



# **RADIO TEST REPORT**

## **ETSI EN 300 328 V2.1.1 (2016-11)**

**Product:** Car Bluetooth Player

**Trademark:** N/A

**Model Name:** S-05

**Serial Model:** S-06, S-07, S-08, S-09, S-10, S-11, S-12, S-13, S-16

**Report No.:** BCTC-FY170704799-3E

### **Prepared for**

**Shenzhen Luoxi Technology Co., Ltd.**

Floor 6, Building B, No. 172, Hangcheng Avenue, Xixiang Town, Bao'an District, Shenzhen City

### **Prepared by**

**Shenzhen BCTC Testing Co., Ltd.**

BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

Tel: 400-788-9558, 0755-33019988

Web: [Http://www.bctc-lab.com.cn](http://www.bctc-lab.com.cn)



## TEST RESULT CERTIFICATION

**Applicant's name** .....: **Shenzhen Luoxi Technology Co., Ltd.**  
**Address** .....: Floor 6, Building B, No. 172, Hangcheng Avenue, Xixiang Town,  
Bao'an District, Shenzhen City  
**Manufacture's Name** .....: **Shenzhen Luoxi Technology Co., Ltd.**  
**Address** .....: Floor 6, Building B, No. 172, Hangcheng Avenue, Xixiang Town,  
Bao'an District, Shenzhen City

### Product description

**Product name**.....: Car Bluetooth Player  
**Trademark** .....: N/A  
**Model and/or type reference** ...: S-05  
**Serial Model:** S-06, S-07, S-08, S-09, S-10, S-11, S-12, S-13, S-16

**Standards**.....: ETSI EN 300 328 V2.1.1 (2016-11)

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 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** .....: Aug. 01 – Aug. 07, 2017

**Date of Issue** .....: Aug. 07, 2017

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

**Prepared by(Engineer):** Sky Huang

*Sky Huang*

**Reviewer(Supervisor):** Jade Yang

*Jade Yang*

**Approved(Manager):** Carson Zhang

*Carson Zhang*



*This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen BCTC Testing Co., Ltd.*



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## 1. General Information

### 1.1. Description of Device (EUT)

|                        |                                                                |
|------------------------|----------------------------------------------------------------|
| EUT Name               | : Car Bluetooth Player                                         |
| Model No.              | : S-05                                                         |
| Serial Model           | : S-06, S-07, S-08, S-09, S-10, S-11, S-12, S-13, S-16         |
| Model Difference       | : The product is different for model number and outlook color. |
| Trademark              | : N/A                                                          |
| Power supply           | : INPUT: DC 12-24V<br>OUTPUT1: DC 5V/2.1A<br>OUTPUT2: DC 5V/1A |
| Operation frequency    | : 2402MHz-2480MHz                                              |
| Modulation             | : GFSK, $\pi/4$ -DQPSK, 8-DPSK                                 |
| Antenna Type           | : PCB Antenna, Maximum Gain is 0dBi                            |
| Intend use environment | : Residential, commercial and light industrial environment     |

#### a) The type of modulation used by the equipment:

☒ FHSS

☐ other forms of modulation

#### b) In case of FHSS modulation:

- In case of non-Adaptive Frequency Hopping equipment:

The number of Hopping Frequencies:

- In case of Adaptive Frequency Hopping Equipment:

The maximum number of Hopping Frequencies: 79

The minimum number of Hopping Frequencies: 79

The Dwell Time: 386.6ms maximum

The Minimum Channel Occupation Time: 1216.0ms maximum

#### c) Adaptive / non-adaptive equipment:

☐ non-adaptive Equipment

☒ adaptive Equipment without the possibility to switch to a non-adaptive mode

☐ adaptive Equipment which can also operate in a non-adaptive mode

#### d) In case of adaptive equipment:

The Channel Occupancy Time implemented by the equipment: 1216.0ms

☐ The equipment has implemented an LBT based DAA mechanism

- ☐ In case of equipment using modulation different from FHSS:

☐ The equipment is Frame Based equipment

☐ The equipment is Load Based equipment

☐ The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment: .....  $\mu$ s

The value q as referred to in clause 4.3.2.5.2.2.2 .....

☒ The equipment has implemented an non-LBT based DAA mechanism

☐ The equipment can operate in more than one adaptive mode

#### e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): 1.49 dBm

The maximum (corresponding) Duty Cycle: ..... %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

**f) The worst case operational mode for each of the following tests:**

- ☐ RF Output Power  
GFSK
- ☐ Power Spectral Density  
.....
- ☐ Duty cycle, Tx-Sequence, Tx-gap  
.....
- ☐ Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment)  
GFSK
- ☐ Hopping Frequency Separation (only for FHSS equipment)  
GFSK
- ☐ Medium Utilisation  
.....
- ☐ Adaptivity & Receiver Blocking  
.....
- ☐ Occupied Channel Bandwidth  
GFSK
- ☐ Transmitter unwanted emissions in the OOB domain  
GFSK
- ☐ Transmitter unwanted emissions in the spurious domain  
GFSK
- ☐ Receiver spurious emissions  
GFSK

**g) The different transmit operating modes (tick all that apply):**

- Operating mode 1: Single Antenna Equipment
  - Equipment with only 1 antenna
    - ☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
    - ☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
  - Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
    - ☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
    - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
    - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
- NOTE: Add more lines if more channel bandwidths are supported.
- Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
  - ☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
  - ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
- NOTE: Add more lines if more channel bandwidths are supported.

**h) In case of Smart Antenna Systems:**

- ☐ The number of Receive chains: .....
- ☐ The number of Transmit chains: .....
  - ☐ symmetrical power distribution
  - ☐ asymmetrical power distribution

In case of beam forming, the maximum beam forming gain: .....

NOTE: Beam forming gain does not include the basic gain of a single antenna.

**i) Operating Frequency Range(s) of the equipment:**

- Operating Frequency Range 1: 2402 MHz to 2480 MHz
  - Operating Frequency Range 2: ..... MHz to ..... MHz
- NOTE: Add more lines if more Frequency Ranges are supported.

**j) Occupied Channel Bandwidth(s):**

- ☐ Occupied Channel Bandwidth 1: 0.795MHz
- ☐ Occupied Channel Bandwidth 2: 0.791MHz

NOTE: Add more lines if more channel bandwidths are supported.



**k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):**☒ Stand-alone☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)☐ Plug-in radio device (Equipment intended for a variety of host systems)

Other .....

**l) The extreme operating conditions that apply to the equipment:**

Operating temperature range: -10° C to 40° C

Operating voltage range: 10.8V to 13.2V ☐ AC ☒ DCDetails provided are for the: ☒ stand-alone equipment☐ combined (or host) equipment☐ test jig**m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:**

## • Antenna Type

☒ Integral Antenna

Antenna Gain: 0 dBi

If applicable, additional beamforming gain (excluding basic antenna gain): ..... dB

☐ Temporary RF connector provided☐ No temporary RF connector provided☐ Dedicated Antennas (equipment with antenna connector)☐ Single power level with corresponding antenna(s)☐ Multiple power settings and corresponding antenna(s)

Number of different Power Levels: .....

Power Level 1: ..... dBm

Power Level 2: ..... dBm

Power Level 3: ..... dBm

NOTE 1: Add more lines in case the equipment has more power levels.

NOTE 2: These power levels are conducted power levels (at antenna connector).

