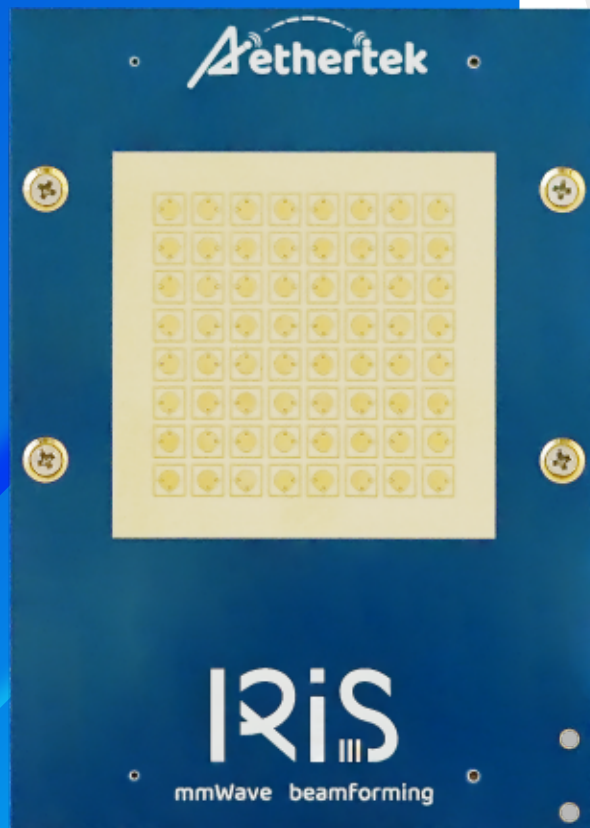




# IRIS

Technologically Advanced  
Beamforming

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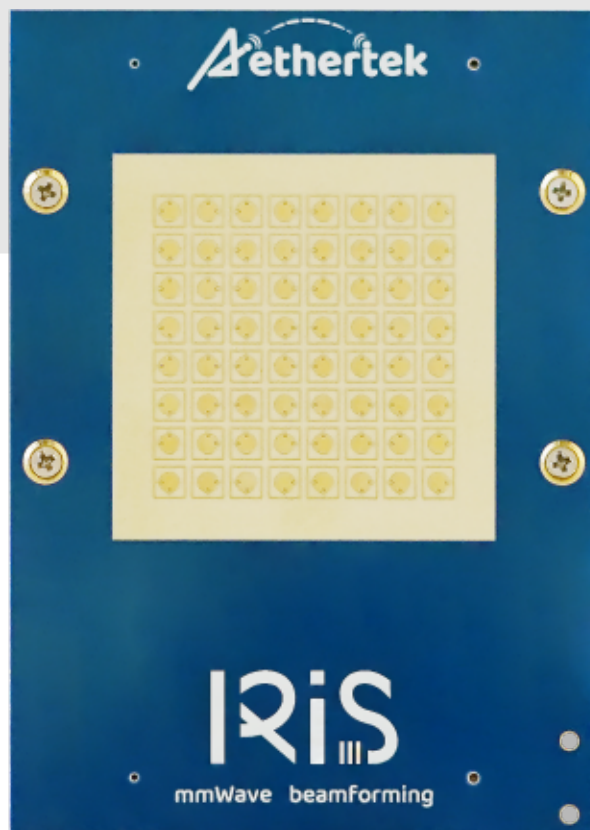
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# IRIS

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## 1. AiM Overview

The "IRIS" is an active phased array antenna module that is designed to support the 5G FR2-1 band. It can be controlled by any processor supporting the SPI interface. Additionally, users can easily configure key parameters to customize their experience. Aethertek has developed an RF control board designed for integration with Metanoia or NXP platforms, simplifying and expediting the development process for customers.



## 2. AIM Description

Aethertek's Phased Array Antenna module, IRIS, is a crucial component that empowers 5G FR2 connectivity within the n257 & n261 frequency bands. It plays a pivotal role in diverse communication equipment, such as Radio Units, Small Cells, and CPEs. By providing enhanced data rates and capacity, it meets the substantial bandwidth requirements of 5G FR2 applications, including those in augmented reality, virtual reality, and IoT deployments.

