

Apple
iPhone SE2

A2296



Sample Report

PRODUCT OVERVIEW



iPhone SE

Lots to love. Less to spend.

iPhone SE packs our most powerful chip into our most popular size at our most affordable price. It's just what you've been waiting for.

Starting at \$399.



Home sweet Home button.

Touch ID lets you securely unlock your iPhone and sign in to apps instantly. You can even use it with Apple Pay to grab a coffee, get a yoga app, or shop for sneakers online. All without reaching for your credit card.



Smile, you're in Portrait mode.

The advanced camera system with A13 Bionic brings you Portrait mode, which artfully blurs the background to put the focus on your subject — even when you're taking selfies.



iPhone 11 Pro called. It wants its chip back.

We put the brains of iPhone 11 Pro in the body of iPhone SE. A13 Bionic is the fastest chip ever in a smartphone, period. So everything feels fluid, whether you're launching apps, playing the latest games, or exploring new ways to work and play with augmented reality.

Survives splashes, sashes, sprinkles, sprays, splatters, and spills.

iPhone SE is water resistant to 1 meter for 30 minutes.* It's not afraid of a little coffee, tea, or soda spill. And dust? No worries.



Brilliant 4.7" Retina HD display

PRODUCT OVERVIEW



GENERAL	
Dimension	67.3 x 138.4 x 7.3mm, 148g
Display	4.7", 750 x 1334 dot, HD+, IPS LCD
OS	iOS 13
CPU	Apple A13 Bionic, 6-core, 2.65GHz
Memory	3GByte DRAM, 64GByte Flash Memory
Camera	Front 7MP, Rear 12MP
Battery	3.82V, 1821mAh, Li-Ion Polymer
Running Time	3G unknown, 4G unknown, WiFi unknown
SENSOR	
Motion Sensor	Accelerometer, Gyroscope, Compass, Barometer
Ambient Sensor	Proximity, Light
Biometric Sensor	-
Security Sensor	Fingerprint
WIRELESS	
Cellular	2G, 3G, 4G, 5G
Connectivity	Wi-Fi (802.11a/b/g/n/ac/ax), Bluetooth 5.0, NFC, RFID, Qi
Location	GPS, GLONASS, BDS, Galileo, QZSS, NavIC
INTERFACE & OTHERS	
External Connection	Lightning
External Memory	-
Water/Dust Repellent	IP67

Manufacturer	Apple
Model Name	iPhone SE 2
Model Number	A2296
Carrier	-
Product Release	2020.04.24
Assembled in	China
Retail Price	USD399.00
Document ID	
Manufacturer	Apple

CELLULAR BAND & PRODUCT ID (ASSUMPTION)



Cellular Frequencies (MHz)

2G GSM	850, 900, 1800, 1900		
3G CDMA	800, 1900		
3G WCDMA	850, 900, 1700, 1900, 2100		
3G TD-SCDMA	-		
4G FDD-LTE	600 (B71), 700 (B12/B13/B14/B17/B29), 800 (B18/B19/B20), 850 (B5/B26), 900 (B8), 1700 (B4/B66), 1800 (B3), 1900 (B2/B25), 2100 (B1), 2300 (B30), 2600 (B7)		
4G TDD-LTE	1900 (B39), 2000 (B34), 2300 (B40), 2500 (B41), 2600 (B38), 3500 (B42), 3600 (B48), 5200 (B46)		
5G Sub 6	-		
5G millimeter wave	-		
5G Speed	-	Max Downlink: -	Max Uplink: -
LTE Category	16	Max Downlink: 1024Mbps	Max Uplink: 150Mbps



TEARDOWN



FPC#2



Speaker

FPC#3



Touch Panel
Display



Display
Cover



PCB#1



Li-Ion Polymer
Battery



Taptic
Engine

Rear
Camera



Qi
Antenna



Center Panel



Rear Cover



FPC#1



Speaker


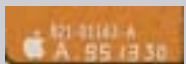
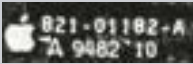
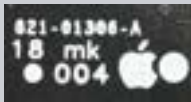




PCB/FPC LISTINGS



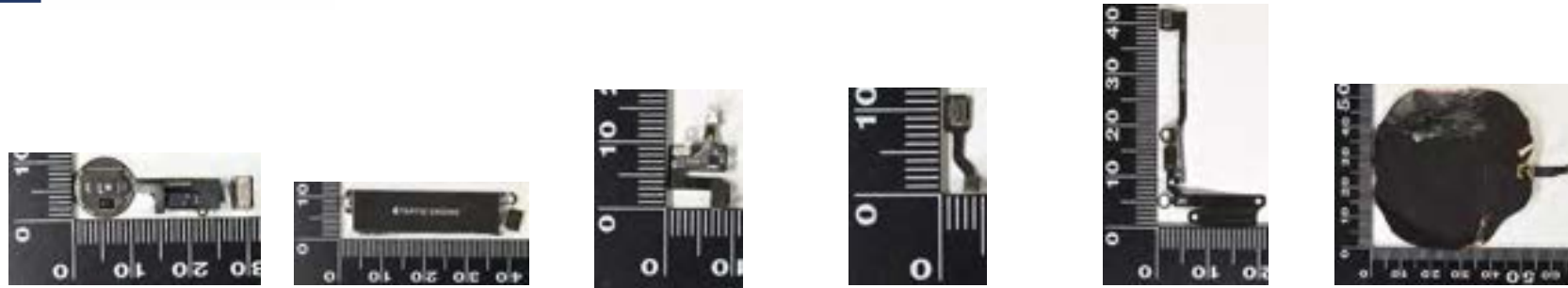
Unit: millimeter otherwise specified



	PCB#1	FPC#1	FPC#2	FPC#3	FPC#4	FPC#5	FPC#6	FPC#7
Function	Main Board	Lightning Microphone	Front Camera Light/Proximity Microphone	Volume/Power LED Flash Microphone	Display	Cable#3	Battery	Rear Camera
Manufacturer	unknown	unknown	Fm	unknown	MK	unknown	unknown	unknown
Dimension	55.8 x 94.6 x 0.59	62.1 x 64.8 x 0.16	54.6 x 18.5 x 0.14	66.3 x 54.2 x 0.18	75.6 x 39.3 x 0.19	66.6 x 41.8 x 0.09	44.2 x 27.1 x 0.40	21.9 x 13.8 x 0.18
Area (sq. mm)	3400	-	-	-	-	-	-	-
Layer	10	-	-	-	-	-	-	-
ZIF Connector #	0	-	-	-	-	-	-	-
B2B Connector #	10	2	1	1	1	2	1	1
Solder #	0	-	-	-	-	-	-	-
RF Socket #	0	1	-	-	-	-	-	-
Test Antenna #	2	-	-	-	-	-	-	-
Marking Photo								

PCB/FPC LISTINGS

Unit: millimeter otherwise specified



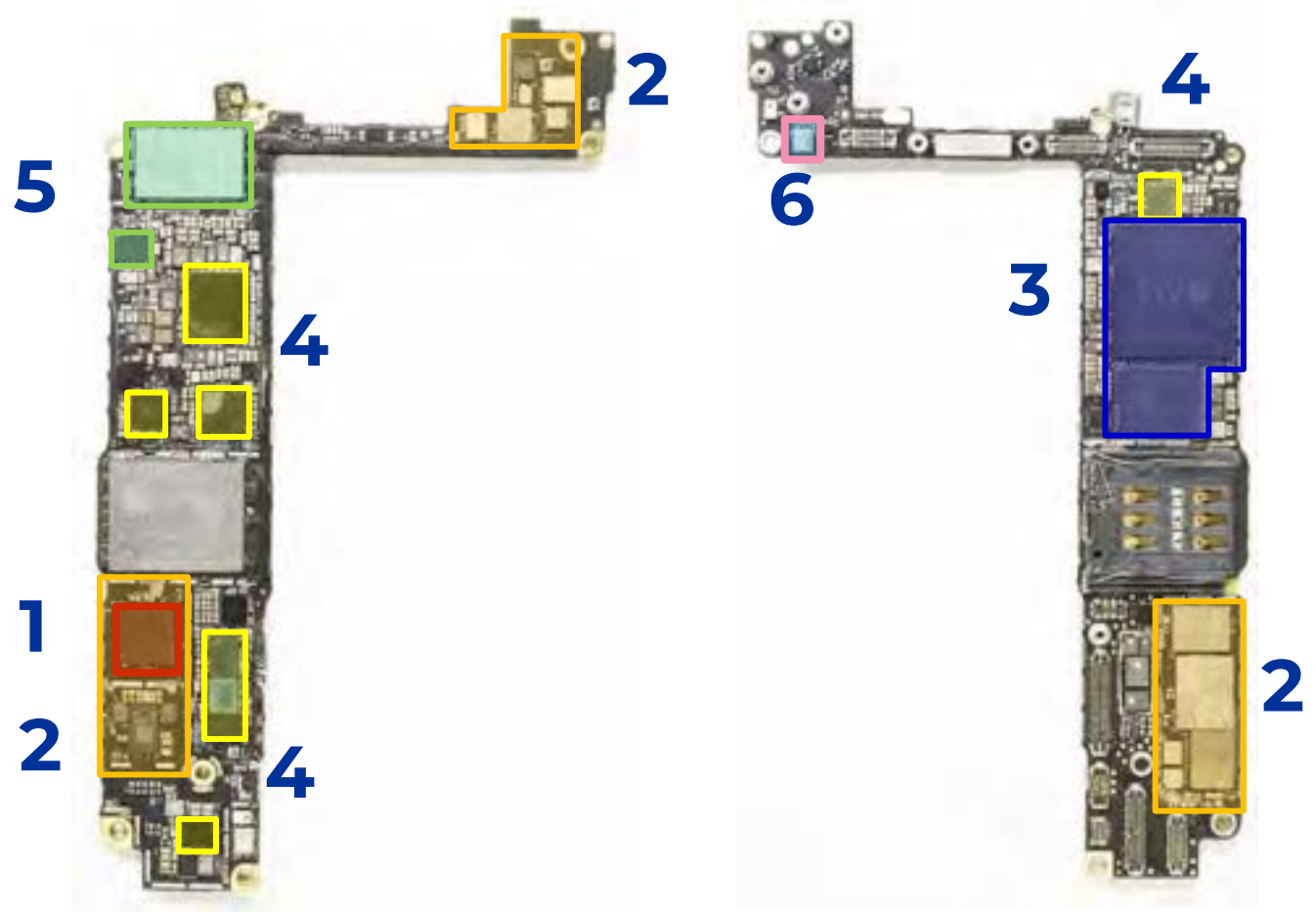
	FPC#8	FPC#9	FPC#10	FPC#11	FPC#12	FPC#13	-	-
Function	Fingerprint Sensor	Taptic Engine	Cable#1	Cable#2	NFC Antenna	Qi Antenna	-	-
Manufacturer	unknown	unknown	Fm	unknown	Fm	Fm	-	-
Dimension	29.0 x 10.5 x 0.09	40.2 x 4.1 x 0.10	9.4 x 15.4 x 0.16	4.0 x 11.8 x 0.25	21.3 x 41.7 x 0.28	73.6 x 53.0 x 0.33	-	-
Area (sq. mm)	-	-	-	-	-	-	-	-
Layer	-	-	-	-	-	-	-	-
ZIF Connector #	-	-	-	-	-	-	-	-
B2B Connector #	1	1	1	1	1	1	-	-
Solder #	-	-	-	-	-	-	-	-
RF Socket #	-	-	-	-	-	-	-	-
Test Antenna #	-	-	-	-	-	-	-	-
Marking Photo				-			-	-

