3900 & 5900 Series Base Station V100R019C10

3900 & 5900 Series Base Station Product Documentation (V100R019C10_Draft B)

Issue Date **2023-01-03**

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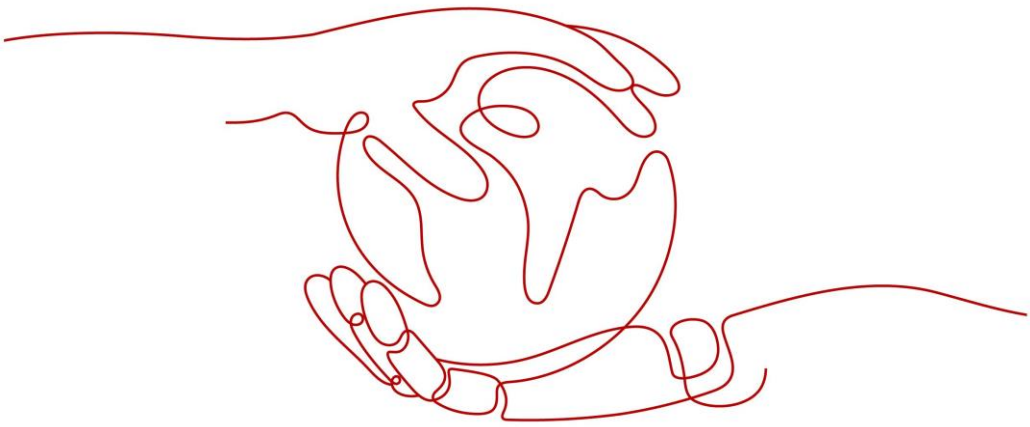

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An AAU integrates the antenna and RF unit. This document provides a reference for planning and deploying an AAU5636w. It describes the radio frequency (RF) specifications, antenna specifications, receiver sensitivity, engineering specifications, and common public radio interface (CPRI) port specifications of the AAU5636w.

NOTICE

The specifications that are not mentioned in this document or described as unsupported may be configurable. The product supports only the specifications that are mentioned in this document and meet specific constraints. If the specifications that are not mentioned in this document or described as unsupported are configured, services may be affected or the network may be out of service.

Product Versions

Product Name	Solution Version	Product Version
AAU5636w	SRAN19.1	V100R019C10 For details about software versions of RF modules, see **Description** > **Hardware Description** > **3900 & 5900 Series Base Station Software and Hardware Compatibility Description**.

Intended Audience

This document is intended for:

- Network planners
- Onsite engineers
- System engineers

Organization

1 AAU5636w Technical Specifications
An AAU integrates the antenna and RF unit. This document provides a reference for planning and deploying an AAU5636w. It describes the radio frequency (RF) specifications, antenna specifications, receiver sensitivity, engineering specifications, and common public radio interface (CPRI) port specifications of the AAU5636w.
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The technical specifications of an AAU5636w (3700 MHz) include RF specifications, antenna specifications, receiver sensitivity, engineering specifications, and CPRI port specifications.

6 Power Configuration Rules for RF Modules

This chapter describes the rules for configuring RF output power.

This section describes the changes in *AAU5636w Technical Specifications*.

Draft A (2022-12-30)

This is a draft.

Compared with Issue 03 (2022-07-29) of V100R018C10, this issue does not include any new topics or changes, or exclude any topics.

The technical specifications of an AAU5636w (2600 MHz) include RF specifications, antenna specifications, receiver sensitivity, engineering specifications, and CPRI port specifications.

3.1 AAU5636w (2600 MHz) RF Specifications

The RF specifications include radio access technologies (RATs), frequency bands, TX/RX modes, capacity, and output power.

- Unless otherwise specified, in the following, **LTE** and **eNodeB** always include LTE FDD, LTE TDD, and LTE NB-IoT. In scenarios where they need to be distinguished, **LTE FDD**, **LTE TDD**, and **LTE NB-IoT** are used. The same rules apply to eNodeB.
- Unless otherwise specified, in the following, **NR** and **gNodeB** always include FDD and TDD. In scenarios where they need to be distinguished, **NR FDD** and **NR TDD** are used. The same rules apply to gNodeB.
- In the following, **G** is short for **GSM**, **U** is short for **UMTS**, **L** is short for **LTE FDD**, **T** is short for **LTE TDD**, **M** is short for **LTE NB-IoT**, **N** is short for **NR**, **N (FDD)** is short for **NR FDD**, and **N (TDD)** is short for **NR TDD**.

Supported Frequency Bands and RATs

Table 3-1 Frequency bands and RATs supported by an AAU5636w (2600 MHz)

Frequency Band (MHz)	Protocol-defined Band	Frequency Range (MHz)[a]	RAT	IBW (MHz)	OBW (MHz)
2600	Band 41/n41	2496 to 2690	LTE TDD, NR TDD, TN (TDD)	194	194
a: **Frequency Range** indicates that the RX frequency range and TX frequency range of the RF module are the same.					

NOTE

For details about the subframe configuration supported by RF modules in LTE TDD mode, see *Subframe Configuration (TDD)* in **eRAN Feature Documentation**. For details about the slot assignment supported by RF modules in NR TDD mode, see *Standards Compliance* in **5G RAN Feature Documentation**.

