



EMC RESEARCH INSTITUTE



# EMI TEST REPORT

## Emission of electromagnetic disturbance

**Test Report No.** : ERI-FCC04-0052  
**Equipment** : MP3 Player  
**Name of basic model** : MP-410TH  
**Family model** : MP-410TE, MP-410TF, MP-410TG  
**Manufacturer** : CENIX DIGICOM CO., LTD.  
**Applicant** : CENIX DIGICOM CO., LTD.  
**Tested date** : 2004. 10. 11 – 10. 12  
**Issued date** : 2004. 10. 15  
**Test results** : PASS  
**Test Standards** : FCC Part 15 Subpart B (Class B)  
/Digital devices & peripherals

### Test Procedure and Items:

- AC Power line Conducted emissions measurement : ANSI C63.4-1992
- Radiated emissions measurement : ANSI C63.4-1992

**Tested by: Kim, Young-sik**

**Approved by: Lee, Sang-kyu**

The results in this report apply only to the sample tested.

This test report shall not be reproduced except in full, without the written approval of **ERI Laboratory**.

## **CONTENTS**

1. CLIENT INFORMATION
2. LABORATORY INFORMATION
3. EQUIPMENT UNDER TEST INFORMATION(EUT)
  - 3.1 Identification of the EUT
  - 3.2 Additional information about the EUT
  - 3.3 Peripheral equipment
4. CONTINUOUS DISTURBANCE VOLTAGE, MAIN TERMINAL
  - 4.1 Operating environment
  - 4.2 Test set-up and test procedures
  - 4.3 Operation Conditions
  - 4.4 Test instrument
  - 4.5 Test results
5. RADIATED DISTURBANCE : 30MHz – 1000MHz
  - 5.1 Operating environment
  - 5.2 Test set-up
  - 5.3 Test conditions
  - 5.4 Test instrument
  - 5.5 Test results (Test mode: Up & Download mode)
  - 5.6 Test results (Test mode: Play mode)
  - 5.7 Test results (Test mode : FM Tuner mode)

## **APPENDIX**

(None)

## 1. CLIENT INFORMATION

The EUT has been tested by request of :

Company : CENIX DIGICOM CO., LTD.  
Address : #584-4 PAJANG-DONG, JANGAN-KU, SUWON-CITY,  
KYUNGGI-DO, KOREA  
Name of contact : -  
Telephone : +82-31-245-2900  
Facsimile : +82-31-251-6425

## 2. LABORATORY INFORMATION

The 10m full-anechoic chamber and/or EMC facilities are used for these testing.  
These facilities were accredited by KOLAS, EK, MIC of Korea and FCC of USA.

### **Address**

ELECTROMAGNETIC RESEARCH INSTITUTE.  
66-6, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA  
Telephone No. : +82-31-336-1186~7  
Facsimile No. : +82-31-336-1184

### **Registered No.**

KOLAS : 111  
EK : J  
MIC : KR0030  
FCC Filing No. : 302567

## 3. EQUIPMENT UNDER TEST INFORMATION(EUT)

### 3.1 Identification of the EUT

Type of equipment : MP3 Player  
Model name : MP-410TH  
Brand name : -  
Manufacturer : CENIX DIGICOM CO., LTD.  
Address : #584-4 PAJANG-DONG, JANGAN-KU, SUWON-CITY,  
KYUNGGI-DO, KOREA  
Telephone : +82-31-245-2900  
Facsimile : +82-31-251-6425  
Country of origin : KOREA  
Rating : DC 1.5V

### 3.2 Additional information about the EUT

Class B,

Family Models List:

| Basic Model | Variant Model | Differential point                 |
|-------------|---------------|------------------------------------|
| MP-410TH    | MP-410TE      | Model name & Memory size(128MByte) |
|             | MP-410TF      | “ (256MByte)                       |
|             | MP-410TG      | “ (512MByte)                       |

