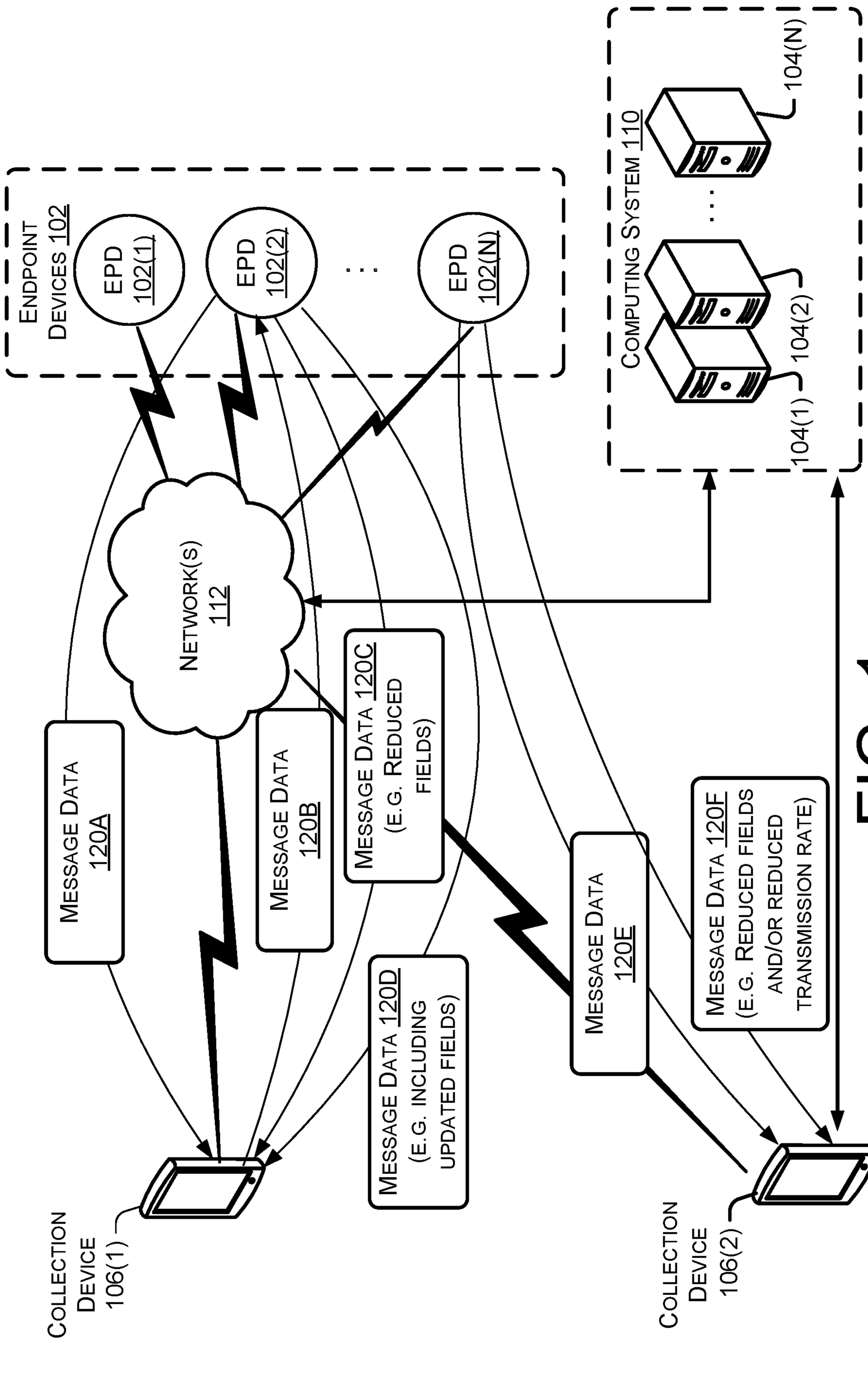

ENDPOINT DEVICES 102
EPD 102(1)
EPD 102(2)
EPD 102(N)
NETWORK(S) 112
COMPUTING SYSTEM 110
104(N)
104(2)
104(1)
MESSAGE DATA 120A
MESSAGE DATA 120B
MESSAGE DATA 120C (E.G. REDUCED FIELDS)
MESSAGE DATA 120D (E.G. INCLUDING UPDATED FIELDS)
MESSAGE DATA 120E
MESSAGE DATA 120F (E.G. REDUCED FIELDS AND/OR REDUCED TRANSMISSION RATE)
COLLECTION DEVICE 106(1)
COLLECTION DEVICE 106(2)
100