TX/RX Modes and Capacity

Table 3-2 TX/RX modes and capacity of an AAU5636w (2600 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	TX/RX Mode[a]	Capacity[b]	Supported Bandwidth (MHz)[c]
2600	2496 to 2690	64T64R	LTE TDD: 8 carriers NR TDD: 2 carriers TN (TDD): 1 NR TDD carrier and 3 LTE TDD carriers	LTE TDD: 10/15/20 NR TDD: 20/30/40/50/60/70/80/90/100

a: **mTnR** in **TX/RX Mode** indicates that the RF module uses *m* transmit channels and *n* receive channels.

b: The number of carriers in the **Capacity** column refers to the maximum number of carriers that can be configured for the module with the RAT configured, not the number of carriers that can be configured for a single channel. For details about the module-level and channel-level carrier configurations supported in single-mode and multimode scenarios, see the **Output Power Configuration** column in the following table. When the module is used with a feature, see the feature specifications in the corresponding feature parameter description to learn the module-level or channel-level carrier configurations that are supported after the feature is enabled.

c: The bandwidth information in **Supported Bandwidth** is the standard bandwidth that can be configured for a carrier when only one carrier is configured for the module working in a single mode. In any carrier combination scenario, the total bandwidth of all carriers cannot exceed the OBW value. For details about the bandwidth that can be configured for each carrier in each carrier combination scenario, see *Typical Power Configurations for AAUs*.

Output Power and Carrier Configurations

Table 3-3 Output power and carrier configurations of an AAU5636w (2600 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Maximum Output Power	Output Power Configuration
2600	2496 to 2690	320 W	For typical configurations, see Typical Power Configurations for AAUs .

NOTE

- The *Typical Power Configurations for AAUs* document includes the configurable carrier combinations and the output power of each carrier in each combination. Before referring to this document, you must be familiar with the output power configuration rules. For details, see 6 Power Configuration Rules for RF Modules.
- The carrier bandwidths supported by carriers with different power may be different. For details about the output power of carriers and supported carrier bandwidth, see the *Typical Power Configurations for AAUs* document. Each **Output Power per Carrier** value in the *Typical Power Configurations for AAUs* document indicates the maximum output power of each carrier under the corresponding configuration while ensuring the network performance. The actually configured carrier power of RF modules can be less than or equal to the value of **Output Power per Carrier** in the document. The power configuration that is not supported in the document may be configurable on the software. Huawei can only promise the performance with the power configurations listed in the document.

RF Compliance Standards

Table 3-4 RF compliance standards for an AAU5636w (2600 MHz)

Item	Standard
LTE standard	3GPP TS 36.104
NR standard	3GPP TS 38.104
Multimode standard	3GPP TS 37.104

3.2 AAU5636w (2600 MHz) Antenna Specifications

The antenna specifications include the frequency range, gains, and beam range of the antenna.

Antenna Specifications

Table 3-5 Antenna electrical specifications of an AAU5636w (2600 MHz)

Item	Specifications
Frequency range (MHz)	2496 to 2690
Polarization mode (°)	+45 and -45
NR TDD gain (dBi)	24.8
NR TDD horizontal beam sweeping range (°)	-60 to +60
NR TDD vertical beam sweeping range (°)	-15 to +15
LTE TDD traffic beam gain (dBi)	24.8
LTE TDD broadcast beam gain (dBi)[a]	17.5
Horizontal half-power beamwidth of the LTE TDD broadcast beam (°)	65±5
Vertical half-power beamwidth of the LTE TDD broadcast beam (°)	≥ 5.5
Number of antenna elements	192
a: The gain is obtained in macro coverage scenarios with the horizontal beamwidth of 65°.	

Antenna Patterns

In the pattern, the area outlined in blue is the maximum beam coverage scope, and the area outlined in red is the minimum beam coverage scope.

Figure 3-1 Vertical pattern sample of AAU5636w (2600 MHz) beams

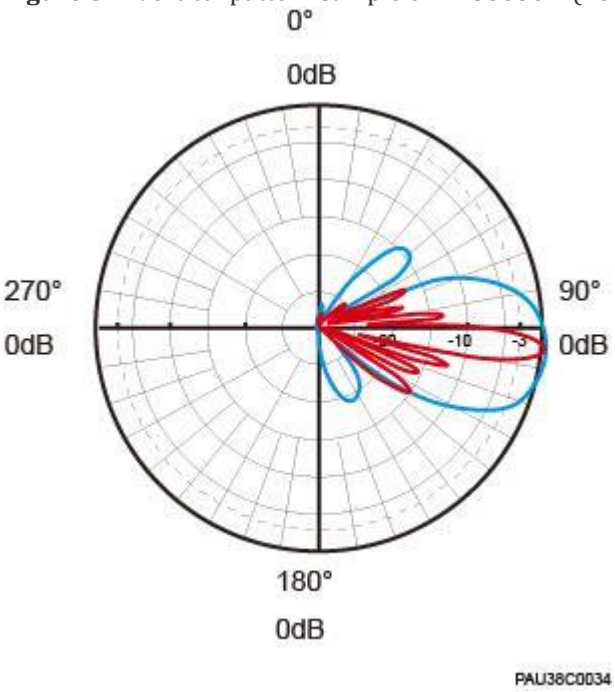
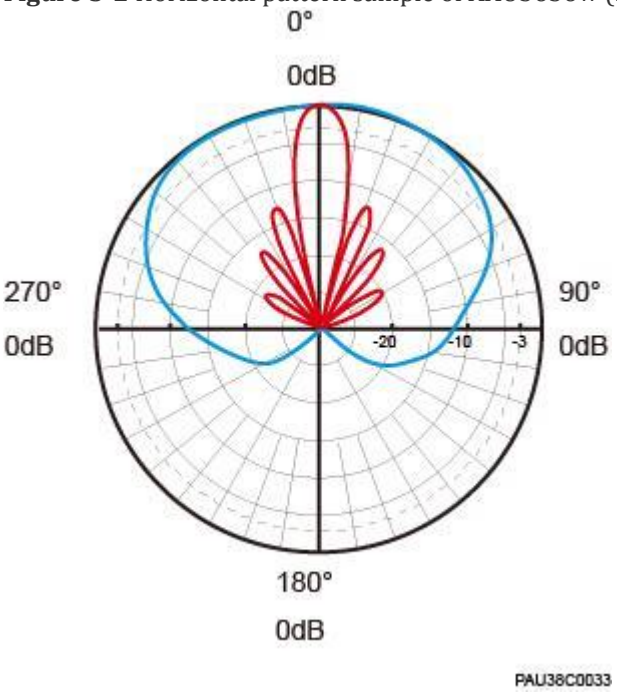


Figure 3-2 Horizontal pattern sample of AAU5636w (2600 MHz) beams in a macro coverage scenario



3.3 AAU5636w (2600 MHz) Receiver Sensitivity

The receiver sensitivity of an AAU measures the capability of the AAU to receive signals with the minimum power.