**n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:**Details provided are for the: ☐ stand-alone equipment☒ combined (or host) equipment☐ test jigSupply Voltage ☐ AC mains State AC voltage: ... V☒ DC State DC voltage : 12V

In case of DC, indicate the type of power source

☐ Internal Power Supply☐ External Power Supply or AC/DC adapter☒ Battery: ...DC12V☐ Other: .....**o) Describe the test modes available which can facilitate testing:**

The EUT can transmit with test software which named CSR BlueSuite

**p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):**

Bluetooth



## 2. Summary of test

### 2.1. Test Standard description:

ETSI EN 300 328 V2.1.1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the RED Directive

### 2.2. Summary of test result

| The following essential requirements and test specifications are relevant to the presumption of conformity under Article 3.2 of the RED Directive                |                                                                   |           |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------|---------|
| No                                                                                                                                                               | Test Parameter                                                    | Clause No | Results |
| Transmitter Parameters                                                                                                                                           |                                                                   |           |         |
| 1                                                                                                                                                                | RF output power                                                   | 4.3.2.1   | PASS    |
| 2                                                                                                                                                                | Power Spectral Density                                            | 4.3.2.2   | N/A     |
| 3                                                                                                                                                                | Duty Cycle, Tx-sequence, Tx-gap                                   | 4.3.2.3   | N/A     |
| 4                                                                                                                                                                | Dwell time, Minimum Frequency Occupation & Hopping Sequence       | 4.3.1.3   | PASS    |
| 5                                                                                                                                                                | Hopping Frequency Separation                                      | 4.3.1.4   | PASS    |
| 6                                                                                                                                                                | Medium Utilisation (MU) factor                                    | 4.3.2.4   | N/A     |
| 7                                                                                                                                                                | Adaptivity (adaptive equipment using modulations other than FHSS) | 4.3.2.5   | N/A     |
| 8                                                                                                                                                                | Occupied Channel Bandwidth                                        | 4.3.2.6   | PASS    |
| 9                                                                                                                                                                | Transmitter unwanted emissions in the out-of-band domain          | 4.3.2.7   | PASS    |
| 10                                                                                                                                                               | Transmitter unwanted emissions in the spurious domain             | 4.3.2.8   | PASS    |
| Receiver Parameters                                                                                                                                              |                                                                   |           |         |
| 11                                                                                                                                                               | Receiver spurious emissions                                       | 4.3.2.9   | PASS    |
| 12                                                                                                                                                               | Receiver Blocking                                                 | 4.3.2.10  | N/A     |
| Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device. |                                                                   |           |         |





### 2.3. Block Diagram of Configuration for test

|     |
|-----|
| EUT |
|-----|

### 2.4. Test mode

The special RF test software was used to control EUT work in Continuous Bluetooth TX mode, and select test channel, wireless mode.

| Mode      | data rate (Mbps) | Channel      | Frequency (MHz) |
|-----------|------------------|--------------|-----------------|
| GFSK      | 1                | Low :CH0     | 2402            |
|           | 1                | Middle: CH39 | 2441            |
|           | 1                | High: CH78   | 2480            |
| π/4-DQPSK | 2                | Low :CH0     | 2402            |
|           | 2                | Middle: CH39 | 2441            |
|           | 2                | High: CH78   | 2480            |
| 8-DPSK    | 3                | Low :CH0     | 2402            |
|           | 3                | Middle: CH39 | 2441            |
|           | 3                | High: CH78   | 2480            |

### 2.5. Test Conditions

|                                                                                                                                                                                         | Normal Conditions | Extreme Conditions                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------|
| Temperature range                                                                                                                                                                       | 15-35 °C          | -20 °C and 55°C                                   |
| Humidity range                                                                                                                                                                          | 20-75%            | 20-75%                                            |
| Pressure range                                                                                                                                                                          | 86-106kPa         | 86-106kPa                                         |
| Power supply                                                                                                                                                                            | DC12V             | 10.8V and 13.2V ( declared by the manufacturer. ) |
| Note 1: The test procedure described in clause 5.1.1 of EN300 328 was used for extreme test procedure.<br>2: The Extreme Temperature and Extreme Voltages declared by the manufacturer. |                   |                                                   |

### 2.6. Measurement Uncertainty (95% confidence levels, k=2)

| Item                                                                  | MU                 | Remark      |
|-----------------------------------------------------------------------|--------------------|-------------|
| Uncertainty for Conducted Emission Test                               | 2.50dB             |             |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.04 dB            | Polarize: V |
|                                                                       | 3.02dB             | Polarize: H |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz) | 3.56dB             | Polarize: H |
|                                                                       | 3.84dB             | Polarize: V |
| Uncertainty for radio frequency                                       | $1 \times 10^{-9}$ |             |
| Uncertainty for conducted RF Power                                    | 0.65dB             |             |
| Uncertainty for temperature                                           | 0.6 °C             |             |
| Uncertainty for humidity                                              | 1%                 |             |



## 2.7. Test Equipment

| Equipment               | Manufacture   | Model No.                   | Serial No.        | Last cal.  | Cal Interval |
|-------------------------|---------------|-----------------------------|-------------------|------------|--------------|
| 3m Semi-Anechoic        | ETS-LINDGREN  | N/A                         | SEL0017           | 2016.08.25 | 1Year        |
| Spectrum analyzer       | Agilent       | E4407B                      | MY46185649        | 2016.08.25 | 1Year        |
| Receiver                | R&S           | ESCI                        | 1166.5950K03-1011 | 2016.08.25 | 1Year        |
| Receiver                | R&S           | ESCI                        | 101202            | 2016.08.25 | 1Year        |
| Bilog Antenna           | Schwarzbeck   | VULB 9168                   | VULB9168-438      | 2016.08.25 | 1Year        |
| Horn Antenna            | EMCO          | 3115                        | 640201028-06      | 2016.08.25 | 1Year        |
| Power Meter             | Anritsu       | ML2495A                     | 1204003           | 2016.08.25 | 1Year        |
| Power Sensor            | Anritsu       | MA2411B                     | 100309            | 2016.08.25 | 1Year        |
| Active Loop Antenna     | Beijing Daze  | ZN30900A                    | SEL0097           | 2016.08.25 | 1Year        |
| Cable                   | Resenberger   | N/A                         | No.1              | 2016.08.25 | 1Year        |
| Cable                   | SCHWARZBECK   | N/A                         | No.2              | 2016.08.25 | 1Year        |
| Cable                   | SCHWARZBECK   | N/A                         | No.3              | 2016.08.25 | 1Year        |
| Pre-amplifier           | Schwarzbeck   | BBV9743                     | 9743-019          | 2016.08.25 | 1Year        |
| Pre-amplifier           | R&S           | AFS33-1800<br>2650-30-8P-44 | SEL0080           | 2016.08.25 | 1Year        |
| Base station            | Agilent       | E5515C                      | GB44300243        | 2016.08.25 | 1 Year       |
| Temperature controller  | Terchy        | MHQ                         | 120               | 2016.08.25 | 1Year        |
| Power divider           | Anritsu       | K240C                       | 020346            | 2016.08.25 | 1 Year       |
| Signal Generator        | HP            | 83732B                      | VS3449051         | 2016.08.25 | 1 Year       |
| Attenuator              | Agilent       | 8491B                       | MY39262165        | 2016.08.25 | 1 Year       |
| vector Signal Generator | Agilent       | E4438C                      | MY49070163        | 2016.08.25 | 1 Year       |
| splitter                | Mini-Circuits | ZAP-50W                     | NN256400424       | 2016.08.25 | 1 Year       |
| Directional Coupler     | Agilent       | 87300C                      | MY44300299        | 2016.08.25 | 1 Year       |