### 3.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT.

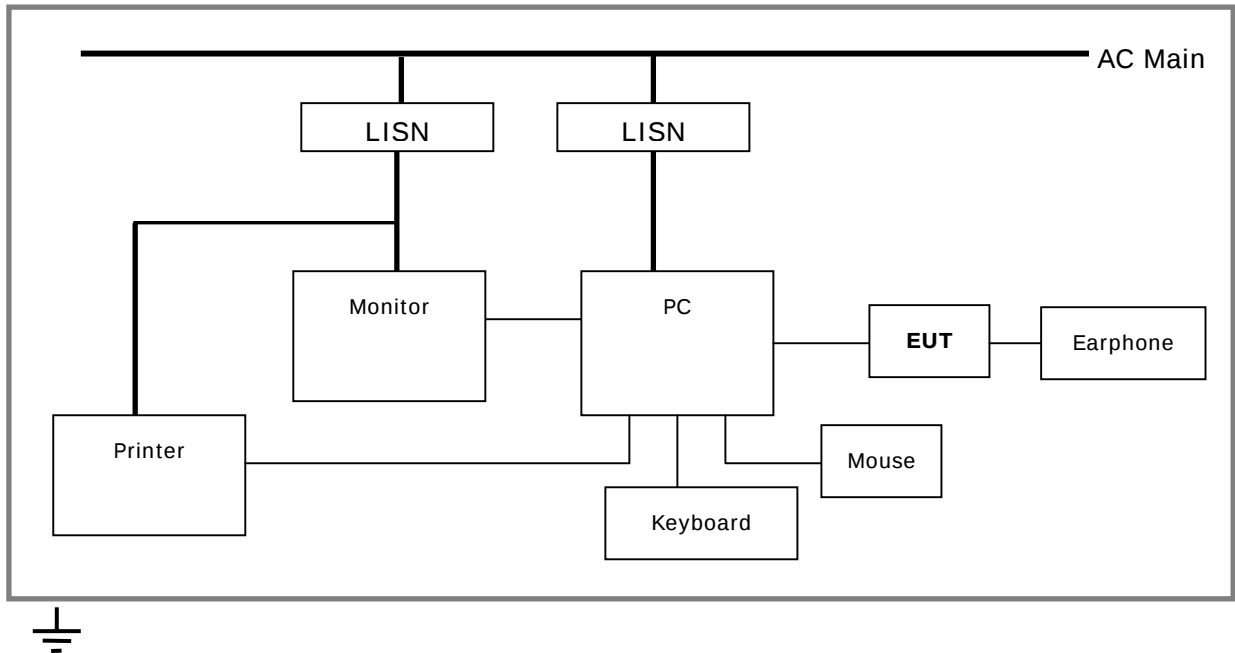
| Description       | Model No. | Serial No.     | Manufacture           |
|-------------------|-----------|----------------|-----------------------|
| Keyboard          | SK-8110   | -              | Dell computer         |
| PS/2 Mouse        | M-S48a    | LZA95250340    | Samsung electronics   |
| Personal computer | MTC2      | FSZS91S        | Dell computer         |
| Printer           | C6247A    | CN13V1V1RY     | hp                    |
| Monitor           | PN15VT    | P181HBOR907989 | Chung-hwa electronics |
| earphone          | -         | -              | -                     |

#### 4. CONTINUOUS DISTURBANCE VOLTAGE, MAIN TERMINAL : Frequency range 0.15 MHz to 30 MHz

##### 4.1 Operating environment

Temperature : 22.0  
Relative Humidity : 46.0 %

##### 4.2 Test set-up and test procedures



The mains terminal disturbance voltage was measured with the equipment under test(EUT) in a shield room. The EUT was connected to an artificial mains network(LISN) placed on the floor. The EUT was placed on non-metallic table 0.4m above the metallic, grounded floor. The distance to other metallic surface was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

