

Installation Manual of GCM6201NA

1. Introduction

This document describes the basic hardware features and behavior of GCM6201NA.

2. Hardware Architecture

Device Name	GCM6201NA
Module Type	PCIe M.2 TYPE 3042-D3-B
Module Size	30mm x 42mm
PCB Thickness	0.8mm
Total Thickness	3.65mm (D3)

2.1 Main Chipset Information

Item	Vendor	Part Number
LTE Modem	GCT Semiconductor	GDM7243ST, GDM7243i

2.2. Form Factor

- PCIe M.2 TYPE 3042-D3-B

2.3. Support LTE Band

- BAND: FDD B24/54, B255

2.4. Digital Interface

- USIM Class B & C(3.0V/1.8V) Supported
- eSIM(1.8V) supported
- USB2.0/UART

2.5. Module output power Setting information

Frequency	Max Power Setting
1626.5~1660.5MHz	23dBm
1670~1675MHz	23dBm

2.6. Module output power information

Frequency	Max output Power ¹
1626.5~1660.5MHz	23+/-2.7dBm
1670~1675MHz	23+/-2.7dBm

Note 1 : QPSK, when do not apply MPR.

3. Operational Description

3.1. Purpose

This device operates in LTE Band 24/54 and NTN B255, providing high-speed wireless communication for private networks, particularly in critical infrastructure industries such as utilities.

3.2. Functionality

The device supports FDD, allowing flexible use of uplink and downlink slots to meet specific application requirements.

3.3. Applications:

- Fixed CPE-Type application ➔ mobile
- Other applications and devices

3.4. Hardware Features

- M.2 Module (8 layers PCB)
- Supports CAT4 LTE + CAT-M1/NB1, NTN Rel17
- 3GPP Rel.17
- GNSS
- Max TX power: +23dBm
- RoHS Compliant, Halogen Free
- Recommended operation condition : Vaux 3.3V

Transmission

- LTE support QPSK/16QAM
- NTN support BPSK/QPSK

3.6. Receiver

- LTE support QPSK/16QAM/64QAM
- NTN support QPSK

3.73.7. Product Details

3.7.1. Support Band and Frequency

Band	Uplink(TX)	Downlink(RX)	Features
B24	1627.5~1637.5, 1646.5~1656.5 MHz	1526~1536 MHz	CAT4 LTE
B54	1670~1675MHz	1670~1675MHz	CAT4 LTE
NTN B255	1626.5~1660.5MHz	1525~1559MHz	CAT-M1/NB1, NTN Rel17

3.7.2. Product Spec.

➤ B54

Parameter		Min	Typ.	Max	Unit
RF Characteristics					
RF Frequency	Tx	1670		1675	MHz
	Rx	1670		1675	MHz
Tx output power(at "23" setting)			23		dBm
Frequency Error Tolerance(+25°C)		-0.1		+0.1	ppm
2 nd Harmonics(conducted)			-50		dBm
3 rd Harmonics(conducted)			-60		dBm
Rx Sensitivity(BW5MHz, MCS5)			-103		dBm
Rx Spurious Emission(30MHz~12.75GHz)			TBD		dBm

➤ B24

Parameter		Min	Typ.	Max	Unit
RF Characteristics					
RF Frequency	Tx	1627.5		1656.5	MHz
	Rx	1526		1536	MHz
Tx output power(at "23" setting)			23		dBm
Frequency Error Tolerance(+25°C)		-0.1		+0.1	ppm
2 nd Harmonics(conducted)			-45		dBm
3 rd Harmonics(conducted)			-60		dBm
Rx Sensitivity(BW10MHz, MCS5)			-100		dBm

Rx Spurious Emission(30MHz~12.75GHz)		TBD		dBm
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➤ NTN B255

Parameter		Min	Typ.	Max	Unit
RF Characteristics					
RF Frequency	Tx	1626.5		1660.5	MHz
	Rx	1525		1559	MHz
Tx output power(at "23" setting)			23		dBm
Frequency Error Tolerance(+25°C)		-0.1		+0.1	ppm
2 nd Harmonics(conducted)			TBD		dBm
3 rd Harmonics(conducted)			TBD		dBm
Rx Sensitivity(BW200KHz)			TBD		dBm
Rx Spurious Emission(30MHz~12.75GHz)			TBD		dBm

4. . Product power Spec.