FIG. 1

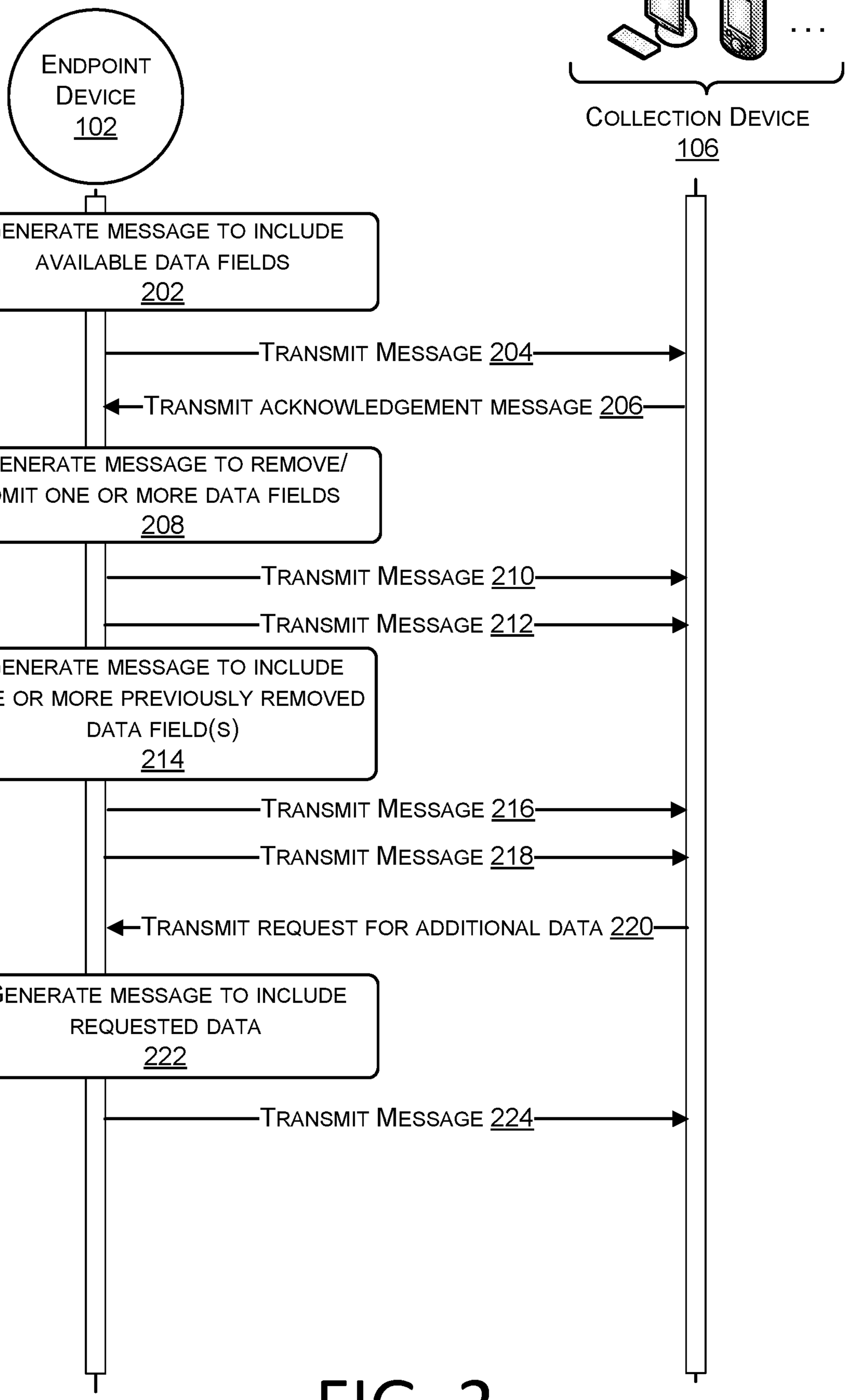

ENDPOINT DEVICE 102
COLLECTION DEVICE 106
GENERATE MESSAGE TO INCLUDE AVAILABLE DATA FIELDS 202
TRANSMIT MESSAGE 204
TRANSMIT ACKNOWLEDGEMENT MESSAGE 206
GENERATE MESSAGE TO REMOVE/ OMIT ONE OR MORE DATA FIELDS 208
TRANSMIT MESSAGE 210
TRANSMIT MESSAGE 212
GENERATE MESSAGE TO INCLUDE ONE OR MORE PREVIOUSLY REMOVED DATA FIELD(S) 214
TRANSMIT MESSAGE 216
TRANSMIT MESSAGE 218
TRANSMIT REQUEST FOR ADDITIONAL DATA 220
GENERATE MESSAGE TO INCLUDE REQUESTED DATA 222
TRANSMIT MESSAGE 224

FIG. 2

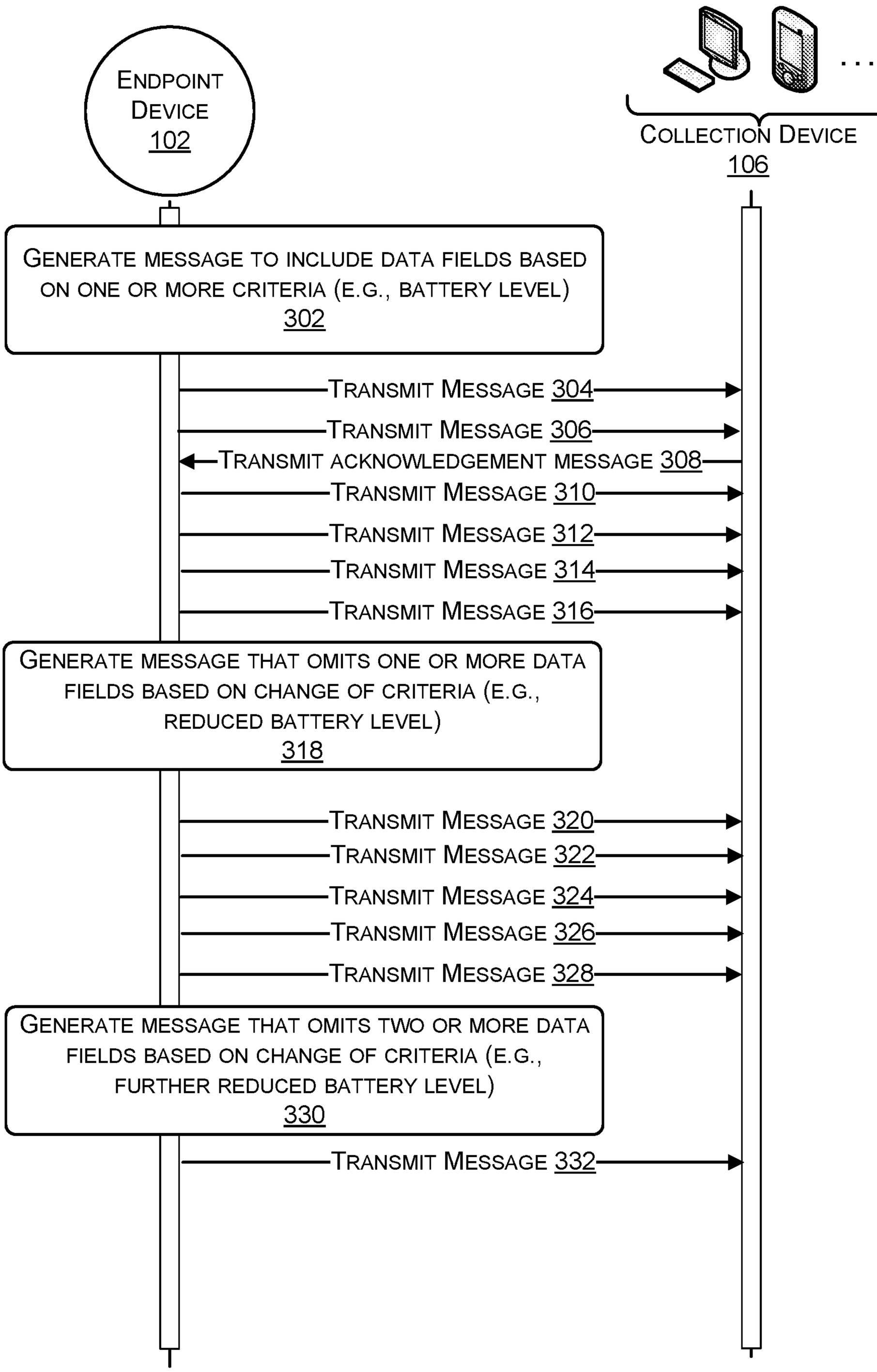

ENDPOINT DEVICE 102
COLLECTION DEVICE 106
GENERATE MESSAGE TO INCLUDE DATA FIELDS BASED ON ONE OR MORE CRITERIA (E.G., BATTERY LEVEL) 302
TRANSMIT MESSAGE 304
TRANSMIT MESSAGE 306
TRANSMIT ACKNOWLEDGEMENT MESSAGE 308
TRANSMIT MESSAGE 310
TRANSMIT MESSAGE 312
TRANSMIT MESSAGE 314
TRANSMIT MESSAGE 316
GENERATE MESSAGE THAT OMITS ONE OR MORE DATA FIELDS BASED ON CHANGE OF CRITERIA (E.G., REDUCED BATTERY LEVEL) 318
TRANSMIT MESSAGE 320
TRANSMIT MESSAGE 322
TRANSMIT MESSAGE 324
TRANSMIT MESSAGE 326
TRANSMIT MESSAGE 328
GENERATE MESSAGE THAT OMITS TWO OR MORE DATA FIELDS BASED ON CHANGE OF CRITERIA (E.G., FURTHER REDUCED BATTERY LEVEL) 330
TRANSMIT MESSAGE 332

