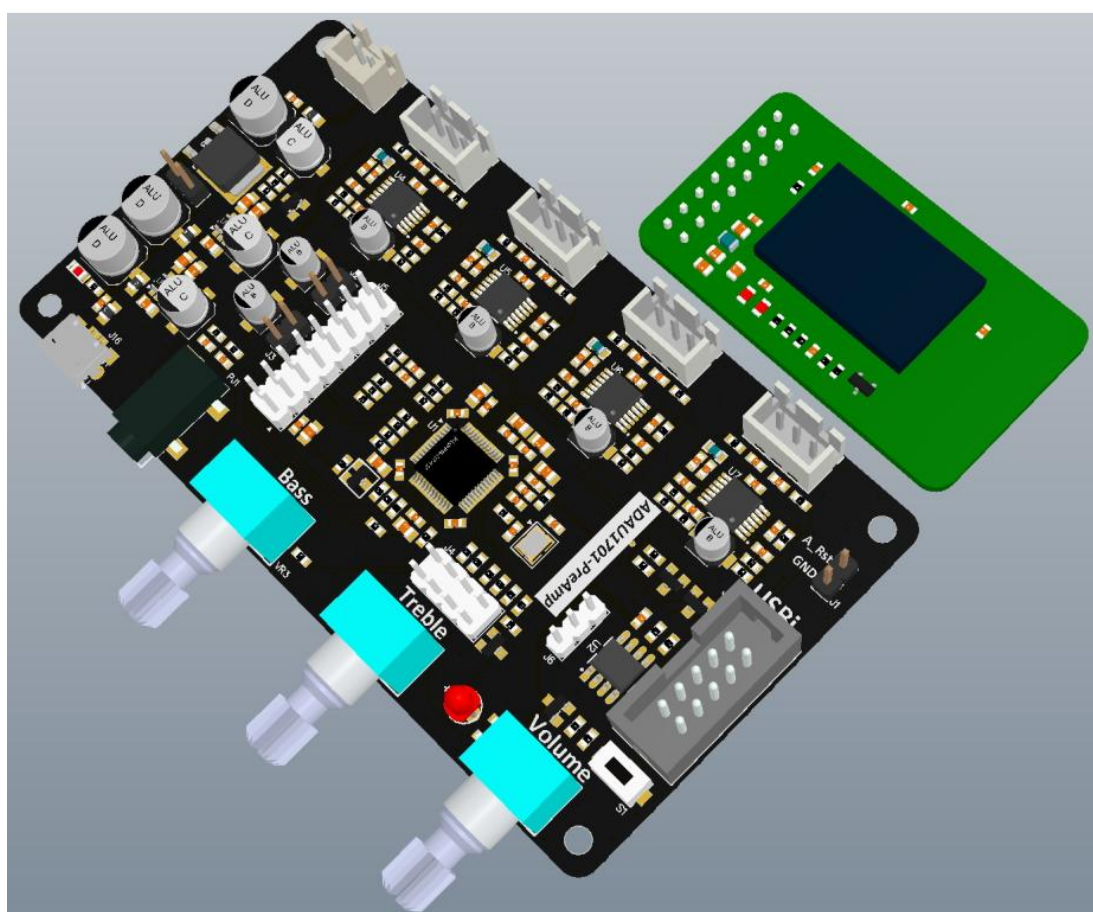


# 2 Channel in 4 Channel out ADAU1701 Sigma DSP Pre-Amplifier with Bluetooth Plug-in Module



## Disclaimer

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

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# 1. General Description

EDSP-1701-24-A is a 2 channel in 4 channel out DSP pre-amplifier module base on ADAU1701 Sigma DSP with customized design and mainly suit for both consumer and professional project.

The ADAU1701 is a complete single-chip audio system with a 28-/56-bit audio DSP, ADCs, DACs, and microcontroller-like control interfaces. Signal processing includes equalization, crossover, bass enhancement, multiband dynamics processing, delay compensation, speaker compensation, and stereo image widening. This processing can be used to compensate for real-world limitations of speakers, amplifiers, and listening environments, providing dramatic improvements in perceived audio quality.

With improved and customized design to obtain highest performance and lowest cost, this module provide an excellent audio solution that highly compact and efficiency into the audio product design.