## 3. Key Features

- Supports 5G NR FR2 n257 & n 261
- Compliant with 3GPP Rel 16 5G-NR standards
- Operates in mmWave TDD mode
- 256QAM DL/UL modulation
- Features an 8x8 phased antenna array with integrated IF up-down converter
- Dual polarization
- Maximum bandwidth of 400MHz for DL / UL
- Module dimensions: 108 x 91 x 14.46 mm

## 4. IRIS High-level Block Diagram

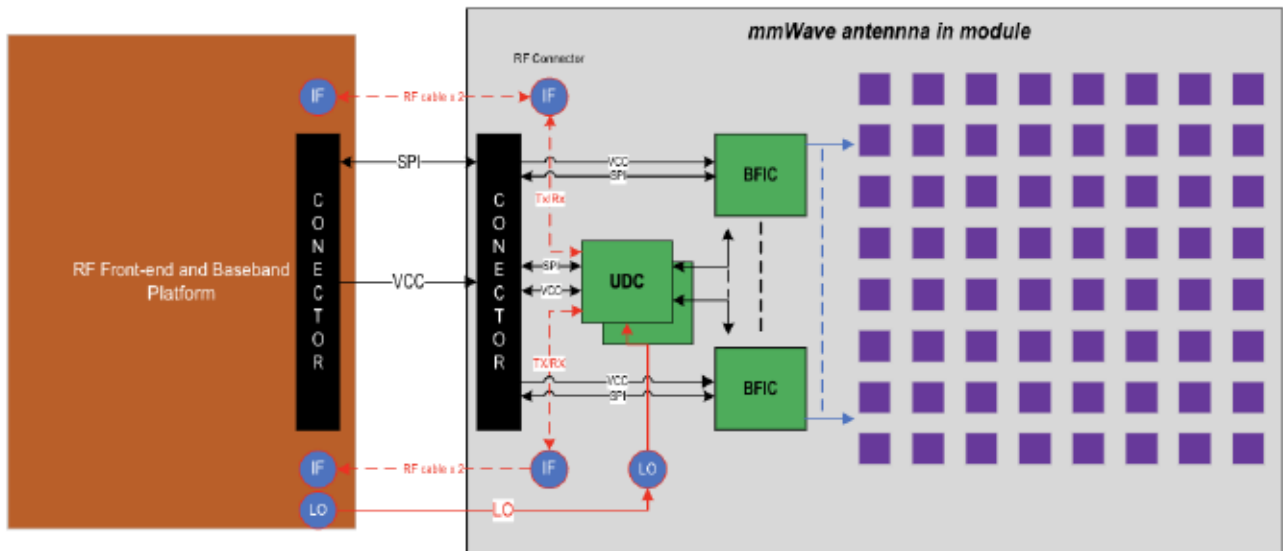


Figure 1: High-Level block diagram



## 5. Absolute Maximum Ratings

Table1. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Power Supply Voltage	VDD	-	-	2	V	-
PA Power Supply Voltage	VDDPA	-	-	2.2	V	-
Logical Level	SPI_xx, TX_EN, RX_EN	-	-	2	V	-
Operating Temperature		0	25	45	Deg	-

## 6. Electrical Specification

Table2. Power supply DC characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Power Supply Voltage	VDD	1.75	1.80	1.85	V	(1)(2)
PA Power Supply Voltage	VDDPA	1.75	1.8	2.05	V	(1)(2)
Control Power Supply	VDD_3V3_SW	3.15	-	3.45	V	-

Table3. SPI DC characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
SPI Input Negative Going Threshold Voltage	SPI_xx, TX_EN, RX_EN	0.3*VDD	-	0.6*VDD	V	Compliant with JESD8-7A Standard
SPI Input Positive Going Threshold Voltage	SPI_xx, TX_EN, RX_EN	0.4*VDD	-	0.7*VDD	V	



Table4. Logic DC characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Note
Digital Control (VIH)	SW_CTRL_xx	1.2	-	3.3	V	-
Digital Control (VIL)	SW_CTRL_xx	0	-	0.8	V	-

## 7. Power Consumption

Table5. Power consumption

Parameter	Min	Typ.	Max	Unit	Note
Supply Voltage	1.75	1.8	1.85	V	-
Supply Current	-	26.7	37	A	100% duty cycle

## 8. Communication Interfaces

### SPI

AiM has five SPI groups to support beam steering control. Each interface consists of a 4-wire SPI (clock rate up to 25MHz) and a PDI (clock rate up to 100MHz).