Symbol	Parameter	Min	Typ.	Max	Unit
VDD	Power supply		3.3		V
Idd	current		500		mA

5. Product Temp. Spec.

Symbol	Parameter	Rating	Unit
Temp	Operating	-30~85	°C
TSTG	Storage Temperature	-50~TBD	°C

Install Guide

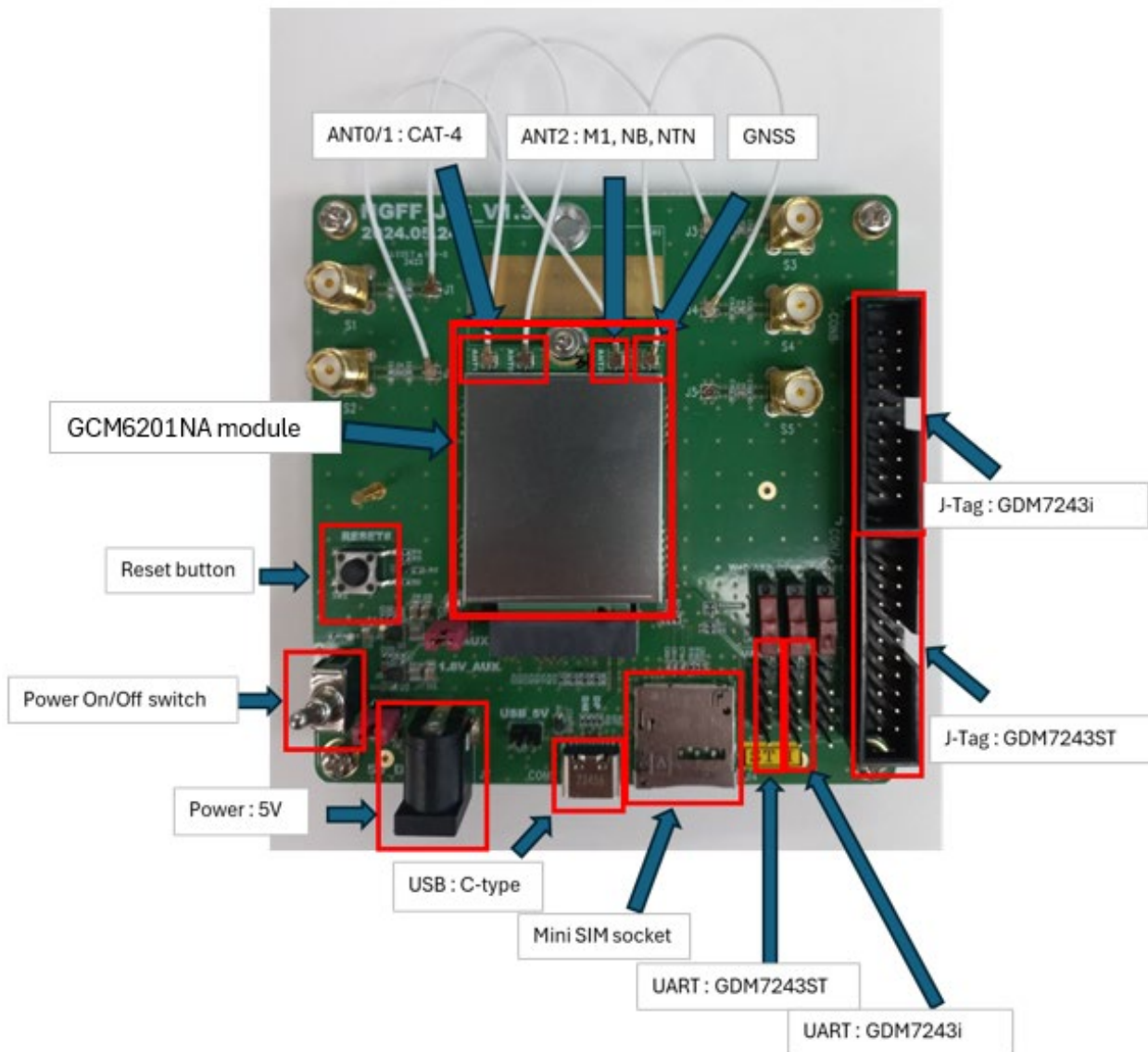
- PCIe M.2 TYPE 3042-D3-B
- Recommended operation condition : Vaux 3.3V
- USIM Class B & C(3.0V/1.8V) Supported
- eSIM(1.8V) supported
- USB2.0/USB3.0/RGMII/PCIE/UART
- GNSS