|                                            |         |         |            |            |        |
|--------------------------------------------|---------|---------|------------|------------|--------|
| vector Signal Generator                    | Agilent | E4438C  | US44271917 | 2016.08.25 | 1 Year |
| X-series USB Peak and Average Power Sensor | Agilent | U2021XA | MY54080020 | 2016.08.25 | 1 Year |
| X-series USB Peak and Average Power Sensor | Agilent | U2021XA | MY54110001 | 2016.08.25 | 1 Year |
| X-series USB Peak and Average Power Sensor | Agilent | U2021XA | MY53480008 | 2016.08.25 | 1 Year |
| X-series USB Peak and Average Power Sensor | Agilent | U2021XA | MY54080019 | 2016.08.25 | 1 Year |
| 4 Ch.Simultaneous Sampling 14 Bits 2 MS/s  | Agilent | U2531A  | TW54063507 | 2016.08.25 | 1 Year |
| 4 Ch.Simultaneous Sampling 14 Bits 2 MS/s  | Agilent | U2531A  | TW54063513 | 2016.08.25 | 1 Year |
| splitter                                   | Mini    | PS3-7   | 4463       | 2016.08.25 | 1 Year |
| Signal Analyzer                            | Agilent | N9010A  | MY48030494 | 2016.08.25 | 1 Year |

### 3. RF output power

#### 3.1. Limit

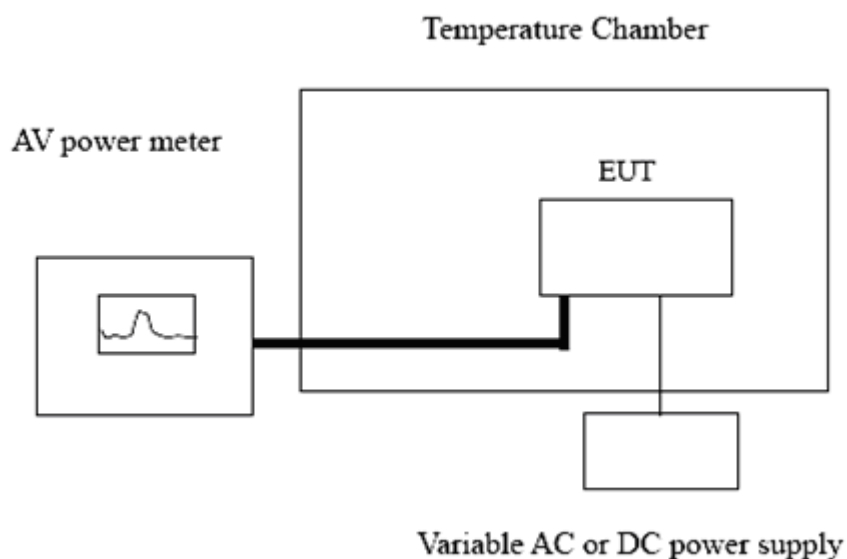
For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. See clause 5.3.1 m). For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

| Limit |
|-------|
| 20dBm |

#### 3.2. Test Setup



#### 3.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.2.2



## 3.4. Test Result

|                           |                     |                                      |                          |                     |
|---------------------------|---------------------|--------------------------------------|--------------------------|---------------------|
| EUT: Car Bluetooth Player |                     |                                      | M/N: S-05                |                     |
| Test date: Aug. 04,2017   |                     |                                      | Test Engineer: Sky Huang |                     |
| Test site: RF site        |                     |                                      |                          |                     |
| Temperature: 25 °C        |                     | Humidity: 60 %                       |                          | Pressure: 100.6 KPa |
| Cable loss: 0.6dB         |                     | Attenuator loss: 20dB                |                          | Antenna Gain: 0dBi  |
| Sample speed              |                     | Sample speed 1 MS/s for power sensor |                          |                     |
| Mode                      | Condition           | CH                                   | Result                   | Limit               |
|                           |                     |                                      | Total e.i.r.p (dBm)      | e.i.r.p (dBm)       |
| GFSK                      | Normal<br>25 °C/12V | CH0                                  | 1.15                     | 20                  |
|                           |                     | CH39                                 | 1.08                     | 20                  |
|                           |                     | CH78                                 | 1.06                     | 20                  |
|                           | -20°C/10.8V         | CH0                                  | 1.12                     | 20                  |
|                           |                     | CH39                                 | 1.13                     | 20                  |
|                           |                     | CH78                                 | 1.02                     | 20                  |
|                           | -20°C/13.2V         | CH0                                  | 1.09                     | 20                  |
|                           |                     | CH39                                 | 1.20                     | 20                  |
|                           |                     | CH78                                 | 1.40                     | 20                  |
|                           | 55°C/10.8V          | CH0                                  | 1.21                     | 20                  |
|                           |                     | CH39                                 | 1.32                     | 20                  |
|                           |                     | CH78                                 | 1.27                     | 20                  |
|                           | 55°C/13.2V          | CH0                                  | 1.19                     | 20                  |
|                           |                     | CH39                                 | 1.17                     | 20                  |
|                           |                     | CH78                                 | 1.36                     | 20                  |
| Conclusion: PASS          |                     |                                      |                          |                     |

Remark: This Report only show the test plots of the worst case.



| EUT: Car Bluetooth Player |                    |                                      | M/N: S-05                |                     |
|---------------------------|--------------------|--------------------------------------|--------------------------|---------------------|
| Test date: Aug. 04,2017   |                    |                                      | Test Engineer: Sky Huang |                     |
| Test site: RF site        |                    |                                      |                          |                     |
| Temperature: 25 °C        |                    | Humidity: 60 %                       |                          | Pressure: 100.6 KPa |
| Cable loss: 0.6dB         |                    | Attenuator loss: 20dB                |                          | Antenna Gain: 0dBi  |
| Sample speed              |                    | Sample speed 1 MS/s for power sensor |                          |                     |
| Mode                      | Condition          | CH                                   | Result                   | Limit               |
|                           |                    |                                      | Total e.i.r.p (dBm)      | e.i.r.p (dBm)       |
| Π/4-DQP<br>SK             | Normal<br>25°C/12V | CH0                                  | 1.21                     | 20                  |
|                           |                    | CH39                                 | 1.02                     | 20                  |
|                           |                    | CH78                                 | 1.25                     | 20                  |
|                           | -20°C/10.8V        | CH0                                  | 1.16                     | 20                  |
|                           |                    | CH39                                 | 1.25                     | 20                  |
|                           |                    | CH78                                 | 1.15                     | 20                  |
|                           | -20°C/13.2V        | CH0                                  | 1.02                     | 20                  |
|                           |                    | CH39                                 | 1.27                     | 20                  |
|                           |                    | CH78                                 | 1.20                     | 20                  |
|                           | 55°C/10.8V         | CH0                                  | 1.49                     | 20                  |
|                           |                    | CH39                                 | 1.21                     | 20                  |
|                           |                    | CH78                                 | 1.09                     | 20                  |
|                           | 55°C/13.2V         | CH0                                  | 1.22                     | 20                  |
|                           |                    | CH39                                 | 1.11                     | 20                  |
|                           |                    | CH78                                 | 1.20                     | 20                  |
| Conclusion: PASS          |                    |                                      |                          |                     |