## 1.1 Key Features:

- < 25uV Output Noise (AES17,A-weighted)
- >3Vrms @ 1% THD+N (Balance Output)
- 102dBA dynamic range
- Support both Analog input and digital I2S input/output
- Very Compact size(100mm\*55mm\*20mm – L\*W\*H)
- Balance output for best matching TPA32xx series amplifier module
- Selectable Power supply input (TPA32xx module AUX VCC or Micro USB)
- Bluetooth plug-in option for wireless audio streaming
- On board USBi connector for online design with sigma-studio
- On board Potentiometer for basic audio tuning(Bass,Treble,Volume,etc)

## 1.2 Applications:

- Multimedia speaker systems
- MP3 player speaker docks
- Automotive head units
- Minicomponent stereos
- Digital televisions
- Studio monitors
- Speaker crossovers
- Musical instrument effects processors
- In-seat sound systems (aircraft/motor coaches)

## 2. Audio Specifications

Symbol	Parameter	Conditions	Min	Type	Max	Unit
<b>V<sub>in</sub></b>	Single-end input voltage	Full-Scale	-	1.1	1.2	Vrms
<b>V<sub>out</sub></b>	Balance output voltage	<1% THD+N	-	3	-	Vrms
<b>V<sub>noise</sub></b>	Output referenced idle noise	A-weighted 20Hz < f < 20kHz	-	25	35	uV
<b>THD+N</b>	THD+N in 20kΩ, f =1kHz 2Vrms balance output	Analog in	-	0.007	0.009	%
		Digital in	-	0.002	0.003	
<b>A<sub>v</sub></b>	Op-Amp voltage gain	f = 1kHz	9	10	11	dB
<b>F<sub>r</sub></b>	Frequency response	20Hz - 20kHz		+/-0.5	+/-1	dB
<b>Z<sub>in</sub></b>	Input impedance	Single-end	-	10	-	kΩ
<b>S/N</b>	Signal to Noise Rate	2Vrm,A-weighted	100	102	104	dB
<b>I2S<sub>in</sub></b>	I2S in channel	digital input	-	2	-	CH
<b>I2S<sub>out</sub></b>	I2S out channel	digital output	-	4	-	CH

*\*Full-scale input voltage can meet 2Vrms by changing input resistor: 8.2kohm->18kohm*

