

10. Bluetooth Operational Description

Please find below the capabilities that are operational for this device:

- Bluetooth v4.0 + LE, EDR
- The minimum number of channel employed in the AFH mode is twenty (20).

Although the chipset documentation may indicate possible functions, the following have been permanently hardware disabled in this device and cannot be enabled by the end user or service provider

- FM Transmitter

Block Diagram

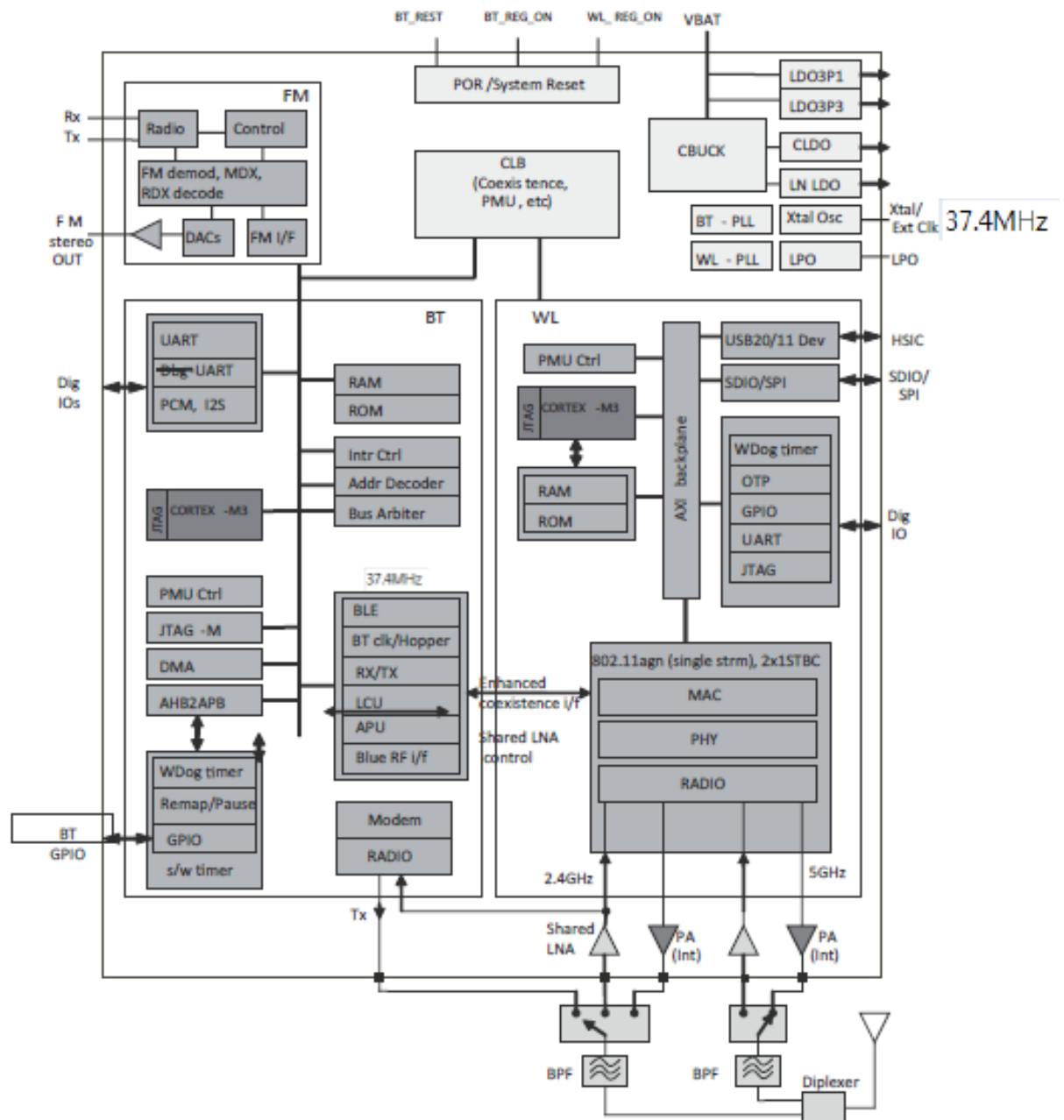


Table 28: Bluetooth Receiver RF Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Unit
General					
Frequency range	—	2402	—	2480	MHz
RX sensitivity	GFSK, 0.1% BER, 1 Mbps	—	−93	−87.5	dBm
	$\pi/4$ -DQPSK, 0.01% BER, 2 Mbps	—	−95	−87.5	dBm
	8-DPSK, 0.01% BER, 3 Mbps	—	−89	−82.5	dBm
Input IP3	—	−16	−9	—	dBm
Maximum input at antenna	—	—	—	−20	dBm
Return loss of BT Rx and Tx pins	50Ω port	10	—	—	dB
Interference Performance¹					
C/I cochannel	GFSK, 0.1% BER	—	—	11.0	dB
C/I 1 MHz adjacent channel	GFSK, 0.1% BER	—	—	0.0	dB
C/I 2 MHz adjacent channel	GFSK, 0.1% BER	—	—	−30.0	dB
C/I ≥ 3 MHz adjacent channel	GFSK, 0.1% BER	—	—	−40.0	dB
C/I image channel	GFSK, 0.1% BER	—	—	−9.0	dB
C/I 1 MHz adjacent to image channel	GFSK, 0.1% BER	—	—	−20.0	dB
C/I cochannel	$\pi/4$ -DQPSK, 0.1% BER	—	—	13.0	dB
C/I 1 MHz adjacent channel	$\pi/4$ -DQPSK, 0.1% BER	—	—	0.0	dB
C/I 2 MHz adjacent channel	$\pi/4$ -DQPSK, 0.1% BER	—	—	−30.0	dB
C/I ≥ 3 MHz adjacent channel	8-DPSK, 0.1% BER	—	—	−40.0	dB
C/I image channel	$\pi/4$ -DQPSK, 0.1% BER	—	—	−7.0	dB
C/I 1 MHz adjacent to image channel	$\pi/4$ -DQPSK, 0.1% BER	—	—	−20.0	dB
C/I cochannel	8-DPSK, 0.1% BER	—	—	21.0	dB
C/I 1 MHz adjacent channel	8-DPSK, 0.1% BER	—	—	5.0	dB
C/I 2 MHz adjacent channel	8-DPSK, 0.1% BER	—	—	−25.0	dB
C/I ≥ 3 MHz adjacent channel	8-DPSK, 0.1% BER	—	—	−33.0	dB
C/I Image channel	8-DPSK, 0.1% BER	—	—	0.0	dB
C/I 1 MHz adjacent to image channel	8-DPSK, 0.1% BER	—	—	−13.0	dB

Table 28: Bluetooth Receiver RF Specifications (Cont.)

Parameter	Conditions	Minimum	Typical	Maximum	Unit
Out-of-Band Blocking Performance (CW)					
30–2000 MHz	0.1% BER	–	–10.0	–	dBm
2000–2399 MHz	0.1% BER	–	–27	–	dBm
2498–3000 MHz	0.1% BER	–	–27	–	dBm
3000 MHz–12.75 GHz	0.1% BER	–	–10.0	–	dBm
Out-of-Band Blocking Performance, Modulated Interferer²					