Remark: This Report only show the test plots of the worst case.





| EUT: Car Bluetooth Player |                     |                                      | M/N: S-05                |                     |
|---------------------------|---------------------|--------------------------------------|--------------------------|---------------------|
| Test date: Aug. 04,2017   |                     |                                      | Test Engineer: Sky Huang |                     |
| Test site: RF site        |                     |                                      |                          |                     |
| Temperature: 25 °C        |                     | Humidity: 60 %                       |                          | Pressure: 100.6 KPa |
| Cable loss: 0.6dB         |                     | Attenuator loss: 20dB                |                          | Antenna Gain: 0dBi  |
| Sample speed              |                     | Sample speed 1 MS/s for power sensor |                          |                     |
| Mode                      | Condition           | CH                                   | Result                   | Limit               |
|                           |                     |                                      | Total e.i.r.p (dBm)      | e.i.r.p (dBm)       |
| 8-DPSK                    | Normal<br>25 °C/12V | CH0                                  | 1.10                     | 20                  |
|                           |                     | CH39                                 | 1.11                     | 20                  |
|                           |                     | CH78                                 | 1.24                     | 20                  |
|                           | -20°C/10.8V         | CH0                                  | 1.20                     | 20                  |
|                           |                     | CH39                                 | 1.19                     | 20                  |
|                           |                     | CH78                                 | 1.23                     | 20                  |
|                           | -20°C/13.2V         | CH0                                  | 1.09                     | 20                  |
|                           |                     | CH39                                 | 1.13                     | 20                  |
|                           |                     | CH78                                 | 1.22                     | 20                  |
|                           | 55°C/10.8V          | CH0                                  | 1.24                     | 20                  |
|                           |                     | CH39                                 | 1.27                     | 20                  |
|                           |                     | CH78                                 | 1.03                     | 20                  |
|                           | 55°C/13.2V          | CH0                                  | 1.31                     | 20                  |
|                           |                     | CH39                                 | 1.27                     | 20                  |
|                           |                     | CH78                                 | 1.35                     | 20                  |
| Conclusion: PASS          |                     |                                      |                          |                     |

Remark: This Report only show the test plots of the worst case.

## 4. Dwell time, Minimum Frequency Occupation and Hopping Sequence

### 4.1. Limit

#### **For Adaptive frequency hopping systems**

Adaptive Frequency Hopping systems shall be capable of operating over a minimum of 70 % of the band specified in clause 1.

The maximum accumulated dwell time on any hopping frequency shall be 400 ms within any period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

The Minimum Frequency Occupation Time shall be equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.

#### **For Non-adaptive frequency hopping systems**

The accumulated Dwell Time on any hopping frequency shall not be greater than 15 ms within any period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

Non-adaptive medical devices requiring reverse compatibility with other medical devices placed on the market when earlier versions of the present document were harmonised, are allowed to have an operating mode in which the maximum dwell time is 400 ms.

The hopping sequence(s) shall contain at least N hopping frequencies where N is 15 or 15 divided by the minimum

Hopping Frequency Separation in MHz, whichever is the greater. The Minimum Frequency Occupation Time shall be equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.

### 4.2. Test Setup



### 4.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.4



#### 4.4. Test Result

##### Hopping channel

|                           |                           |                                            |            |
|---------------------------|---------------------------|--------------------------------------------|------------|
| EUT: Car Bluetooth Player |                           | M/N: S-05                                  |            |
| Test date: Aug. 04,2017   |                           | Test site: RF site<br>Tested by: Sky Huang |            |
| Mode                      | Number of hopping channel | Limit                                      | Conclusion |
| GFSK                      | 79                        | >15                                        | PASS       |
| π/4-DQPSK                 | 79                        | >15                                        | PASS       |
| 8-DPSK                    | 79                        | >15                                        | PASS       |

##### Dwell time

|                                                                    |         |                    |                |                      |            |
|--------------------------------------------------------------------|---------|--------------------|----------------|----------------------|------------|
| EUT: Car Bluetooth Player                                          |         |                    | M/N: S-05      |                      |            |
| Test Date: Aug. 04,2017                                            |         | Test site: RF site |                | Tested by: Sky Huang |            |
| Mode                                                               | Channel | Pulse time (ms)    | Dwell time(ms) | Limit                | Conclusion |
| DH1                                                                | Low     | 0.36               | 115.2          | <400ms               | PASS       |
|                                                                    | Mid     | 0.36               | 115.2          |                      |            |
|                                                                    | High    | 0.36               | 115.2          |                      |            |
| DH3                                                                | Low     | 1.75               | 280.0          |                      |            |
|                                                                    | Mid     | 1.75               | 280.0          |                      |            |
|                                                                    | High    | 1.75               | 280.0          |                      |            |
| DH5                                                                | Low     | 2.85               | 304.0          |                      |            |
|                                                                    | Mid     | 2.85               | 304.0          |                      |            |
|                                                                    | High    | 2.85               | 304.0          |                      |            |
| Note: DH1=1600/(79*(DH))*79*0.4* Pulse time .(DH1=2, DH3=4, DH5=6) |         |                    |                |                      |            |

##### Mini Frequency Occupation Time

|                                                             |              |                    |                                    |                      |
|-------------------------------------------------------------|--------------|--------------------|------------------------------------|----------------------|
| EUT: Car Bluetooth Player                                   |              |                    | M/N: S-05                          |                      |
| Test Date: Aug. 04,2017                                     |              | Test site: RF site |                                    | Tested by: Sky Huang |
| Mode                                                        | Channel      | Dwell time(ms)     | Mini frequency occupation Time(ms) | Conclusion           |
| DH1                                                         | Low/Mid/High | 115.2              | 460.8                              | PASS                 |
| DH3                                                         | Low/Mid/High | 280.0              | 1120.0                             |                      |
| DH5                                                         | Low/Mid/High | 304.0              | 1216.0                             |                      |
| Remark: Mini frequency occupation Time(ms)=4*Dwell time(ms) |              |                    |                                    |                      |

**Operating hopping Bandwidth:**

|                           |                 |                    |                      |
|---------------------------|-----------------|--------------------|----------------------|
| EUT: Car Bluetooth Player |                 | M/N: S-05          |                      |
| Test date: Aug. 04,2017   |                 | Test site: RF site | Tested by: Sky Huang |
| Mode                      | Bandwidth (MHz) | Limit(MHz)         | Conclusion           |
| GFSK                      | 81.01           | 58.45              | PASS                 |

**Hopping sequence**

|                                                                                                                                                                                                                                     |                     |                    |                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|----------------------|
| EUT: Car Bluetooth Player                                                                                                                                                                                                           |                     | M/N: S-05          |                      |
| Test date: Aug. 04,2017                                                                                                                                                                                                             |                     | Test site: RF site | Tested by: Sky Huang |
| Mode                                                                                                                                                                                                                                | Hopping Sequence(%) | Limit              | Conclusion           |
| GFSK                                                                                                                                                                                                                                | 97.02%              | >70%               | PASS                 |
| Note: 1. For adaptive systems, using the lowest and highest -20 dB points from the total spectrum envelope, it shall be verified whether the system uses 70 % of the band specified.<br>2. Hopping Sequence(%) = (20dB BW/83.5)*100 |                     |                    |                      |



## 5. Hopping Frequency Separation

### 5.1. Limit

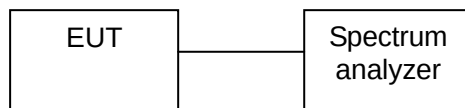
For Non-adaptive frequency hopping systems

The minimum Hopping Frequency Separation shall be equal to Occupied Channel Bandwidth (see clause 4.3.1.7) of a single hop, with a minimum separation of 100 kHz.