##### 4.3 Operation Conditions

Up & Down load mode, play mode

##### 4.4 Test instrument

| Instrument    | Model No       | Serial No. | Makers | Next cal.date | Used |
|---------------|----------------|------------|--------|---------------|------|
| Test receiver | ESCS30         | 100022     | R&S    | 2005. 06. 16  |      |
| L.I.S.N.      | ESH3-Z5        | 100029     | R&S    | 2004. 11. 11  |      |
|               | ESH3-Z5        | 100031     | R&S    | 2005. 01. 06  |      |
| Shield room   | 8 × 6 × 3.3m/H | -          | -      | -             |      |

#### 4.5 Test results

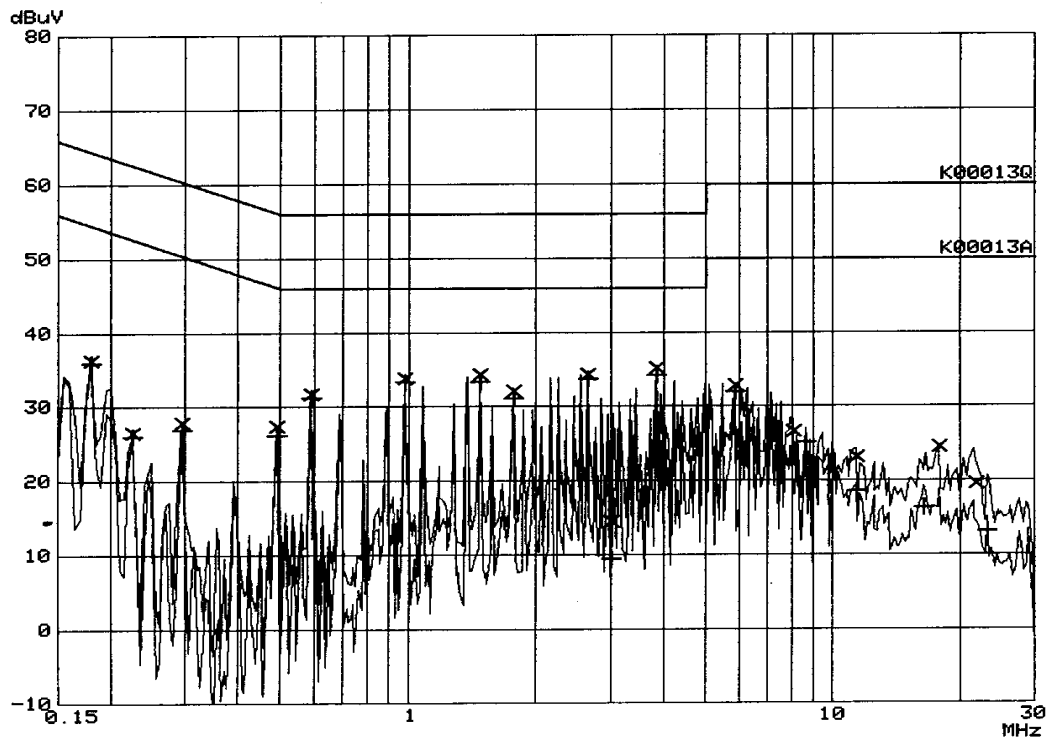
Date of test: Oct 11, 2004.

An overview sweep performed with peak detector & average detector are included in the report **as test reports**.