FUNCTIONAL AREA: PCB#1

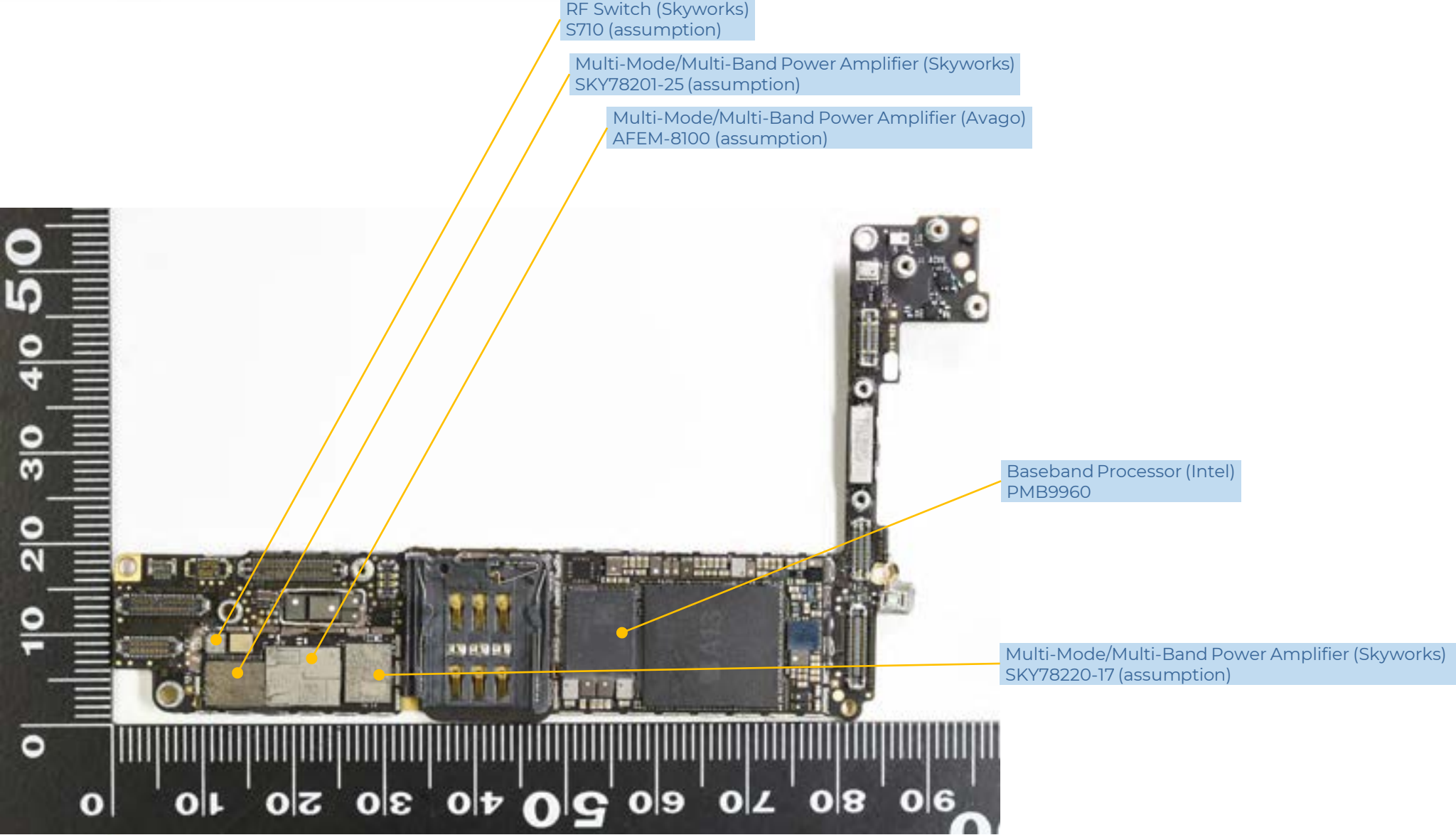
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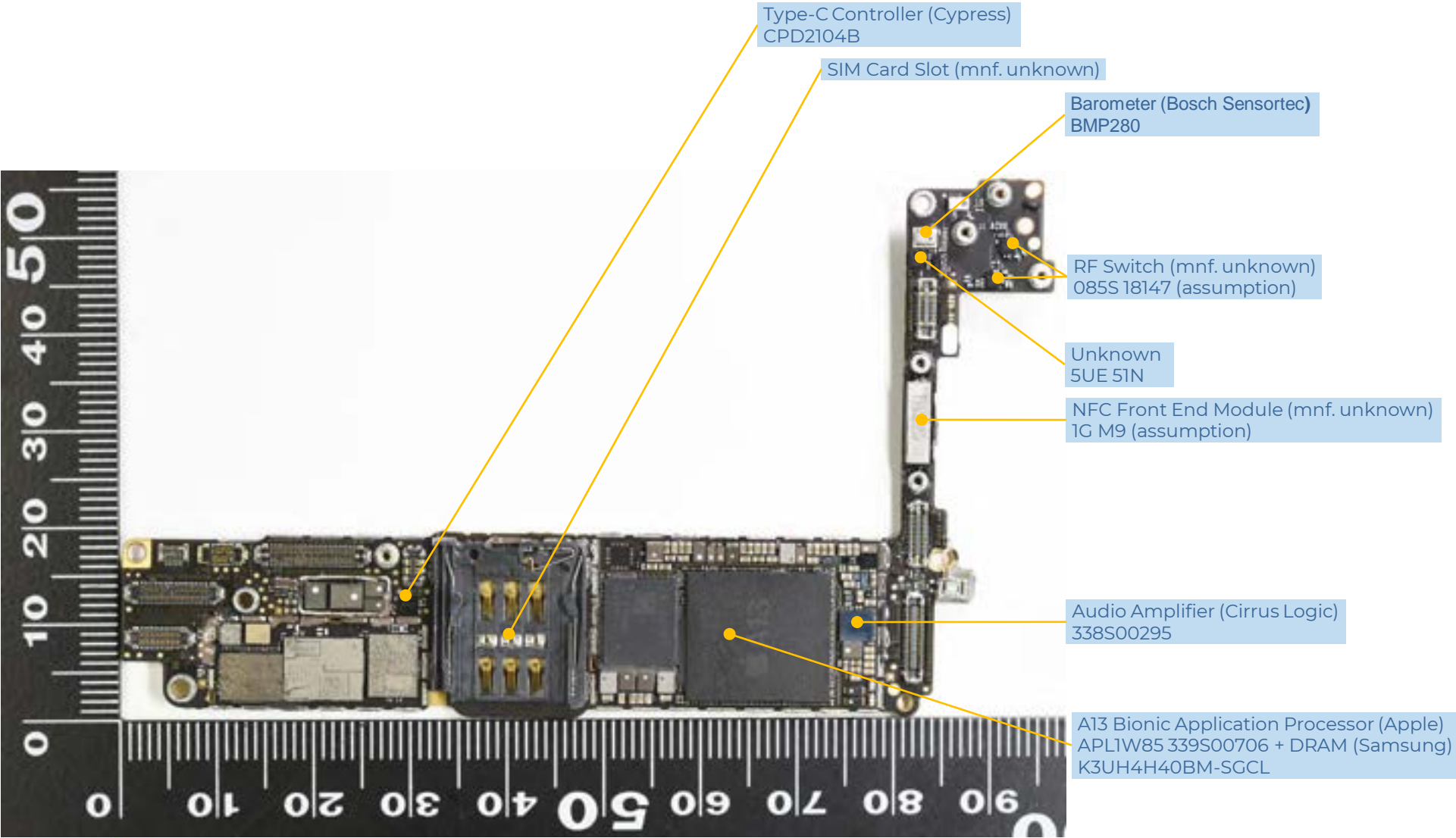
PCB #1	
Manufacturer	unknown
Dimension	55.8 x 94.6 x 0.59
Approx. Area (sq. mm)	3400
1. RF Area	50 sq. mm (1.5%)
2. Front End Area	490 sq. mm (14.4%)
3. BB + AP Area	280 sq. mm (8.2%)
4. Audio + Power Area	270 sq. mm (7.9%)
5. Connectivity Area	110 sq. mm (3.2%)
6. Sensor Area	10 sq. mm (0.3%)