For Adaptive frequency hopping systems

The minimum Hopping Frequency Separation shall be 100 kHz.

### 5.2. Test setup



### 5.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.5

### 5.4. Test Result

| EUT: Car Bluetooth Player |     | M/N: S-05          |                      |            |
|---------------------------|-----|--------------------|----------------------|------------|
| Test date: Aug. 04, 2017  |     | Test site: RF site | Tested by: Sky Huang |            |
| Mode                      |     | Result (MHz)       | Limit (MHz)          | Conclusion |
| GFSK                      | DH1 | 1.03               | 0.1                  | PASS       |
|                           | DH3 | 1.05               | 0.1                  |            |
|                           | DH5 | 0.98               | 0.1                  |            |

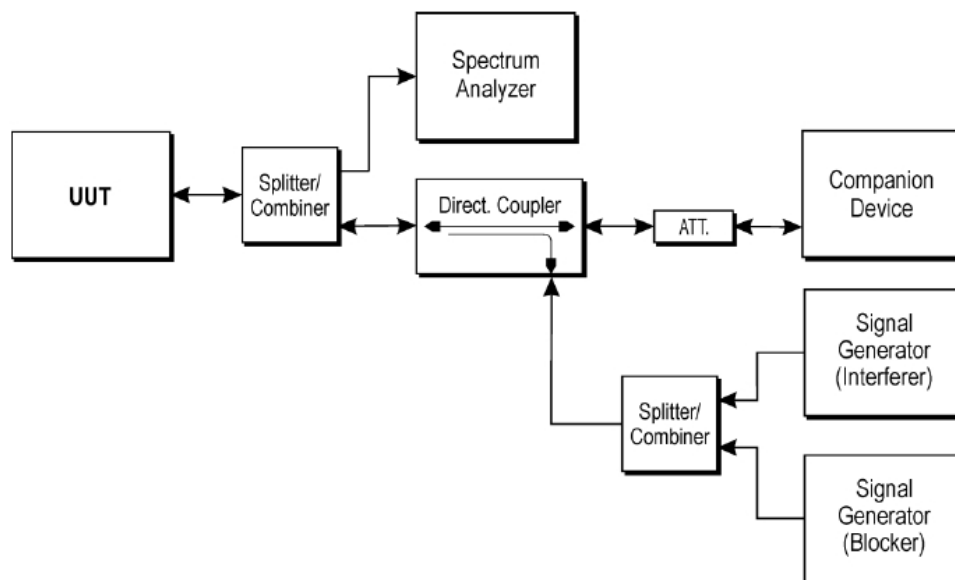
## 6. Adaptivity

### 6.1. Limit

The frequency range of the equipment is determined by the lowest and highest

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Non-LBT based Detect and Avoid:</p> <ol style="list-style-type: none"> <li>1 The frequency shall remain unavailable for a minimum time equal to 1 second after which the channel maybe considered again as an 'available' channel;</li> <li>2 <math>COT \leq 40 \text{ ms}</math>;</li> <li>3 Idle Period = 5% of COT;</li> <li>4 Detection threshold level = <math>-70\text{dBm/MHz} + 20 - P_{out} \text{ E.I.R.P (Pout in dBm)}</math>;</li> </ol>        |
| <p>LBT based Detect and Avoid (Frame Based Equipment):</p> <ol style="list-style-type: none"> <li>1 Minimum Clear Channel Assessment (CCA) time = 20 <math>\mu\text{s}</math>;</li> <li>2 CCA observation time declared by the supplier;</li> <li>3 <math>COT = 1 \sim 10 \text{ ms}</math>;</li> <li>4 Idle Period = 5% of COT;</li> <li>5 Detection threshold level = <math>-70\text{dBm/MHz} + 20 - P_{out} \text{ E.I.R.P (Pout in dBm)}</math>;</li> </ol> |
| <p>LBT based Detect and Avoid (Load Based Equipment):</p> <ol style="list-style-type: none"> <li>1 Minimum Clear Channel Assessment (CCA) time = 20 <math>\mu\text{s}</math>;</li> <li>2 CCA declared by the manufacturer;</li> <li>3 <math>COT \leq (13 / 32) * q \text{ ms}</math>; <math>q = [4 \sim 32]</math>; 1.625ms~13ms;</li> <li>4 Detection threshold level = <math>-73\text{dBm/MHz} + 20 - P_{out} \text{ E.I.R.P (dBm)}</math>;</li> </ol>        |
| <p>Short Control Signalling Transmissions:</p> <p>Short Control Signalling Transmissions shall have a maximum duty cycle of 10% within an observation period of 50ms.</p>                                                                                                                                                                                                                                                                                       |

### 6.2. Test Setup



### 6.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.7.

### 6.4. Test Result

Not applicable

Note : The maximum output power of EUT less than 10dBm, so not applicable.



## 7. Occupied Channel Bandwidth

### 7.1. Limit

The Occupied Channel Bandwidth shall fall completely within the band given in 2.4GHz to 2.4835GHz.

In addition, for non-adaptive systems using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

### 7.2. Test Setup



### 7.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.8.

### 7.4. Test Result

|                           |                          |                      |
|---------------------------|--------------------------|----------------------|
| EUT: Car Bluetooth Player |                          | M/N: S-05            |
| Test site: RF site        | Test date: Aug. 04, 2017 | Tested by: Sky Huang |

| Frequency Rang     |     |      |         |         |
|--------------------|-----|------|---------|---------|
| Test mode          |     | CH   | Result  | Limit   |
|                    |     |      | MHz     | MHz     |
| GFSK               | DH1 | CH0  | 2401.89 | >2400.0 |
|                    |     | CH78 | 2480.91 | <2483.5 |
| GFSK               | DH3 | CH0  | 2401.11 | >2400.0 |
|                    |     | CH78 | 2481.03 | <2483.5 |
| GFSK               | DH5 | CH0  | 2401.23 | >2400.0 |
|                    |     | CH78 | 2480.56 | <2483.5 |
| Test Result: PASS. |     |      |         |         |





| Occupied Bandwidth |     |                          |            |
|--------------------|-----|--------------------------|------------|
| Test mode          |     | Occupied Bandwidth (MHz) |            |
|                    |     | Lowest CH                | Highest CH |
| GFSK               | DH1 | 0.788                    | 0.786      |
|                    | DH3 | 0.795                    | 0.791      |
|                    | DH5 | 0.784                    | 0.782      |
| Test Result: PASS. |     |                          |            |

## 8. Transmitter unwanted emissions in the out-of-band domain

### 8.1. Limit

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure 3.