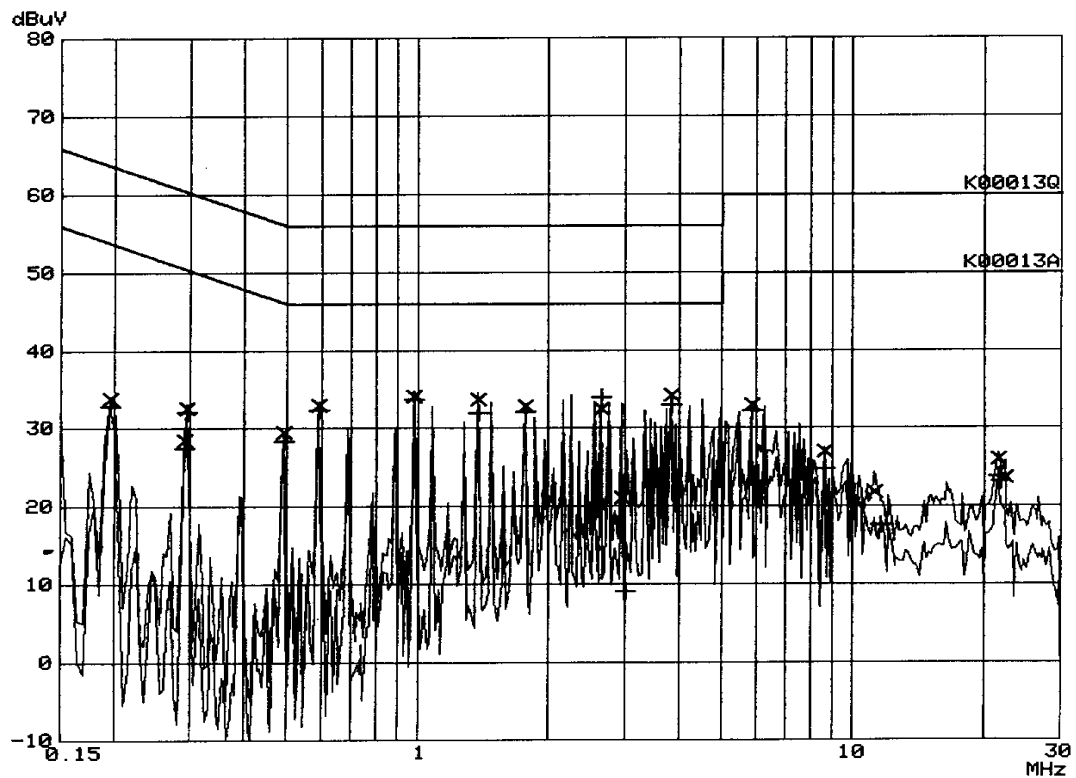
| Frequency Range<br>[MHz] | Tested Freq.<br>[MHz] | LISN | Meter Reading |      | Limits |      | Margin |      |
|--------------------------|-----------------------|------|---------------|------|--------|------|--------|------|
|                          |                       |      | QP            | AV   | QP     | AV   | QP     | AV   |
|                          |                       |      | [dBuV]        |      | [dBuV] |      | [dBuV] |      |
| <b>0.15-30</b>           | 0.156                 | N    | 35.4          | 35.0 | 65.7   | 55.7 | 30.3   | 20.7 |
|                          | 0.195                 | H    | 33.9          | 33.8 | 63.8   | 53.8 | 29.9   | 20.0 |
|                          | 0.981                 | H    | 33.4          | 33.0 | 56.0   | 46.0 | 22.6   | 13.0 |
|                          | 2.253                 | N    | 34.0          | 33.2 | 56.0   | 46.0 | 22.0   | 12.8 |
|                          | 2.646                 | H    | 35.5          | 35.2 | 56.0   | 46.0 | 20.5   | 10.8 |
|                          | 2.742                 | N    | 34.1          | 33.0 | 56.0   | 46.0 | 21.9   | 13.0 |
|                          | 3.820                 | H    | 36.6          | 36.1 | 56.0   | 46.0 | 19.4   | 9.9  |
|                          | 3.920                 | N    | 36.4          | 35.6 | 56.0   | 46.0 | 19.6   | 10.4 |
|                          | 4.700                 | H    | 33.7          | 32.9 | 60.0   | 50.0 | 26.3   | 17.1 |
|                          | 7.640                 | H    | 33.3          | 30.1 | 60.0   | 50.0 | 26.7   | 19.9 |

\* <5 : mean less than 5dB

\* Other frequency keep over 20dB margin.