Table 3-6 Receiver sensitivity of an AAU5636w (2600 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Receiver Sensitivity
2600	2496 to 2690	LTE TDD: -105 dBm NR TDD: -99 dBm

NOTE

- The LTE TDD receiver sensitivity is measured with the ambient temperature of 25°C (77°F) and test configurations (QPSK, R = 1/3, 25 RBs) recommended in 3GPP TS 36.141.
- The NR TDD receiver sensitivity is measured with the ambient temperature of 25°C (77°F) and test configurations (QPSK, R = 1/3, 51 RBs) recommended in 3GPP TS 38.141.

3.4 AAU5636w (2600 MHz) Engineering Specifications

The engineering specifications include the input power, module power consumption, dimensions, weight, and environmental specifications.

Input Power

Table 3-7 Input power of an AAU5636w (2600 MHz)

Power Supply Type	Operating Voltage
-48 V DC	-36 V DC to -63 V DC

Module Power Consumption

Table 3-8 Power consumption of an AAU5636w (2600 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Typical Power Consumption (W)[a]
2600	2496 to 2690	900
a: The typical power consumption of a module is measured when the ambient temperature is 25°C (77°F) and the load is 50%. The actual power consumption has a 10% deviation from this value.		

Dimensions and Weight

Table 3-9 Dimensions and weight of an AAU5636w (2600 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Dimensions (H x W x D)	Weight
2600	2496 to 2690	965 mm x 470 mm x 160 mm (37.99 in. x 18.50 in. x 6.30 in.)	35 kg (77.18 lb, excluding mounting kits)

Environmental Specifications

Table 3-10 Environmental specifications of an AAU5636w (2600 MHz)

Item	Specifications
Operating temperature	Without solar radiation: -40°C to +55°C (-40°F to +131°F)
Wind load (Assume that the wind speed is 150 km/h.)	Front: 675 N Side: 195 N
Operating wind speed	150 km/h
Survival wind speed	200 km/h

Item	Specifications
Relative humidity	5% RH to 100% RH
Altitude	≤ 4000 m (13123.36 ft)

NOTE

The output power of an AAU may decrease when it operates at temperature ranges 10°C (18°F) less than or equal to its maximum operating temperature. This is dependent on installation scenario, traffic load, and carrier configuration.

Table 3-11 Surge protection specifications of ports

Port	Surge Protection Mode	Surge Protection Specifications
Power port	Surge current	20 kA

NOTE

- Unless otherwise specified, the lightning protection specifications depend on the surge waveform of 8/20 μs.
- All the surge current items, unless otherwise specified as **Maximum discharge current**, refer to **Nominal discharge current**.

Compliance Standards

Table 3-12 Compliance standards for an AAU5636w (2600 MHz)

Item	Standard
Operating environment	ETSI EN 300 019-1-4 Class 4.1
Storage environment[a]	ETSI EN 300 019-1-1 Class 1.2
Shockproof protection	NEBS GR63 Zone 4
Ingress protection rating	IP65
Surge protection	IEC 62305-1 ITU-T K.35 ITU-T K.56 ITU-T K.97 ETSI EN 300 253
a: The validity period is one year. The product can function properly within the validity period if the storage environment meets the preceding standards.	

3.5 AAU5636w (2600 MHz) CPRI Port Specifications

The CPRI port specifications of an AAU include the CPRI port protocol, rate, and maximum level of cascading and maximum distance with a BBU.

Table 3-13 CPRI port protocol and rate of an AAU5636w (2600 MHz)

Number of CPRI Ports	Protocol Type	Port Rate (Gbit/s)

Number of CPRI Ports	Protocol Type	Port Rate (Gbit/s)
2	eCPRI	10/25

Table 3-14 Maximum level of cascading and maximum distance between an AAU5636w (2600 MHz) and a BBU

Module	Maximum Level of Cascading with a BBU	Maximum Distance from a BBU[a]
AAU5636w	Not supported	20 km (12.43 mi.)
a: This distance is related to the maximum distance supported by the optical module. If the maximum distance supported by the optical module is less than 20 km (12.43 mi.), the maximum distance between the AAU and BBU is subject to that supported by the optical module.		

NOTE

- For details about the CPRI topologies supported by each AAU model, see RF Unit and Topology Management .
- For details about the ALD capabilities supported by each AAU model (for example, the capabilities of RF ports supporting RET antennas and TMAs), see ALD Management .
- For details about the eCPRI protocol and parameter configurations, see eCPRI .

The technical specifications of an AAU5636w (3500 MHz) include RF specifications, antenna specifications, receiver sensitivity, engineering specifications, and CPRI port specifications.

4.1 AAU5636w (3500 MHz) RF Specifications

The RF specifications include RATs, frequency bands, TX/RX modes, capacity, and output power.

- Unless otherwise specified, in the following, **LTE** and **eNodeB** always include LTE FDD, LTE TDD, and LTE NB-IoT. In scenarios where they need to be distinguished, **LTE FDD**, **LTE TDD**, and **LTE NB-IoT** are used. The same rules apply to eNodeB.
- Unless otherwise specified, in the following, **NR** and **gNodeB** always include FDD and TDD. In scenarios where they need to be distinguished, **NR FDD** and **NR TDD** are used. The same rules apply to gNodeB.