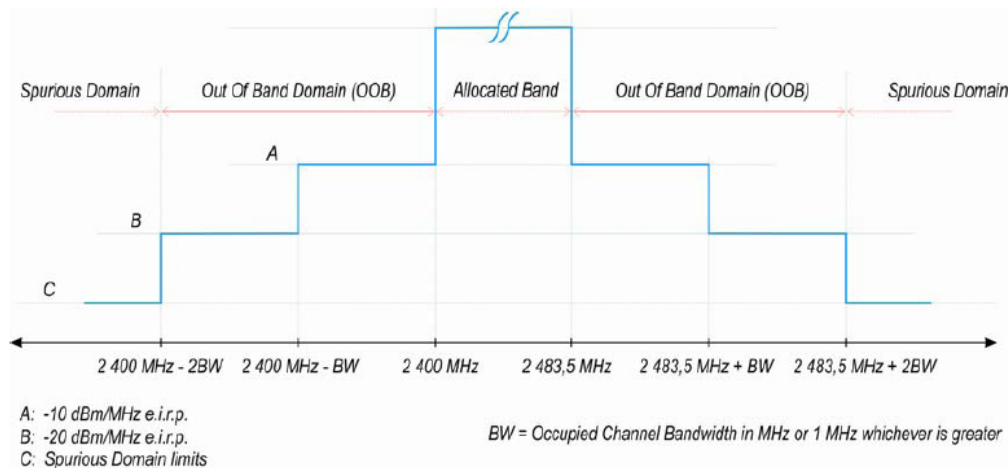
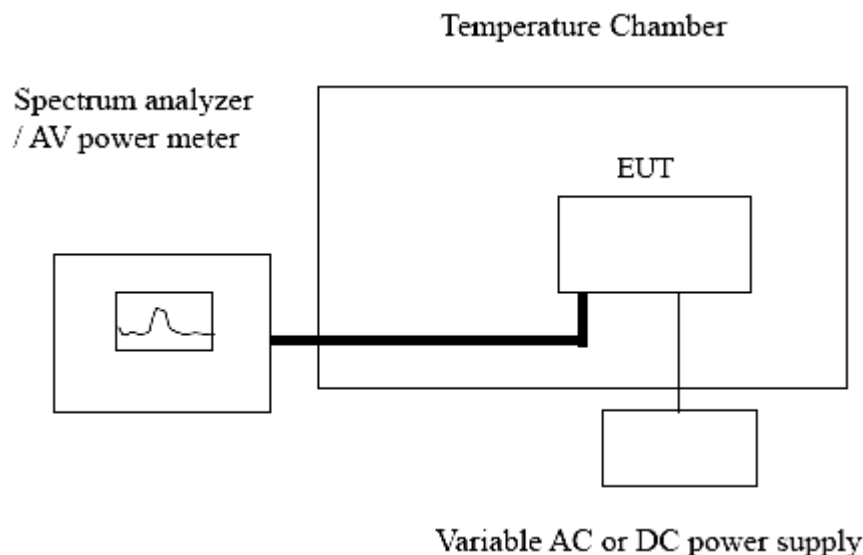


Figure 3: Transmit mask

### 8.2. Test Setup



### 8.3. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.9.

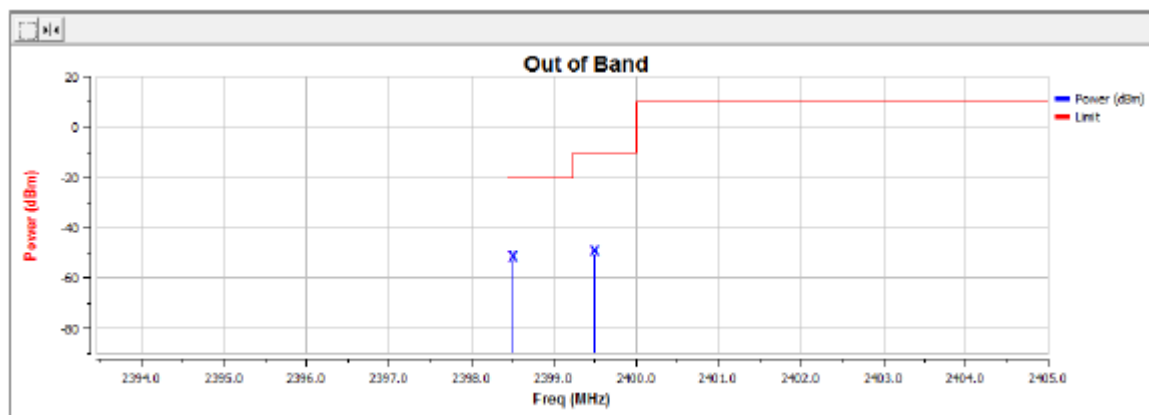
## 8.4. Test Result

### GFSK Hopping mode:

| Test Condition                                                                                                 |        |         | Lower Band Edge     |                     | Higher Band Edge    |                     |
|----------------------------------------------------------------------------------------------------------------|--------|---------|---------------------|---------------------|---------------------|---------------------|
| Test Mode                                                                                                      | Temp   | Voltage | Segment A (dBm/MHz) | Segment B (dBm/MHz) | Segment A (dBm/MHz) | Segment B (dBm/MHz) |
| GFSK                                                                                                           | Normal | Normal  | -50.39              | -53.09              | -57.08              | -58.35              |
|                                                                                                                | 55 °C  | 10.8    | /                   | /                   | /                   | /                   |
|                                                                                                                | 55 °C  | 13.2    | /                   | /                   | /                   | /                   |
|                                                                                                                | -25°C  | 10.8    | /                   | /                   | /                   | /                   |
|                                                                                                                | -25°C  | 13.2    | /                   | /                   | /                   | /                   |
| Limit                                                                                                          |        |         | -10                 | -20                 | -10                 | -20                 |
| Conclusion                                                                                                     |        |         | PASS                |                     |                     |                     |
| Remark: All modulations of EUT have been tested, but only show the test data of the worst case in this report. |        |         |                     |                     |                     |                     |

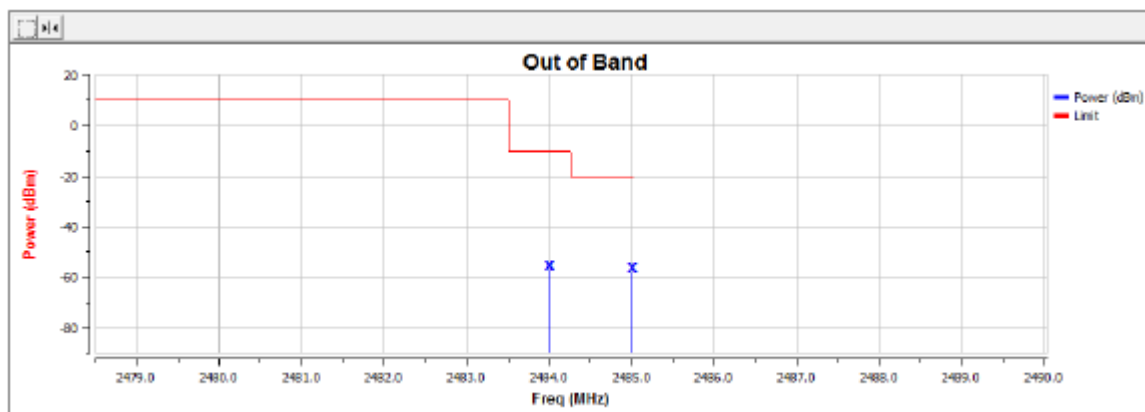
### CH Low (Normal Temp)

| Channel     | Antenna   | Frequency | Level  | Limit |
|-------------|-----------|-----------|--------|-------|
| CH Low-2402 | Antenna 1 | 2399.5    | -50.05 | -10   |
| CH Low-2402 | Antenna 1 | 2398.5    | -53.31 | -20   |



**CH High (Normal Temp)**

| Channel     | Antenna   | Frequency | Level  | Limit |
|-------------|-----------|-----------|--------|-------|
| CH Low-2480 | Antenna 1 | 2484      | -57.08 | -10   |
| CH Low-2480 | Antenna 1 | 2485      | -58.35 | -20   |



## 9. Transmitter unwanted emissions in the spurious domain

### 9.1. Limit

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table 4.