FIG. 3A

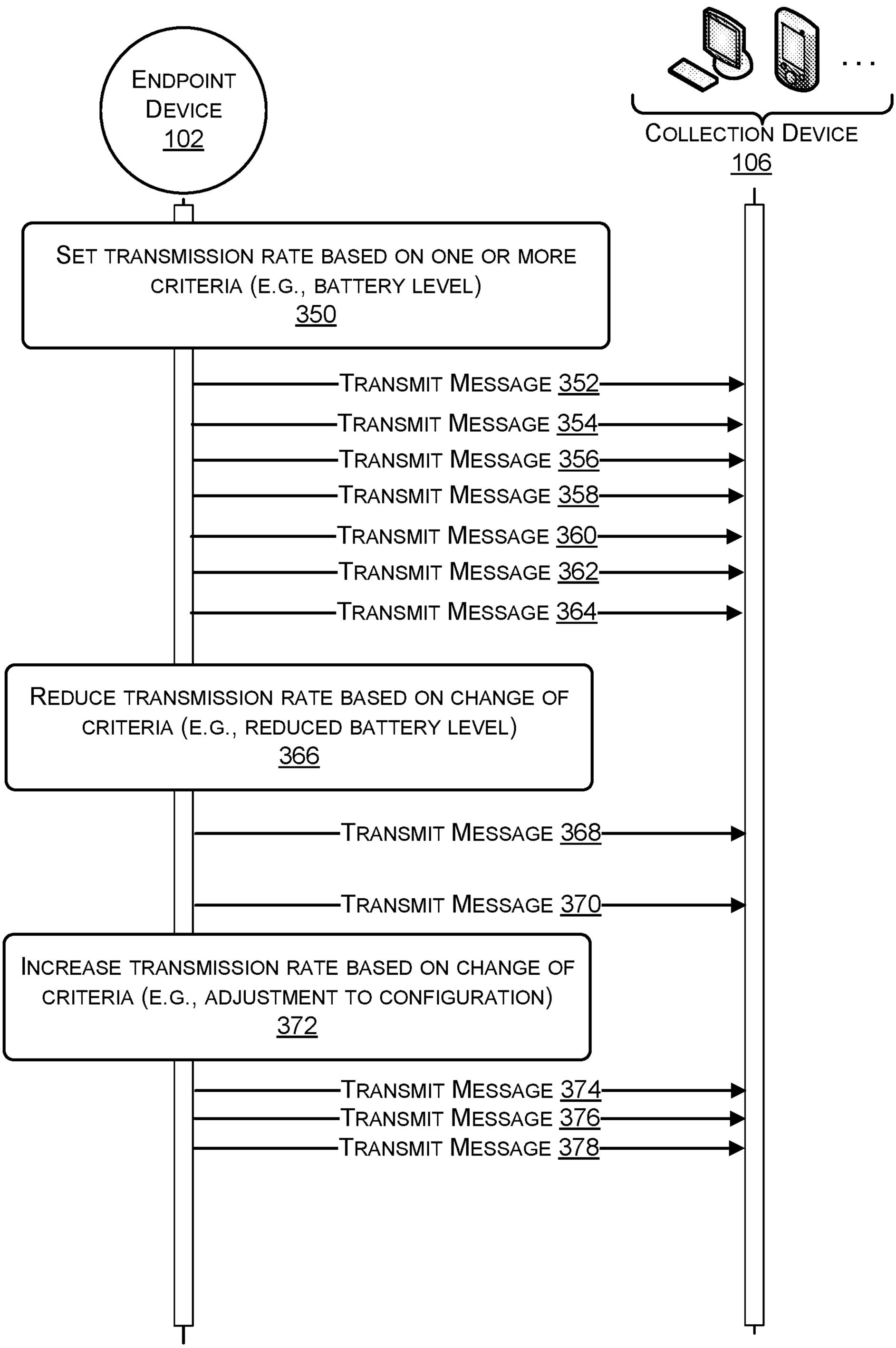

ENDPOINT DEVICE 102
COLLECTION DEVICE 106
SET TRANSMISSION RATE BASED ON ONE OR MORE CRITERIA (E.G., BATTERY LEVEL) 350
TRANSMIT MESSAGE 352
TRANSMIT MESSAGE 354
TRANSMIT MESSAGE 356
TRANSMIT MESSAGE 358
TRANSMIT MESSAGE 360
TRANSMIT MESSAGE 362
TRANSMIT MESSAGE 364
REDUCE TRANSMISSION RATE BASED ON CHANGE OF CRITERIA (E.G., REDUCED BATTERY LEVEL) 366
TRANSMIT MESSAGE 368
TRANSMIT MESSAGE 370
INCREASE TRANSMISSION RATE BASED ON CHANGE OF CRITERIA (E.G., ADJUSTMENT TO CONFIGURATION) 372
TRANSMIT MESSAGE 374
TRANSMIT MESSAGE 376
TRANSMIT MESSAGE 378

