Zelustek Z400-H Smart LTE Module Specification

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1. Product Description

1.1 Brief Introduction

Z400-H Smart LTE Module launched by Zelustek comply with 3GPP specification.

- Supports multi-modes of connectivity including TD-LTE/FDD-LTE/TD-SCDMA/WCDMA/GSM;
- Support 2.4/5G Wi-Fi,BT5.0 ;
- Support GNSS capability for satellite positioning;
- Highly integrated, small package size;

	Z400-HEU	Z400-HA	Z400-HJ	Z400-HC	Z400-HW
Region	Europe/South America/Korea/Southeast Asia/ Australia/India/ New Zealand/ South Africa	North America	Japan	China/India	Global
Memory	LPDDR3+eMMC EMCP 1+8GB, LPDDR3+eMMC EMCP 2+16GB, LPDDR3/4X+ eMMC EMCP 3+32GB LPDDR4X+eMMC EMCP 4+64GB,	LPDDR3+eMMC EMCP 1+8GB, LPDDR3+eMMC EMCP 2+16GB, LPDDR3/4X+ eMMC EMCP 3+32GB LPDDR4X+eMMC EMCP 4+64GB,	LPDDR3+eMMC EMCP 1+8GB, LPDDR3+eMMC EMCP 2+16GB, LPDDR3/4X+ eMMC EMCP 3+32GB LPDDR4X+eMMC EMCP 4+64GB,	LPDDR3+eMMC EMCP 1+8GB, LPDDR3+eMMC EMCP 2+16GB, LPDDR3/4X+ eMMC EMCP 3+32GB LPDDR4X+eMMC EMCP 4+64GB,	LPDDR3+eMMC EMCP 1+8GB, LPDDR3+eMMC EMCP 2+16GB, LPDDR3/4X+ eMMC EMCP 3+32GB LPDDR4X+eMMC EMCP 4+64GB,
OS	Android 13	Android 13	Android 13	Android 13	Android 13
Frequency Bands					
LTE-FDD	B1/2/3/4/5/7/8/20/28	B2/4/5/7/12/13/14/17/25/26/66/71	B1/3/5/8/11/18/19/21/26/28	B1/3/5/8	-
LTE-TDD	B38/40/41	B38/41	B41/42	B34/38/39/40/41	-
WCDMA	B1/2/4/5/8	B2/4/5	B1/6/8/19	B1/8	-
TD-SCDMA	-	-	-	B34/39	-
GSM	850/900/1800/1900	850/1900	-	900/1800	-
WI-FI	2.4&5GHz,802.11a/b/g/n/ac	2.4&5GHz,802.11a/b/g/n/ac	2.4&5GHz,802.11a/b/g/n/ac	2.4&5GHz,802.11a/b/g/n/ac	2.4&5GHz,802.11a/b/g/n/ac
BT	2.1 EDR/3.0 HS/4.2 LE/5.0 LE	2.1 EDR/3.0 HS/4.2 LE/5.0 LE	2.1 EDR/3.0 HS/4.2 LE/5.0 LE	2.1 EDR/3.0 HS/4.2 LE/5.0 LE	2.1 EDR/3.0 HS/4.2 LE/5.0 LE
GNSS	GPS/Beidou/Glonass/Galileo, (choose three from you four)	GPS/Beidou/Glonass/Galileo, (choose three from you four)	GPS/Beidou/Glonass/Galileo, (choose three from you four)	GPS/Beidou/Glonass/Galileo, (choose three from you four)	GPS/Beidou/Glonass/Galileo, (choose three from you four)
Certification					
Mandatory	CE,Anatel*,GCF*	FCC,PTCRB*		CCC	

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Other	RoHS/ REACH	RoHS/ REACH	RoHS/ REACH	RoHS/ REACH	RoHS/ REACH

Note:* means in progress.

1.2 Key Features

Z400-H Smart LTE Module use LCC+LGA package, Dimensions 40.5x40.5x2.8mm. Z400-H Smart LTE Module use Android 13 OS. A rich set of interfaces, such as LCM, Camera, Touch, Microphone, Line Out, UART, USB, I2C, SPI, apply to for payment and handheld terminal.

1.3 Product Parameters

Items	Parameters
CPU	MT8766,12nm Quad-core ARM® Cortex-A53 2.0GHz
GPU	GE8300@660MHZ
Firmware Upgrade	USB/OTA/SD card
Memory	Support LPDDR3/LPDDR4x, up to 4GB Support EMMC5.1
Display Interface	1* 4 data lanes MIPI DSI interface, support WUXGA 1920*1200@60fps
Camera Interface	2*4 data lanes MIPI CSI-2 interface -1*21MP@30fps -2*13MP+8MP@30fps -Support YUV422/YUV420/EXIF/JFIF format
Analog Audio Interface	Input: -Mic bias on module -3*Analog microphone input interface (MIC0/MIC2 could use for DMIC function) Output: (No AMP on Module): -1*Single ended stereo output, Max 0.93Vrms (S.E.)@32Ω -1*Line out, Max 1.88Vrms-vd@600Ω -1*Handset output,1.87Vrms-vd@32Ω
Digital I2S Interface	I2S2 Rx IF -Master mode -1 data wires =>Up to 2-CHs -24bits up to 192KHz I2S1 Tx IF -Master mode -1 data wires =>Up to 2-CHs -24bits up to 192KHz
USB Interface	USB2.0 (High-Speed), Max data rate 480Mbps -Support OTG
(U)SIM Interface	2*(U)SIM, Support 1.8V/3.3V auto switch. -Support dual SIM (single working), support hot plug
SD card Interface	1*SD, not support SDIO interface, just support SD/SDHC/MS/MSPRO/MMC -Max up to 256GB
UART Interface	1*4 lanes UART, Support CTS/RTS(UART1) 1*2 lanes debug UART, support switch to normal UART(UART0) -FIFO RX/TX, Max 8K byte

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	- baud-rate 110bps~3844800bps (default 961200)
I2C Interface	6*I2C, support 100KHz standard mode and 400KHz high-speed mode
SPI Interface	5*SPI -Min data rate 0.8K bit/s -Max data rate 27M bit/s
ADC Interface	2*Auxiliary ADC -input 0.05~1.45V -12-bits -Sampling rate 3.25/(N+8)MSPS@N-bit
RTC	Support
Antenna	Main antenna, DRX antenna, Wi-Fi/BT/GNSS antenna