6.1. Pin Allocation

- Based on Socket 2 Key B PCIe/USB3.1 Gen1-based WWAN
- IO voltage level : 1.8V

Pin	Usage	Pin	Usage
1	CONFIG_3=NC	2	3.3V_M.2
3	GND	4	3.3V_M.2
5	GND	6	PWR_EN
7	USB2.0_DP	8	NC
9	USB2.0_DM	10	NC
11	GND	ADD-IN CARD KEY B	
ADD-IN CARD KEY B		20	NC
21	CONFIG_0=NC	22	NC
23	NC	24	NC
25	USB_VBUS	26	NC
27	GND	28	NC
29	NC	30	SIM1_RST_O
31	NC	32	SIM1_CLK_O
33	GND	34	SIM1_DAT_O
35	NC	36	SIM_VCC
37	NC	38	NC
39	GND	40	NC
41	UART0_RXD	42	NC
43	UART0_TXD	44	UART1_RXD
45	GND	46	UATR1_TXD
47	TMS_ST	48	NC
49	TDI_ST	50	NC
51	GND	52	TMS_i
53	TDO_ST	54	TDI_i
55	TCK_ST	56	TDO_i
57	GND	58	TCK_i
59	NC	60	NC
61	GPIO_GPD4	62	UART3_RXD
63	GPIO_GPD5	64	TART3_TXD
65	GPIO_GPD6	66	NC
67	RESET#_1.8V	68	NC
69	CONFIG_1=NC	70	3.3V_M.2
71	GND	72	3.3V_M.2
73	GND	74	3.3V_M.2
75	CONFIG_2=NC		

6.2. Module Figure



7. Equipment Description

- Equipment Type: LTE Module
- Model Number: GCM6201NA
- FCC ID: 2ALIY-GCM6201NA

8. Manufacturer

- Company Name: GCT Semiconductor, Inc.
- Contact Person: Helen Lee.
- Phone Number: 82-2-2167-1267
- Email: helenlee@gctsemi.com
- Contact Address:

Construction Financial Building 10F, 11F
15, Boramae-ro 5-gil, Dongjak-gu, Seoul (07071), Korea

1) FCC Statement

FCC Part 15.19 Statements:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.21 statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Part 15.105 statement (Class B)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

2) Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual v01>

List of applicable FCC rules

This module has been granted modular approval as below listed FCC rule parts.

[-FCC Rule parts 25 and 27](#)

Summarize the specific operational use conditions

-The OEM integrator should use equivalent antennas which is the equal or less gain than an antenna listed below in this instruction manual.

Trace antenna designs

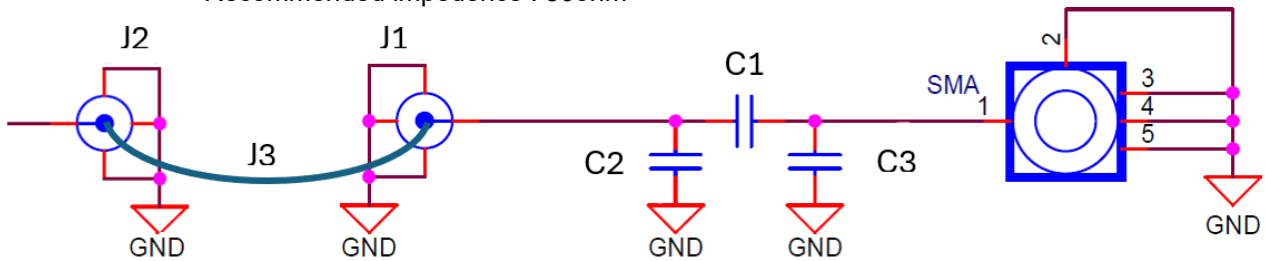
If trace antenna designs are applicable, full-detail design specifications are required per D02 Module Q&A Question 11.