776–794 MHz	CDMA2000	–	–7	–	dBm
824–849 MHz	cdmaOne	–	–7	–	dBm
824–849 MHz	GSM850	–	–7	–	dBm
880–915 MHz	E-GSM	–	–8	–	dBm
1710–1785 MHz	GSM1800	–	–14	–	dBm
1850–1910 MHz	GSM1900	–	–15	–	dBm
1850–1910 MHz	cdmaOne	–	–14	–	dBm
1850–1910 MHz	WCDMA	–	–14	–	dBm
1920–1980 MHz	WCDMA	–	–15	–	dBm
Spurious Emissions					
30 MHz–1 GHz		–	–	–62	dBm
1–12.75 GHz		–	–	–47	dBm
851–894 MHz		–	–147	–	dBm/Hz
925–960 MHz		–	–147	–	dBm/Hz
1805–1880 MHz		–	–147	–	dBm/Hz
1930–1990 MHz		–	–147	–	dBm/Hz
2110–2170 MHz		–	–147	–	dBm/Hz

1. The maximum value represents the actual Bluetooth specification required for Bluetooth qualification as defined in the version 4.0 specification.

2. Bluetooth reference level for wanted signal at the Bluetooth RF port = –84.5 dBm.

Table 29: Bluetooth Transmitter RF Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Unit
General					
Frequency range		2402	–	2480	MHz
Basic rate (GFSK) Tx power at Bluetooth RF port		–	12	–	dBm
QPSK Tx Power at Bluetooth RF Port		–	10	–	dBm
8PSK Tx Power at Bluetooth RF Port		–	10	–	dBm
Power control step		2	4	6	dB

Table 29: Bluetooth Transmitter RF Specifications (Cont.)

Parameter	Conditions	Minimum	Typical	Maximum	Unit
GFSK In-Band Spurious Emissions					
-20 dBc BW	-	-	-	1	MHz
EDR In-Band Spurious Emissions					
1.0 MHz < M - N < 1.5 MHz	M - N = the frequency range for which the spurious emission is measured relative to the transmit center frequency.	-	-33	-26.0	dBc
1.5 MHz < M - N < 2.5 MHz		-	-27	-20.0	dBm
M - N ≥ 2.5 MHz		-	-43	-40.0	dBm
Out-of-Band Spurious Emissions					
30 MHz to 1 GHz		-	-	-36.0 ^{a, b}	dBm
1 GHz to 12.75 GHz		-	-	-30.0 ^{b, c, d}	dBm
1.8 GHz to 1.9 GHz		-	-	-47.0	dBm
5.15 GHz to 5.3 GHz		-	-	-47.0	dBm
Rx LO Leakage					
2.4 GHz band		-	-	-60.0	dBm
GPS Band Spurious Emissions					
Spurious emissions			-150	-127	dBm/Hz
Out-of-Band Noise Floor^e					
65-108 MHz	FM Rx	-	-146	-	dBm/Hz
776-794 MHz	CDMA2000	-	-146	-	dBm/Hz
869-960 MHz	cdmaOne, GSM850	-	-146	-	dBm/Hz
925-960 MHz	E-GSM	-	-146	-	dBm/Hz
1570-1580 MHz	GPS	-	-143	-	dBm/Hz
1805-1880 MHz	GSM1800	-	-140	-	dBm/Hz
1930-1990 MHz	GSM1900, cdmaOne, WCDMA	-	-138	-	dBm/Hz
2110-2170 MHz	WCDMA	-	-135	-	dBm/Hz

a. The maximum value represents the value required for Bluetooth qualification as defined in the v4.0 specification.