- In the following, **G** is short for **GSM**, **U** is short for **UMTS**, **L** is short for **LTE FDD**, **T** is short for **LTE TDD**, **M** is short for **LTE NB-IoT**, **N** is short for **NR**, **N (FDD)** is short for **NR FDD**, and **N (TDD)** is short for **NR TDD**.

Supported Frequency Bands and RATs

Table 4-1 Frequency bands and RATs supported by an AAU5636w (3500 MHz)

Frequency Band (MHz)	Protocol-defined Band	Frequency Range (MHz)[a]	RAT	IBW (MHz)	OBW (MHz)
3500	Band 42/n78	3400 to 3600	LTE TDD, NR TDD, TN (TDD)	200	200
a: **Frequency Range** indicates that the RX frequency range and TX frequency range of the RF module are the same.					

NOTE

For details about the subframe configuration supported by RF modules in LTE TDD mode, see *Subframe Configuration (TDD)* in **eRAN Feature Documentation**. For details about the slot assignment supported by RF modules in NR TDD mode, see *Standards Compliance* in **5G RAN Feature Documentation**.

TX/RX Modes and Capacity

Table 4-2 TX/RX modes and capacity of an AAU5636w (3500 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	TX/RX Mode[a]	Capacity[b]	Supported Bandwidth (MHz)[c]
3500	3400 to 3600	64T64R	LTE TDD: 8 carriers NR TDD: 2 carriers TN (TDD): 1 NR TDD carrier and 3 LTE TDD carriers	LTE TDD: 10/15/20 NR TDD: 20/30/40/50/60/70/80/90/100
a: **mTnR** in **TX/RX Mode** indicates that the RF module uses *m* transmit channels and *n* receive channels. b: The number of carriers in the **Capacity** column refers to the maximum number of carriers that can be configured for the module with the RAT configured, not the number of carriers that can be configured for a single channel. For details about the module-level and channel-level carrier configurations supported in single-mode and multimode scenarios, see the **Output Power Configuration** column in the following table. When the module is used with a feature, see the feature specifications in the corresponding feature parameter description to learn the module-level or channel-level carrier configurations that are supported after the feature is enabled. c: The bandwidth information in **Supported Bandwidth** is the standard bandwidth that can be configured for a carrier when only one carrier is configured for the module working in a single mode. In any carrier combination scenario, the total bandwidth of all carriers cannot exceed the OBW value. For details about the bandwidth that can be configured for each carrier in each carrier combination scenario, see *Typical Power Configurations for AAUs*.				

Output Power and Carrier Configurations

Table 4-3 Output power and carrier configurations of an AAU5636w (3500 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Maximum Output Power	Output Power Configuration
3500	3400 to 3600	320 W	For typical configurations, see Typical Power Configurations for AAUs .

NOTE

- The *Typical Power Configurations for AAUs* document includes the configurable carrier combinations and the output power of each carrier in each combination. Before referring to this document, you must be familiar with the output power configuration rules. For details, see 6 Power Configuration Rules for RF Modules.
- The carrier bandwidths supported by carriers with different power may be different. For details about the output power of carriers and supported carrier bandwidth, see the *Typical Power Configurations for AAUs* document. Each **Output Power per Carrier** value in the *Typical Power Configurations for AAUs* document indicates the maximum output power of each carrier under the corresponding configuration while ensuring the network performance. The actually configured carrier power of RF modules can be less than or equal to the value of **Output Power per Carrier** in the document. The power configuration that is not supported in the document may be configurable on the software. Huawei can only promise the performance with the power configurations listed in the document.

RF Compliance Standards

Table 4-4 RF compliance standards for an AAU5636w (3500 MHz)

Item	Standard
NR standard	3GPP TS 38.104

4.2 AAU5636w (3500 MHz) Antenna Specifications

The antenna specifications include the frequency range, gains, and beam range of the antenna.

Antenna Specifications

Table 4-5 Antenna electrical specifications of an AAU5636w (3500 MHz)

Item	Specifications
Frequency range (MHz)	3400 to 3600
Polarization mode (°)	+45 and -45
NR TDD gain (dBi)	25
NR TDD horizontal beam sweeping range (°)	-60 to +60
NR TDD vertical beam sweeping range (°)	-15 to +15
Number of antenna elements	192
a: The gain is obtained in macro coverage scenarios with the horizontal beamwidth of 65°.	

Antenna Patterns

In the pattern, the area outlined in blue is the maximum beam coverage scope, and the area outlined in red is the minimum beam coverage scope.