*\*Input source will auto switch to 3.5mm AUX In once it is inserted*

### 3. Board Drawing

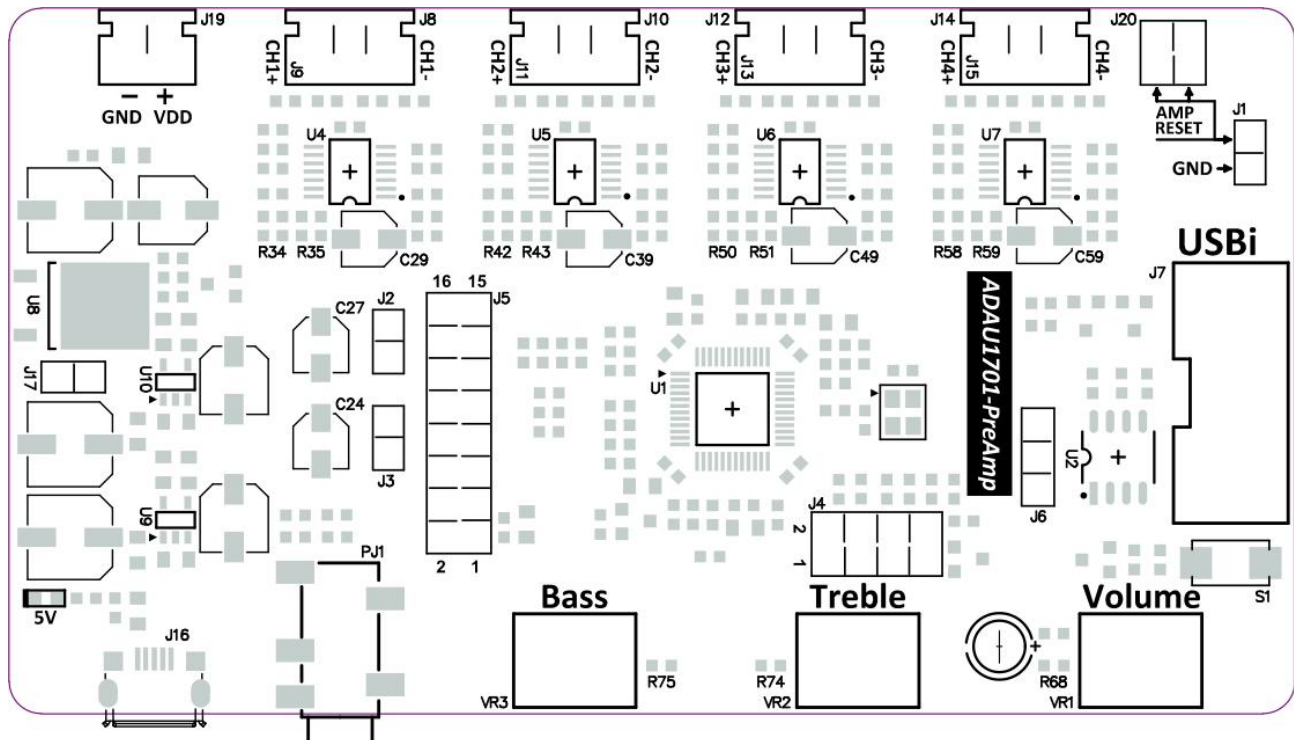


Figure 1: Board Top view

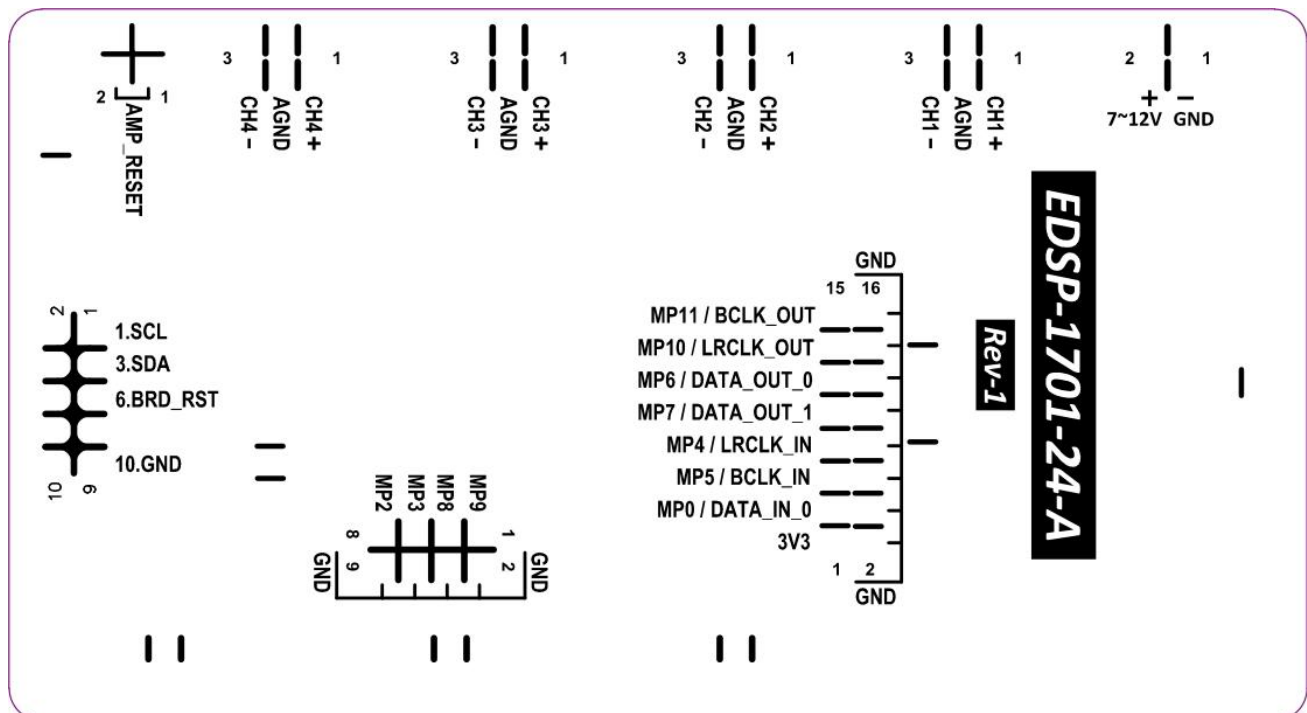


Figure 2: Board Bottom view

## 4. Connection Diagram

### 4.1 Input Signal Connector Specification (PJ1)

Type: 3.5mm Phone Jack			
PIN	Function	Description	I/O Type
1	AGND	Ground of the input signal	GND
2	IN-Left	Left channel input	Audio Input
3	IN-Right	Right channel input	Audio Input

### 4.2 Output Signal Connector Specification (J8&J10&J10&J14)

Type: JST2.54-3PIN			
PIN	Function	Description	I/O Type
1	CH <del>x</del> +	Positive output	Output
2	AGND	Ground of the output signal	GND
3	CH <del>x</del> -	Negative output	Output
*X means channel 1~4			

### 4.3 Power Supply Input connector Specification (J19)

Type: JST2.54-2PIN			
PIN	Function	Description	I/O Type
1	GND	Power supply ground	GND
2	VDD(7~12V)	Power supply Input	Input
*please set the Jumper(J17) ON when use J19 as the power input, and OFF when use Micro USB input			

