

Bill of materials

Table 1. STDES-CBMLoRaBLE bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	Table 2	-	Main board	ST	Not available for sale
2	1	Table 3	-	Expansion board no. 1	ST	Not available for sale
3	1	Table 4	-	Expansion board no. 2	ST	Not available for sale
4	1	Table 5	-	System on board	ST	Not available for sale
5	1	Table 6	-	Flexible cable no. 1	ST	Not available for sale
6	1	Table 7	-	Flexible cable no. 2	ST	Not available for sale

Table 2. STDES-CBMLoRaBLE: main board bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	C1	1uF	CAP CER 1UF 6.3V X5R 0402	Taiyo Yuden	JMK105BJ105KV-F
2	10	C5 C6 C7 C8 C12 C15 C16 C17 C18 C20	0.1uF	CAP CER 0.1UF 16V X7R 0402	Würth Elektronik	885012205037
3	1	C9	470nF	CAP CER 0.47UF 25V X7R 0603	Würth Electronics Inc.	885012206075
4	1	C10	1uF	CAP CER 1UF 100V X7R 1206	TDK Corporation	C3216X7R2A105K160AA
5	1	C11	47pF	CAP CER 47PF 50V C0G 0603	TDK Corporation	C1608C0G1H470J080AA
6	1	C13	10uF	CAP CER 10UF 10V X5R 0402	Samsung Electro-Mechanics America, Inc.	CL05A106MP8NUB8
7	1	C14	10uF	CAP CER 10UF 75V X7R 1210	TDK Corporation	CGA6P1X7R1N106M250AC
8	1	C19	10uF	CAP CER 10UF 6.3V X5R 0603	TDK Corporation	C1608X5R0J106M080AB
9	1	CN1	WE-63272330001 1	USB 3.1 TYPE C RECEPTACLE THT/SM	Würth Electronics Inc.	632723300011
10	9	D1 D2 D3 D4 D5 D6 D15 D16 D18	BAT30F4, ST0201	30 V, 300 mA CSP general purpose Small Signal Schottky Diode	ST	BAT30F4
11	3	D7 D12 D14	ESDALC6V1-1U2, ST0201	Single-line low capacitance Transil for ESD protection	ST	ESDALC6V1-1U2

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
12	1	D9	SMA4F58AY	Automotive 400 W TVS in SMA Flat	ST	SMA4F58AY
13	1	D10	12V	DIODE ZENER 12V 500MW SOD123	ON Semiconductor	MMSZ5242BT1G
14	1	D11	LED AMBER 0402 SMD	LED AMBER 0402 SMD	Würth Electronics	150040AS73240
15	1	D13	LED YELLOW CLEAR 0402 SMD	LED YELLOW CLEAR 0402 SMD	Würth Elektronik	150040YS73240
16	1	D17	ESDA25P35-1U1 M, QFN-2L	High-power transient voltage suppressor	ST	ESDA25P35-1U1M
17	1	D19	LED BLUE CLEAR 0402	LED BLUE CLEAR 0402 SMD	Würth Elektronik	150040BS73240
18	2	D20 D21	ESDA7P120-1U1 M, QFN-2L	High-power transient voltage suppressor	ST	ESDA7P120-1U1M
19	1	IC1	ECMF02-2AMX6, QFN-6L	Common-mode filter and ESD protection for USB 2.0 and MIPI/ MDDI interfaces	ST	ECMF02-2AMX6
20	1	J1	Con2- Würth6553021240 22	CONN HEADER SMD 2POS 1MM	Würth Elektronik	665302124022
21	2	J2 J3	CON34-Socket	CONN SOCKET 34POS SMD GOLD	Panasonic Electric Works	AXF5G3412A
22	6	J4 J6 J8 J10 J12 J14	CON 3 Strip 1.27	CONN HEADER VERT 3POS 1.27MM	Harwin Inc.	M50-3530342
23	10	J5 J7 J9 J11 J13 J16 J18 J23 J28 J33	Jumper-Female	CONN JUMPER SHORTING 1.27MM GOLD	Sullins Connector Solutions	NPB02SVAN-RC
24	1	J15	STLINK-V3 Adapter Receptacle	CONN HEADER SMD 14POS 1.27MM	Samtec Inc.	FTSH-107-01-L-DV-K
25	5	J17 J19 J22 J24 J25	Strip male 2X1 pitch 1.27	CONN HEADER VERT 2POS 1.27MM	Harwin Inc.	M50-3530242
26	1	J21	CON2	CONN TERM BLOCK 2.54MM 2POS	Phoenix Contact	1725656
28	2	J26 J27	CON 22 Header	CONN HEADER SMD 22POS 1.27MM	Samtec Inc.	FTSH-111-01-L-DV-K-P-TR
29	1	L1	120uH 0.7A	FIXED IND 120UH 670MA 660 MOHM	Würth Elektronik	744777212
30	1	L2	Filter LC 1uF	FILTER LC 1UF SMD	Murata Electronics	BNX022-01L