Figure 4-1 Vertical pattern sample of AAU5636w (3500 MHz) beams

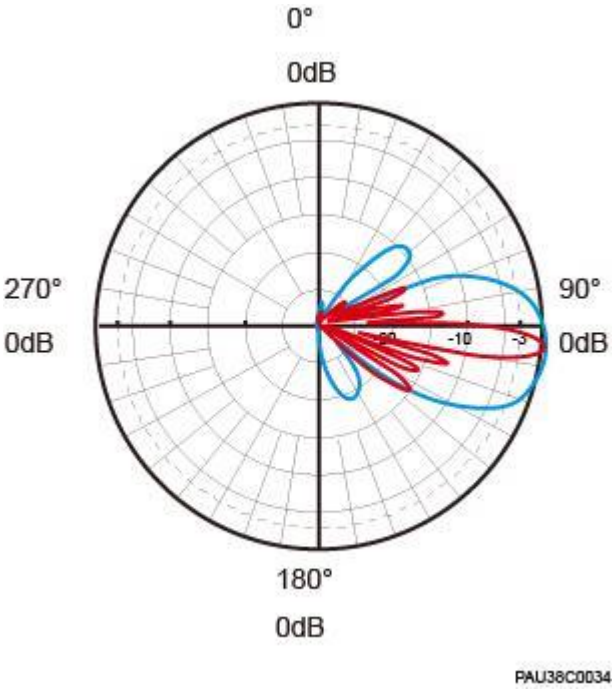
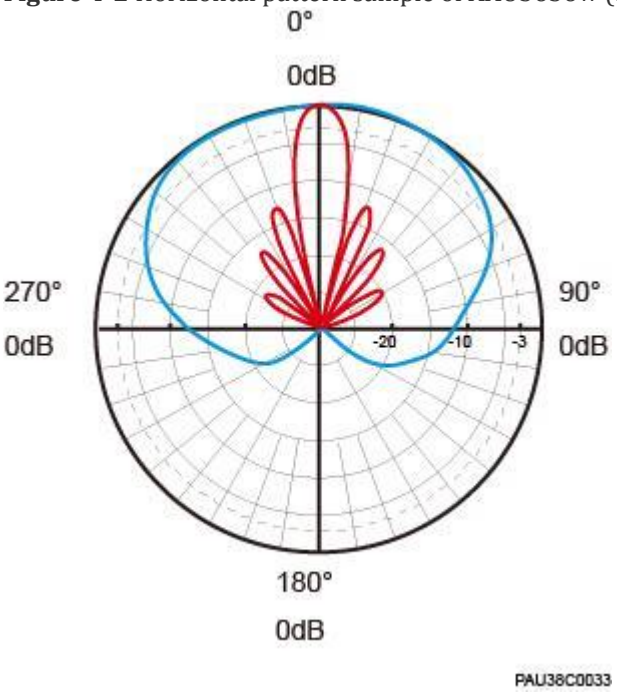


Figure 4-2 Horizontal pattern sample of AAU5636w (3500 MHz) beams in a macro coverage scenario



4.3 AAU5636w (3500 MHz) Receiver Sensitivity

The receiver sensitivity of an AAU measures the capability of the AAU to receive signals with the minimum power.

Table 4-6 Receiver sensitivity of an AAU5636w (3500 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Receiver Sensitivity
3500	3400 to 3600	LTE TDD: -105 dBm NR TDD: -99 dBm

NOTE

- The NR TDD receiver sensitivity is measured with the ambient temperature of 25°C (77°F) and test configurations (QPSK, R = 1/3, 51 RBs) recommended in 3GPP TS 38.141.
- The LTE TDD receiver sensitivity is measured with the ambient temperature of 25°C (77°F) and test configurations (QPSK, R = 1/3, 25 RBs) recommended in 3GPP TS 36.141.

4.4 AAU5636w (3500 MHz) Engineering Specifications

The engineering specifications include the dimensions, weight, input power, module power consumption, and environmental specifications.

Input Power

Table 4-7 Input power of an AAU5636w (3500 MHz)

Power Supply Type	Operating Voltage
-48 V DC	-36 V DC to -63 V DC

Module Power Consumption

Table 4-8 Power consumption of an AAU5636w (3500 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Typical Power Consumption (W)[a]
3500	3400 to 3600	795
a: The typical power consumption of a module is measured when the ambient temperature is 25°C (77°F) and the load is 50%. The actual power consumption has a 10% deviation from this value.		

Dimensions and Weight

Table 4-9 Dimensions and weight of an AAU5636w (3500 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Dimensions (H x W x D)	Weight
3500	3400 to 3600	730 mm x 395 mm x 180 mm (28.74 in. x 15.55 in. x 7.09 in.)	28 kg (61.74 lb, excluding mounting kits)

Environmental Specifications

Table 4-10 Environmental specifications of an AAU5636w (3500 MHz)

Item	Specifications
Operating temperature	Without solar radiation: -40°C to +55°C (-40°F to +131°F)
Wind load (Assume that the wind speed is 150 km/h.)	Front: 430 N Side: 155 N
Operating wind speed	150 km/h
Survival wind speed	200 km/h
Relative humidity	5% RH to 100% RH
Altitude	≤ 4000 m (13123.36 ft)

NOTE

The output power of an AAU may decrease when it operates at temperature ranges 10°C (18°F) less than or equal to its maximum operating temperature. This is dependent on installation scenario, traffic load, and carrier configuration.

Table 4-11 Surge protection specifications of ports

Port	Surge Protection Mode	Surge Protection Specifications
Power port	Surge current	20 kA

NOTE

- Unless otherwise specified, the lightning protection specifications depend on the surge waveform of 8/20 μs.
- All the surge current items, unless otherwise specified as **Maximum discharge current**, refer to **Nominal discharge current**.

Compliance Standards

Table 4-12 Compliance standards for an AAU5636w (3500 MHz)

Item	Standard
Operating environment	ETSI EN 300 019-1-4 Class 4.1
Storage environment[a]	ETSI EN 300 019-1-1 Class 1.2
Shockproof protection	NEBS GR63 Zone 4
Ingress protection rating	IP65
Surge protection	IEC 62305-1 ITU-T K.35 ITU-T K.56 ITU-T K.97 ETSI EN 300 253
a: The validity period is one year. The product can function properly within the validity period if the storage environment meets the preceding standards.	

4.5 AAU5636w (3500 MHz) CPRI Port Specifications

The CPRI port specifications of an AAU include the CPRI port protocol, rate, and maximum level of cascading and maximum distance with a BBU.

Table 4-13 CPRI port protocol and rate of an AAU5636w (3500 MHz)

Number of CPRI Ports	Protocol Type	Port Rate (Gbit/s)
2	eCPRI	10/25

Table 4-14 Maximum level of cascading and maximum distance between an AAU5636w (3500 MHz) and a BBU

Module	Maximum Level of Cascading with a BBU	Maximum Distance from a BBU[a]

Module	Maximum Level of Cascading with a BBU	Maximum Distance from a BBU[a]
AAU5636w	Not supported	20 km (12.43 mi.)
a: This distance is related to the maximum distance supported by the optical module. If the maximum distance supported by the optical module is less than 20 km (12.43 mi.), the maximum distance between the AAU and BBU is subject to that supported by the optical module.		