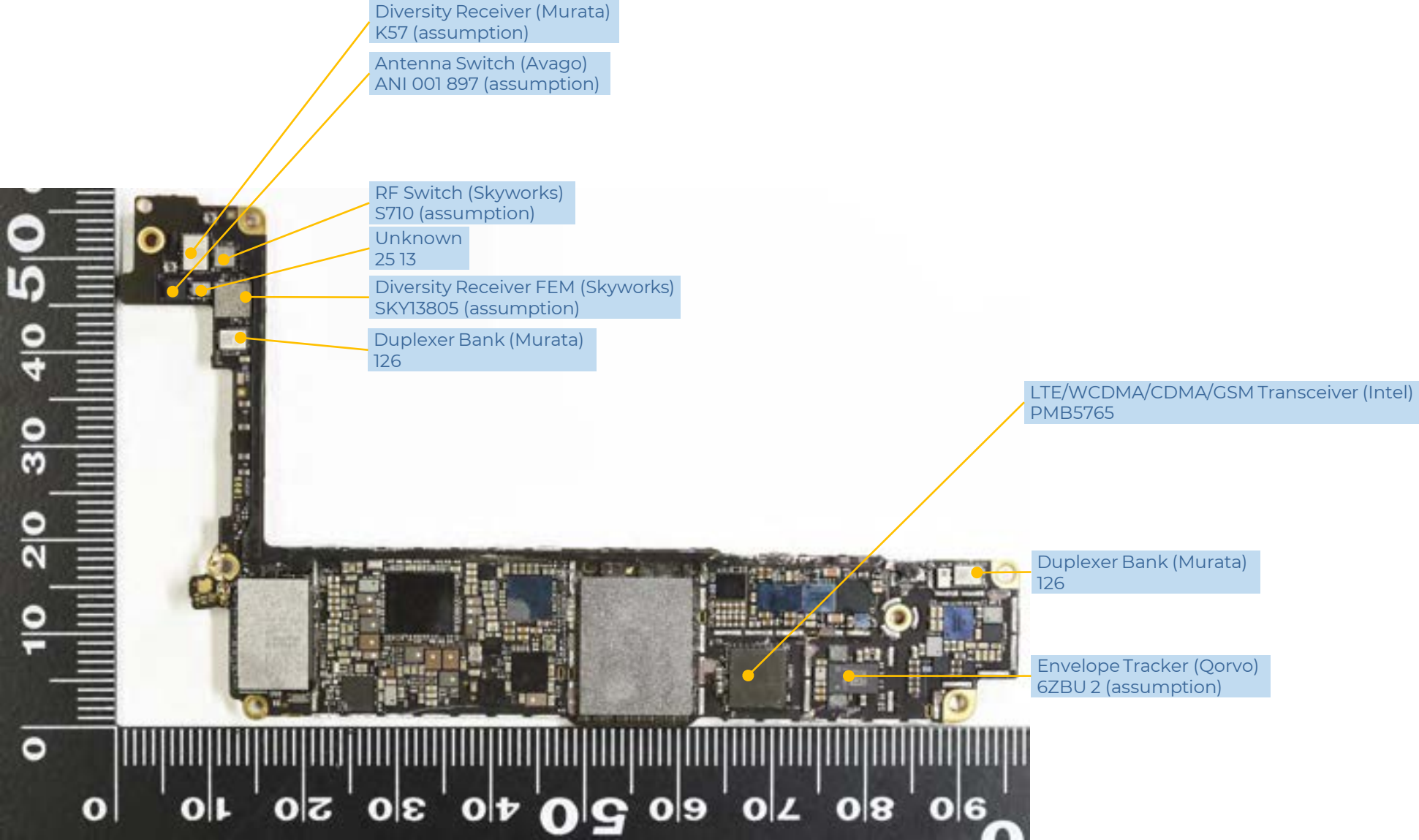
PCB#1 DISPLAY SIDE: CELLULAR



PCB#1 DISPLAY SIDE: KEY COMPONENTS

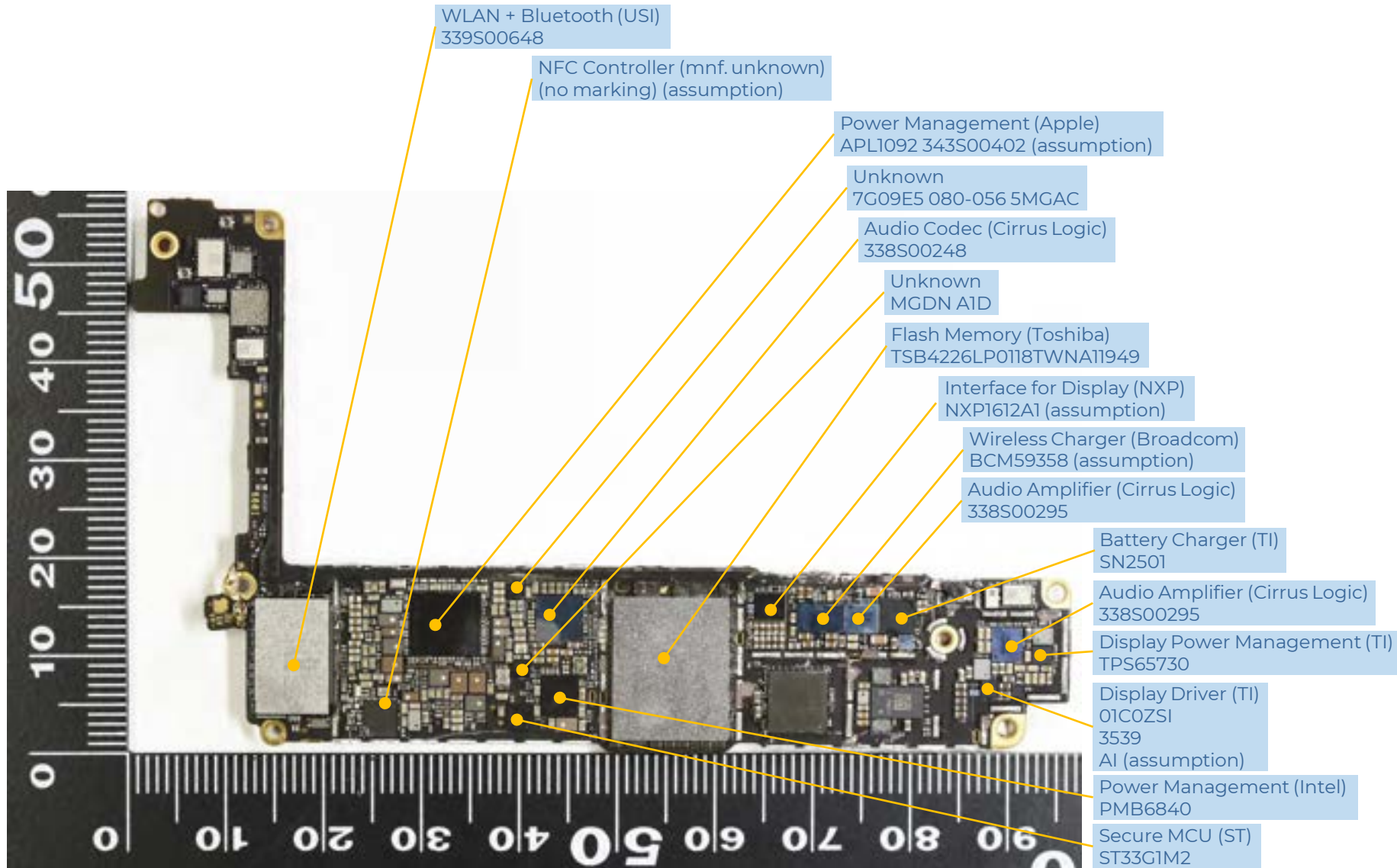


PCB#1 BATTERY SIDE: CELLULAR

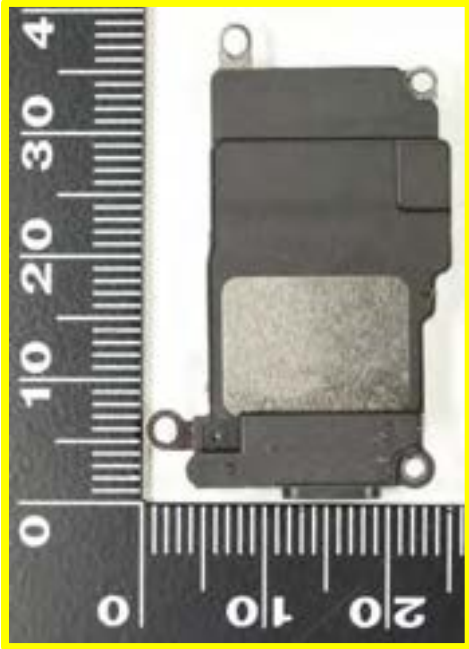
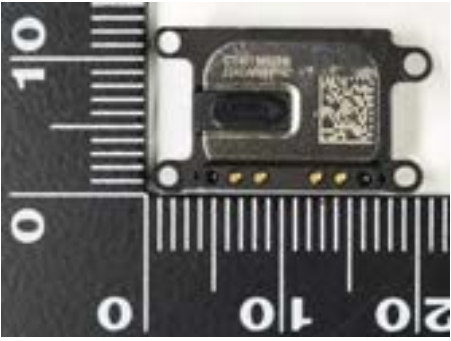
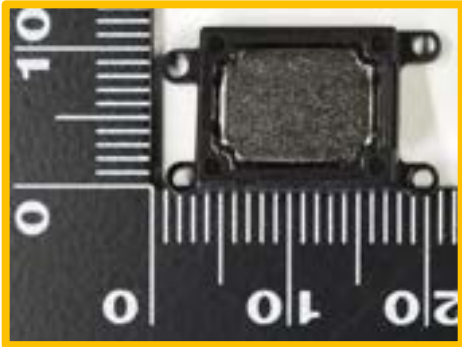