### 4.4 Digital I2S Input/output connector Specification (J5)

Type: JST2.54-16PIN			
PIN	Function	Description	I/O Type
2~16	GND	Signal ground	GND
1	3.3V	Power supply output	Output
3	MP0/DATA_IN_0	MP0 or I2S Data In	I/O
5	MP5/BCLK_IN	MP5 or I2S Bit Clock In	I/O
7	MP4/LRCLK_IN	MP4 or I2S Frame Clock In	I/O
9	MP7/DATA_OUT_1	MP7 or I2S Data Out 1	I/O
11	MP6/DATA_OUT_0	MP6 or I2S Data Out 0	I/O
13	MP10/LRCLK_OUT	MP10 or I2S Frame Clock Out	I/O
15	MP11/BCLK_OUT	MP11 or I2S Bit Clock Out	I/O
*MP - multipurpose pin			
*Jumper J2&J3 should be ON when setting DSP as the Master(default)			

#### 4.5 MP PIN Connector Specification (J4)

Type: JST2.54-8PIN			
PIN	Function	Description	I/O Type
2~8	GND	Signal ground	GND
1	MP9	multipurpose pins 9	I/O
3	MP8	multipurpose pins 8	I/O
5	MP3	multipurpose pins 3	I/O
7	MP2	multipurpose pins 2	I/O
<i>*J4 isn't populated default</i>			

#### 4.6 Potentiometer Specification

D/L	Function	Description
VR1	Volume	Master volume control, can be redefine by user
VR2	Treble	Treble frequency control, can be redefine by user
VR3	Bass	Bass frequency control, can be redefine by user
<i>*VR1~VR3: 10Kohm <math>\pm</math>5%, typically</i>		

#### 4.7 AMP Reset IO Specification (J1&J20)

Type: JST2.54-2/4PIN			
PIN	Function	Description	I/O Type
-	AMP RESET	Amplifier reset output control	O
-	GND	Signal ground	GND
<i>*please refer to the detail marked on the board</i>			