NOTE

- For details about the CPRI topologies supported by each AAU model, see RF Unit and Topology Management .
- For details about the ALD capabilities supported by each AAU model (for example, the capabilities of RF ports supporting RET antennas and TMAs), see ALD Management .
- For details about the eCPRI protocol and parameter configurations, see eCPRI .

The technical specifications of an AAU5636w (3700 MHz) include RF specifications, antenna specifications, receiver sensitivity, engineering specifications, and CPRI port specifications.

- **5.1 AAU5636w (3700 MHz) RF Specifications**
  The RF specifications include RATs, frequency bands, TX/RX modes, capacity, and output power.
- **5.2 AAU5636w (3700 MHz) Antenna Specifications**
  The antenna specifications include the frequency range, gains, and beam range of the antenna.
- **5.3 AAU5636w (3700 MHz) Receiver Sensitivity**
  The receiver sensitivity of an AAU measures the capability of the AAU to receive signals with the minimum power.
- **5.4 AAU5636w (3700 MHz) Engineering Specifications**
  The engineering specifications include the dimensions, weight, input power, module power consumption, and environmental specifications.
- **5.5 AAU5636w (3700 MHz) CPRI Port Specifications**

5.1 AAU5636w (3700 MHz) RF Specifications

The RF specifications include RATs, frequency bands, TX/RX modes, capacity, and output power.

- Unless otherwise specified, in the following, **LTE** and **eNodeB** always include LTE FDD, LTE TDD, and LTE NB-IoT. In scenarios where they need to be distinguished, **LTE FDD**, **LTE TDD**, and **LTE NB-IoT** are used. The same rules apply to eNodeB.
- Unless otherwise specified, in the following, **NR** and **gNodeB** always include FDD and TDD. In scenarios where they need to be distinguished, **NR FDD** and **NR TDD** are used. The same rules apply to gNodeB.
- In the following, **G** is short for **GSM**, **U** is short for **UMTS**, **L** is short for **LTE FDD**, **T** is short for **LTE TDD**, **M** is short for **LTE NB-IoT**, **N** is short for **NR**, **N (FDD)** is short for **NR FDD**, and **N (TDD)** is short for **NR TDD**.

Supported Frequency Bands and RATs

Table 5-1 Frequency bands and RATs supported by an AAU5636w (3700 MHz)

Frequency Band (MHz)	Protocol-defined Band	Frequency Range (MHz)[a]	RAT	IBW (MHz)	OBW (MHz)
3700	n78	3600 to 3800	NR TDD	200	200
a: **Frequency Range** indicates that the RX frequency range and TX frequency range of the RF module are the same.					

NOTE

For details about the slot assignment supported by RF modules in NR TDD mode, see *Standards Compliance* in **5G RAN Feature Documentation**.

TX/RX Modes and Capacity

Table 5-2 TX/RX modes and capacity of an AAU5636w (3700 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	TX/RX Mode[a]	Capacity[b]	Supported Bandwidth (MHz)[c]
3700	3600 to 3800	64T64R	NR TDD: 2 carriers	NR TDD: 20/30/40/50/60/70/80/90/100
a: **mTnR** in **TX/RX Mode** indicates that the RF module uses *m* transmit channels and *n* receive channels. b: The number of carriers in the **Capacity** column refers to the maximum number of carriers that can be configured for the module in single-mode scenarios, not for a single channel. For details about the channel-level carrier configurations for the module working in a single mode, see **Output Power Configuration** in the following table. When the module is used with a feature, see the feature specifications in the corresponding feature parameter description to learn the module-level or channel-level carrier configurations that are supported after the feature is enabled. c: The bandwidth information in **Supported Bandwidth** is the standard bandwidth that can be configured for a carrier when only one carrier is configured for the module working in a single mode. In any carrier combination scenario, the total bandwidth of all carriers cannot exceed the OBW value. For details about the bandwidth that can be configured for each carrier in each carrier combination scenario, see *Typical Power Configurations for AAUs*.				

Output Power and Carrier Configurations

Table 5-3 Output power and carrier configurations of an AAU5636w (3700 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Maximum Output Power	Output Power Configuration
3700	3600 to 3800	320 W	For typical configurations, see Typical Power Configurations for AAUs .

NOTE

- The *Typical Power Configurations for AAUs* document includes the configurable carrier combinations and the output power of each carrier in each combination. Before referring to this document, you must be familiar with the output power configuration rules. For details, see 6 Power Configuration Rules for RF Modules.
- The carrier bandwidths supported by carriers with different power may be different. For details about the output power of carriers and supported carrier bandwidth, see the *Typical Power Configurations for AAUs* document. Each **Output Power per Carrier** value in the *Typical Power Configurations for AAUs* document indicates the maximum output power of each carrier under the corresponding configuration while ensuring the network performance. The actually configured carrier power of RF modules can be less than or equal to the value of **Output Power per Carrier** in the document. The power configuration that is not supported in the document may be configurable on the software. Huawei can only promise the performance with the power configurations listed in the document.

RF Compliance Standards

Table 5-4 RF compliance standards for an AAU5636w (3700 MHz)

Item	Standard
NR standard	3GPP TS 38.104

5.2 AAU5636w (3700 MHz) Antenna Specifications

The antenna specifications include the frequency range, gains, and beam range of the antenna.

Antenna Specifications

Table 5-5 Antenna electrical specifications of an AAU5636w (3700 MHz)

Item	Specifications
Frequency range (MHz)	3600 to 3800
Polarization mode (°)	+45 and -45
NR TDD gain (dBi)	25
NR TDD horizontal beam sweeping range (°)	-60 to +60
NR TDD vertical beam sweeping range (°)	-15 to +15
Number of antenna elements	192

Antenna Patterns

In the pattern, the area outlined in blue is the maximum beam coverage scope, and the area outlined in red is the minimum beam coverage scope.