FIG. 3B

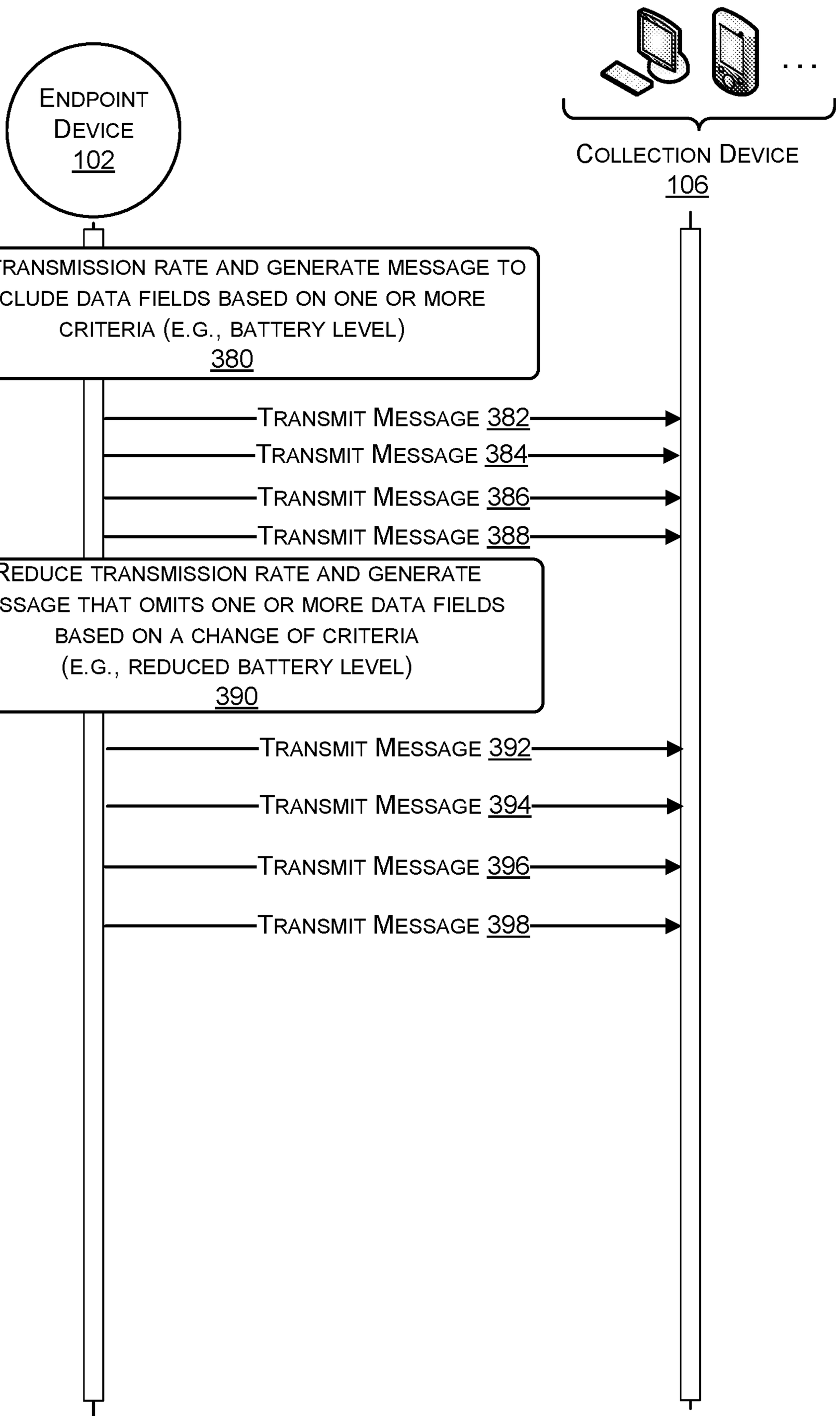

ENDPOINT DEVICE 102
COLLECTION DEVICE 106
SET TRANSMISSION RATE AND GENERATE MESSAGE TO INCLUDE DATA FIELDS BASED ON ONE OR MORE CRITERIA (E.G., BATTERY LEVEL) 380
TRANSMIT MESSAGE 382
TRANSMIT MESSAGE 384
TRANSMIT MESSAGE 386
TRANSMIT MESSAGE 388
REDUCE TRANSMISSION RATE AND GENERATE MESSAGE THAT OMITS ONE OR MORE DATA FIELDS BASED ON A CHANGE OF CRITERIA (E.G., REDUCED BATTERY LEVEL) 390
TRANSMIT MESSAGE 392
TRANSMIT MESSAGE 394
TRANSMIT MESSAGE 396
TRANSMIT MESSAGE 398

FIG. 3C

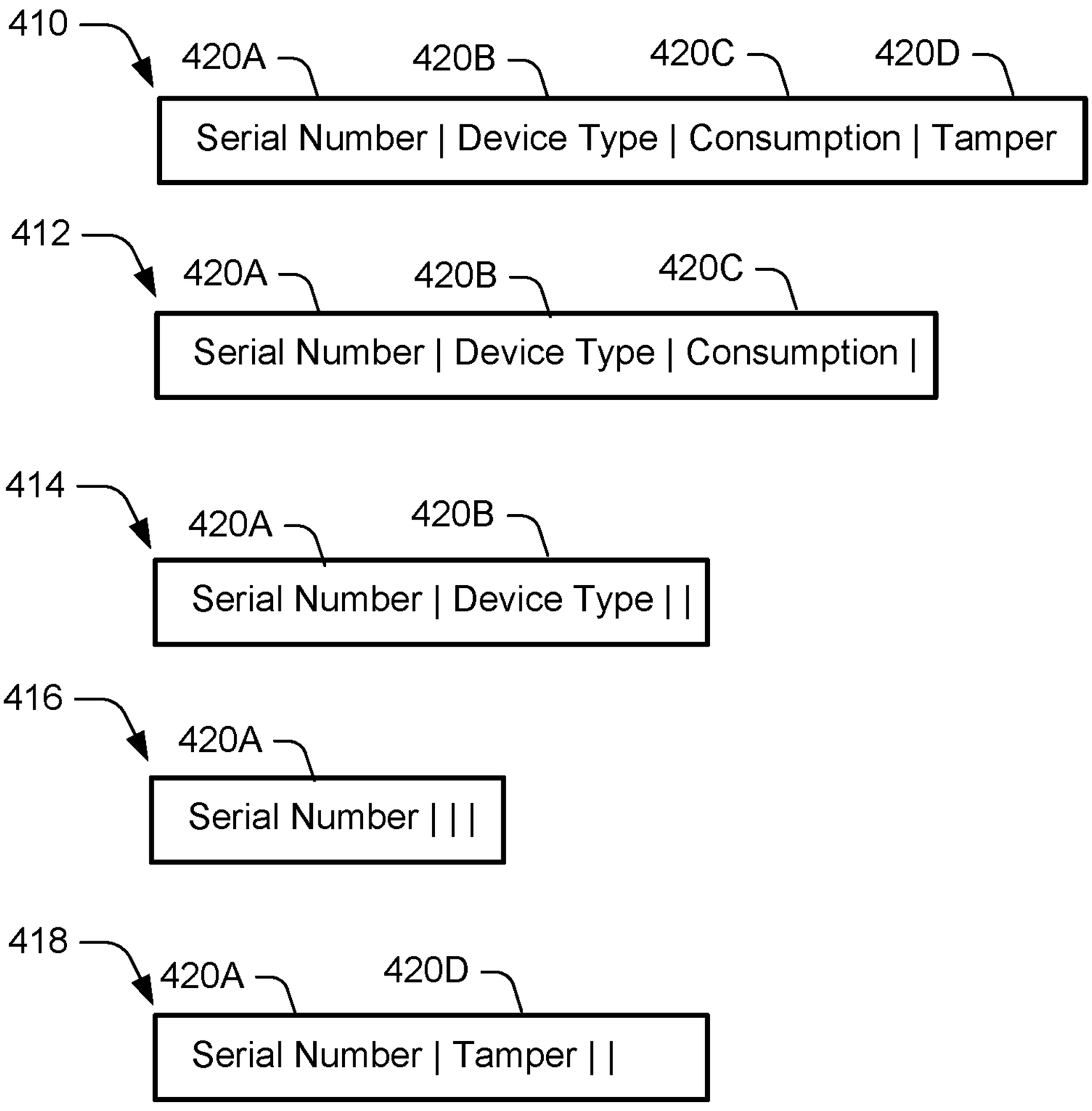

410
420A
420B
420C
420D
Serial Number | Device Type | Consumption | Tamper
412
420A
420B
420C
Serial Number | Device Type | Consumption |
414
420A
420B
Serial Number | Device Type | |
416
420A
Serial Number | | |
418
420A
420D
Serial Number | Tamper | |