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
31	1	M1	MX66L2G45GXRI00	IC FLASH SERIAL NOR 2GBIT	Macronix	MX66L2G45GXRI00
32	1	Q4	STL9P3LLH6, PowerFLAT 3.3x3.3	P-channel -30 V, 12 mOhm typ., -9 A STripFET H6 Power MOSFET in a PowerFLAT 3.3 x 3.3 package	ST	STL9P3LLH6
33	3	Q5 Q6 Q7	RV3C002UN	NCH 20V 150MA SM SIG MOSFET, VML	Rohm Semiconductor	RV3C002UNT2CL
34	1	Q8	STL6N3LLH6, PowerFLAT 2x2	N-channel 30 V, 0.021 Ohm typ., 6 A STripFET H6 Power MOSFET in a PowerFLAT 2x2 package	ST	STL6N3LLH6
35	1	R1	36k	RES SMD 36K OHM 1% 1/10W 0603	Yageo	RC0603FR-0736KL
36	8	R2 R14 R27 R28 R31 R32 R36 R37	1M	RES SMD 1M OHM 1% 1/16W 0402	TE CONNECTIVITY	CRG0402F1M0
37	1	R3	100k	RES SMD 100K OHM 5% 1/10W 0603	Stackpole Electronics Inc	RMCF0603FT100K
38	5	R13 R15 R16 R35 R38	10K	RES SMD 10K OHM 1% 1/16W 0402	Yageo	AC0402FR-0710KL
39	1	R17	0	RES SMD 0 OHM JUMPER 1/10W 0603	Panasonic Electronic Components	ERJ-3GEY0R00V
40	1	R18	300k	CHIP RESISTOR SMD 1% 1/10W 0603	Bourns	CR0603-FX-3003ELF
41	7	R19 R22 R23 R30 R34 SB2 SB3	0	RES SMD 0 OHM JUMPER 1/16W 0402	Vishay Dale	CRCW04020000Z0ED
42	1	R20	5.6k	RES SMD 5.6K OHM 0.05% 1/8W 0603	Panasonic Electronic Components	ERA-3VRW5601V
43	1	R21	62k	RES SMD 62K OHM 0.1% 1/10W 0603	Yageo	RT0603BRD0762KL
44	3	R24 R29 R40	1k	RES SMD 1K OHM 5% 1/16W 0402	Yageo	RC0402JR-071KL
45	2	R25 R26	100kOhms	RES SMD 100K OHM 1% 1/16W 0402	Yageo	RC0402FR-07100KL
46	1	R39	2.4k	CHIP RESISTOR SMD 1% 1/16W 0402	Yageo	RC0402FR-072K4L
47	6	S1 S2 S3 S4 S5 S6	Spacer_1.5mm	RND STANDOFF M2X0.4 STEEL 1.5MM	Würth Elektronik	9774015243R