Figure 5-1 Vertical pattern sample of AAU5636w (3700 MHz) beams

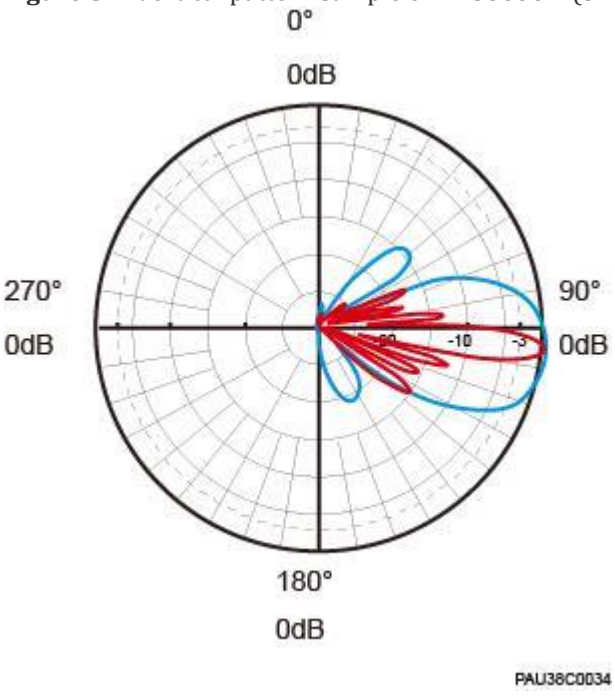
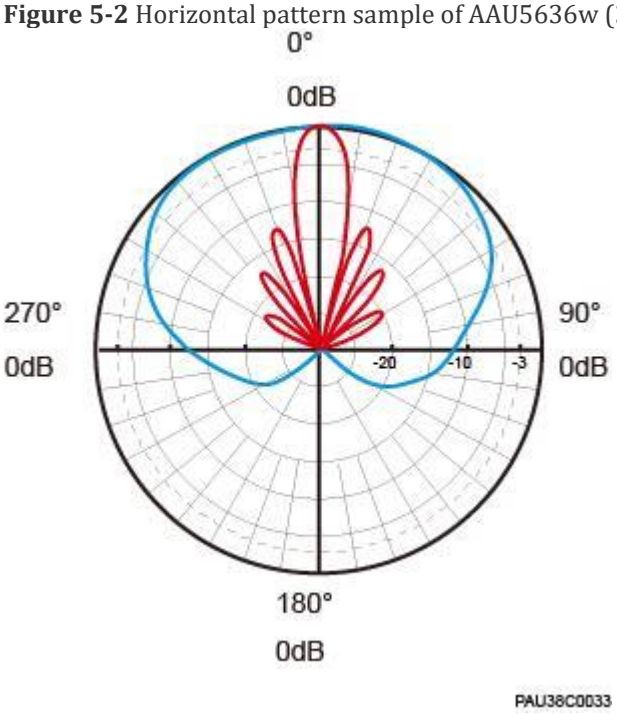


Figure 5-2 Horizontal pattern sample of AAU5636w (3700 MHz) beams in a macro coverage scenario



5.3 AAU5636w (3700 MHz) Receiver Sensitivity

The receiver sensitivity of an AAU measures the capability of the AAU to receive signals with the minimum power.

Table 5-6 Receiver sensitivity of an AAU5636w (3700 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Receiver Sensitivity
3700	3600 to 3800	NR TDD: -99 dBm

NOTE

The NR TDD receiver sensitivity is measured with the ambient temperature of 25°C (77°F) and test configurations (QPSK, R = 1/3, 51 RBs) recommended in 3GPP TS 38.141.

5.4 AAU5636w (3700 MHz) Engineering Specifications

The engineering specifications include the dimensions, weight, input power, module power consumption, and environmental specifications.

Input Power

Table 5-7 Input power of an AAU5636w (3700 MHz)

Power Supply Type	Operating Voltage
-48 V DC	-36 V DC to -63 V DC

Module Power Consumption

Table 5-8 Power consumption of an AAU5636w (3700 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Typical Power Consumption (W)[a]

Frequency Band (MHz)	Frequency Range (MHz)	Typical Power Consumption (W)[a]
3700	3600 to 3800	817
a: The typical power consumption of a module is measured when the ambient temperature is 25°C (77°F) and the load is 50%. The actual power consumption has a 10% deviation from this value.		

Dimensions and Weight

Table 5-9 Dimensions and weight of an AAU5636w (3700 MHz)

Frequency Band (MHz)	Frequency Range (MHz)	Dimensions (H x W x D)	Weight
3700	3600 to 3800	730 mm x 395 mm x 180 mm (28.74 in. x 15.55 in. x 7.09 in.)	28 kg (61.74 lb, excluding mounting kits)

Environmental Specifications

Table 5-10 Environmental specifications of an AAU5636w (3700 MHz)

Item	Specifications
Operating temperature	Without solar radiation: -40°C to +55°C (-40°F to +131°F)
Wind load (Assume that the wind speed is 150 km/h.)	Front: 430 N Side: 155 N
Operating wind speed	150 km/h
Survival wind speed	200 km/h
Relative humidity	5% RH to 100% RH
Altitude	≤ 4000 m (13123.36 ft)

NOTE

The output power of an AAU may decrease when it operates at temperature ranges 10°C (18°F) less than or equal to its maximum operating temperature. This is dependent on installation scenario, traffic load, and carrier configuration.

Table 5-11 Surge protection specifications of ports

Port	Surge Protection Mode	Surge Protection Specifications
Power port	Surge current	20 kA

NOTE

- Unless otherwise specified, the lightning protection specifications depend on the surge waveform of 8/20 μs.
- All the surge current items, unless otherwise specified as **Maximum discharge current**, refer to **Nominal discharge current**.