FIG. 4A

450

Field #	Field Name	Length(bits)	Value
1	Preamble	32	0x55559048
2	Protocol ID	8	(See 460)
3	Endpoint Type and Subtype	8	*
4	Endpoint Serial Number	32	*
5	Current Consumption	32	*
6	Tampers/Flags	16	*
7	CRC-16	16	*

452 454 456 458

460

Message A (18 Bytes) – Fields 1-7 Protocol ID Value (0x06)

Message B (16 Bytes) – Fields 1-5, and 7 Protocol ID Value (0x07)

Message C (12 Bytes) – Fields 1-4, and 7 Protocol ID Value (0x08)

Message D (11 Bytes) – Fields 1, 2, 4, and 7 Protocol ID Value (0x09)

Message E (14 Bytes) – Fields 1-4, and 6, 7 Protocol ID Value (0x0A)

FIG. 4B

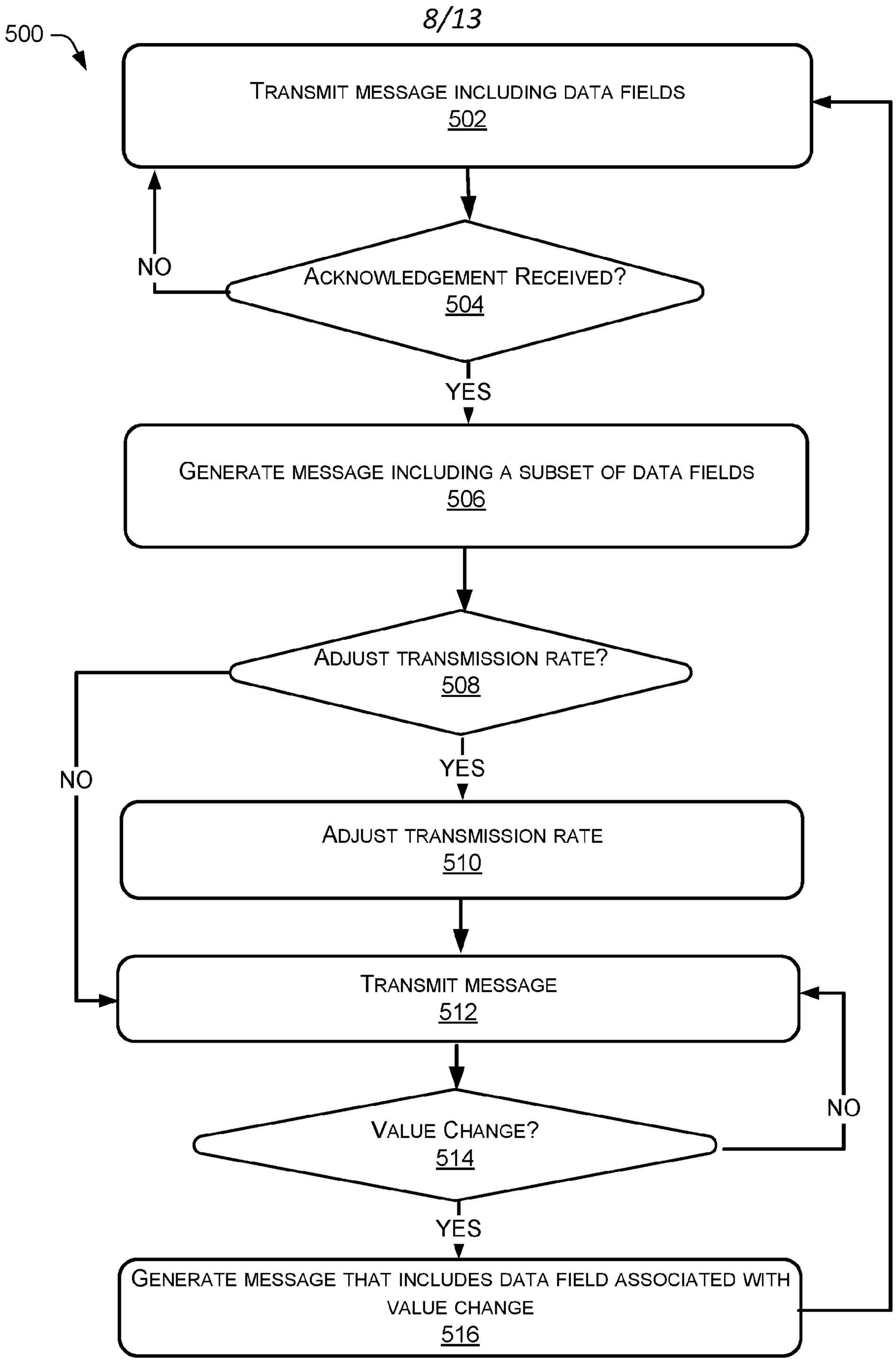

500
TRANSMIT MESSAGE INCLUDING DATA FIELDS
502
ACKNOWLEDGEMENT RECEIVED?
504
NO
YES
GENERATE MESSAGE INCLUDING A SUBSET OF DATA FIELDS
506
ADJUST TRANSMISSION RATE?
508
NO
YES
ADJUST TRANSMISSION RATE
510
TRANSMIT MESSAGE
512
VALUE CHANGE?
514
NO
YES
GENERATE MESSAGE THAT INCLUDES DATA FIELD ASSOCIATED WITH VALUE CHANGE
516