1.4 RF Parameters

Items	Parameters
Output Power	Class 4 (33dbm±2db) for GSM850 Class 4 (33dbm±2db) for EGSM900 Class 1 (30dbm±2db) for DCS1800 Class 1 (30dbm±2db) for PCS1900 Class E2 (27dbm±3db) for GSM850 8-PSK Class E2 (27dbm±3db) for EGSM900 8-PSK Class E2 (26dbm±3db) for DCS1800 8-PSK Class E2 (26dbm±3db) for PCS1900 8-PSK Class 3 (24dbm+1/-3db) for WCDMA bands Class 2 (24dbm+1/-3db) for TD-SCDMA bands Class 3 (23dbm+1/-2.7db) for LTE-FDD bands Class 3 (23dbm+1/-2.7db) for LTE-TDD bands
GSM/GPRS/EDGE	R99: CSD data rate:9.6kbps,14.4kbps GPRS: Support GPRS multi-slot class 12 Encoding Format:CS-1/CS-2/CS-3 和 CS-4 Max 4*Rx time slot per frame EDGE: Support EDGE multi-slot class 12 Support GMSK and 8-PSK Uplink Format: CS 1-4 和 MCS 1-9 Downlink Format: CS 1-4 和 MCS 1-9
WCDMA	Support 3GPP R9 Support 16-QAM/QPSK modulation CAT7 HSUPA: Max uplink rate 11Mbps CAT14 CAT7 HSDPA: Max downlink rate 21Mbps
LTE	Support 3GPP R10 Support FDD/TDD CAT4 Support 1.4-20M, downlink support 2×2 MIMO Max uplink rate 50Mbps, Max downlink rate 150Mbps
SMS	Text and PDU mode, P2P MO and MT short message cell broadcast

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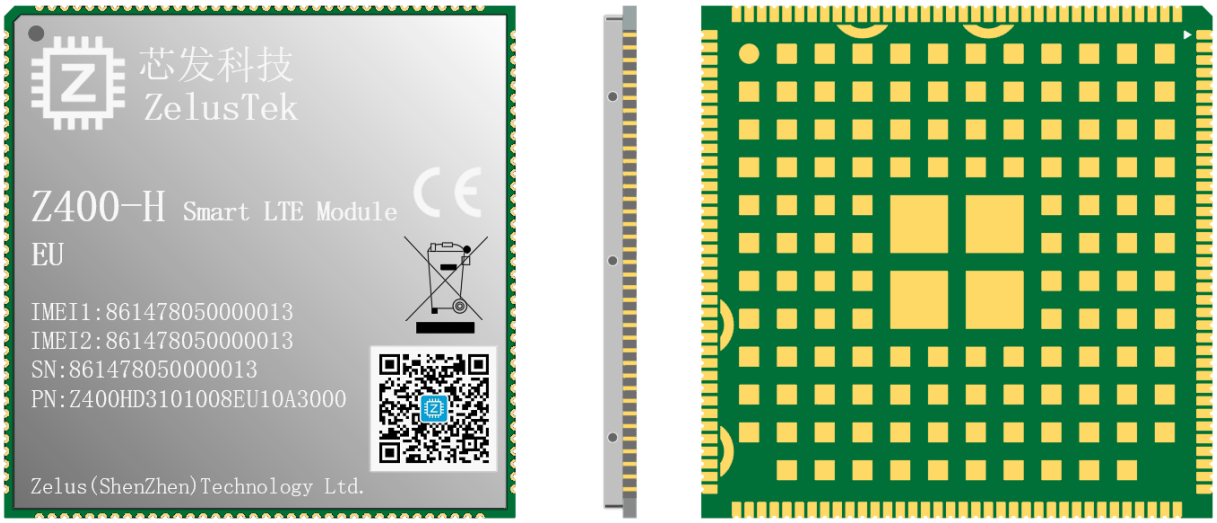
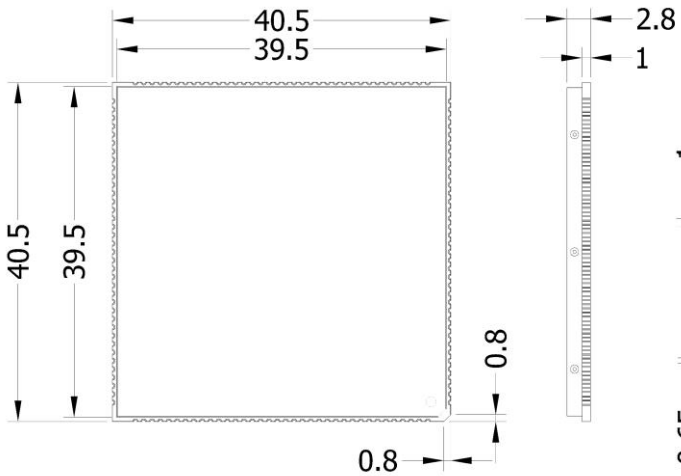
1.5 Module Appearance

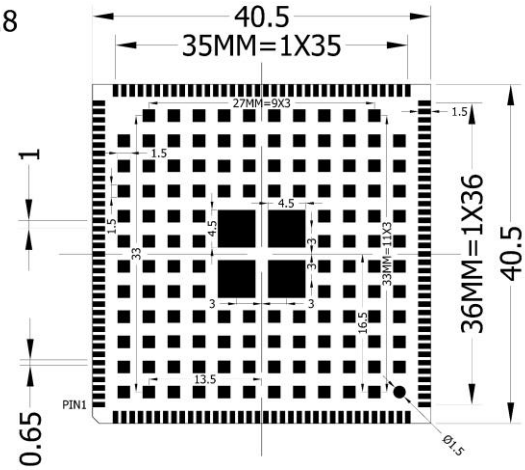


1.6 Dimension

LCC+LGA package, 275PIN, dimension: 40.5mmx40.5mmx2.8mm



TOP view (Unit: mm)



BOT view (Unit: mm)

1.7 RF Conductance Parameters

1.7.1 Z400-H EU

Emission Power:

Mode	Bands	Max (dbm)	Min (dbm)
GSM	850 (GMSK)	33±2	5±5
	900 (GMSK)	33±2	5±5
	1800 (GMSK)	30±2	0±5

	1900 (GMSK)	30±2	0±5
GSM	850 (8PSK)	27.0±3	5±5
	900 (8PSK)	27.0±3	5±5
	1800 (8PSK)	26.0±3	0±5
	1900 (8PSK)	26.0±3	0±5
WCDMA	Band 1	24+1/-3	<-49
	Band 2	24+1/-3	<-49
	Band 4	24+1/-3	<-49
	Band 5	24+1/-3	<-49
	Band 8	24+1/-3	<-49
LTE FDD	Band 1	23.0±2	<-39
	Band 2	23.0±2	<-39
	Band 3	23.0±2	<-39
	Band 4	23.0±2	<-39
	Band 5	23.0±2	<-39
	Band 7	23.0±2	<-39
	Band 8	23.0±2	<-39
	Band 20	23.0±2	<-39
	Band 28	23.0±2	<-39
LTE TDD	Band 38	23.0±2	<-39
	Band 40	23.0±2	<-39
	Band 41	23.0±2	<-39