PCB#1 BATTERY SIDE: KEY COMPONENTS

1 notch = 1mm

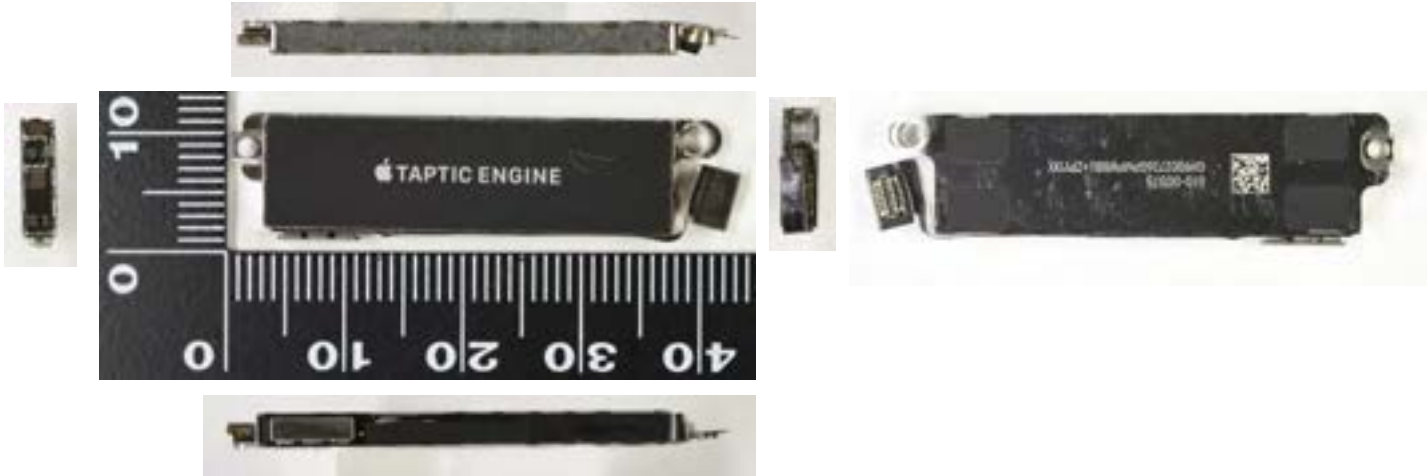


SPEAKER

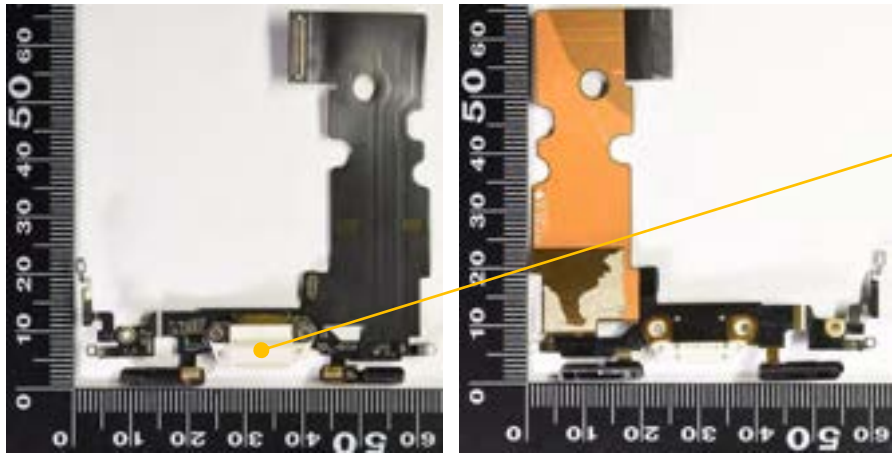


TAPTIC ENGINE

1 notch = 1mm 

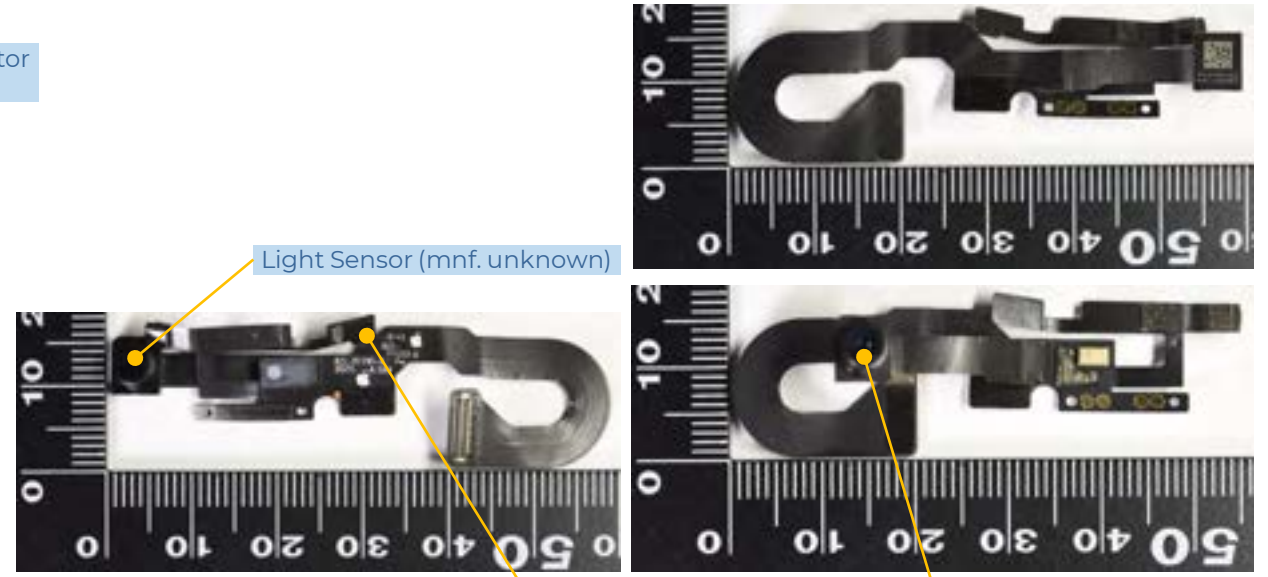


FPC#1: Lightning Connector, Microphone



Lightning Connector (mnf. unknown)

FPC#2: Front Camera, Microphone Light Sensor, Proximity Sensor

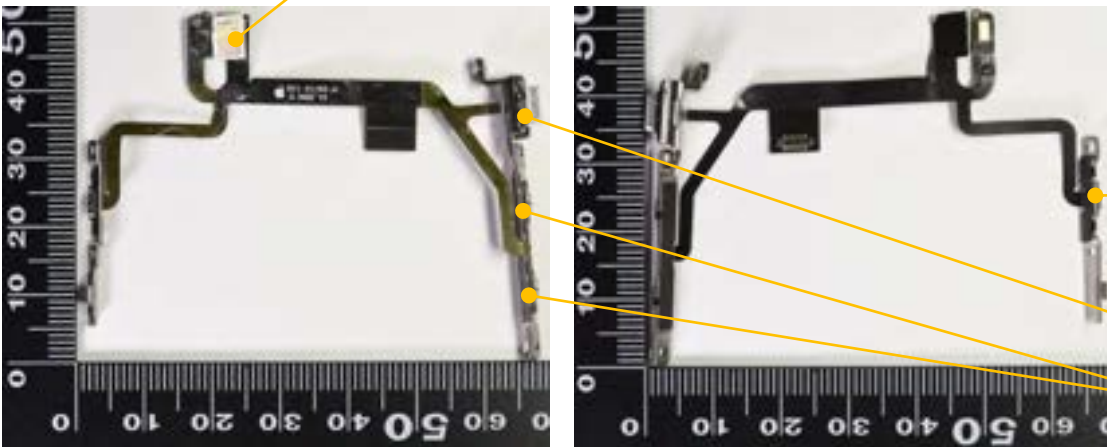


Light Sensor (mnf. unknown)

Front Camera (mnf. unknown)

Proximity Sensor (mnf. unknown)

FPC#3: Volume/Power Button, LED Flash, Microphone



LED Flash (mnf. unknown)

Side Button (mnf. unknown)

Ring/Silent Button (mnf. unknown)