[Live line]



[Neutral line]

## 5. RADIATED DISTURBANCE : 30MHz – 1000MHz

### 5.1 Operating environment

Temperature : 23.0  
Relative Humidity : 48.0 %

### 5.2 Test set-up

The frequency range investigated was 30 MHz to 1000 MHz.

All readings are quasi-peak unless stated otherwise.

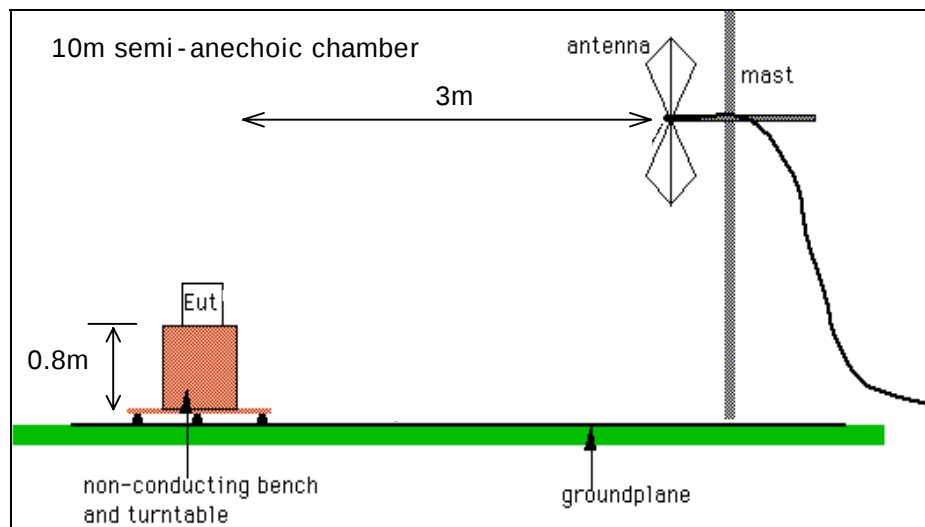
The half-wave dipole antenna was tuned to the frequency found during Preliminary radiated measurements. The EUT, support equipment and Interconnecting cables were re-configured to the set-up to the producing the Maximum emission for the frequency and were placed on top of a 0.8 meter High non-metallic 1 X 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission.

The turntable containing the system was rotated the antenna height was varied 1 to 4 meters

and stopped at the azimuth or height producing the maximum emission.

And this device(EUT) was tested in 3 orthogonal planes.

The antenna measured both horizontal and vertical polarization.



<General test set-up for radiated emissions>

### 5.3 Operation Conditions

Up load mode, play mode, tuner mode

#### 5.4 Test instrument

| Instrument           | Model No.  | Serial No. | Makers      | Next cal.date | Used |
|----------------------|------------|------------|-------------|---------------|------|
| Test receiver        | ESCS30     | 100021     | R&S         | 2005. 02.06   |      |
| Biconical Antenna    | VHA9103    | 91031950   | Schwarzbeck | 2005. 02.04   |      |
| Log-Periodic Antenna | UHALP9108A | 0392       | Schwarzbeck | 2005. 02.04   |      |
| Antenna Mast         | MA240      | N/A        | HD          | -             |      |
| Turn Table           | DT430S     | N/A        | HD          | -             |      |

#### 5.5 Test results (Test mode: Up & Downlode)

Date of test: Oct 11, 2004.

| Freq (MHz) | Reading (dBuV / m) | Ant | AF (dB) | CL (dB) | Result (dBuV / m) | Limit (dB) | Margin (dB) |
|------------|--------------------|-----|---------|---------|-------------------|------------|-------------|
| 98.18      | 25.54              | V   | 9.22    | 2.30    | 37.06             | 43.5       | 6.44        |
| 136.65     | 18.28              | V   | 14.10   | 2.60    | 34.98             | 43.5       | 8.52        |
| 144.08     | 14.96              | H   | 14.42   | 2.60    | 31.98             | 43.5       | 11.52       |
| 300.05     | 19.10              | H   | 13.69   | 3.90    | 36.69             | 46.0       | 9.31        |
| 564.25     | 16.14              | H   | 18.16   | 5.00    | 39.30             | 46.0       | 6.7         |