b. The spurious emissions during Idle mode are the same as specified in Table 29 on page 125.

c. Specified at the Bluetooth antenna port.

d. Meets this specification using a front-end band-pass filter.

e. Transmitted power in cellular and FM bands at the Bluetooth antenna port. See Figure 41 on page 123 for location of the port.

Table 30: Local Oscillator Performance

Parameter	Minimum	Typical	Maximum	Unit
LO Performance				
Lock time	–	72	–	μ s
Initial carrier frequency tolerance	–	± 25	± 75	kHz
Frequency Drift				
DH1 packet	–	25	± 25	kHz
DH3 packet	–	40	± 40	kHz
DH5 packet	–	40	± 40	kHz
Drift rate	–	6	20	kHz/50 μ s
Frequency Deviation				
00001111 sequence in payload ^a	140	147	175	kHz
10101010 sequence in payload ^b	115	138	–	kHz
Channel spacing	–	1	–	MHz

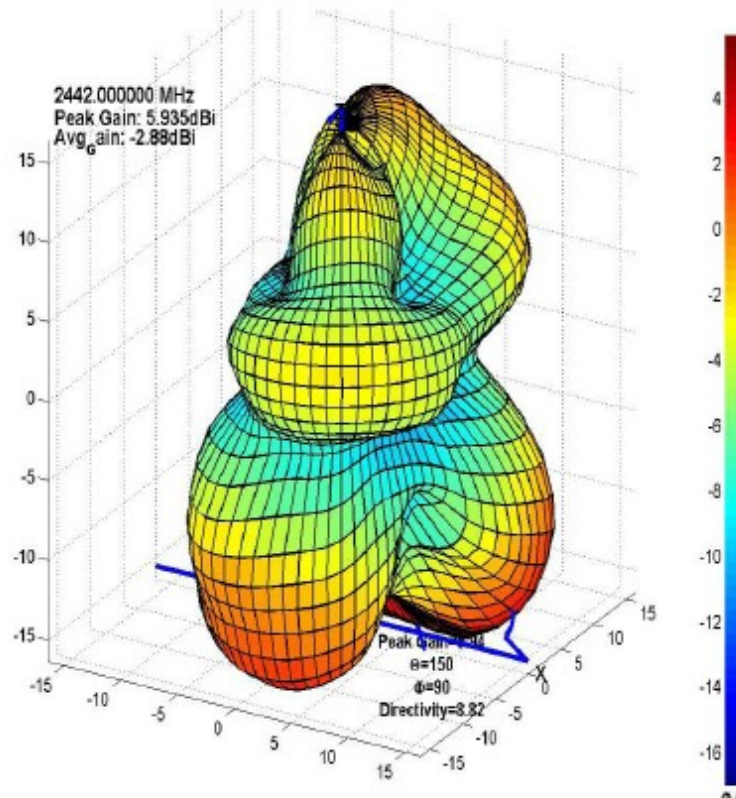
a. This pattern represents an average deviation in payload.

b. Pattern represents the maximum deviation in payload for 99.9% of all frequency deviations.

Rear case Jig 상 VSWR 측정 Data

검사 항목		VSWR			
		@1862-42MHz (1820MHz)		@1862+42MHz (1904MHz)	
SPEC		최대 2.1:1 최소 1.1:1		최대 2.1:1 최소 1.1:1	
1	16	1.64	1.65	1.61	1.62
2	17	1.68	1.64	1.63	1.64
3	18	1.42	1.82	1.46	1.88
4	19	1.65	1.64	1.59	1.63
5	20	1.66	1.67	1.57	1.58
6	21	1.53	1.82	1.55	1.85
7	22	1.78	1.68	1.73	1.56
8	23	1.66	1.69	1.61	1.63
9	24	1.71	1.80	1.63	1.82
10	25	1.69	1.70	1.63	1.62
11	26	1.67	1.68	1.63	1.59
12	27	1.77	1.63	1.72	1.57
13	28	1.53	1.65	1.48	1.65
14	29	1.63	1.64	1.68	1.61
15	30	1.67	1.67	1.59	1.53
AVG		1.67		1.63	
STDEV		0.083		0.094	
Cpk		1.74		1.67	

[VSWR : 단품 Jig 상에서 측정]



[Radiation Pattern : Set 상에서 측정]

Peak Gain	5.93 dBi
Avg. Gain	-2.88 dBi