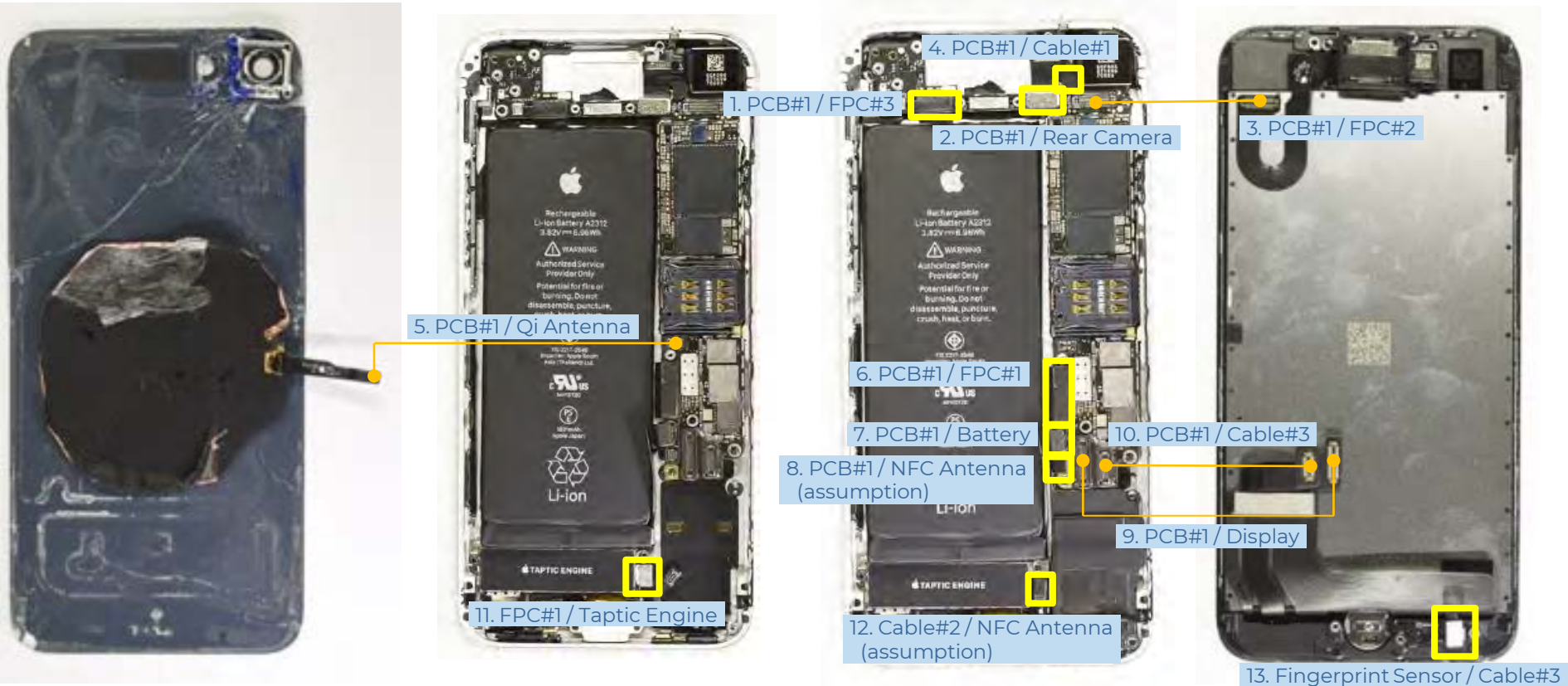
Volume Button (mnf. unknown)

Ear Pods with Lightning Connector



CONNECTORS

Unit: millimeter otherwise specified



CONNECTOR DETAILS: B2B



1	PCB#1	FPC#3
Image		
Mnf.	unknown	
Count	Pin # 14	Pitch 0.35
L x W x H	6.30 x 1.85 x 0.58	5.58 x 1.03 x 0.60
2	PCB#1	Rear Camera
Image		
Mnf.	unknown	
Count	Pin # 24	Pitch 0.35
L x W x H	6.75 x 1.86 x 0.60	6.01 x 1.03 x 0.59
3	PCB#1	FPC#2
Image		
Mnf.	unknown	
Count	Pin # 36	Pitch 0.35
L x W x H	9.22 x 1.84 x 0.62	8.12 x 1.21 x 0.67

4	PCB#1	Cable#1
Image		
Mnf.	unknown	
Count	Pin # 6	Pitch 0.35
L x W x H	3.50 x 1.96 x 0.58	2.34 x 1.22 x 0.54
5	PCB#1	Ultra-wide Camera
Image		
Mnf.	unknown	
Count	Pin # 22+2	Pitch 0.35
L x W x H	6.41 x 1.92 x 0.56	5.34 x 1.01 x 0.61
6	PCB#1	FPC#1
Image		
Mnf.	unknown	
Count	Pin # 50	Pitch 0.35
L x W x H	11.69 x 1.86 x 0.62	10.62 x 1.06 x 0.61

CONNECTOR DETAILS: B2B





7	PCB#1	Battery		
Image				
Mnf.	unknown			
Count	Pin #	3	Pitch	-
L x W x H	4.98 x 1.94 x 0.62		4.57 x 1.12 x 0.54	
8	PCB#1	NFC Antenna		
Image				
Mnf.	unknown			
Count	Pin #	5	Pitch	0.35
L x W x H	3.07 x 1.53 x 0.58		1.60 x 2.92 x 0.54	
9	PCB#1	Display		
Image				
Mnf.	unknown			
Count	Pin #	40	Pitch	0.35
L x W x H	9.96 x 1.84 x 0.60		8.80 x 1.08 x 0.57	

10	PCB#1	Cable#3		
Image				
Mnf.	unknown			
Count	Pin #	24	Pitch	0.35
L x W x H	7.04 x 1.74 x 0.62		5.89 x 1.01 x 0.55	
11	FPC#1	Taptic Engine		
Image				
Mnf.	unknown			
Count	Pin #	10	Pitch	0.35
L x W x H	4.17 x 1.74 x 0.73		3.47 x 1.31 x 0.51	
12	Cable#2	NFC Antenna		
Image				
Mnf.	unknown			
Count	Pin #	5	Pitch	0.35
L x W x H	1.40 x 2.80 x 0.47		1.56 x 2.87 x 0.55	

CONNECTOR DETAILS: B2B



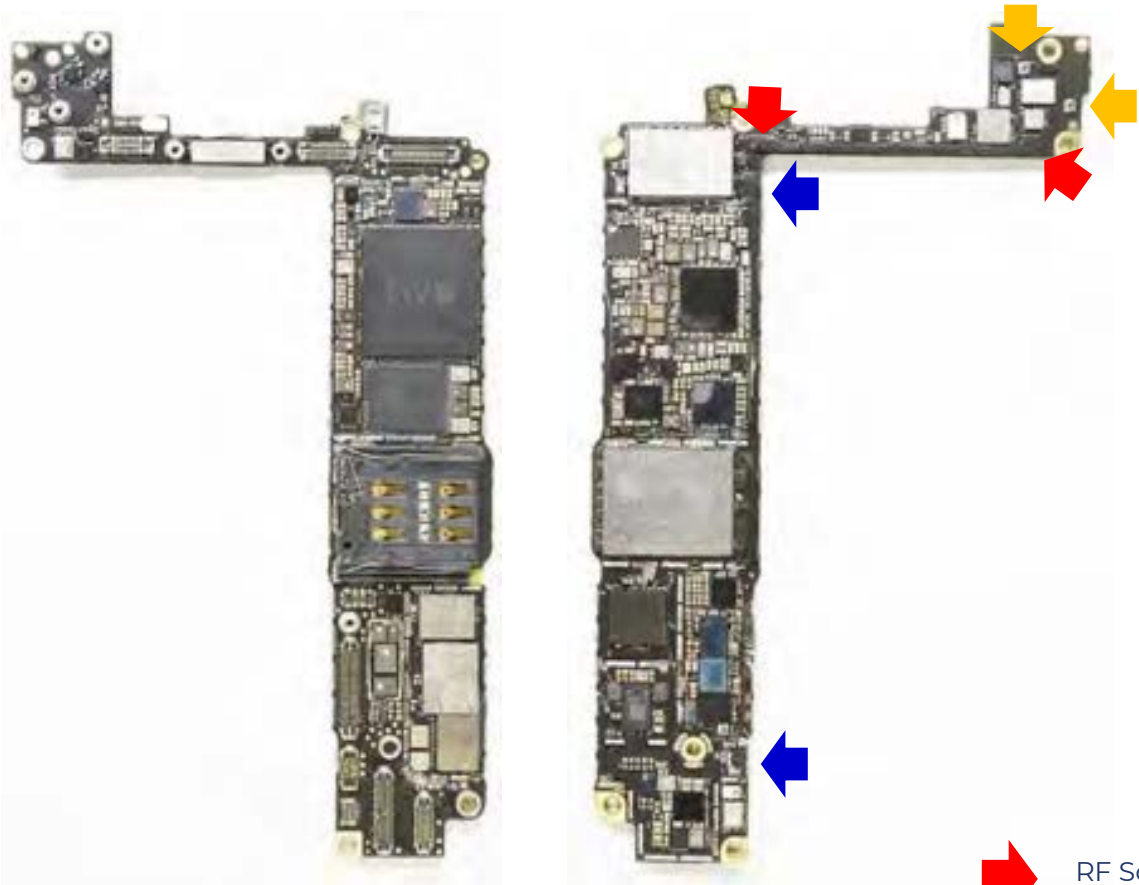
13	Fingerprint Sensor		Cable#3	
Image				
Mnf.	unknown			
Count	Pin #	14	Pitch	0.35
L x W x H	4.92 x 1.74 x 0.60		4.20 x 1.06 x 0.50	