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Receiver Sensitivity:

Mode	Bands	Main Antenna	Diversity Antenna	3GPP Spec	Unit
GSM	850	-110	-	-102.4	dbm
	900	-111	-	-102.4	dbm
	1800	-109	-	-102.4	dbm
	1900	-109	-	-102.4	dbm
WCDMA	Band 1	-111	-	-106.7	dbm
	Band 2	-111	-	-104.7	dbm

	Band 4			-106.7	dbm
	Band 5	-111	-	-104.7	dbm
	Band 8	-111	-	-103.7	dbm
LTE FDD	Band 1(10MHZ)	-98.7	-100.1	-96.3	dbm
	Band 2(10MHZ)	-99.7	-98.9	-94.3	dbm
	Band 3(10MHZ)	-99.4	-100	-93.3	dbm
	Band 4(10MHZ)			-96.3	dbm
	Band 5(10MHZ)	-100	-99.7	-94.3	dbm
	Band 7(10MHZ)	-97.3	-98	-94.3	dbm
	Band 8(10MHZ)	-100	-100.6	-93.3	dbm
	Band 20(10MHZ)	-99.6	-100.2	-93.3	dbm
	Band 28(10MHZ)	-100	-99.8	-94.8	dbm
LTE TDD	Band 38(10MHZ)	-97.9	-99	-96.3	dbm
	Band 40(10MHZ)	-96.7	-100.1	-96.3	dbm
	Band 41(10MHZ)	-97.7	-98.9	-94.3	dbm

1.7.2 Z400-H A

Emission Power:

Mode	Bands	Max (dbm)	Min (dbm)
GSM	850(GMSK)	33±2	5±5
	1900(GMSK)	30±2	0±5
GSM	850(8PSK)	27.0±3	5±5
	1900(8PSK)	26.0±3	0±5
WCDMA	Band 2	24+1/-3	<-49
	Band 4	24+1/-3	<-49
	Band 5	24+1/-3	<-49
LTE FDD	Band 2	23.0±2	<-39
	Band 4	23.0±2	<-39
	Band 5	23.0±2	<-39
	Band 7	23.0±2	<-39
	Band 12	23.0±2	<-39
	Band 13	23.0±2	<-39
	Band 14	23.0±2	<-39
	Band 17	23.0±2	<-39
	Band 25	23.0±2	<-39
	Band 26	23.0±2	<-39
	Band 66	23.0±2	<-39

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	Band 71	23.0±2	<-39
LTE TDD	Band 38	23.0±2	<-39
	Band 41	23.0±2	<-39

Receiver Sensitivity:

Mode	Bands	Main Antenna	Diversity Antenna	3GPP Spec	Unit
GSM	850	-110	-	-102.4	dbm
	1900	-109.5	-	-102.4	dbm
WCDMA	Band 2	-110.5	-	-104.7	dbm
	Band 4	-109.5	-	-106.7	dbm
	Band 5	-111	-	-104.7	dbm
LTE FDD	Band 2(10MHZ)	-99.7	-99.8	-94.3	dbm
	Band 4(10MHZ)	-100	-99.7	-96.3	dbm
	Band 5(10MHZ)	-99.1	-98.6	-94.3	dbm
	Band 7(10MHZ)	-96.8	-97.3	-94.3	dbm
	Band 12(10MHZ)	-98.4	-98.9	-93.3	dbm
	Band 13(10MHZ)	-98.1	-99.4	-93.3	dbm
	Band 14(10MHZ)			-93.3	dbm
	Band 17(10MHZ)	-98.6	-98.7	-93.3	dbm
	Band 25(10MHZ)	-99.3	-99.4	-92.8	dbm
	Band 26(10MHZ)	-99.5	-99.2	-93.8	dbm
	Band 66(10MHZ)	-97.3	-99.2	-95.8	dbm
	Band 71(10MHZ)	-99.2	-99	-93.5	dbm
LTE TDD	Band 38(10MHZ)	-97.9	-99	-96.3	dbm
	Band 41(10MHZ)	-97.7	-98.9	-94.3	dbm

1.7.3 Z400-H C

Emission Power:

Mode	Bands	Max (dbm)	Min (dbm)
GSM	900 (GMSK)	33±2	5±5
	1800 (GMSK)	30±2	0±5
GSM	900 (8PSK)	27.0±3	5±5
	1800 (8PSK)	26.0±3	0±5
WCDMA	Band 1	24+1/-3	<-49
	Band 8	24+1/-3	<-49
LTE FDD	Band 1(10MHZ)	23.0±2	<-39
	Band 3(10MHZ)	23.0±2	<-39
	Band 5(10MHZ)	23.0±2	<-39

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	Band 8(10MHZ)	23.0±2	<-39
LTE TDD	Band 34(10MHZ)	23.0±2	<-39
	Band 38(10MHZ)	23.0±2	<-39
	Band 39(10MHZ)	23.0±2	<-39
	Band 40(10MHZ)	23.0±2	<-39
	Band 41(10MHZ)	23.0±2	<-39

Receiver Sensitivity:

Mode	Bands	Main Antenna	Diversity Antenna	3GPP Spec	Unit
GSM	900	-111	-	-102.4	dbm
	1800	-110	-	-102.4	dbm
WCDMA	Band 1	-110	-	-106.7	dbm
	Band 8	-111	-	-103.7	dbm
LTE FDD	Band 1(10MHZ)	-98.7	-99.3	-96.3	dbm
	Band 3(10MHZ)	-99	-99.4	-93.3	dbm
	Band 5(10MHZ)	-99.3	-98.3	-94.3	dbm
	Band 8(10MHZ)	-99.3	-99.1	-93.3	dbm
LTE TDD	Band 34(10MHZ)	-97.7	-98.8	-96.3	dbm
	Band 38(10MHZ)	-97.7	-97.8	-96.3	dbm
	Band 39(10MHZ)	-98	-99.4	-96.3	dbm
	Band 40(10MHZ)	-97.4	-100.1	-96.3	dbm
	Band 41(10MHZ)	-97.5	-97.7	-94.3	dbm

1.7.4 Z400-H J

Emission Power:

Mode	Bands	Max (dbm)	Min (dbm)
WCDMA	Band 1	24+1/-3	<-49
	Band 6	24+1/-3	<-49
	Band 8	24+1/-3	<-49
	Band 19	24+1/-3	<-49
LTE FDD	Band 1(10MHZ)	23.0±2	<-39
	Band 3(10MHZ)	23.0±2	<-39
	Band 5(10MHZ)	23.0±2	<-39
	Band 8(10MHZ)	23.0±2	<-39
	Band 11(10MHZ)	23.0±2	<-39