FIG. 5

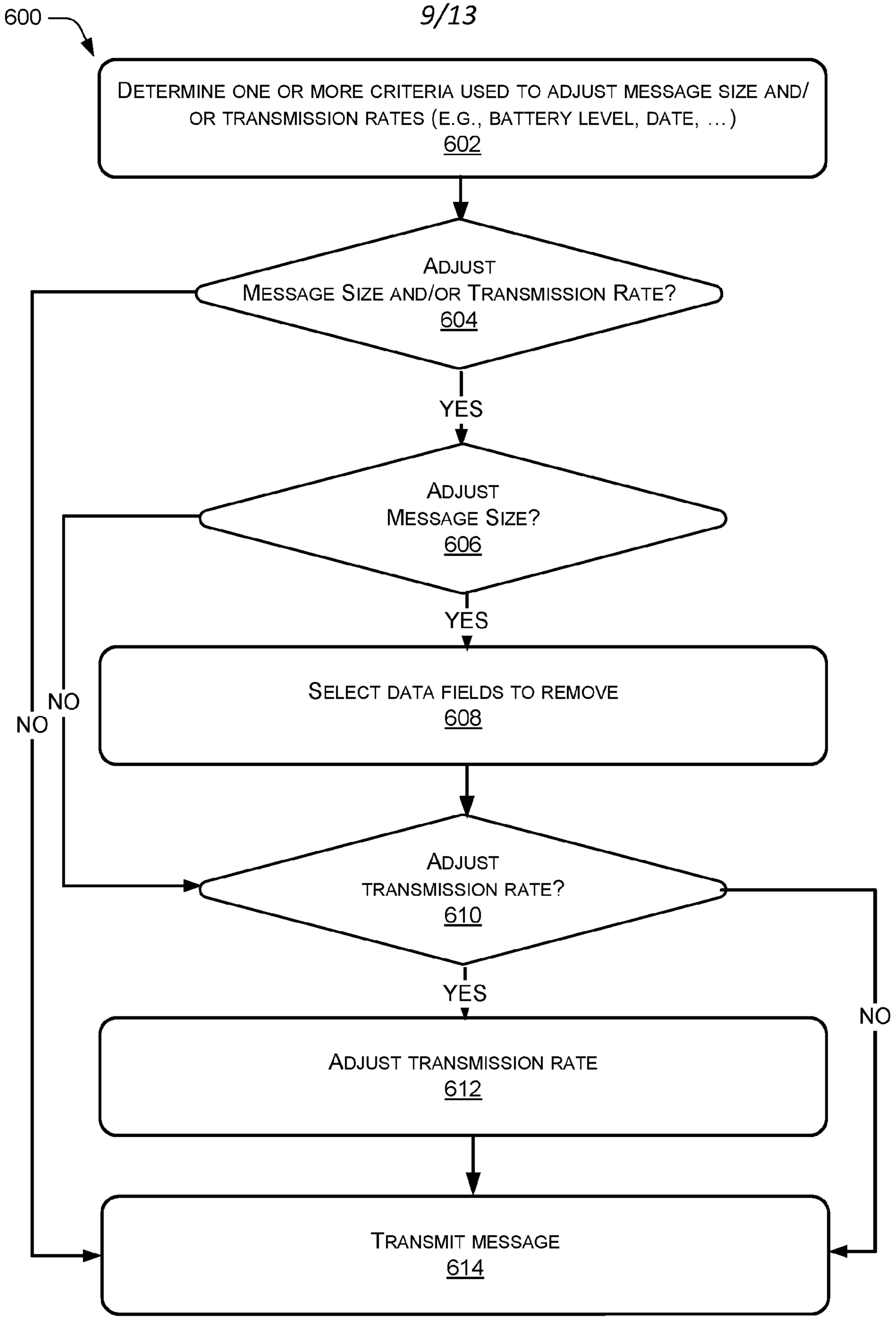

600
DETERMINE ONE OR MORE CRITERIA USED TO ADJUST MESSAGE SIZE AND/OR TRANSMISSION RATES (E.G., BATTERY LEVEL, DATE, ...)
602
ADJUST MESSAGE SIZE AND/OR TRANSMISSION RATE?
604
YES
NO
ADJUST MESSAGE SIZE?
606
YES
NO
SELECT DATA FIELDS TO REMOVE
608
ADJUST TRANSMISSION RATE?
610
YES
NO
ADJUST TRANSMISSION RATE
612
TRANSMIT MESSAGE
614