**NOT
EQUIPPED**

CONNECTORS

Unit: millimeter otherwise specified



-  RF Socket + Cable
-  Test Antenna Port
-  Test Antenna Port



SIM Slot



Lightning Connector

Display Side



Battery Side



Gasket

Lightning Connector	
Mnf.	unknown
Pin Number	8
Waterproof	IP67
Gasket	Yes



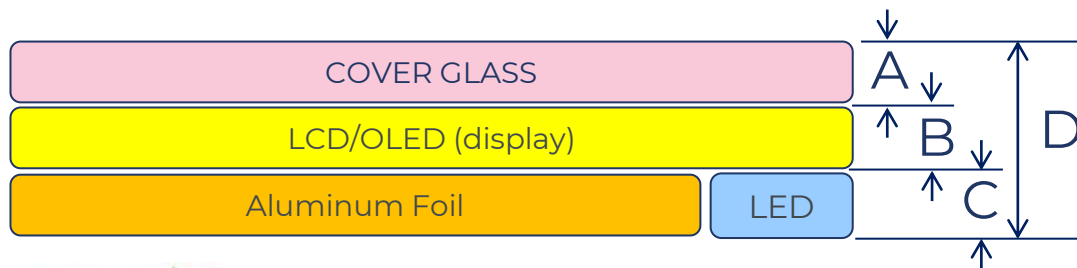
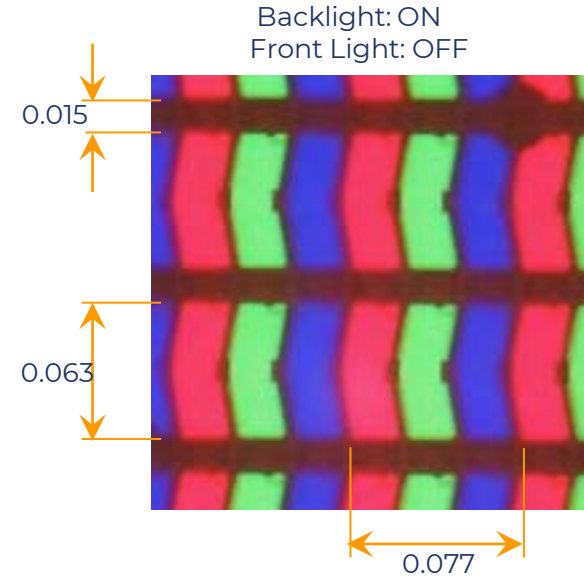
**NOT
EQUIPPED**

MAIN DISPLAY DIMENSION & PIXEL

Unit: millimeter otherwise specified



Display Module Size (width x height)		61.03 x 110.35
Display Marking (location)		FVQ0145E0DBMJKQAE +J138LUY123WHA1J13 (bottom metal plate)
Display Panel Manufacturer		unknown
Display Diagonal Size (inch)		4.7
Display Mode (alignment)		IPS (stripe alignment)
Pixel Count (dot)		750 x 1334
Resolution (pixel per inch)		326
Display Component Presence	1a: LCD Top Polarizer	n/a (stack on touch panel)
	1b: LCD Panel	n/a (stack on touch panel)
	1c: LCD Lower Polarizer + Reflector	○
	2: Diffuser #1	-
	3: Brightness Enhancement Film #1	○
	4: Brightness Enhancement Film #2	○
	5: Diffuser #2	○
	6: Light Guide	○
	7: Reflector	○
Display Backlight LED Count (size)		12 (3.00 x 0.86 x 0.37)
Cover Glass Thickness (A)		0.89
Display Thickness (B)		0.59
Display Film Material (BEF, etc.) Thickness (C)		1.04
Display Unit Total Thickness (D)		2.52



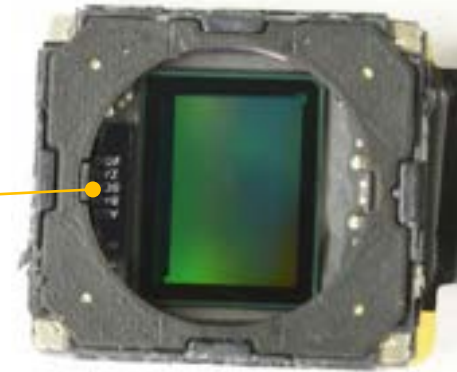
CAMERA



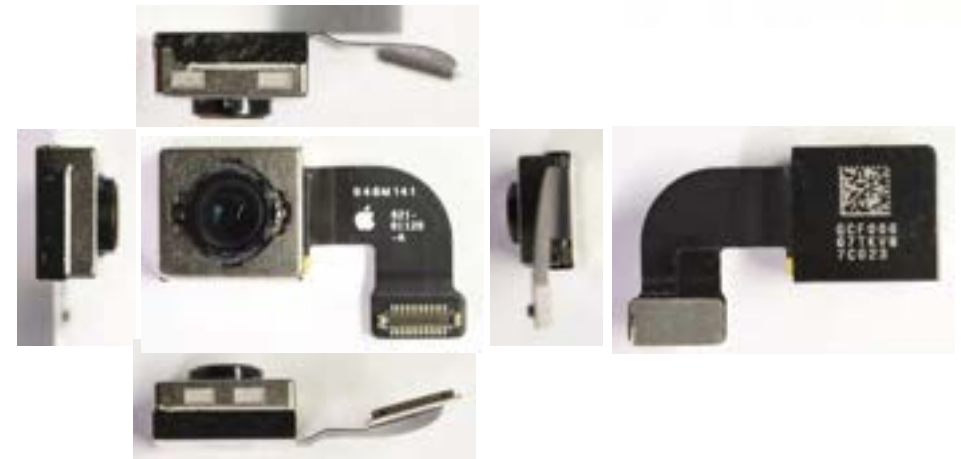
FRONT CAMERA	
Pixel	7MP
Module Size	5.78 x 6.78 x 4.34
Module Marking	G8R947769 35HQHC9A
Sensor Diagonal Size	4.63
Sensor Manufacturer	unknown
Sensor Board Thickness	0.53



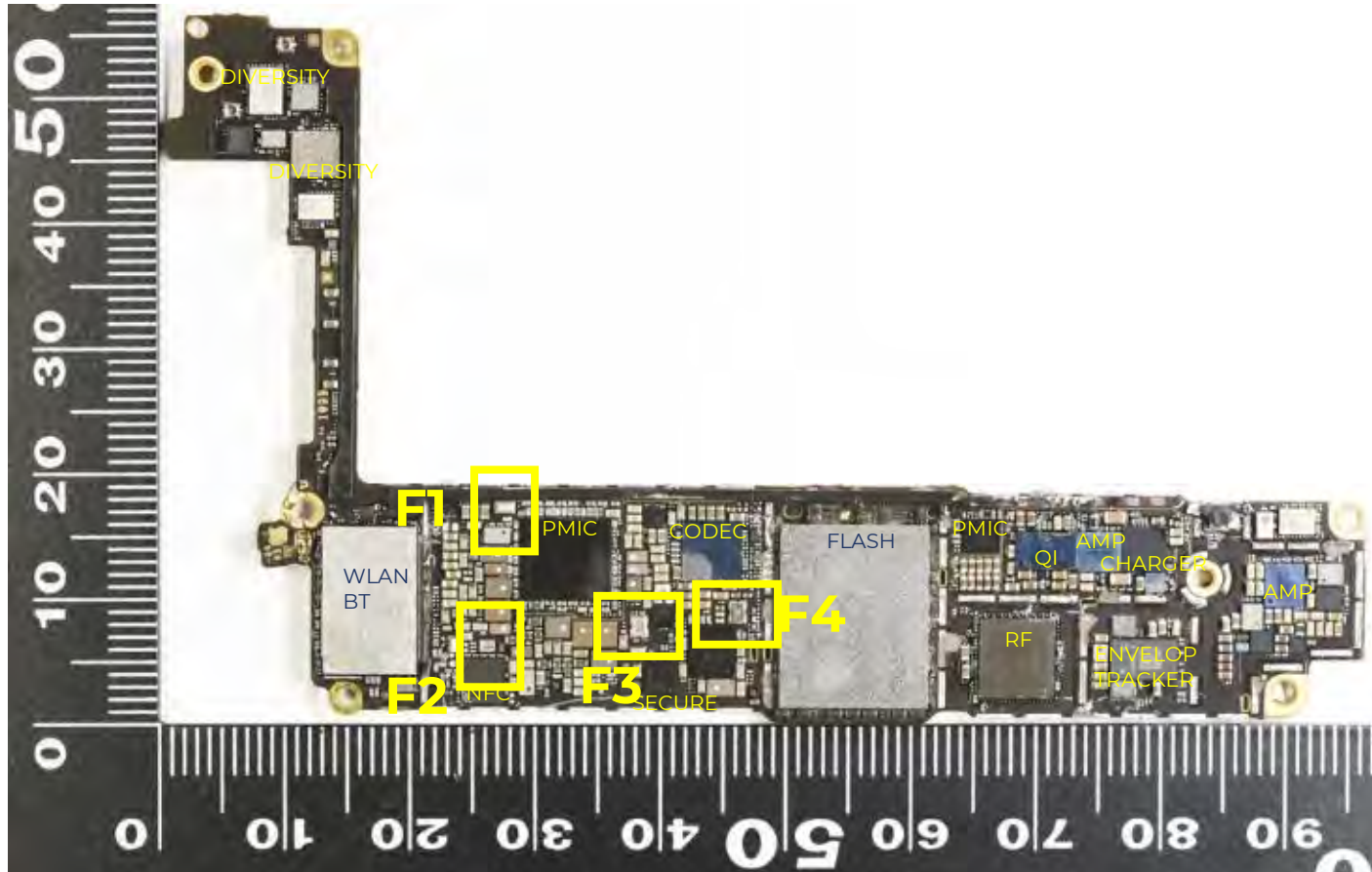
REAR CAMERA	
Pixel	12MP
Module Size	10.38 x 9.38 x 5.68
Module Marking	GCF006 67TKVM 7C023
Sensor Diagonal Size	6.30
Sensor Manufacturer	unknown
Sensor Board Thickness	0.74