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	Band 18(10MHZ)	23.0±2	<-39
	Band 19(10MHZ)	23.0±2	<-39
	Band 21(10MHZ)	23.0±2	<-39
	Band 26(10MHZ)	23.0±2	<-39
	Band 28(10MHZ)	23.0±2	<-39
LTE TDD	Band 41(10MHZ)	23.0±2	<-39
	Band 42(10MHZ)	23.0±2	<-39

Receiver Sensitivity:

Mode	Bands	Main Antenna	Diversity Antenna	3GPP Spec	Unit
WCDMA	Band 1		-	-106.7	dbm
	Band 6		-	-106.7	dbm
	Band 8			-103.7	dbm
	Band 19		-	-106.7	dbm
LTE FDD	Band 1(10MHZ)			-96.3	dbm
	Band 3(10MHZ)			-93.3	dbm
	Band 5(10MHZ)			-94.3	dbm
	Band 8(10MHZ)			-93.3	dbm
	Band 11(10MHZ)			-96.3	dbm
	Band 18(10MHZ)			-96.3	dbm
	Band 19(10MHZ)			-96.3	dbm
	Band 21(10MHZ)			-96.3	dbm
	Band 26(10MHZ)			-93.8	dbm
	Band 28(10MHZ)			-94.8	dbm
LTE TDD	Band 41(10MHZ)			-94.3	dbm
	Band 42(10MHZ)			-95	dbm

1.8 Temperature Range

Items	Specification	Remark
Operating Temperature	-35℃~+75℃	
Storage Temperature	-40℃~90℃	
Environmental certification	RoHS	

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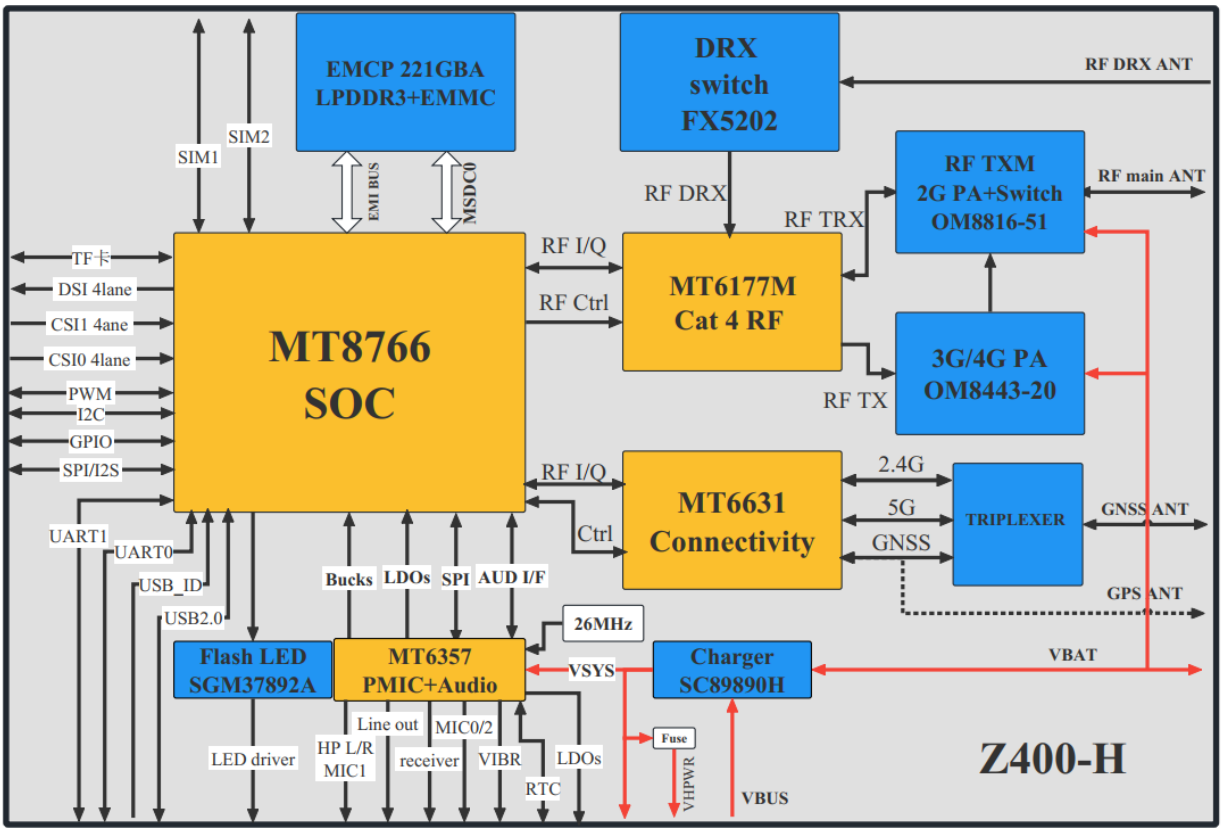
2. Module Hardware Introduction

2.1 Hardware Architecture



2.2 RF Bands

2.2.1 Z400-H EU

Frequency Bands	Uplink(UL)	Downlink(DL)	Unit	Duplex Mode
GSM	850~900		MHz	
GSM	1800~1900		MHz	
WCDMA B1	1920~1980	2110~2170	MHz	
WCDMA B2	1852~1908	1932~1988	MHz	
WCDMA B4	1710~1755	2110~2155	MHz	
WCDMA B5	824~849	869~894	MHz	
WCDMA B8	880~915	925~960	MHz	
LTE B1	1920~1980	2110~2170	MHz	FDD
LTE B2	1850~1910	1930~1990	MHz	FDD
LTE B3	1710~1785	1805~1880	MHz	FDD
LTE B4	1710~1755	2110~2155	MHz	FDD
LTE B5	824~849	869~894	MHz	FDD
LTE B7	2500~2570	2620~2690	MHz	FDD
LTE B8	880~915	925~960	MHz	FDD
LTE B20	832~862	791~821	MHz	FDD
LTE B28	703~748	758~803	MHz	FDD
LTE B38	2570~2620	2570~2620	MHz	TDD

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LTE B40	2300~2400	2300~2400	MHz	TDD
LTE B41	2535~2655	2535~2655	MHz	TDD

2.2.2 Z400-H A

Frequency Bands	Uplink(UL)	Downlink(DL)	Unit	Duplex Mode
GSM	850		MHz	
GSM	1900		MHz	
WCDMA B2	1852~1908	1932~1988	MHz	
WCDMA B4	1712~1753	2112~2153	MHz	
WCDMA B5	824~849	869~894	MHz	
LTE B2	1850~1910	1930~1990	MHz	FDD
LTE B4	1710~1755	2110~2155	MHz	FDD
LTE B5	824~849	869~894	MHz	FDD
LTE B7	2500~2570	2620~2690	MHz	FDD
LTE B12	699~716	729~746	MHz	FDD
LTE B13	777~787	746~756	MHz	FDD
LTE B14	788~798	758~768	MHz	FDD
LTE B17	704~716	734~746	MHz	FDD
LTE B25	1850~1915	1930~1995	MHz	FDD
LTE B26	814~849	859~894	MHz	FDD
LTE B66	1710~1780	2110~2200	MHz	FDD
LTE B71	663~698	617~652	MHz	FDD
LTE B38	2570~2620	2570~2620	MHz	TDD
LTE B41	2535~2655	2535~2655	MHz	TDD