## 9. IRIS Features

Parameter	Capability
Operating frequency	26.5GHz to 29.5GHz (n257 , n261)
IF range	2.6GHz to 5.8GHz
LO range	4.725GHz to 6.75GHz, LS-LO 6.75GHz to 8.775GHz, HS-LO (Suggested)
Duplexing	TDD
Max Bandwidth	400MHz
Radio interface	I-PEX (U.FL)
Control interfaces	SPI
Power supplies	1.8V
Diemension	108 x 91.4 x 14.46 mm (included heat spreader)



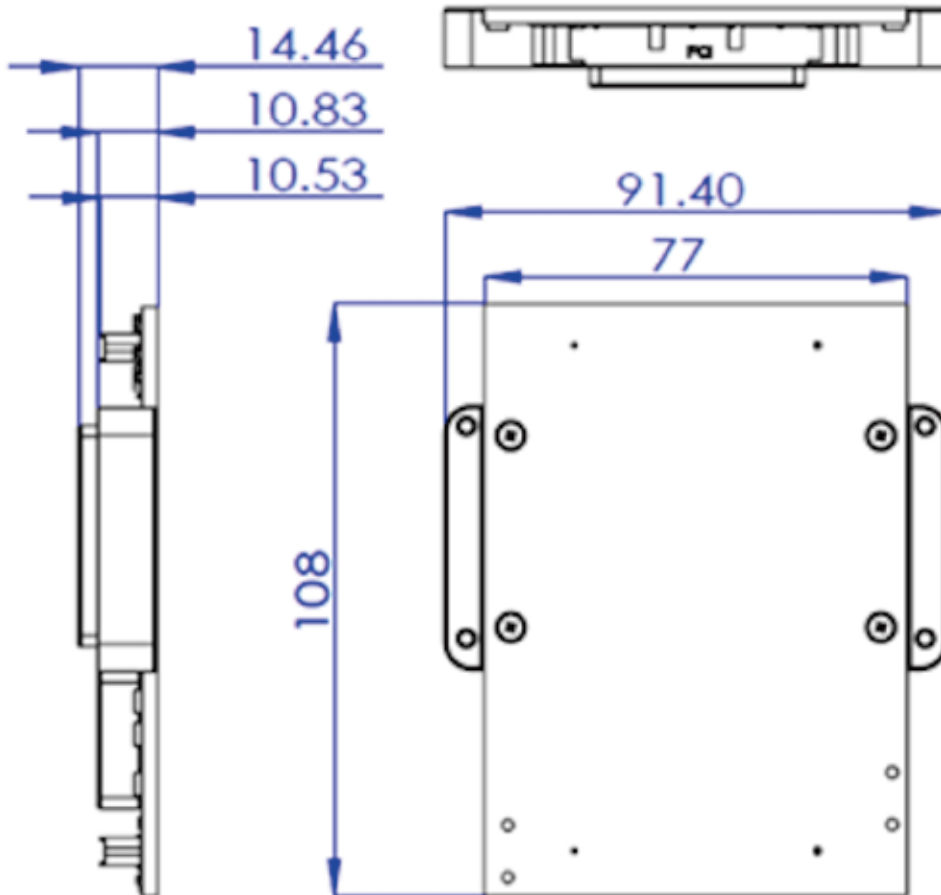
## 10. General Specifications of IRIS Antenna Module

Parameter	Condition	Min	Typ.	Max	Unit
Total Max EIRP (V+H) <sup>(1) (2)</sup>	256 QAM, 100MHz, 400MHz	-	-	50	dBm
Beam Scan Angle	-	-	+/- 60	-	Deg
Min EIRP Over Scan Angle	256 QAM, 100MHz, 400MHz	44	-	-	dBm
EVM	-	-	<3.5%	8	%
ACLR	TM1.1, 100MHz, 400MHz	-	-	-28	dBc
Cross-pol Leakage	0 deg Az/ 0 deg El	-	-30	-	dBc
Noise Figure	0 deg Az/ 0 deg El	-	5.5	-	dB





## 11. Mechanical Specification



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