## 5. Typical Performance Characteristics

### 5.1 Frequency Response (2Vrms)

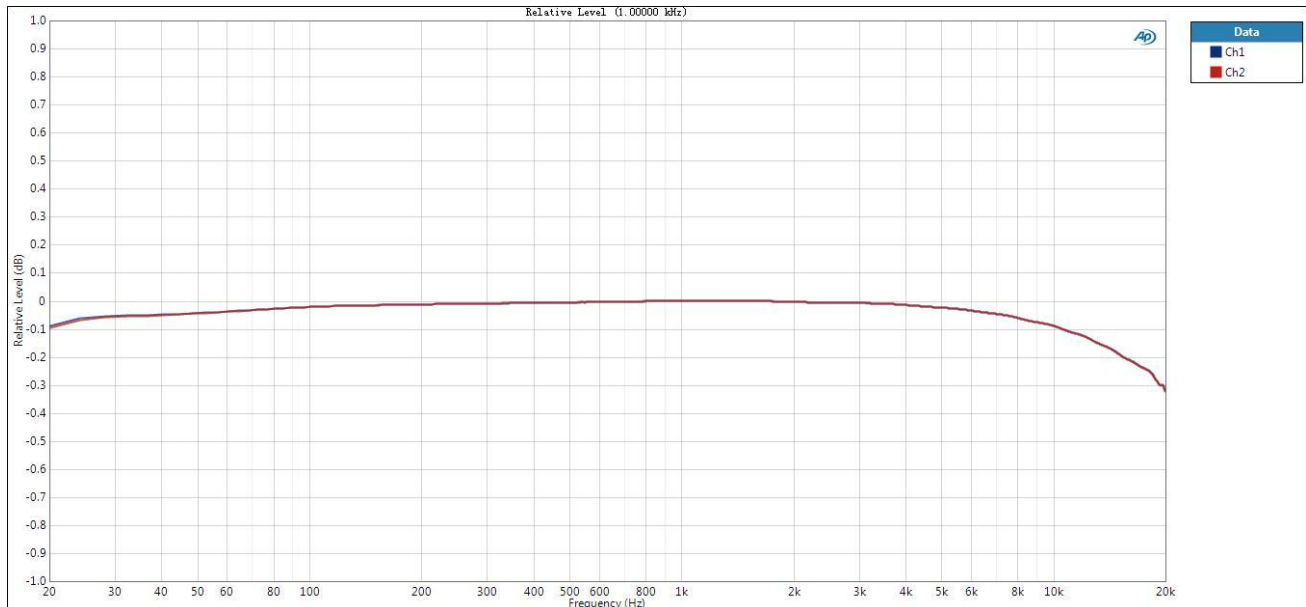


Figure 3: Frequency response - Analog In

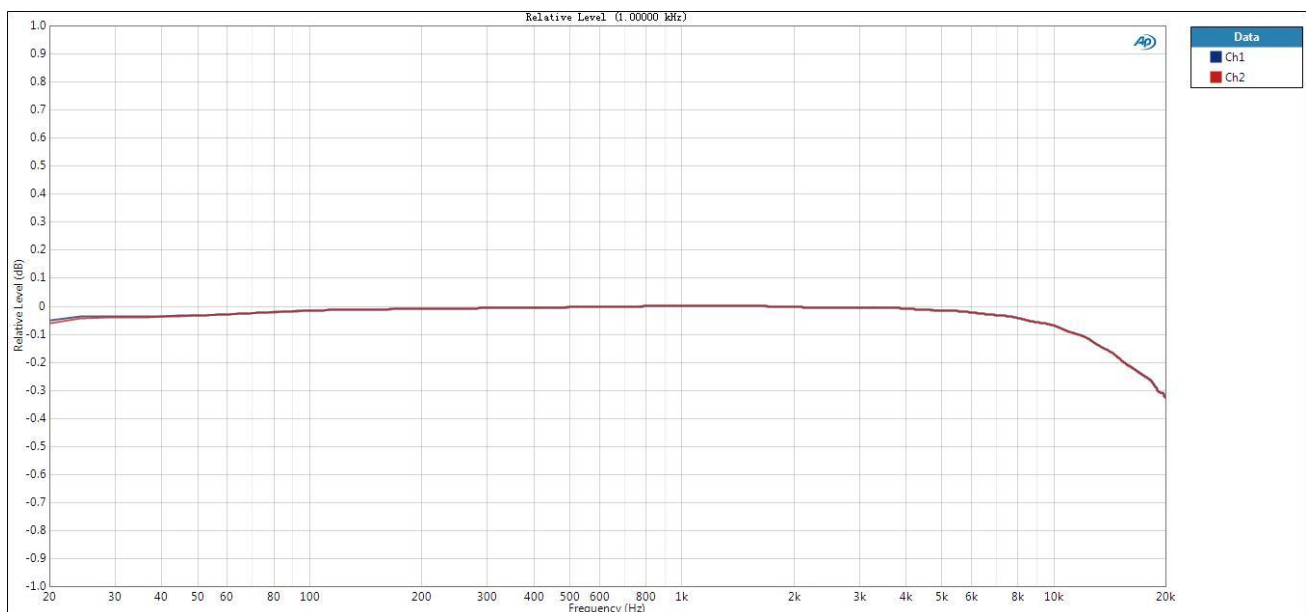


Figure 3: Frequency response - Digital In



## 5.2 THD+N vs Output Level

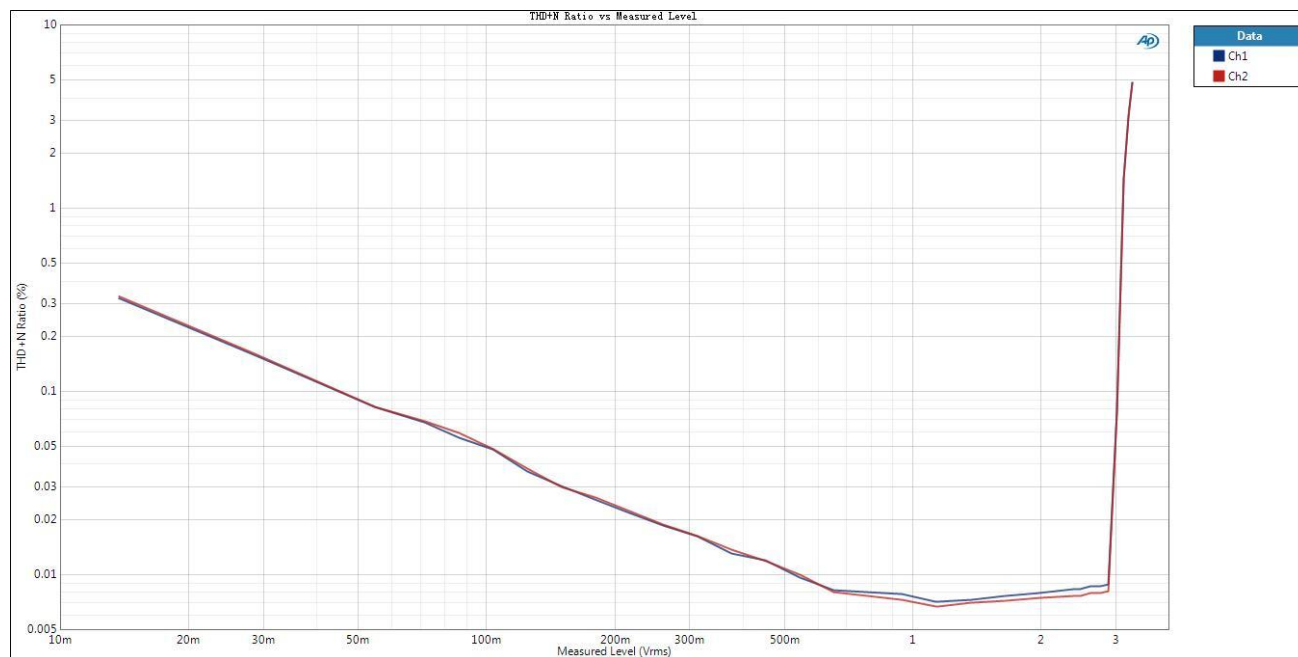