2.2.3 Z400-H C

Frequency Bands	Uplink(UL)	Downlink(DL)	Unit	Duplex Mode
GSM	900		MHz	
GSM	1800		MHz	
WCDMA B1	1920~1980	2110~2170	MHz	
WCDMA B8	880~915	925~960	MHz	
TD-SCDMA B34	2010~2025	2010~2025	MHz	
TD-SCDMA B39	1880~1920	1880~1920	MHz	
LTE B1	1920~1980	2110~2170	MHz	FDD
LTE B3	1710~1785	1805~1880	MHz	FDD
LTE B5	824~849	869~894	MHz	FDD
LTE B8	880~915	925~960	MHz	FDD
LTE B34	2010~2025	2010~2025	MHz	TDD
LTE B38	2570~2620	2570~2620	MHz	TDD
LTE B39	1880~1920	1880~1920	MHz	TDD
LTE B40	2300~2400	2300~2400	MHz	TDD
LTE B41	2535~2655	2535~2655	MHz	TDD

2.2.4 Z400-H J

Frequency Bands	Uplink(UL)	Downlink(DL)	Unit	Duplex Mode
WCDMA B1	1920~1980	2110~2170	MHz	

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WCDMA B6	832~838	877~883	MHz	
WCDMA B8	880~915	925~960	MHz	
WCDMA B19	832~843	877~888	MHz	
LTE B1	1920~1980	2110~2170	MHz	FDD
LTE B3	1710~1785	1805~1880	MHz	FDD
LTE B5	824~849	869~894	MHz	FDD
LTE B8	880~915	925~960	MHz	FDD
LTE B11	1427.9~1447.9	1475.9~1495.9	MHz	FDD
LTE B18	815~830	860~875	MHz	FDD
LTE B19	830~845	875~890	MHz	FDD
LTE B21	1447.9~1462.9	1495.9~1510.9	MHz	FDD
LTE B26	814~849	859~894	MHz	FDD
LTE B28	703~748	758~803	MHz	FDD
LTE B41	2535~2655	2535~2655	MHz	TDD
LTE B42	3400~3600	3400~3600	MHz	TDD

2.2.5 GNSS Frequency

Type	Frequency
GPS	1575.42±1.023MHz
Glonass	1597.5~1605.8MHz
Beidou	1561.098±2.046MHz
Galileo	1575.42±1.023MHz

2.2.6 GNSS Receive Mode

GNSS	GPS/Glonass/Beidou
	GPS/Glonass/Galileo
	GPS/Beidou/ Galileo

2.2.7 RF Data Rate

FDD-LTE	Uplink(UL)	50Mbps
	Downlink(DL)	150Mbps
TDD-LTE	Uplink(UL)	30Mbps
	Downlink(DL)	117Mbps
UMTS	HSUPA Uplink(UL)	5.76Mbps
	DC-HSDPA Downlink(DL)	21Mbps
	WCDMA Uplink(UL)	384Kbps
	WCDMA Downlink(DL)	384Kbps
GPRS	Uplink(UL)	85.6Kbps
	Downlink(DL)	85.6Kbps
EDGE	Uplink(UL)	236.8Kbps
	Downlink(DL)	236.8Kbps

2.3 Wi-Fi

Emission Power:

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Frequency	Mode	Rate	Bandwidth (MHz)	Power(dbm)
2.4G	802.11b	1Mbps	20	17±3
		11Mbps	20	17±3
	802.11g	6Mbps	20	16±3
		54Mbps	20	13±3
	802.11n	MCS0	20	15±3
		MCS7	20	13±3
5G	802.11a	6Mbps	20	15±3
		54Mbps	20	13±3
	802.11n	MCS0	20	15±3
		MCS7	20	13±3
	802.11n	MCS0	40	15±3
		MCS7	40	13±3
	802.11ac	MCS0	20	15±3
		MCS8	20	12±2
	802.11ac	MCS0	40	15±3
		MCS9	40	12±2
	802.11ac	MCS0	80	15±3
		MCS9	80	12±2

Receiver Sensitivity:

Frequency	Mode	Rate	Bandwidth (MHz)	Sensitivity (dbm)
2.4G	802.11b	1Mbps	20	-92
		11Mbps	20	-85
	802.11g	6Mbps	20	-90
		54Mbps	20	-73.5
	802.11n	MCS0	20	-87.5
		MCS7	20	-72
5G	802.11a	6Mbps	20	-92
		54Mbps	20	-75.5
	802.11n	MCS0	20	-90
		MCS7	20	-71.5
	802.11n	MCS0	40	-87
		MCS7	40	-68.5
	802.11ac	MCS0	20	-92.5
		MCS8	20	-71
	802.11ac	MCS0	40	-87
		MCS9	40	-69

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	802.11ac	MCS0	80	-86
		MCS9	80	-64

2.4 Bluetooth

Items	DH-5	2-DH5	3-DH5	BLE	Unit
Emission Power	9.5	-2.5	-2.5	-5.27	dbm
Sensitivity	-90	-89.5	-83.5	1M: -85 2M: -83 LE S=2: -86 LE 2=8: -85	dbm

2.5 GNSS Conductance

Items	Description	Typical Value	Unit
Sensitivity	Cold start	147	dbm
	Reacquisition	157	dbm
	Tracking	156	dbm
TTFF	Cold start	33.7	S
	Warm start	6.6	S
	Hot start	1.2	S
Static Drift	CEP-50	0.7	m

2.6 Antenna Specification

2.6.1 RF Antenna Specification

Parameter	Requirements
Operating Frequency	See 2G/3G/4G *Operating Frequency*
Direction	Omni Directional
Gain	>-3dbi(Avg)
Impedance	50 Ω
Efficiency	>50%
Max. Input Power	50W
VSWR	<2
Isolation	20db is preferred
Cable Insertion Loss <1GHz	<1db
Cable Insertion Loss 1GHz~2.2GHz	<1.5db
Cable Insertion Loss 2.3GHz~2.7GHz	<2db
Cable Insertion Loss 3.3GHz~6GHz	<2.5db

2.6.2 GNSS Antenna Specification

Parameter	Requirement
Operating Frequency	1559~1609MHZ
Direction	Hemisphere, face to sky