Compliance Standards

Table 5-12 Compliance standards for an AAU5636w (3700 MHz)

Item	Standard
Operating environment	ETSI EN 300 019-1-4 Class 4.1
Storage environment[a]	ETSI EN 300 019-1-1 Class 1.2
Shockproof protection	NEBS GR63 Zone 4
Ingress protection rating	IP65
Surge protection	IEC 62305-1 ITU-T K.35 ITU-T K.56 ITU-T K.97 ETSI EN 300 253
a: The validity period is one year. The product can function properly within the validity period if the storage environment meets the preceding standards.	

5.5 AAU5636w (3700 MHz) CPRI Port Specifications

The CPRI port specifications of an AAU include the CPRI port protocol, rate, and maximum level of cascading and maximum distance with a BBU.

Table 5-13 CPRI port protocol and rate of an AAU5636w (3700 MHz)

Number of CPRI Ports	Protocol Type	Port Rate (Gbit/s)
2	eCPRI	10/25

Table 5-14 Maximum level of cascading and maximum distance between an AAU5636w (3700 MHz) and a BBU

Module	Maximum Level of Cascading with a BBU	Maximum Distance from a BBU[a]
AAU5636w	Not supported	20 km (12.43 mi.)
a: This distance is related to the maximum distance supported by the optical module. If the maximum distance supported by the optical module is less than 20 km (12.43 mi.), the maximum distance between the AAU and BBU is subject to that supported by the optical module.		

NOTE

- For details about the CPRI topologies supported by each AAU model, see RF Unit and Topology Management .
- For details about the ALD capabilities supported by each AAU model (for example, the capabilities of RF ports supporting RET antennas and TMAs), see ALD Management .
- For details about the eCPRI protocol and parameter configurations, see eCPRI .

This chapter describes the rules for configuring RF output power.

General Rules

- The total output power of all carriers on a single channel cannot exceed the maximum output power of a single channel.

- It is recommended that a module be located at an altitude less than or equal to 4000 m (13123.36 ft). The output power is 1 dB less than the standard power when a module is located at an altitude of 3500 m (11482.80 ft) to 4500 m (14763.60 ft) and is 2 dB less than the standard power when a module is located at an altitude of 4500 m (14763.60 ft) to 6000 m (19684.80 ft).

If RF modules working in multiple frequency bands are used, pay attention to the following: If a single channel is configured with multiple cells in different frequency bands and the carrier output power of each cell in a frequency band is less than the minimum configurable output power of the cell, the performance of the cell in the frequency band cannot be ensured, and the performance of the cells that work in other frequency bands and share the same channel as the cell is also significantly affected. Therefore, such configuration needs to be avoided. (To ensure cell performance, the minimum configurable output power of a cell varies depending on the RAT. For details, see the output power configuration rules of each RAT.)

For example, a single channel of an RF module is configured with one NR cell in the 1800 MHz frequency band and one LTE cell in the 2100 MHz frequency band. The carrier output power of the NR cell in the 1800 MHz frequency band is 1 mW, which is less than the minimum configurable output power per channel for the NR cell of the module. In this case, the performance of the NR cell cannot be ensured. In addition, the performance of the LTE cell in the 2100 MHz frequency band on the same channel deteriorates significantly even if its output power meets the requirements.

LTE TDD Output Power Configuration Rules

To ensure the performance of an LTE cell and other cells that share the same channel as the cell, the minimum configurable carrier output power per channel for the LTE cell is equal to the total rated power per PA for an RF module (unit: W) divided by 16. For example, the maximum output power of an RF module is 2x80 W. When you configure an LTE cell, the minimum configurable carrier output power per channel for the LTE cell is 5 W (80 W/16).

NR Output Power Configuration Rules

To ensure the performance of an NR cell and other cells that share the same channel as the cell, pay attention to the following: If the NR cell is a low-frequency cell, the minimum configurable output power of the NR cell is equal to the total rated power of the RF module (unit: W) divided by 16. If an NR high-frequency RF module is used, the minimum configurable EIRP of the RF module (unit: dBm) is equal to the rated EIRP of the RF module (unit: dBm) minus 10.
The AAU5636w is used as an example. The maximum output power of the AAU5636w is 320 W. When you configure an NR cell, the minimum output power of the NR cell is 20 W (320 W/16). When two NR carriers are deployed, the minimum output power of each carrier is 10 W (20 W/2).

Multimode Output Power Configuration Rules

- GUL/GUN (FDD)/GULN (FDD) carriers cannot be configured on the same channel simultaneously in a single frequency band.
- The output power per carrier must be balanced among multiple channels if possible.
- To ensure the performance of a cell and other cells that share the same channel as the cell, the minimum total configurable output power of all carriers per channel is equal to the total rated power per PA for an RF

module (unit: W) divided by 16. For example, if the maximum output power of an RF module is 2x80 W, the minimum total output power of all carriers per each channel is 5 W (80 W/16).

- Non-MSR and MSR
  - Non-MSR: Carriers of different RATs cannot be configured on the same RF channel. For example, a 2T RF module supports GU. If GSM carriers are configured on PA1, then UMTS carriers cannot be configured on PA1. That is, UMTS carriers can be configured only on PA2, and GSM carriers cannot be configured on PA2.
  - MSR: Carriers of different RATs can be configured on the same RF channel. For example, a 2T RF module supports GU. Both GSM carriers and UMTS carriers can be configured on PA1 or PA2 simultaneously.
- When LTE FDD and NR FDD carrier are configured, it is recommended that the power spectral density (PSD) of each carrier be set to the same value. PSD = Carrier output power/Carrier bandwidth (1.4 MHz and 3 MHz bandwidths are considered as 5 MHz bandwidth in this formula.)
- The GU frequency spacing can be calculated using the following formula: GU frequency spacing ≥ [(GSM bandwidth/2) + (UMTS bandwidth/2)].