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
48	2	SB1 SB4	N.M.	RES SMD 0402 - NOT MOUNTED	-	-
49	4	SB5 SB6 SB9 SB10	0	0 OHM JUMPER 0603	Panasonic Electronic Components	ERJ-3GEY0R00V
50	2	SW1 SW4	Push-Bottom_WE43433 1013822	SWITCH TACTILE SPST-NO 0.05A 12V	Würth Elektronik	434331013822
51	1	SW2	Push-Bottom-43433104 5822	SWITCH TACTILE SPST-NO 0.05A 12V	Würth Elektronik	434331045822
52	1	SW3	Switch 4P	Slide Switches Slide Type 1P4T (1.4mm height)	Diptronics	MSS4-V-T/R
53	4	TP1 TP2 TP3 TP4	5Vdc	TEST POINT PC MINI .040"D BLACK	Keystone Electronics	5001
54	3	U1 U3 U6	STG4160	Analog Switch ICs LV 0.5 Ohm SPDT 15kV 1.65 to 4.8V 0.2uA	STMicroelectronics	STG4160BJR
55	1	U4	STSAFA110DFSP L02, UFDFPN 8 2x3x0.6	Authentication, state-of-the-art security for peripherals and IoT devices	ST	STSAFA110DFSP L02
56	1	U5	L7983PUR, DFN 3X3X0.8 10L PITCH 0.5	60 V 300 mA synchronous step-down switching regulator with 10 µA quiescent current	ST	L7983PUR
57	1	U7	74LVC1G74GT	IC FF D-TYPE SNGL 1BIT 8XSON	Nexperia USA Inc.	74LVC1G74GT,115
58	1	U8	TCP01-M12	USB Type-C® port protection for sink applications	ST	TCP01-M12
59	1	MODULE 1	-	Board WWB_WL_SOB	ST	-

Table 3. STDES-CBMLoRaBLE: expansion board no. 1 bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	7	C1 C2 C3 C4 C5 C6 C7	100nF	CAP CER 0.1UF 16V X7R 0402	Murata Electronics North America	GRM155R71C104KA88J
2	1	J1	CON34-Header	CONN HDR 34POS SMD GOLD	Panasonic Electric Works	AXF6G3412A
3	4	R1 R6 R16 R17	N.M.	RES SMD 0402 - NOT MOUNTED	-	-
4	1	R2	7.5k	CHIP RESISTOR SMD 1% 1/16W 0402	-	-

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
5	11	R3 R4 R5 R7 R8 R9 R10 R11 R12 R13 R14	0	RES SMD 0 OHM JUMPER 1/16W 0402	Vishay Dale	CRCW04020000Z0ED
6	3	SC1 SC2 SC3	Screw M2X4	MACH SCREW PAN SLOTTED M2X4mm	RS	914-1462
7	1	U1	ISM330DHCXTR, VFLGA2.5X3X.86 14L P.5 L.475X.25	NEMO inertial module with Machine Learning Core, Finite State Machine with digital output for industrial applications	ST	ISM330DHCXTR
8	1	U2	IIS3DWBTR, VFLGA2.5X3X.86 14L P.5 L.475X.25	Ultra-wide bandwidth, low- noise 3-axis digital accelerometer	ST	IIS3DWBTR
9	1	U3	IIS2ICLXTR, LGA 5X5X1.7 16LD CERAMIC CAVITY	High-accuracy, High-resolution, Low-power, 2- axis Digital Inclinometer with Embedded Machine Learning Core	ST	IIS2ICLXTR
10	1	U4	STTS22HTR, UDFN 2X2X.55 6L PITCH0.65	Low-voltage, ultra- low-power, 0.5°C accuracy I2C/ SMBus 3.0 temperature sensor	ST	STTS22HTR

Table 4. STDES-CBMLoRaBLE: expansion board no. 2 bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	2	C1 C4	100nF	CAP CER 0.1UF 16V X7R 0402	Murata Electronics North America	GRM155R71C104KA88J
2	1	C3	100nF	CAP CER 0.1UF 16V X7R 0402	Murata Electronics North America	GRM155R71C104KA88J
3	1	C2	1uF	CAP CER 1UF 6.3V X5R 0402	Taiyo Yuden	JMK105BJ105KV-F
4	1	C5	4.7uF	CAP CER 4.7UF 10V X5R 0603	Würth Electronics Inc.	885012106012
5	1	C6	2.2nF	CAPACITOR CERAMIC SMD 0603	Würth Electronics Inc.	885012206061
6	1	C7	47nF	CAPACITOR CERAMIC SMD 0603	Würth Electronics Inc.	885012206063
7	2	J1 J3	95293-101-03LF	CONN HEADER SMD 3POS 2.54MM	Amphenol ICC (FCI)	95293-101-03LF
8	3	J2 J4 J5	Jumper-Female	CONN JUMPER SHORTING 1.27MM GOLD	Sullins Connector Solutions	NPB02SVAN-RC