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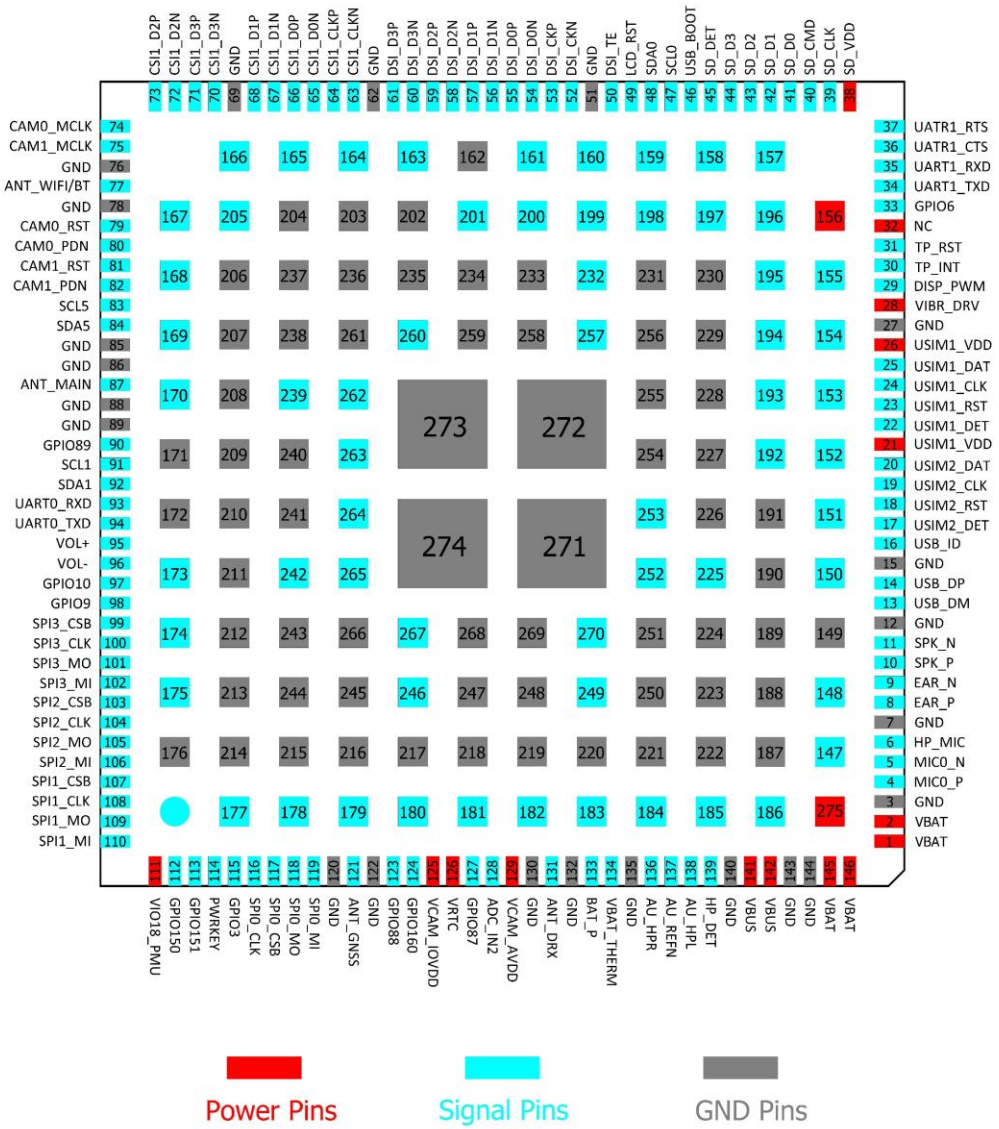
Antenna Gain	> 2db
Impedance	50 Ω
Efficiency	> 50 %
Max. Input Power	50W
VSWR	< 2
Polarization	RHCP or Linear
Noise Figure for Active Antenna	< 1.5
Total Gain for Active Antenna	< 17db
Cable Insertion Loss	<1.5db

2.7 Module PIN Description



(TOP View)

2.8 Module PIN Definition

1	VBAT	93	UART0_RXD	185	ADC_IN3
2	VBAT	94	UART0_TXD	186	GPIO172
3	GND	95	VOL+	187	CS_N
4	MIC0_P	96	VOL-	188	CS_P
5	MIC0_N	97	GPIO10	189	GND
6	HP_MIC	98	GPIO9	190	GND
7	GND	99	SPI3_CSB/I2S2_BCK	191	GND
8	EAR_P	100	SPI3_CLK/I2S2_DI	192	VCAMD_PMU
9	EAR_N	101	SPI3_MO/I2S2_LRCK	193	VLDO28_PMU
10	SPK_P	102	SPI3_MI/I2S2_MCK	194	GPIO_GPS_LNA_EN
11	SPK_N	103	SPI2_CSB	195	CHG_LED
12	GND	104	SPI2_CLK	196	CSI0_CLKP
13	USB_DM	105	SPI2_MO	197	CSI0_LN0P
14	USB_DP	106	SPI2_MI	198	CSI0_LN1P
15	GND	107	SPI1_CSB/I2S1_BCK	199	CSI0_LN2P
16	USB_ID	108	SPI1_CLK/I2S1_DO	200	CSI0_LN3P
17	USIM2_DET	109	SPI1_MO/I2S1_LRCK	201	GPIO168
18	USIM2_RST	110	SPI1_MI/I2S1_MCK	202	GND
19	USIM2_CLK	111	VIO18_PMU	203	GND
20	USIM2_DAT	112	GPIO150	204	GND
21	USIM2_VDD	113	GPIO151	205	SDA2
22	USIM1_DET	114	PWRKEY	206	GND
23	USIM1_RST	115	GPIO3	207	GND
24	USIM1_CLK	116	SPI0_CLK	208	GND
25	USIM1_DAT	117	SPI0_CSB	209	GND
26	USIM1_VDD	118	SPI0_MO	210	GND
27	GND	119	SPI0_MI	211	GND
28	VIBR_DRV	120	GND	212	GND
29	DISP_PWM	121	ANT_GNSS	213	GND
30	TP_INT	122	GND	214	GND
31	TP_RST	123	GPIO88	215	GND
32	NC	124	GPIO160	216	GND
33	GPIO6	125	VCAM_IOVDD	217	GND
34	UART1_TXD	126	VRTC	218	GND
35	UART1_RXD	127	GPIO87	219	GND
36	UART1_CTS	128	ADC_IN2	220	GND
37	UART1_RTS	129	VCAM_AVDD	221	GND
38	SD_VDD	130	GND	222	GND
39	SD_CLK	131	ANT_DRX	223	GND
40	SD_CMD	132	GND	224	GND
41	SD_D0	133	BAT_P	225	SYSRSTB

