 | 49.77 | -12.78 | 36.99 | 54 | -17.01 | peak | Vertical |
| 2483.5 | 51.28 | -12.78 | 38.5 | 54 | -15.5 | peak | Horizontal |

Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average didn't record.

Band Edge, Left Side

Band Edge, Right Side


# 10. ANTENNA REQUIREMENT

## 10.1 STANDARD REQUIREMENT

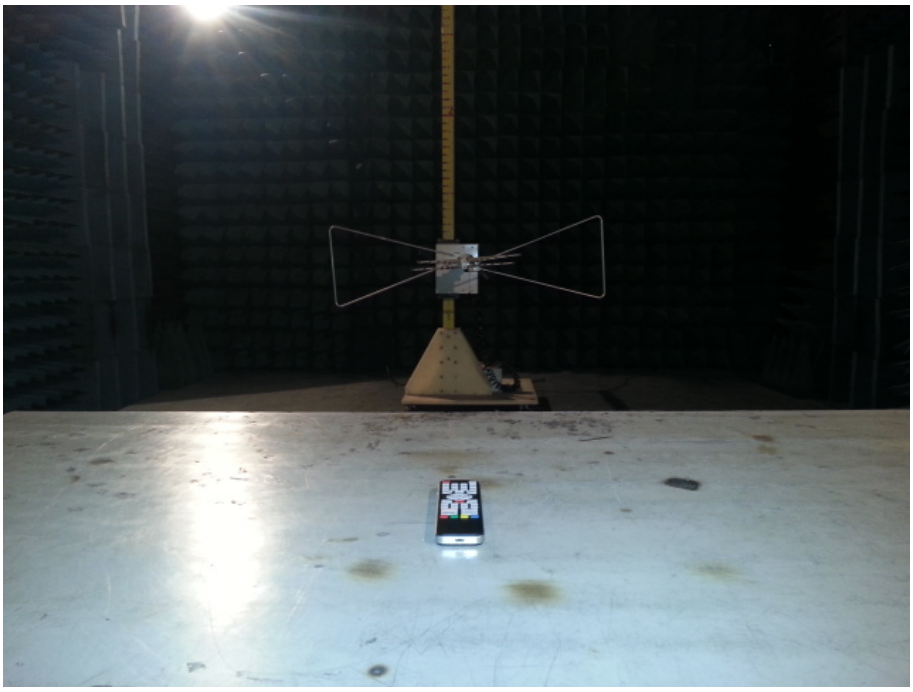
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

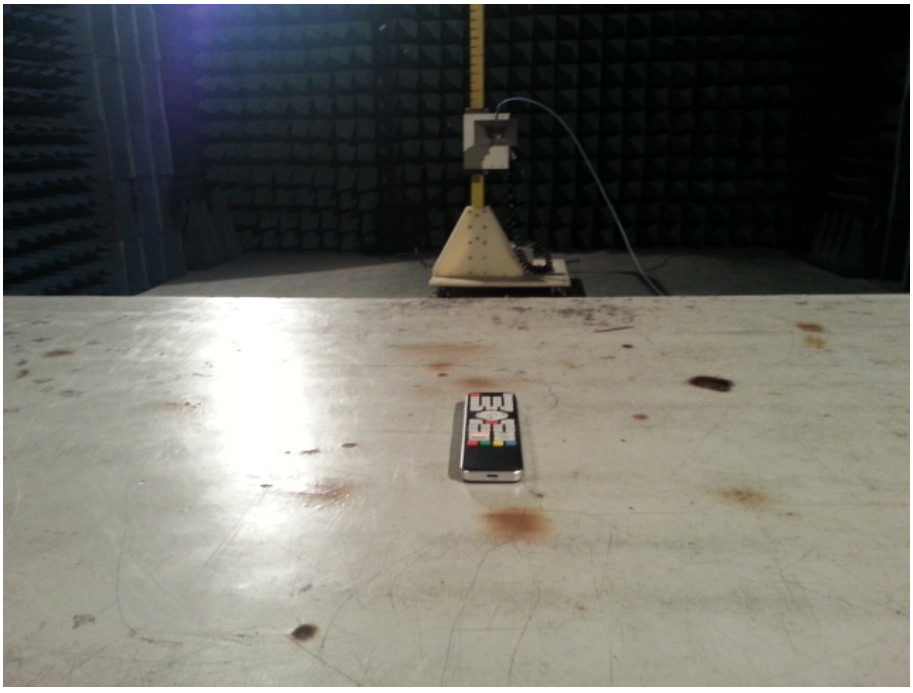
## 10.2 EUT ANTENNA

The EUT antenna is PCB antenna. It comply with the standard requirement.

## 11. EUT TEST PHOTO

**Radiated Measurement Photos**





## CE Measurement Photos