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
9	1	J6	CON34-Header	CONN HDR 34POS SMD GOLD	Panasonic Electric Works	AXF6G3412A
10	3	J7 J9 J10	Con3_Strip_Male_SMD	CONN HEADER SMD 3POS 1.27MM	Sullins Connector Solutions	GRPB031VWTC-RC
11	1	J8	CON34-Socket	CONN SOCKET 34POS SMD GOLD	Panasonic Electric Works	AXF5G3412A
12	2	R1 R25	N.M.	RES SMD 0402 - NOT MOUNTED	-	-
13	9	R2 R4 R5 R10 R15 R16 R17 R18 R26	N.M.	RES SMD 0402 - NOT MOUNTED	-	-
14	13	R3 R7 R8 R9 R12 R13 R14 R19 R21 R22 R24 R27 R28	0	RES SMD 0 OHM JUMPER 1/16W 0402	Vishay Dale	CRCW04020000Z0ED
15	2	R6 R11	N.M.	CHIP RESISTOR SMD 1% 1/16W 0402	-	-
16	1	R20	N.M.	RES SMD 0402 - NOT MOUNTED	-	-
17	1	R23	N.M.	RES SMD 0 OHM JUMPER 1/16W 0402	Vishay Dale	CRCW04020000Z0ED
18	2	SB2 SB3	0	0 OHM JUMPER 0603	Yageo	RC0603JR-070RL
19	3	SC1 SC2 SC3	Screw M2X4	MACH SCREW PAN SLOTTED M2X4mm	RS	914-1462
20	1	U2	IMP34DT05TR, HCLGA 4MM X 3 MM X 1.00 MM MICRO	MEMS audio sensor omnidirectional digital microphone for industrial applications	ST	IMP34DT05TR
21	1	U3	ILPS22QSTR, HLGA 2X2X.8 10L EXP. SILIC .91SQ	Dual full-scale, 1260 hPa and 4060 hPa, absolute digital output barometer with embedded Qvar electrostatic sensor	ST	ILPS22QSTR

Table 5. STDES-CBMLoRaBLE: system on board bill of materials

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
1	1	C900	100nF 0201 10V 20%	CAPACITOR CERAMIC SMD 0201 10V X5R 100 nF (not mounted)	Murata Electronics	GRM033R61A104ME15D
2	1	C901	22uF 0603 (1608 Metric) 16V 20%	CAPACITOR CERAMIC SMD	Samsung Electro-Mechanics	CL10A226M07JZNC

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
				0603 22 uF 16V 20% X5R		
3	2	C902 C903	10uF 0805 (2012 Metric) 16V 10%	CAP CER 10UF 16V X5R 0805	Murata	GRM21BR61C106KE15L
4	1	C904	10uF 0603 (1608 Metric) 6.3V 20%	CAP CER 10UF 6.3V X5R 0603	TDK Corporation	C1608X5R0J106M080AB
5	13	C905 C906 C918 C919 C921 C922 C926 C927 C928 C929 C931 C936 C940	100nF 0201 10V 20%	CAPACITOR CERAMIC SMD 0201 10V X5R 100 nF	Murata Electronics	GRM033R61A104ME15D
6	10	C907 C908 C909 C910 C911 C912 C913 C914 C915 C916	3pF 0201 25V 10%	CAPACITOR CERAMIC SMD 0201 25V COG 3pF	Murata Electronics	GRM0335C1E3R0CA01D
7	1	C917	10uF 0603 (1608 Metric) 10V 20%	Tantalum Capacitors - Solid SMD 10V 10uF 20%	Vishay	TR8M106M0102T2000
8	2	C920 C925	4.7uF 0201 6.3V 20%	CAPACITOR CERAMIC SMD 0201 6.3V X5R 4.7 uF	Murata Electronics	GRM035R60J475ME15D
9	2	C923 C930	5.3pF 0402 (1005 Metric) 50V 0.1pF	CAPACITOR CERAMIC SMD 0402 5.3pF 50V COG	Murata Electronics	GCQ1555C1H5R3BB01D
10	1	C932	47pF 0201 25V 5%	CAPACITOR CERAMIC SMD 0201 25V COG 47 pF	Murata Electronics	GRM0335C1E470JA01J
11	3	C933 C934 C935	33pF 0201 50V 5%	CAPACITOR CERAMIC SMD 0201 50V COG 33 pF	Murata Electronics	GRM0335C1H330JA01D
12	1	C937	47pF 0201 25V 5%	CAPACITOR CERAMIC SMD 0201 25V X5R 47 pF	Murata Electronics	GRM0335C1E470JA01J
13	1	C938	470nF 0402 (1005 Metric) 10V 10%	CAP CER 0.47UF 10% 10V X5R 0402	Yageo	CC0402KRX5R6BB474
14	1	C939	10pF 0402 (1005 Metric) 50V 5%	CAP CER 10pF 0.25pF 50V COG 0402	Kemet	C0402C100J5GACTU
15	3	C941 C943 C946	1nF 0201 50V 10%	CAPACITOR CERAMIC SMD 0201 50V X7R 1 nF	Murata Electronics	GRM033R71H102KA12D
16	1	C942	2.2pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 2.2pF 0.05pF% 50V COG 0402	Murata Electronics	GJM1555C1H2R2WB01D
17	1	C949	1.5pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 1.5pF 0.05pF% 50V COG 0402	Murata Electronics	GJM1555C1H1R5WB01D
18	5	C944 C945 C953 C954 C961	33pF 0402 (1005 Metric) 50V 1%	CAPACITOR CERAMIC SMD	Murata Electronics	GJM1555C1H330FB01D