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42	SD_D1	134	VBAT_THERM	226	GND
43	SD_D2	135	GND	227	GND
44	SD_D3	136	AU_HPR	228	GND
45	SD_DET	137	AU_REFN	229	GND
46	USB_BOOT	138	AU_HPL	230	GND
47	SCL0	139	HP_DET	231	GND
48	SDA0	140	GND	232	GPIO164
49	LCD_RST	141	VBUS	233	GND
50	DSI_TE	142	VBUS	234	GND
51	GND	143	GND	235	GND
52	DSI_CKN	144	GND	236	GND
53	DSI_CKP	145	VBAT	237	GND
54	DSI_D0N	146	VBAT	238	GND
55	DSI_D0P	147	MICBIAS0	239	GPIO169
56	DSI_D1N	148	MIC2_P	240	GND
57	DSI_D1P	149	MIC2_N	241	GND
58	DSI_D2N	150	NC	242	SPI4_CSB
59	DSI_D2P	151	VCDT	243	GND
60	DSI_D3N	152	NC	244	GND
61	DSI_D3P	153	GPIO7	245	GND
62	GND	154	GPIO8	246	NC
63	CSI1_CLKN	155	MICBIAS1	247	GND
64	CSI1_CLKP	156	VIO28_PMU	248	GND
65	CSI1_D0N	157	CSI0_CLKN	249	LED_B
66	CSI1_D0P	158	CSI0_LN0N	250	GND
67	CSI1_D1N	159	CSI0_LN1N	251	GND
68	CSI1_D1P	160	CSI0_LN2N	252	LED_G
69	GND	161	CSI0_LN3N	253	LED_R
70	CSI1_D3N	162	GND	254	NC
71	CSI1_D3P	163	GPIO107	255	GND
72	CSI1_D2N	164	GPIO109	256	GND
73	CSI1_D2P	165	GPIO108	257	NC
74	CAM0_MCLK	166	SCL2	258	GND
75	CAM1_MCLK	167	SCL3	259	GND
76	GND	168	SDA3	260	BPI_BUS5
77	AN_WI-FI/BT/GNSS	169	SCL4	261	GND
78	GND	170	SDA4	262	BPI_BUS6
79	CAM0_RST	171	GND	263	NC
80	CAM0_PDN	172	GND	264	SPI4_MO
81	CAM1_RST	173	BPI_BUS7	265	SPI4_MI
82	CAM1_PDN	174	NC	266	GND
83	SCL5	175	NC	267	GPIO152
84	SDA5	176	GND	268	GND
85	GND	177	GPIO165	269	GND
86	GND	178	GPIO176	270	SPI4_CLK
87	ANT_MAIN	179	GPIO167	271	GND
88	GND	180	FLASH_LED	272	GND
89	GND	181	NFC_CLK	273	GND

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90	GPIO89	182	GPIO166	274	GND
91	SCL1	183	NC	275	VSYS
92	SDA1	184	VPH_PWR		

2.9 Electrical Parameters

2.9.1 Power

Parameter	Description	Min	Type	Max	Unit
VBAT	Power Supply	3.5	3.8	4.4	V
Ipeak	Peak current			3000	mA
Isleep	Current in sleep mode			TBD	mA
Ileakage	Current in power off mode			TBD	uA

2.9.2 I/O

Voltage Domain	Parameter	Min	Type	Max
VOH	High level output	1.35V	1.8V	1.98V
VOL	Low level output	0V	-	0.45V
VIH	High level input	1.26V	1.8V	1.98V
VIL	Low level input	0V	-	0.54V

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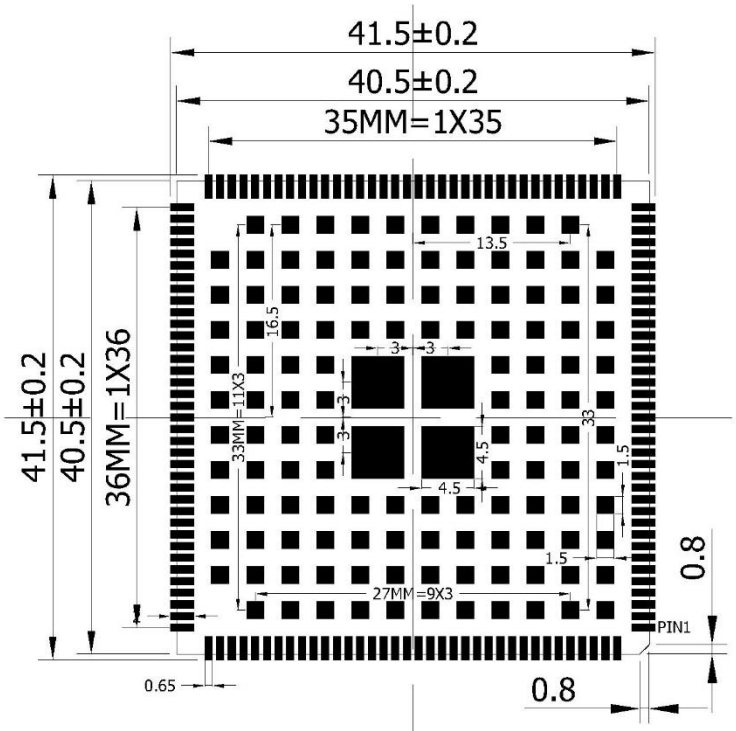
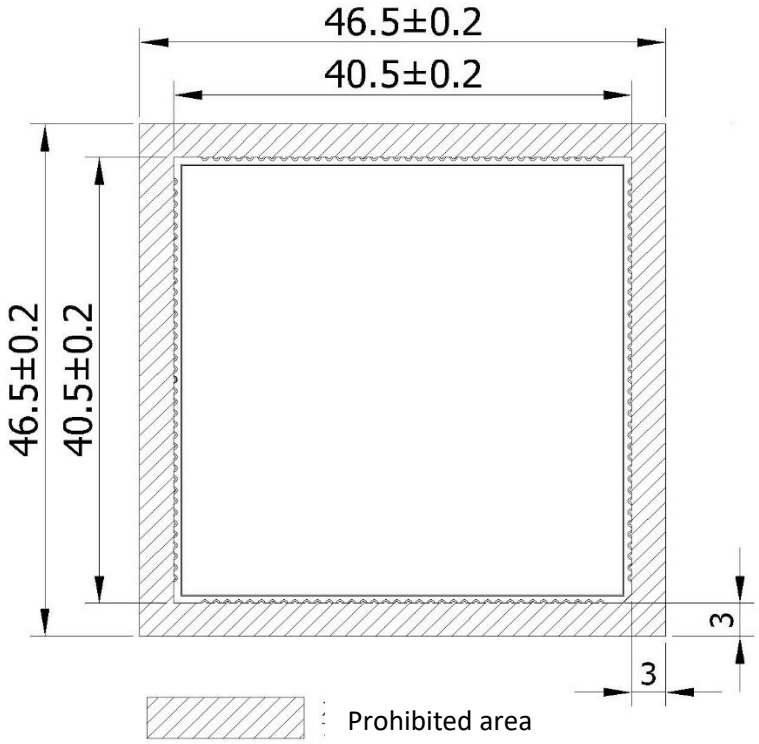
3. Recommended PCB Package Size



unit: mm



unit: mm

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1. **Integration instructions for host product manufacturers according to KD B 996369 D03 OEM Manual v01**