**Table 4: Transmitter limits for spurious emissions**

| Frequency range     | Maximum power,<br>e.r.p. ( $\leq 1$ GHz)<br>e.i.r.p. ( $> 1$ GHz) | Bandwidth |
|---------------------|-------------------------------------------------------------------|-----------|
| 30 MHz to 47 MHz    | -36 dBm                                                           | 100 kHz   |
| 47 MHz to 74 MHz    | -54 dBm                                                           | 100 kHz   |
| 74 MHz to 87,5 MHz  | -36 dBm                                                           | 100 kHz   |
| 87,5 MHz to 118 MHz | -54 dBm                                                           | 100 kHz   |
| 118 MHz to 174 MHz  | -36 dBm                                                           | 100 kHz   |
| 174 MHz to 230 MHz  | -54 dBm                                                           | 100 kHz   |
| 230 MHz to 470 MHz  | -36 dBm                                                           | 100 kHz   |
| 470 MHz to 862 MHz  | -54 dBm                                                           | 100 kHz   |
| 862 MHz to 1 GHz    | -36 dBm                                                           | 100 kHz   |
| 1 GHz to 12,75 GHz  | -30 dBm                                                           | 1 MHz     |

### 9.2. Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.10.



### 9.3. Test Result

|                                                                       |                      |                        |                 |                   |                      |             |             |
|-----------------------------------------------------------------------|----------------------|------------------------|-----------------|-------------------|----------------------|-------------|-------------|
| Spurious emissions                                                    |                      |                        |                 |                   |                      |             |             |
| EUT: Car Bluetooth Player                                             |                      |                        |                 | M/N: S-05         |                      |             |             |
| Power: DC12V from battery                                             |                      |                        |                 |                   |                      |             |             |
| Test Date: Aug. 04,2017                                               |                      | Test site: RF Site     |                 |                   | Tested by: Sky Huang |             |             |
| Ambient Temperature: 25°C                                             |                      | Relative Humidity: 65% |                 |                   |                      |             |             |
| Test Mode: GFSK Tx in CH0 2402MHz                                     |                      |                        |                 |                   |                      |             |             |
| Frequency (MHz)                                                       | Antenna polarization | SG level (dBm)         | Cable loss (dB) | Antenna Gain(dBi) | Result (dBm)         | Limit (dBm) | Margin (dB) |
| 163.79                                                                | H                    | -48.15                 | 1.70            | 2.9               | -46.95               | -36         | 10.95       |
| 436.66                                                                | H                    | -53.55                 | 2.40            | 7.1               | -48.85               | -36         | 12.85       |
| 4804.00                                                               | H                    | -39.07                 | 8.65            | 9.2               | -38.52               | -30         | 8.52        |
| 7206.00                                                               | H                    | -40.04                 | 11.20           | 11.2              | -40.04               | -30         | 10.04       |
| 163.79                                                                | V                    | -48.66                 | 1.70            | 2.9               | -47.46               | -36         | 11.46       |
| 436.66                                                                | V                    | -53.3                  | 2.40            | 7.1               | -48.6                | -36         | 12.60       |
| 4804.00                                                               | V                    | -39.28                 | 8.65            | 9.2               | -38.73               | -30         | 8.73        |
| 7206.00                                                               | V                    | -40.53                 | 11.20           | 11.2              | -40.53               | -30         | 10.53       |
| Test Mode: GFSK Tx in CH78 2480MHz                                    |                      |                        |                 |                   |                      |             |             |
| 163.79                                                                | H                    | -50.12                 | 1.70            | 2.9               | -48.92               | -36         | 12.92       |
| 436.66                                                                | H                    | -51.91                 | 2.40            | 7.1               | -47.21               | -36         | 11.21       |
| 4960.00                                                               | H                    | -40.86                 | 8.75            | 9.3               | -40.31               | -30         | 10.31       |
| 7440.00                                                               | H                    | -39.20                 | 11.25           | 11.3              | -39.15               | -30         | 9.15        |
| 163.79                                                                | V                    | -48.54                 | 1.70            | 2.9               | -47.34               | -36         | 11.34       |
| 436.66                                                                | V                    | -51.23                 | 2.40            | 7.1               | -46.53               | -36         | 10.53       |
| 4960.00                                                               | V                    | -41.27                 | 8.75            | 9.3               | -40.72               | -30         | 10.72       |
| 7440.00                                                               | V                    | -39.24                 | 11.25           | 11.3              | -39.19               | -30         | 9.19        |
| Note1: Result =SG Level – Cable loss + Antenna Gain – 2.15            |                      |                        |                 |                   |                      |             |             |
| Note2: All the emissions detected are belong to narrowband emissions. |                      |                        |                 |                   |                      |             |             |



## 10. Receiver Spurious emissions

### 10.1 Limit

The spurious emissions of the receiver shall not exceed the values given in table 5.

Table 5: Spurious emission limits for receivers

| Frequency Range  | Limit  |
|------------------|--------|
| 30MHz to 1GHz    | -57dBm |
| 1GHz to 12.75GHz | -47dBm |