OIS Controller
(Analog Devices)
AD5844



TIMING DEVICE: PCB#1 BATTERY SIDE



(F1) FORK-XTAL

Mnf.	TXC
Marking	TAp19
Size	1.58 x 0.95 x 0.52



(F3) AT-XTAL

Mnf.	Epson
Marking	2400P E015A
Size	1.58 x 1.14 x 0.48



(F2) AT-XTAL

Mnf.	TXC
Marking	T271 Mq6P
Size	1.16 x 0.92 x 0.42

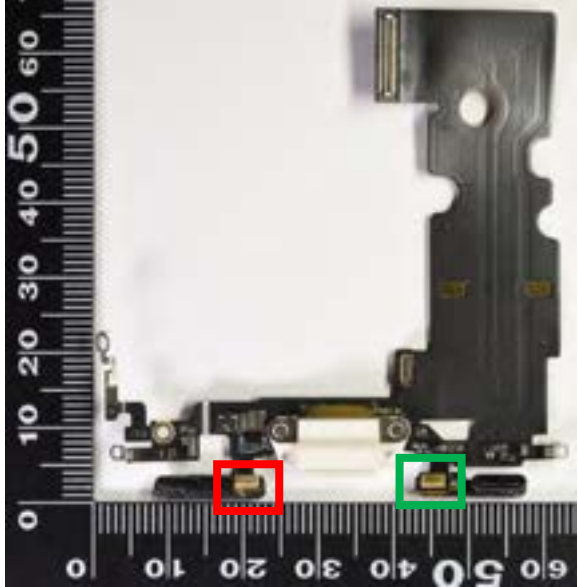
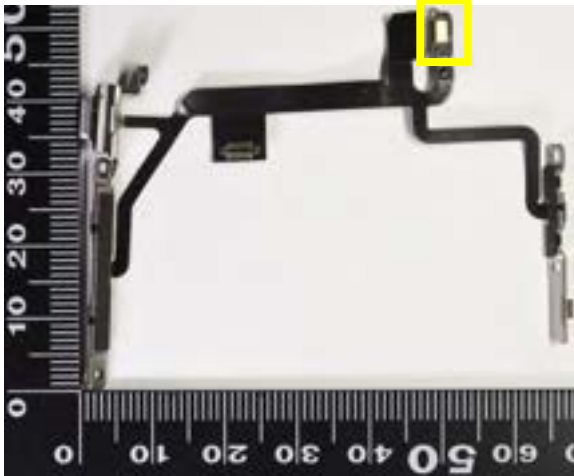
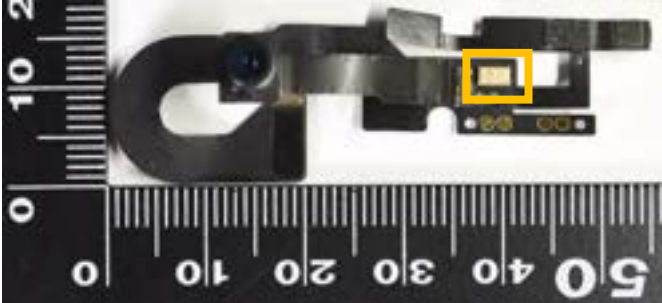


(F4) AT-XTAL + Thermistor (assumption)

Mnf.	Kyocera
Marking	384C K010Z
Size	1.70 x 1.26 x 0.82

SILICON AUDIO (MICROPHONE)

Unit: millimeter otherwise specified



Microphone	
Mnf.	Goertek
Marking	V 146 003 GWM1
Size	1.95 x 3.24 x 0.89



Microphone	
Mnf.	Knowles Acoustics
Marking	T 142 950 KSM1
Size	1.89 x 3.23 x 0.87



Microphone	
Mnf.	Goertek
Marking	T 182 004 GWM1
Size	1.97 x 3.37 x 0.90



Microphone	
Mnf.	Knowles Acoustics
Marking	V 147 947 KSM1
Size	1.90 x 3.17 x 0.89

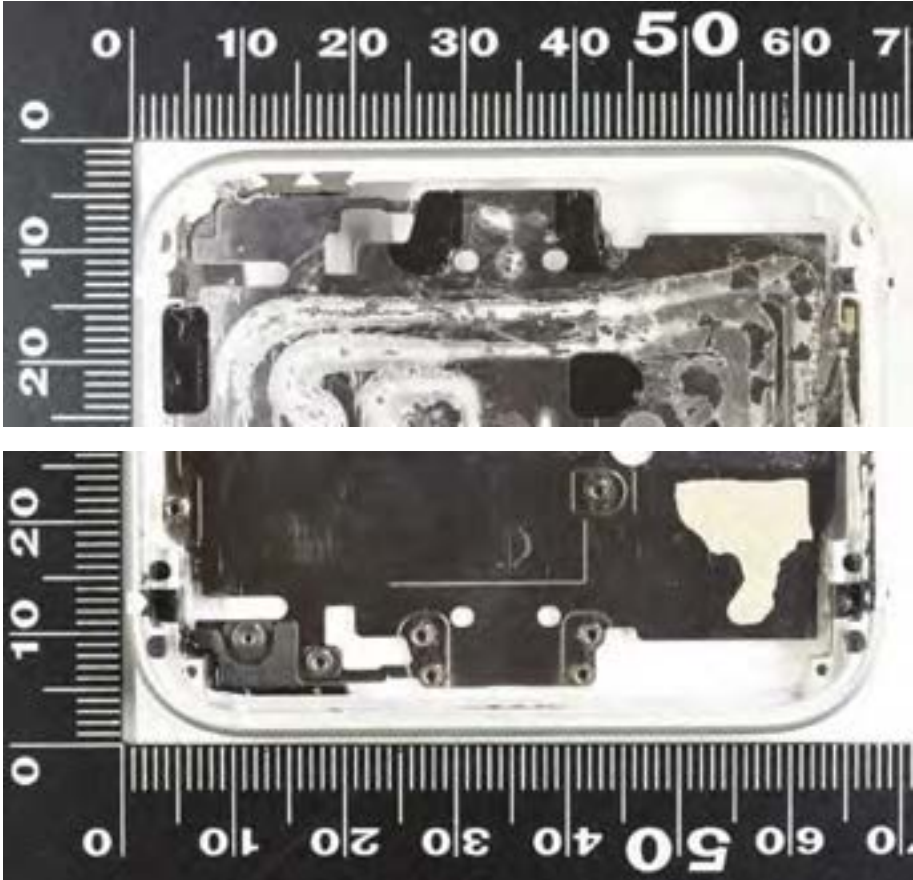


ANTENNA (ASSUMPTION)

Unit: millimeter otherwise specified



CELLULAR #1



ANTENNAS BUILT-IN. DETAILS UNKNOWN

ANTENNA (ASSUMPTION)



CELLULAR #2/GPS, WLAN/Bluetooth

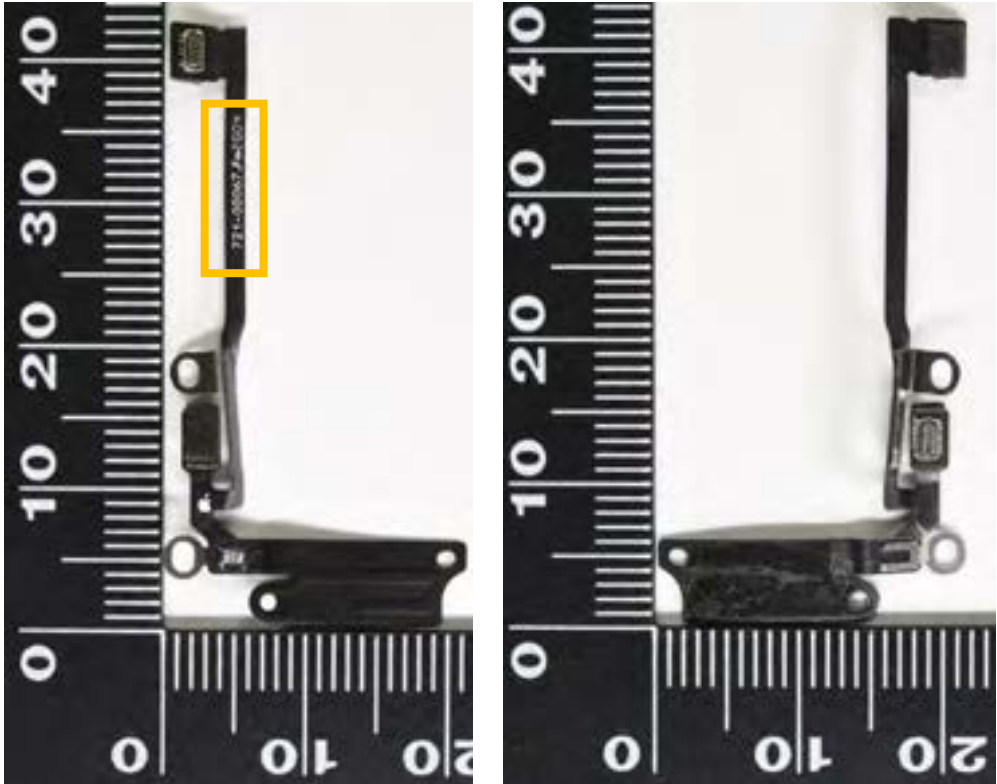


ANTENNAS BUILT-IN. DETAILS UNKNOWN

ANTENNA (ASSUMPTION)