FIG. 6

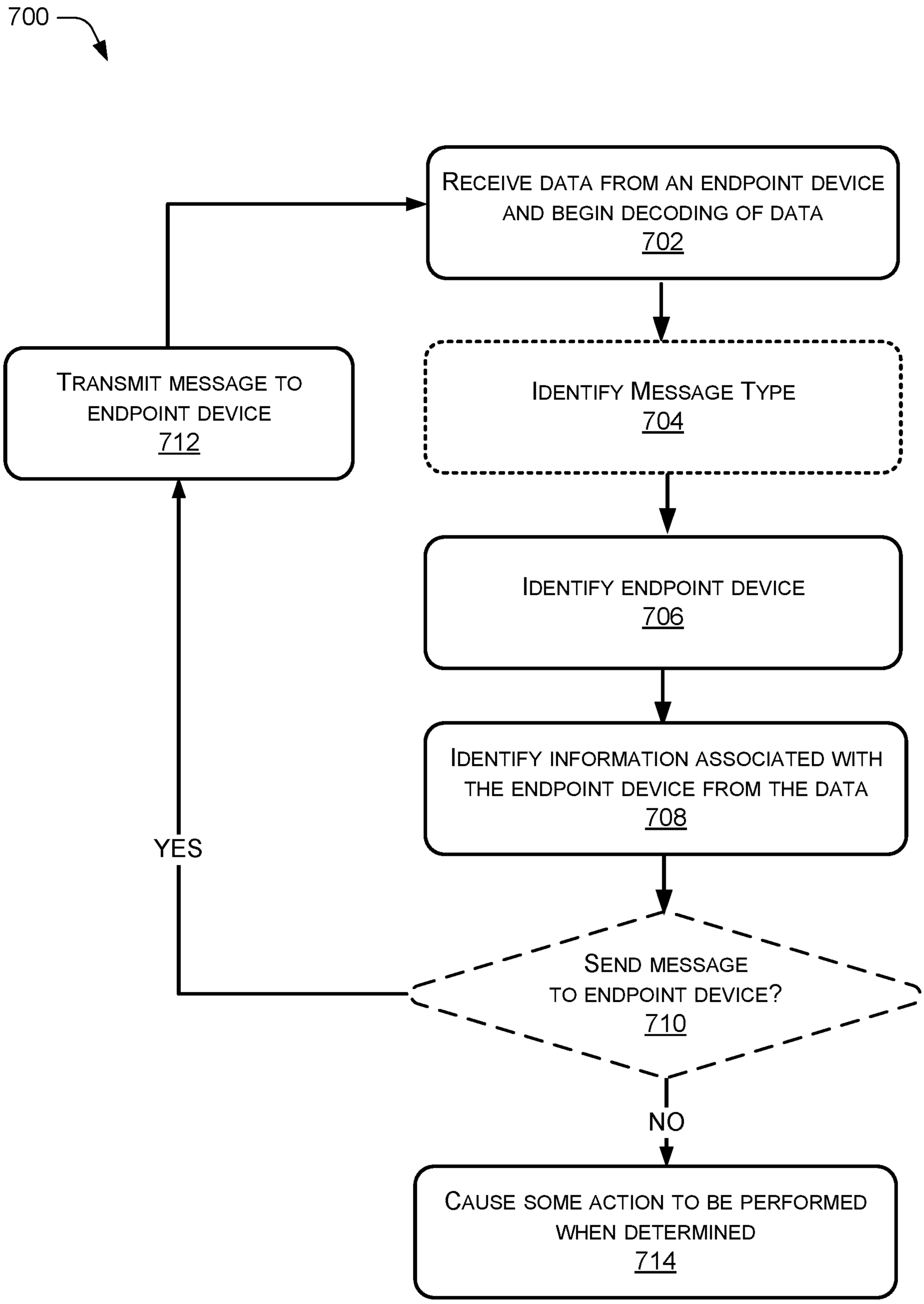

700
RECEIVE DATA FROM AN ENDPOINT DEVICE AND BEGIN DECODING OF DATA
702
IDENTIFY MESSAGE TYPE
704
IDENTIFY ENDPOINT DEVICE
706
IDENTIFY INFORMATION ASSOCIATED WITH THE ENDPOINT DEVICE FROM THE DATA
708
SEND MESSAGE TO ENDPOINT DEVICE?
710
YES
NO
TRANSMIT MESSAGE TO ENDPOINT DEVICE
712
CAUSE SOME ACTION TO BE PERFORMED WHEN DETERMINED
714

FIG. 7

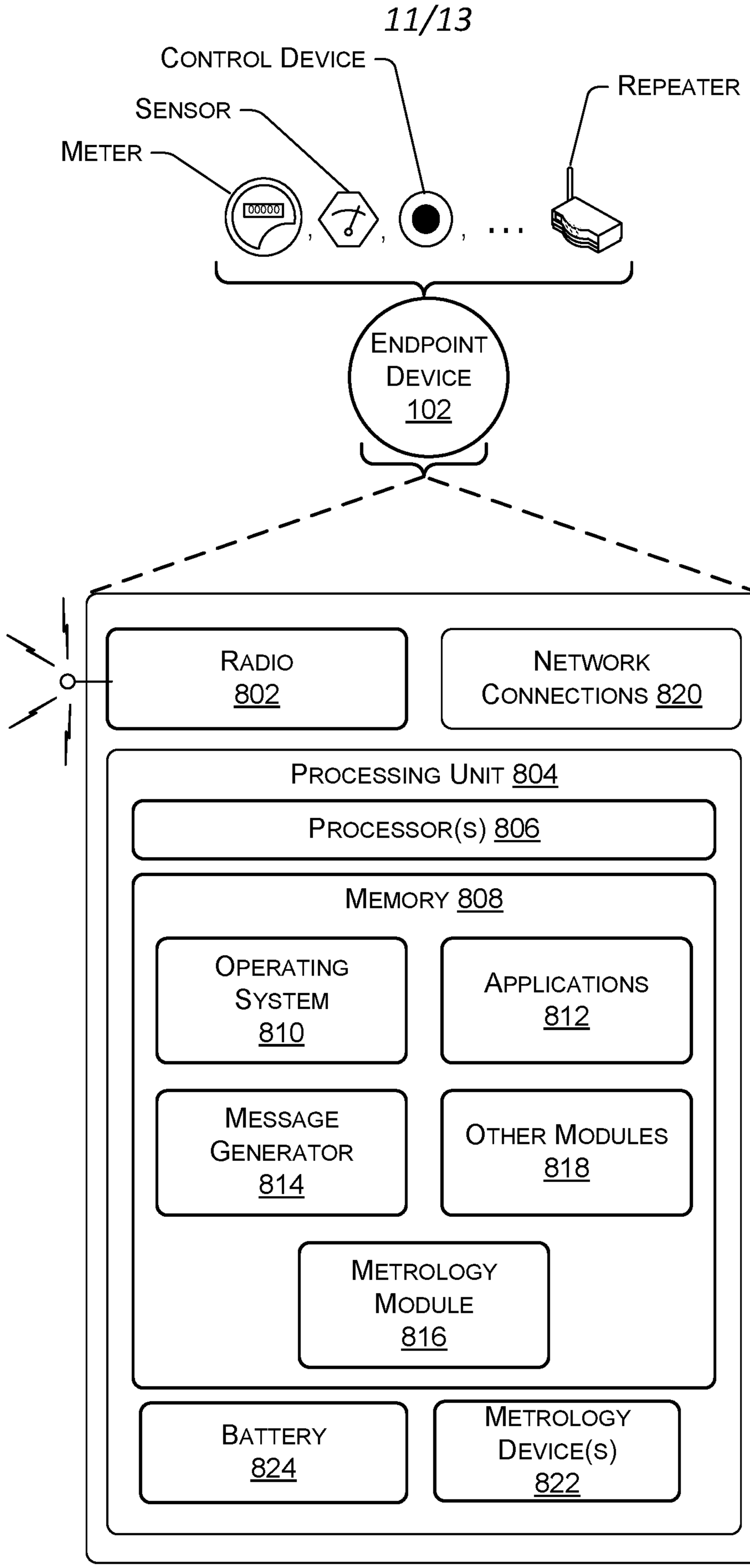

CONTROL DEVICE
SENSOR
METER
REPEATER
00000
ENDPOINT DEVICE 102
RADIO 802
NETWORK CONNECTIONS 820
PROCESSING UNIT 804
PROCESSOR(S) 806
MEMORY 808
OPERATING SYSTEM 810
APPLICATIONS 812
MESSAGE GENERATOR 814
OTHER MODULES 818
METROLOGY MODULE 816
BATTERY 824
METROLOGY DEVICE(S) 822