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, partslist (BOM), antenna, connectors, and isolation requirements.

- a) Information that includes permitted variances(e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
- b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
- c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
- d) Appropriate parts by manufacturer and specifications;
- e) Test procedures for design verification; and
- f) Production test procedures for ensuring compliance

➤ Reference Circuit

- ✓ Recommended impedance : 50ohm

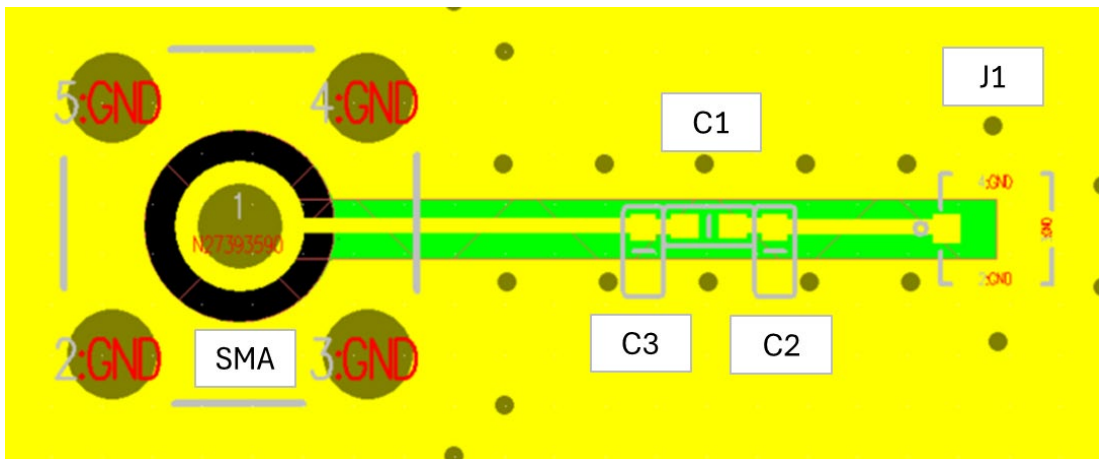


✓ Component of reference circuit

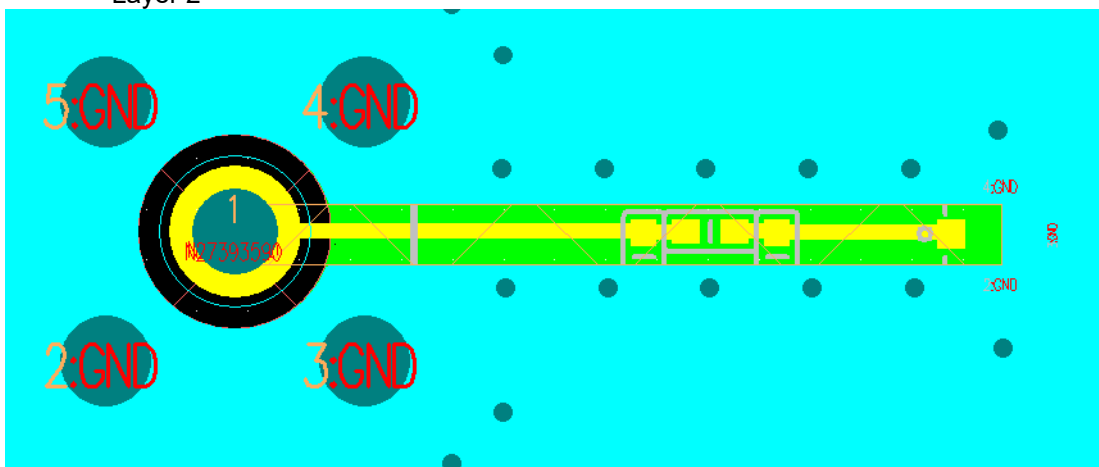
J1, J2	Receptacle	K.FL2-R-SMT-1(800) or Compatible Products
J3	Coaxial RF cable	50ohm to 50ohm cable that matches with receptacle
C1	8pF	
C2	NC	
C3	NC	

- PCB layout of antenna in EVB board (6 layers)
PCB have to be designed to meet 50ohm.