Figure 6: THD+N vs Output Level - Analog In

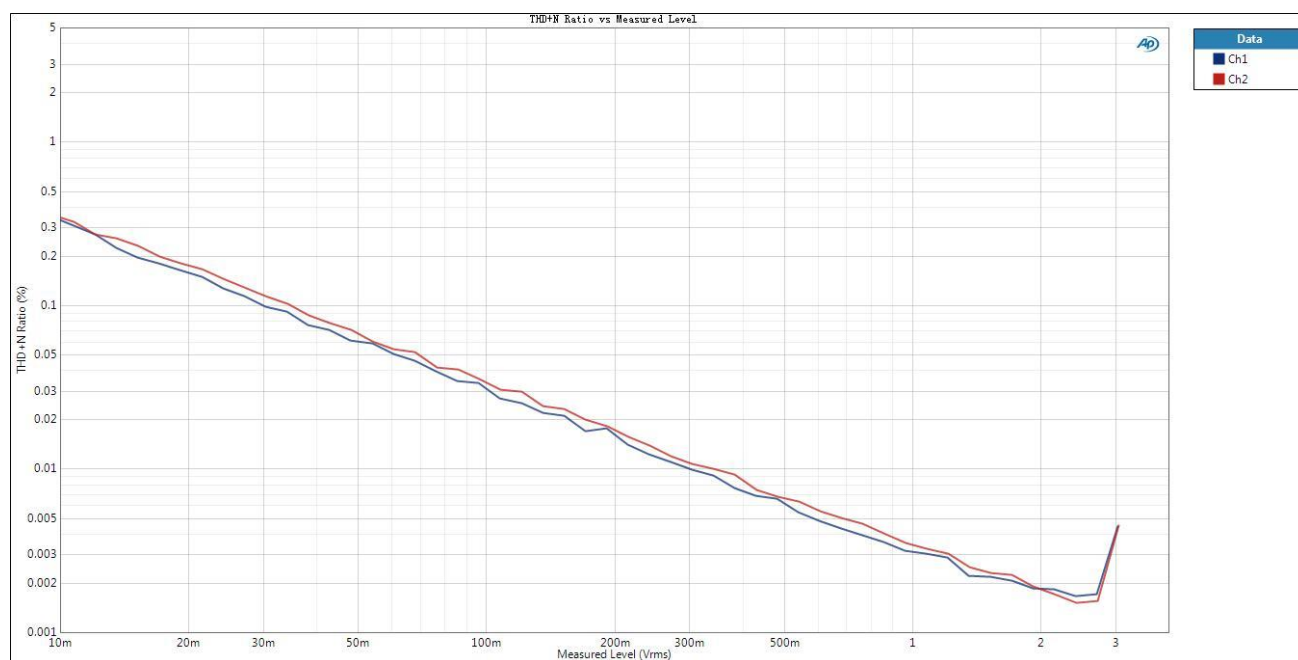


Figure 6: THD+N vs Output Level - Digital In

### 5.3 THD+N vs Frequency (2Vrms)

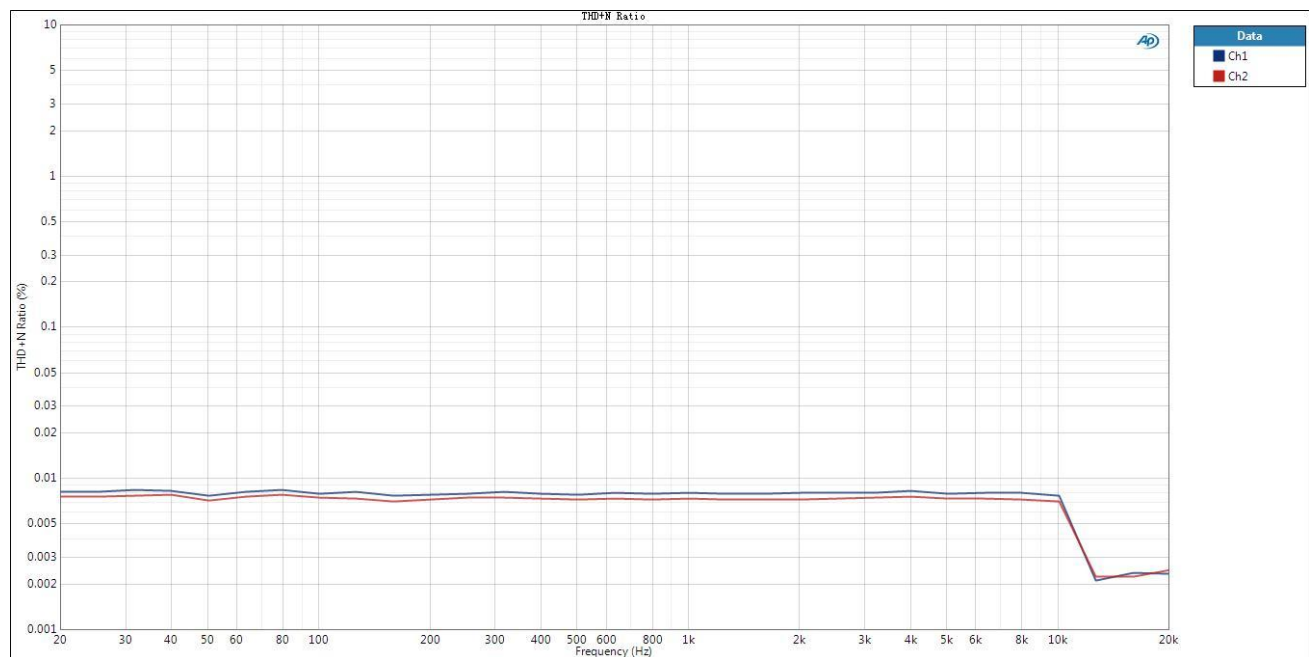


Figure 7: THD+N vs Frequency - Analog In

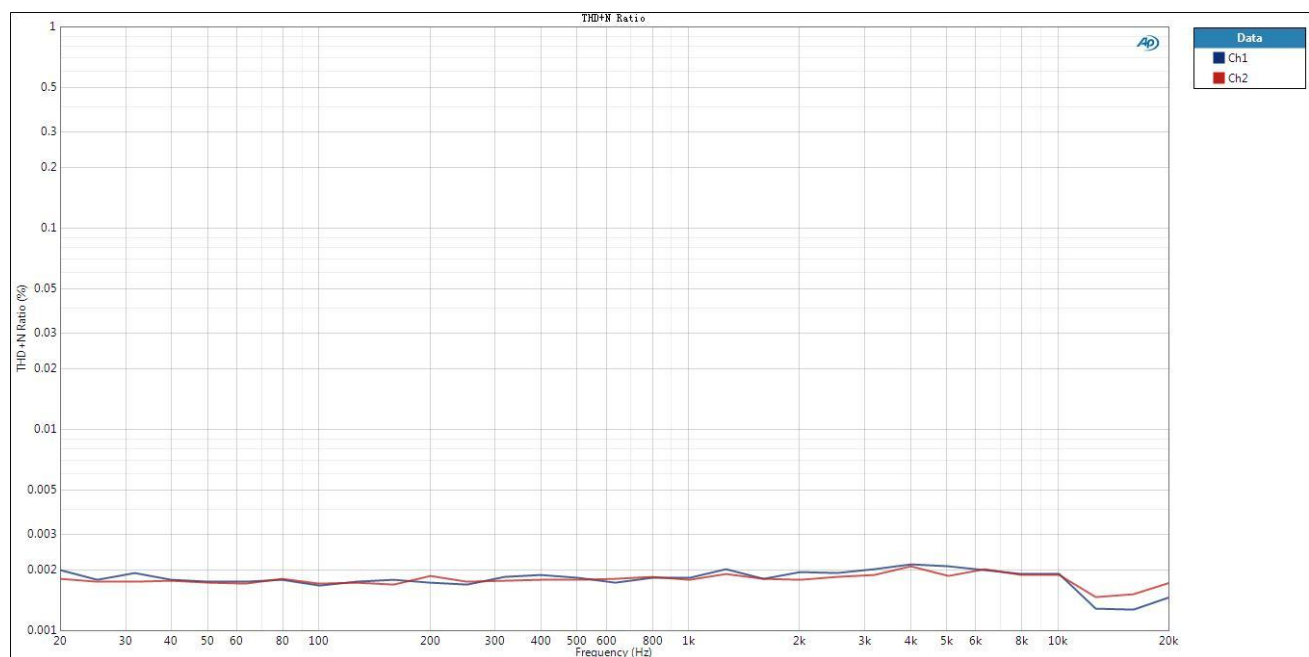


Figure 7: THD+N vs Frequency - Digital In

## 6. Bluetooth Plug-in Module

The EDSP-1701-24-A has been design to support both analog and digital I2S source input, so it is possible to upgrade with wireless audio streaming in the design with this Bluetooth plug-in module flexibly.