FIG. 8

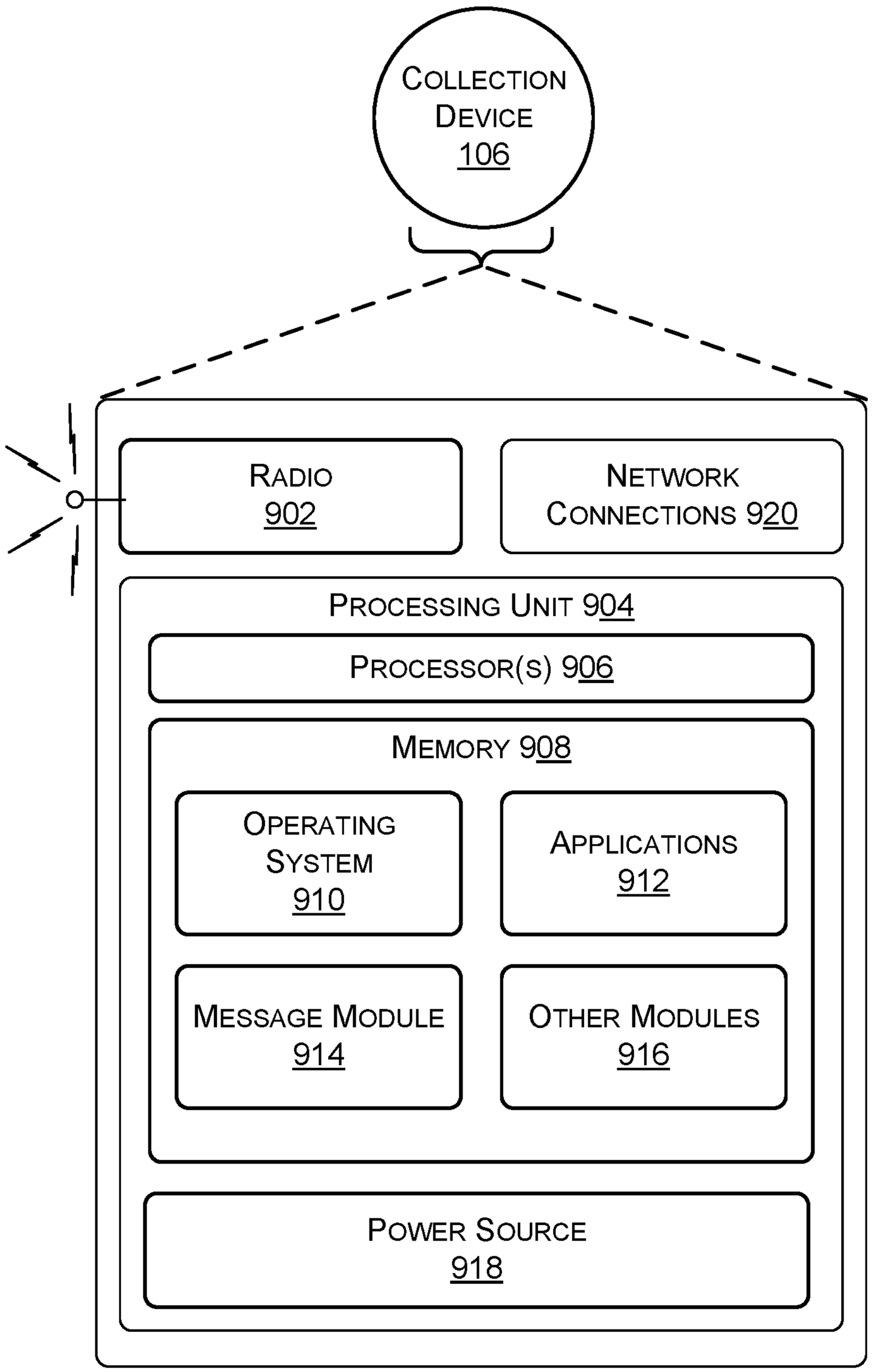

COLLECTION DEVICE 106
RADIO 902
NETWORK CONNECTIONS 920
PROCESSING UNIT 904
PROCESSOR(S) 906
MEMORY 908
OPERATING SYSTEM 910
APPLICATIONS 912
MESSAGE MODULE 914
OTHER MODULES 916
POWER SOURCE 918

FIG. 9

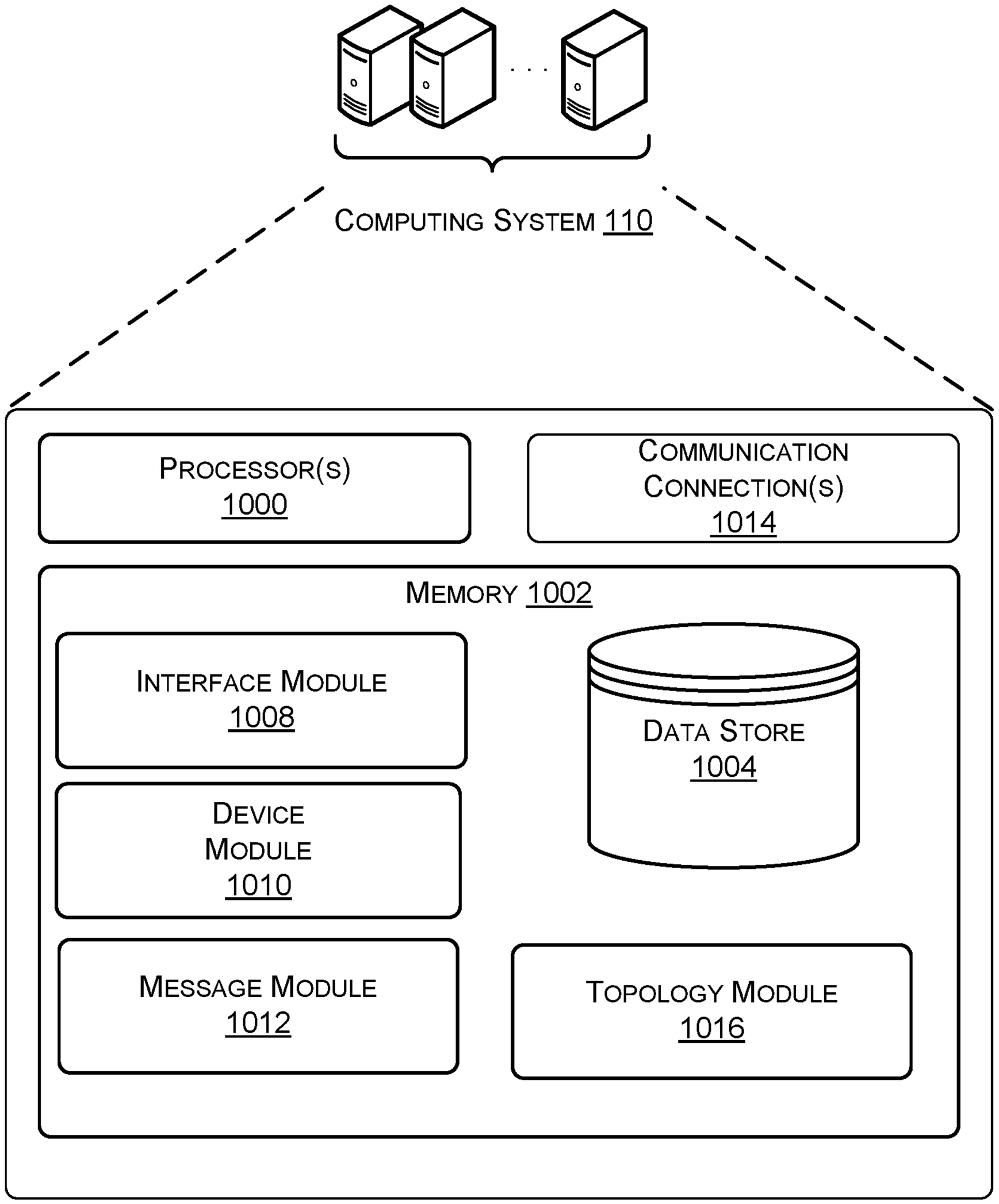

COMPUTING SYSTEM 110
PROCESSOR(S) 1000
COMMUNICATION CONNECTION(S) 1014
MEMORY 1002
INTERFACE MODULE 1008
DATA STORE 1004
DEVICE MODULE 1010
MESSAGE MODULE 1012
TOPOLOGY MODULE 1016

FIG. 10