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
				0402 33pF 1% 50V COG		
19	1	C947	6.2pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 6.2pF 0.05pF 50V COG 0402	Murata Electronics	GJM1555C1H6R2WB01D
20	1	C948	4.3pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 4.3pF 0.05pF 50V COG 0402	Murata Electronics	GJM1555C1H4R3WB01D
21	1	C950	47nF 0201 16V 10%	CAPACITOR CERAMIC SMD 0201 16V X5R 47 nF	Murata Electronics	GRM033R61C473KE84D
22	1	C951	68pF 0201 50V 5%	CAPACITOR CERAMIC SMD 0201 50V COG 68 pF	Murata Electronics	GRM0335C1H680JA01D
23	2	C952 C966	2.7pF 0402 (1005 Metric) 50V 0.1pF	CAP CER 2.7pF 0.1pF% 50V COG 0402	Yageo	CC0402BRNPO9BN2R7
24	1	C955	5.6pF 0402 (1005 Metric) 50V 0.25pF	CAP CER 5.6pF 0.25pF% 50V COG 0402	Murata Electronics	GRM1555C1H5R6BA01D
25	3	C956 C962 C964	3.3pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 3.3pF 0.05pF% 50V COG 0402	Murata Electronics	GJM1555C1H3R3WB01D
26	1	C957	1.3pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 1.3pF 0.05pF% 50V COG 0402	Murata Electronics	GJM1555C1H1R3WB01D
27	1	C963	3.6pF 0402 (1005 Metric) 50V 0.05pF	CAP CER 3.6pF 0.05pF 50V COG 0402	Murata Electronics	GJM1555C1H3R6WB01D
28	1	C965	1pF 0402 (1005 Metric) 50V 0.1pF	CAP CER 1pF 0.1pF% 50V COG 0402 (not mounted)	AVX Corporation	04025A1R0BAT2A
29	4	CL1 CL2 CL3 CL4	Clip-0951-46R	RFI SHIELD CLIP COMPACT TIN SMD	Harwin Inc.	S0951-46R
30	2	D900 D901	BAT30F4 0201 (0603 Metric) 300mA ST0201	30 V, 300 mA CSP general purpose small signal Schottky diode	ST	BAT30F4
31	1	D902	Led_RGB 0404 (1010 Metric) 5mA Red, 5mA Green, 5mA Blue	WL-SFCC SMT FULL-COLOR CHIP LED	Würth Elektronik	150044M155260
32	30	J900 J901 J902 J903 J904 J905 J906 J907 J908 J909 J910 J911 J912 J913 J914 J915 J916 J917 J918 J919 J920 J921 J922 J923 J924 J925 J926 J927 J928 J929	0 0402	TIN DROP JUMPER 0402 (not mounted)	-	-