The Bluetooth module is designed compatible with the Digital I2S Input/output connector (J5), user just install onto the DSP mother board when this module had been selected.

Bluetooth Module Specification	
Chipset	CSRA64215
BT Version	4.2
Output Power	4dBm(typ),8dBm(max)
Sensitivity	-85dBm@0.1%BER
Frequency Band	2.402GHz~2.480GHz
Modulation Type	GFSK, $\pi/4$ DQPSK,8DPSK
Music Enhancements:	SBC,aptX,AAC decoder
Connection Status	
Pairing/Discoverable	<b>LED0B,LED1B</b> flash alternately (Pairing Timeout=10min)
Connectable (paired before)	<b>LED0B</b> flash alternately (3times/2Second)
Connected	<b>LED0B ON</b>
Streaming Audio	<b>LED0B,LED1B both ON</b>

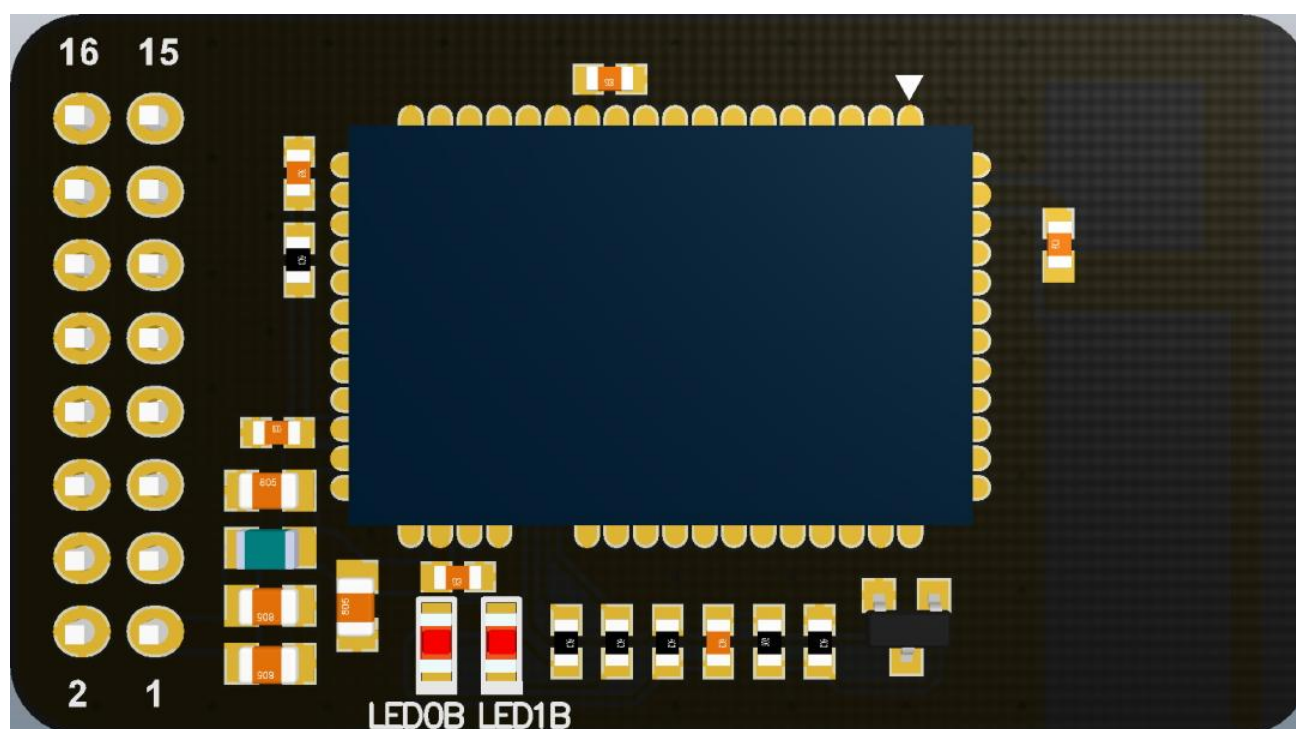


Figure 8: CSRA64215 Bluetooth Module

## 7. Revisions

Revision	Change Logs	Date
1.0	Initial version	Jun,2018