NFC



ANTENNAS BUILT-IN. DETAILS UNKNOWN

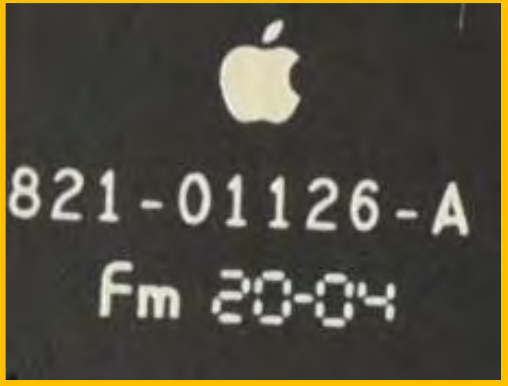
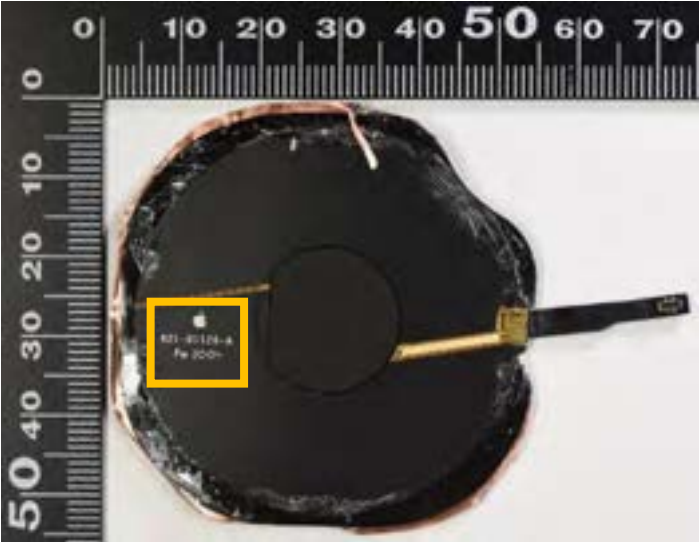
ANTENNA (ASSUMPTION)



Unit: millimeter otherwise specified



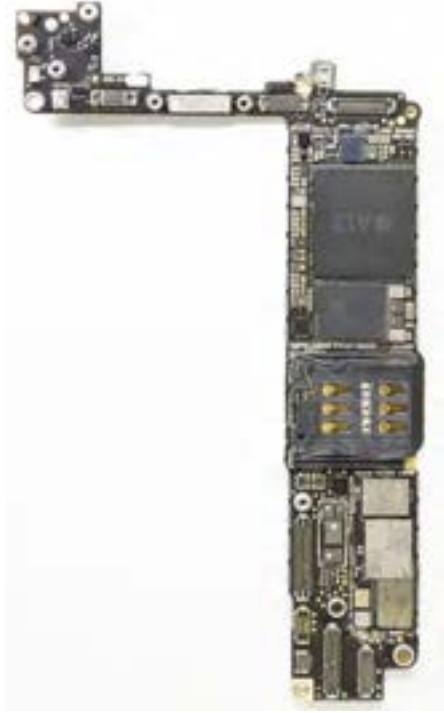
Qi



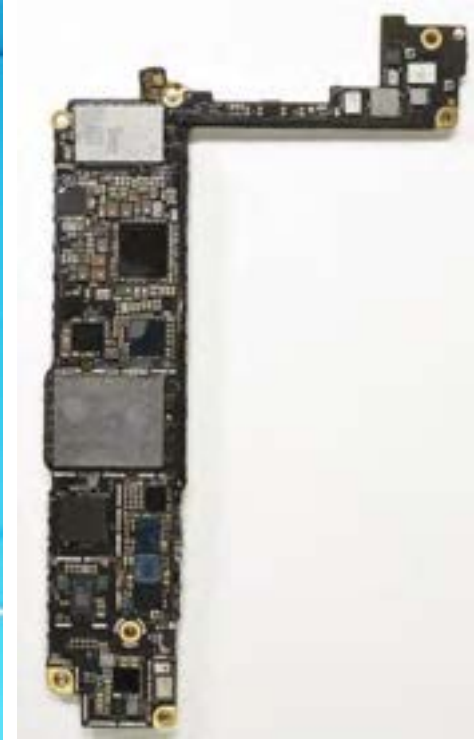
ANTENNAS BUILT-IN. DETAILS UNKNOWN



PCB#1 Display Side



PCB#1 Battery Side



POWER SOURCE: BATTERY

Unit: millimeter otherwise specified 

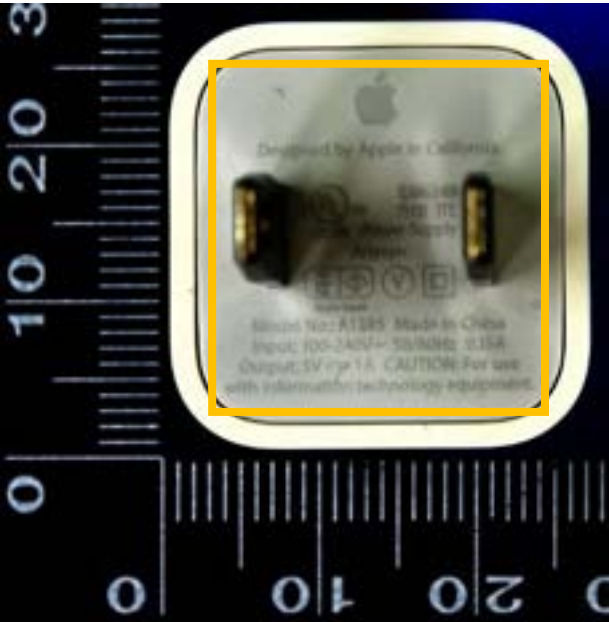


Battery placement by double-sided tape

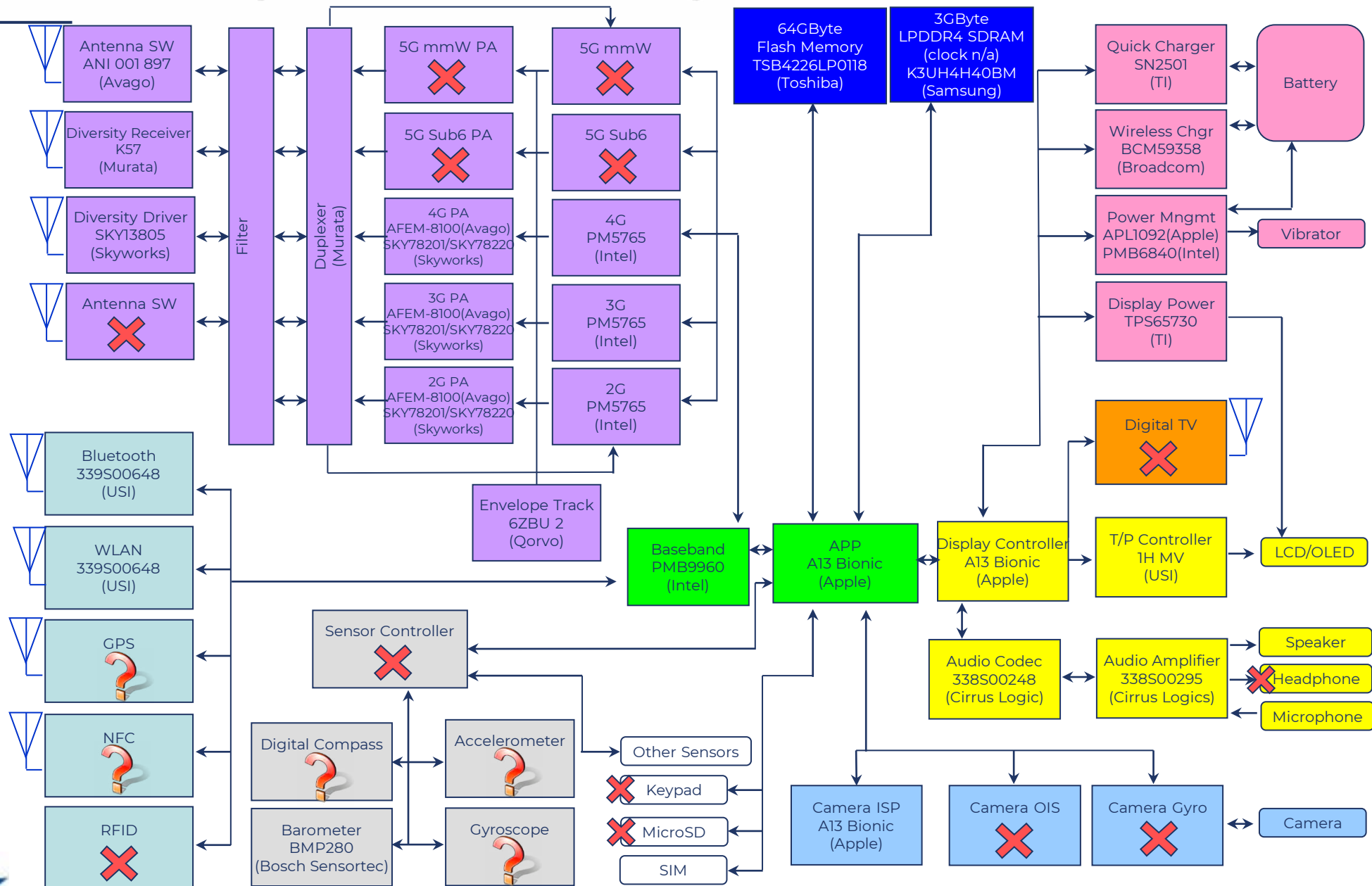


Battery	
Type	Lithium Ion Polymer
Mnf.	Huizhou Desay Battery
Size (mm)	38.15 x 93.21 x 2.88
Voltage	3.82V
Capacity	1821mAh
Watt	7.03Wh

POWER SOURCE: AC ADAPTER



BLOCK DIAGRAM (WITH ASSUMPTION)





SERVICES

- TEARDOWN: on cellular phone, smartphone, tablet, base station, automotive, laptop PC, digital still camera, LCD TV, and other consumer electronics and industrial equipment.
- BILL OF MATERIALS: all-component-cost-breakdown into more than 200 categories.
- MARKET REPORT: based on requests.
- SEMINAR: based on requests. Free seminars offered to service subscribers every quarter.
- INTELLECTUAL PROPERTY: old phones available since 1997 up to date. Most of them are functional.

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