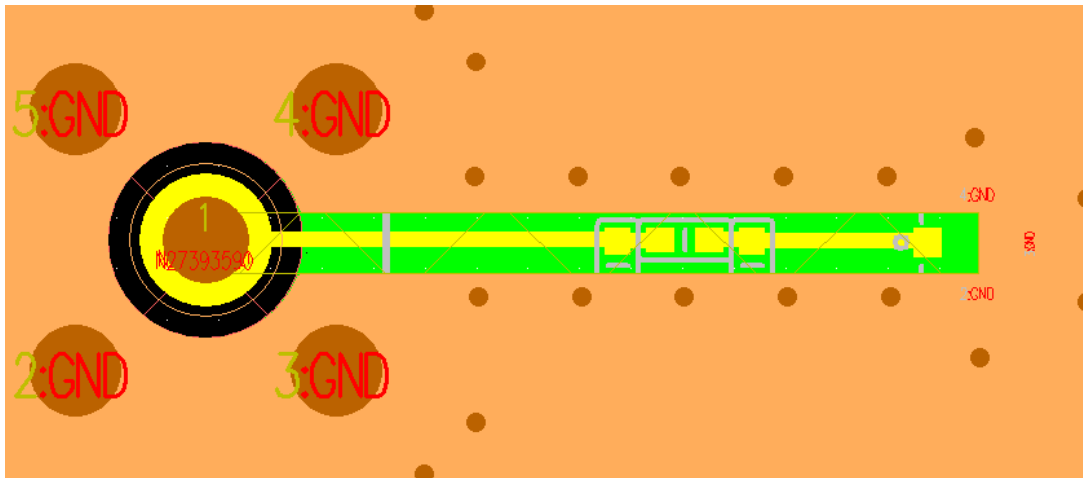
✓ Layer 1



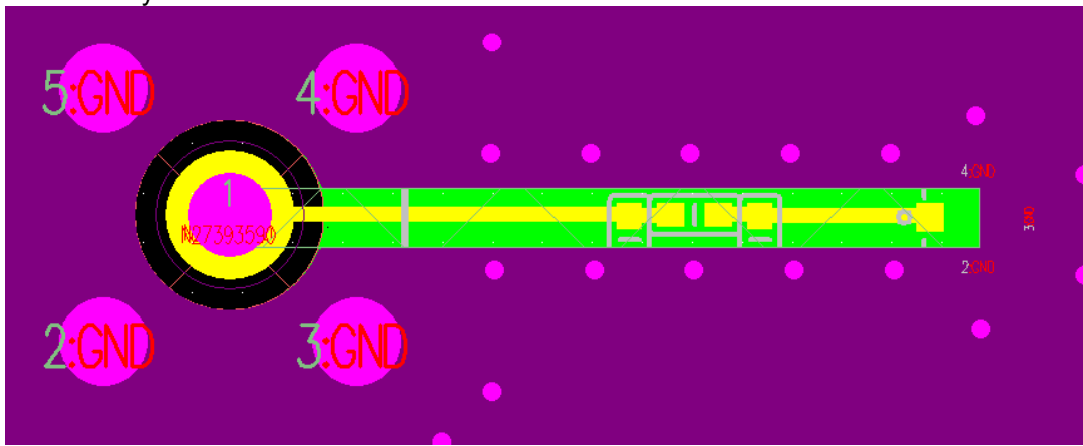
✓ Layer 2



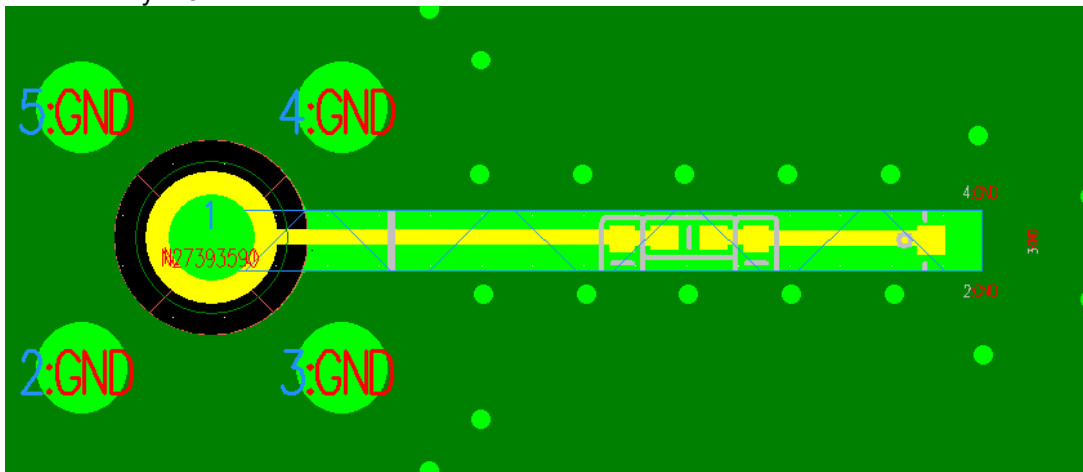
✓ Layer 3



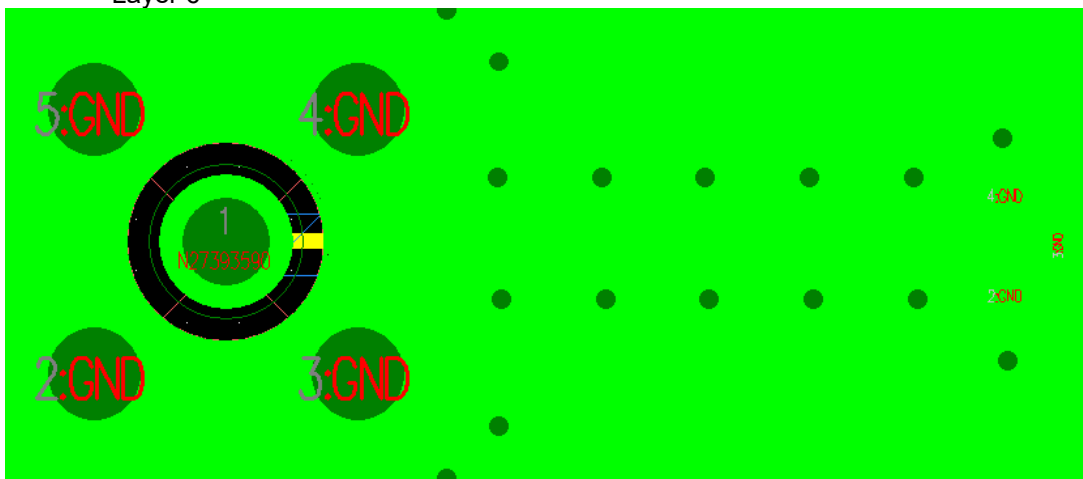
✓ Layer 4



✓ Layer 5



✓ Layer 6



RF exposure considerations

The module has been certified for integration into products only by OEM integrators under the following condition:

- The antenna(s) must be installed such that a minimum separation distance of at least **20** cm is maintained between the radiator (antenna) and all persons at all times.
- The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.
- Mobile use

As long as the three conditions above are met, further transmitter testing will not be required.

OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

Antennas list

The host manufacturer must not use an antenna with a gain that exceeds the values listed for each respective band.

Frequency	Allowed Peak Antenna gain
B54 (1670~1675MHz)	4 dBi
B24 (1526~1656.5MHz)	4 dBi
B255 (1526.5 ~1660.5MHz)	4 dBi

Label and compliance information

End Product Labeling

The module is labeled with its own FCC ID. If the FCC ID are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

"Contains FCC ID: [2ALIY-GCM6201NA](#)

Information on test modes and additional testing requirements

-OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

Additional testing, Part 15 Subpart B disclaimer

-The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.

Note EMI Considerations

Note that a host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

How to make changes

Since only Grantees are permitted to make permissive changes, when the module will be used differently than granted, please contact the module manufacture on below contact information.

-. Contact information:

- Company Name: GCT Semiconductor, Inc.
- Contact Person: Helen Lee.
- Phone Number: 82-2-2167-1267
- Email: helenlee@gctsemi.com
- Contact Address: Construction Financial Building 10F, 11F
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