8.1 List of applicable FCC rules.

Part 15C,15E,22H,24E,27

8.2 Specific operational use conditions

Operating Frequency:part 2.3.1
Z400-H Is a universal GSM WCDMA LTE Wi-FiBTSmart module, with the industry's competitive package size and ultra-low energy consumption technology, designed for mobile devices and Internet of Things applications, Users can connect to the network through GSM, WCDMA, LTE WIFI, network communication, networking functions.
To maintain compliance with FCC RF exposure requirements, Please use the antenna provided with the product.

8.3 Limited Module Procedures. KDB 996369 D03, Section 2.4

not applicable .Please refer to the manual for usage scenarios Single Modular Approval Request

8.4 Trace antenna designs. KDB 996369 D03, Section 2.5

not applicable .without trace antenna

8.5 RF exposure considerations.

RF exposure requirements are fulfilled for mobile configuration. This equipment should be installed and operated with minimum distance between 20cm the radiator your body
The installation of the module is restricted to mobile host devices
For portable applications OEM integrators need SAR evaluation and an own fCC ID.

8.6 Antennas.

The module comes with permanently attached External antennas. The spurious emission requirements are fulfilled (see attached test report).

8.7 Label and compliance information.

See Guidelines for Labeling and User Information for RF Devices –KDB Publication 784748.host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID 2A9FT-Z400-H ” with their finished product.

8.8 Information on test modes and additional testing requirements.

The test mode in the report is the module's maximum transmitting power emission for testing

Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

8.9 Additional testing, Part 15 Subpart B disclaimer

the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

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FCC WARNING

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

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module 2A9FT-Z400-H”

RF Specification:

Function	Operation Frequency	Max RF output power:
BLE	2402MHz–2480MHz	<10 dBm
BT(BR+EDR)	2402MHz–2480MHz	<10 dBm
WIFI 802.11b/g/ n(HT20/40)	802.11b/g/n(20MHz): 2412~2472MHz; 802.11n(40MHz):2422~2462MHz	<20 dBm
Wi-Fi 5.2G(802.11a/n20/n40 /ac20/ac40/ac80)	802.11a/ n20/ac20:5180MHz~5240MHz 802.11 n40/ac40:5190MHz~5230MHz 802.11 ac80:5210MHz	<20 dBm
Wi-Fi 5.3G(802.11a/n20/n40 /ac20/ac40/ac80)	802.11a/ n20/ac20:5260MHz~5320MHz 802.11 n40/ac40:5270MHz~5310MHz 802.11 ac80:5290MHz	<20 dBm
Wi-Fi 5.6G(802.11a/n20/n40 /ac20/ac40/ac80)	802.11a/ n20/ac20:5500MHz~5700MHz 802.11 n40/ac40:5510MHz~5670MHz 802.11 ac80:55300MHz~5610MHz	<20 dBm
Wi-Fi 5.8G(802.11a/n20/n40 /ac20/ac40/ac80)	802.11a/ n20/ac20:5180MHz~5240MHz 802.11 n40/ac40:5190MHz~5230MHz 802.11 ac80:5210MHz	<20 dBm
GSM/GPRS/EGPRS 900	TX(Uplink):880M-915MHZ; RX(Downlink):925M-960MHZ	<33 dBm
GSM/GPRS/EGPRS 1800	TX(Uplink):1710M-1785MHZ; RX(Downlink):1805M-1880MHZ	<33 dBm
WCDMA B1	TX(Uplink):1920-1980MHz; RX(Downlink):2110-2170MHz	<25 dBm
WCDMA B8	TX(Uplink): 880-915MHz; RX(Downlink):925-960MHz	<25 dBm
LTE FDD B1	TX(Uplink):1920-1980MHz; RX(Downlink):2110-2170MHz	<25 dBm
LTE FDD B3	TX(Uplink) :1710-1785MHz; RX(Downlink):1805-1880MHz	<25 dBm
LTE FDD B7	TX(Uplink) :2500-2570MHz; RX(Downlink):2620-2690MHz	<25 dBm

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LTE FDD B8	TX(Uplink): 880MHz to 915 MHz RX(Downlink): 925 MHz to 960 MHz	<25 dBm
LTE FDD B20	TX(Uplink) 832MHz~862MHz; RX(Downlink)791MHz~821MHz	<25 dBm
LTE FDD B28	TX(Uplink) 703 MHz to 748MHz RX(Downlink) 758 MHz to 803 MHz	<25 dBm
LTE TDD B38	TX(Uplink)& RX(Downlink): 2570 MHz to 2620 MHz	<25 dBm
LTE FDD B40	TX(Uplink)& RX(Downlink): 2300 MHz to 2400 MHz	<25 dBm
GPS	Rx(Downlink): 1.57542GHz	--

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Warning:

1.Use careful with the earphone maybe possible excessive sound pressurefrom earphones and headphones can cause hearing loss.

2. CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BYAN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDINGTO THE INSTRUCTIONS.

3. The product shall only be connected to a USB interface of version USB2.0.

4. Adapter shall be installed near the equipment and shall be easily accessible.

5. Operation temperature:-30~75ºC.

6. The plug considered as disconnect device of adapter.

7. SAR: The device complies with RF specifications when the device used at 0.5cm from your body (SAR limit 2.0 W/Kg). The device is in compliance with the requirements.

Restrictions in the 5 GHz band:

According to Article 10 (10) of Directive 2014/53/EU, the packaging shows that this radio equipment will be subject to some restrictions when placed on the market in Belgium (BE), Bulgaria (BG), the Czech Republic (CZ),Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain(ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania(LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria(AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK),Finland (FI), Sweden (SE),, Turkey (TR), Norway(NO), Switzerland (CH), Iceland (IS), and Liechtenstein (LI).

The WLAN function for this device is restricted to indoor use only when operating in the 5150 to 5350 MHz frequency range.

	ES	LU	RO	CZ	FR	HU	SI
	DK	HR	BE	BG	DE	EE	IE
	EL	IT	Cy	LV	LT	SK	MT
	NL	AT	PL	PT	FI	SE	TR
	NO	CH	IS	LI			

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