



RF Exposure Evaluation Declaration

FCC ID: RQ9VS30

APPLICANT: Yanfeng Visteon Automotive Electronics Co., Ltd.

Application Type: Certification

Product: MB Audio System

Model No.: VS30

FCC Classification: FCC Part 15 Spread Spectrum Transmitter(DSS)

Test Procedure(s): KDB 447498 D01v06

Test Date: July 14 ~ 21, 2017

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Approved By : *Marlin Chen*
(Marlin Chen)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date	Note
1707RSU01502	Rev. 01	Initial Report	07-31-2017	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	MB Audio System
Model No.	VS30
Bluetooth Version	v2.1 + EDR
Hardware Version	17/19
Software Version	V3.2.0
Operating Frequency	2402~2480MHz
Bluetooth Version	v2.1 + EDR
Type of modulation	FHSS
Data Rate	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Antenna Gain	-1.0dBi

2. RF Exposure Evaluation

2.1. Limits

FCC Rules:

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

Formula as follows:

f= Frequency in MHz

Calculation Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	MB Audio System
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is -1.0dBi for 2.4GHz in logarithm scale.

Output Power into Antenna:

Test Mode	Frequency Band (MHz)	Maximum output power to antenna (mW)	SAR Test Exclusion Threshold (mW)
Bluetooth v2.1	2402 ~ 2480	6.637	10

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, Bluetooth SAR was not required;

$$[(6.637\text{mW}/5) * \sqrt{2.480}] = 2.09 < 3.0$$

Note: When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.