\* Receiving Antenna Mode : **Horizontal, Vertical**

\* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result = Field Strength( AF + CL+ Reading)

#### Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

### 5.6 Test results (Test mode: Play mode)

Date of test: Oct 11, 2004.

| Freq<br>(MHz) | Reading<br>(dBuV / m) | Ant | AF<br>(dB) | CL<br>(dB) | Result<br>(dBuV / m) | Limit<br>(dB) | Margin<br>(dB) |
|---------------|-----------------------|-----|------------|------------|----------------------|---------------|----------------|
| 358.40        | 12.59                 | H   | 14.31      | 3.80       | 30.70                | 46.00         | 15.30          |
| 370.20        | 11.19                 | H   | 14.31      | 3.80       | 29.30                | 46.00         | 16.70          |
| 384.10        | 20.33                 | H   | 15.17      | 4.00       | 39.50                | 46.00         | 6.50           |

\* Receiving Antenna Mode : **Horizontal, Vertical**

\* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result = Field Strength( AF + CL+ Reading)

### Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

**5.7 Test results < Test mode: FM tuner >**

Date of test: Oct 11, 2004.

| T.                                                                                                                                                                                           | Tested    | Meter Reading<br>(quasi-peak) |          | Limits | Margins  |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------|----------|--------|----------|----------|
| Frequency                                                                                                                                                                                    | Frequency | H                             | V        |        | H        | V        |
| [MHz]                                                                                                                                                                                        | [MHz]     | [dBuV/m]                      | [dBuV/m] |        | [dBuV/m] | [dBuV/m] |
| 87.5                                                                                                                                                                                         | 99.8      | 3.2                           | -        | 43.5   | 40.3     | -        |
|                                                                                                                                                                                              | 198.6     | 2.5                           | -        | 43.5   | 41.0     | -        |
|                                                                                                                                                                                              | 297.4     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 396.2     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 495.0     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 593.8     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 692.6     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 791.4     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 890.2     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 989.0     | -                             | -        | 54.0   | -        | -        |
| 98.0                                                                                                                                                                                         | 108.8     | 2.7                           | -        | 43.5   | 40.8     | -        |
|                                                                                                                                                                                              | 217.6     | 2.0                           | -        | 46.0   | 44.0     | -        |
|                                                                                                                                                                                              | 326.4     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 435.2     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 544.0     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 652.8     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 761.6     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 870.4     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 979.2     | -                             | -        | 54.0   | -        | -        |
| 108.0                                                                                                                                                                                        | 118.4     | 3.1                           | -        | 43.5   | 40.4     | -        |
|                                                                                                                                                                                              | 236.8     | 1.9                           | -        | 46.0   | 44.1     | -        |
|                                                                                                                                                                                              | 355.2     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 473.6     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 592.0     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 710.4     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 828.8     | -                             | -        | 46.0   | -        | -        |
|                                                                                                                                                                                              | 947.2     | -                             | -        | 46.0   | -        | -        |
| Others                                                                                                                                                                                       | 174.5     | 14.84                         | -        | 46.0   | 12.4     | -        |
|                                                                                                                                                                                              | 192.0     | 6.30                          | -        | 46.0   | 20.2     | -        |
|                                                                                                                                                                                              | 239.9     | 3.10                          | -        | 46.0   | 22.5     | -        |
|                                                                                                                                                                                              | 384.1     | 11.73                         | -        | 46.0   | 15.1     | -        |
| * Meter reading: <b>Loss include</b><br>* Margins : <b>[Limits] - [Meter reading]</b><br>* Receiving Antenna Mode: <b>Horizontal, Vertical</b><br>* 10m chamber<br>* <5 : mean less than 5dB |           |                               |          |        |          |          |

**Result: Pass**

The measured emissions level of the EUT have found the below of the specified limit.