### 10.2 Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.11.

### 10.3 Test Result

|                                                           |                      |                        |                 |                      |              |             |             |
|-----------------------------------------------------------|----------------------|------------------------|-----------------|----------------------|--------------|-------------|-------------|
| Spurious emissions                                        |                      |                        |                 |                      |              |             |             |
| EUT: Car Bluetooth Player                                 |                      |                        |                 | M/N: S-05            |              |             |             |
| Power: DC12V from battery                                 |                      |                        |                 |                      |              |             |             |
| Test Date: Aug. 04,2017                                   |                      | Test site: RF Site     |                 | Tested by: Sky Huang |              |             |             |
| Ambient Temperature: 25 °C                                |                      | Relative Humidity: 65% |                 |                      |              |             |             |
| Test Mode: Rx in CH0 2402MHz                              |                      |                        |                 |                      |              |             |             |
| Frequency (MHz)                                           | Antenna polarization | SG level (dBm)         | Cable loss (dB) | Antenna Gain(dBi)    | Result (dBm) | Limit (dBm) | Margin (dB) |
| 163.40                                                    | H                    | -70.44                 | 1.70            | 2.9                  | -69.24       | -57         | 12.24       |
| 435.41                                                    | H                    | -75.23                 | 2.66            | 7.5                  | -70.39       | -57         | 13.39       |
| 2026.00                                                   | H                    | -61.22                 | 5.40            | 2.3                  | -64.32       | -47         | 17.32       |
| 2413.00                                                   | H                    | -59.55                 | 6.03            | 7.7                  | -57.88       | -47         | 10.88       |
| 163.40                                                    | V                    | -71.19                 | 1.70            | 2.9                  | -69.99       | -57         | 12.99       |
| 435.41                                                    | V                    | -74.14                 | 2.66            | 7.5                  | -69.3        | -57         | 12.30       |
| 2026.00                                                   | V                    | -62.61                 | 5.40            | 2.3                  | -65.71       | -47         | 18.71       |
| 2413.00                                                   | V                    | -61.56                 | 6.03            | 7.7                  | -59.89       | -47         | 12.89       |
| Test Mode: Rx in CH78 2480MHz                             |                      |                        |                 |                      |              |             |             |
| 163.40                                                    | H                    | -71.34                 | 1.70            | 2.9                  | -70.14       | -57         | 13.14       |
| 435.41                                                    | H                    | -73.3                  | 2.66            | 7.5                  | -68.46       | -57         | 11.46       |
| 2026.00                                                   | H                    | -61.38                 | 5.40            | 2.3                  | -64.48       | -47         | 17.48       |
| 2413.00                                                   | H                    | -61.44                 | 6.03            | 7.7                  | -59.77       | -47         | 12.77       |
| 163.40                                                    | V                    | -70.22                 | 1.70            | 2.9                  | -69.02       | -57         | 12.02       |
| 435.41                                                    | V                    | -72.40                 | 2.66            | 7.5                  | -67.56       | -57         | 10.56       |
| 2026.00                                                   | V                    | -60.41                 | 5.40            | 2.3                  | -63.51       | -47         | 16.51       |
| 2413.00                                                   | V                    | -61.25                 | 6.03            | 7.7                  | -59.58       | -47         | 12.58       |
| Note: Result =SG Level – Cable loss + Antenna Gain – 2.15 |                      |                        |                 |                      |              |             |             |



## 11. Receiver Spurious emissions

### 11.1 Receiver Blocking

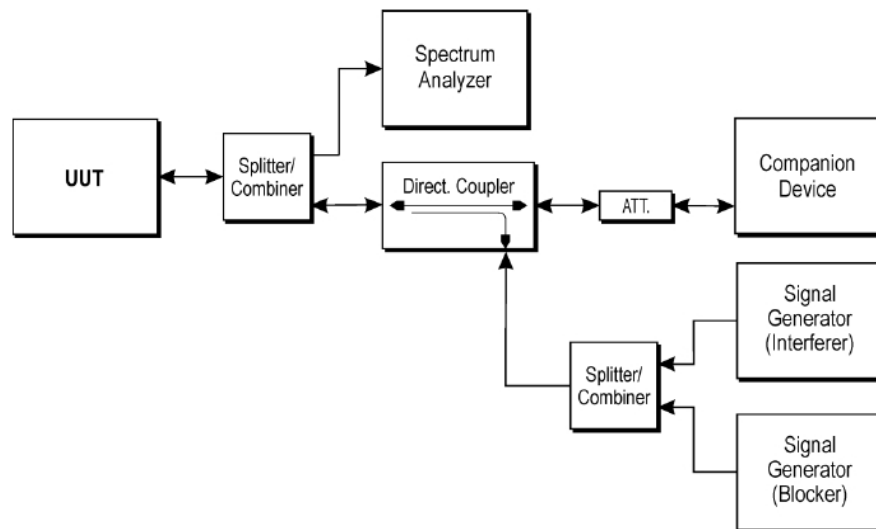
### 11.2 Limit

Adaptive equipment using wide band modulations other than FHSS, shall comply with the requirements defined in clauses 4.3.2.5.1 (non-LBT based DAA) or 4.3.2.5.2 (LBT based DAA) in the presence of a blocking signal with characteristics as provided in table 6.

**Table 6: Receiver Blocking parameters**

| Equipment Type<br>(LBT / non- LBT)                                                                                                                                                          | Wanted signal mean<br>power from companion<br>device | Blocking signal<br>frequency<br>[MHz] | Blocking<br>signal power<br>[dBm] | Type of<br>interfering<br>signal |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------|-----------------------------------|----------------------------------|
| LBT                                                                                                                                                                                         | sufficient to maintain the<br>link (see note 2)      | 2 395 or 2 488,5<br>(see note 1)      | -30                               | CW                               |
| Non-LBT                                                                                                                                                                                     | -30 dBm                                              |                                       |                                   |                                  |
| NOTE 1: The highest blocking frequency shall be used for testing the lowest operating channel, while the lowest blocking frequency shall be used for testing the highest operating channel. |                                                      |                                       |                                   |                                  |
| NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.                                                                                                                     |                                                      |                                       |                                   |                                  |

### 11.3 Test Setup



### 11.4 Test Procedure

Refer to ETSI EN 300 328 V2.1.1 (2016-11) Clause 5.3.7.

### 11.5 Test Result

Not applicable

Note : The maximum output power of EUT less than 10dBm, so not applicable.



## 12. Photos of test setup



### 13. Photos of the EUT

EUT Photo 1



EUT Photo 2





**EUT Photo 3**



**EUT Photo 4**



**EUT Photo 5**

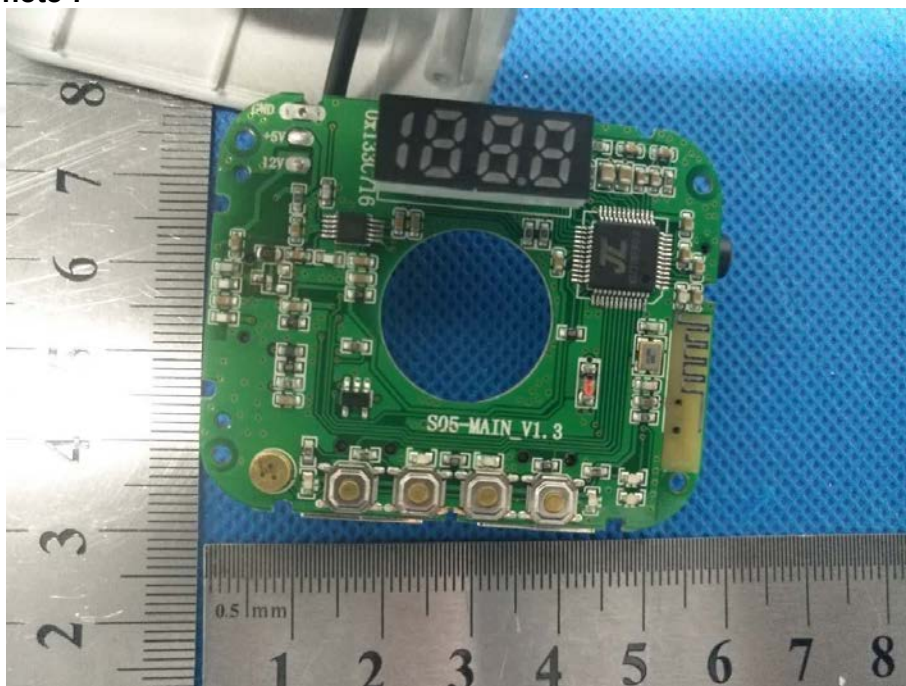


**EUT Photo 6**





EUT Photo 7



-----END OF REPORT-----