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
33	2	J930 J931	CON 22 Header	CONN HEADER SMD 22POS 1.27MM (not mounted)	Samtec Inc.	FTSH-111-01-L-DV-K-P-TR
34	2	J932 J933	NX3L1T3157GM 6-XFDFN	IC SWITCH SPDT 6XSON	NXP USA Inc.	NX3L1T3157GMZ
35	1	J935	CON_SMA_Wurth _60312202114508	SMA PCB END LAUNCH JACK ROUND PO	Würth Elektronik	60312202114508
36	1	J936	UFL Wurth_636101111 001 U.FL-R- SMT-1	WR-UMRF_PCB RECEPTACLE_S MT_3 PAD (not mounted)	Würth Elektronik	636101111001
37	1	J937	0 R 0603 1/10W 1%	RES SMD 1% 1/10W 0603 0 OHM	Vishay	CRCW06030000Z0EB
38	1	L900	2.2uH 1.2A 0806 (2016 Metric) 20%	FIXED IND 2.2UH 1.2A 110 MOHM	Würth Elektronik	74479776222
39	1	L901	2.2uH 1.2A 0806 (2016 Metric) 20%	FIXED IND 2.2UH 1.2A 110 MOHM	Würth Elektronik	74479776222
40	1	L902	600Ohm@100MH z 0603 (16085 Metric) 300mA	INDUCTOR SMD 0603 600 OHM 100MHz	Chilisin Electronics	BBBK00160808601Y00
41	1	L903	15uH 0603 (16085 Metric) 250mA	INDUCTOR SMD 0603 15uH 250mA	TDK Corporation	MLZ1608N150LT000
42	1	L904	1kOhm 100MHz 0402 (1005 Metric) 250mA	INDUCTOR SMD 0402	Murata Electronics	BLM15HG102SN1D
43	2	L905 L912	3.3nH 0402 (1005 Metric) 2A 0.1nH	INDUCTOR SMD 0402 3.3nH	Murata Electronics	LQW15AN3N3B80D
44	2	L907 L908	47nH 0402 (1005 Metric) 210mA	INDUCTOR SMD 0402 47nH	Murata Electronics	LQW15AN47NJ00D
45	1	L909	3nH 0402 (1005 Metric) 1.35A	INDUCTOR SMD 0402 3nH	Murata Electronics	LQW15AN3N0C80D
46	3	L906 L910 L913	8.7nH 0402 (1005 Metric) 1.42A 2%	INDUCTOR SMD 0402 8.7nH	Murata Electronics	LQW15AN8N7G80D
47	1	L911	2.5nH 0402 (1005 Metric) 1A	INDUCTOR SMD 0402 2.5nH	Murata Electronics	LQW15AN2N5B80D
48	1	L914	11nH 0402 (1005 Metric) 500mA	INDUCTOR SMD 0402 11nH	Murata Electronics	LQW15AN11NG00D
49	1	Q1	VT6X1T2R VMT-6	Bipolar Transistors - BJT TR NPNX2 20V VCEO	ROHM Semiconductor	VT6X1T2R
50	1	Q2	2SCR522MT2L SOT-723 150mW	TRANS NPN 20V 0.2A VMT3	Rohm Semiconductor	2SCR522MT2L
51	4	R900 R909 R910 R911	100R 0201 1/20 1%	RES SMD 1% 1/20W 0201 100R 1/20W	PANASONIC	ERJ1GNF1000C
52	3	R901 R924 R930	1M 0201 1/20 1%	RES SMD 1% 1/20W 0201 1M 1/20W	Yageo	RC0201FR-071ML
53	3	R902 R903 R904	10k 0201 1/20 1%	RES SMD 1% 1/20W 0201 10K 1% 1/20W	VISHAY	CRCW020110K0FKED

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
54	31	R905 R906 R913 R914 R915 R916 SB900 SB901 SB902 SB904 SB905 SB906 SB907 SB908 SB909 SB910 SB911 SB912 SB913 SB918 SB922 SB923 SB924 SB925 SB926 SB927 SB928 SB929 SB931 SB940 SB941	0R 0201 1/20 1%	RES SMD 1% 1/20W 0201 0R 1/20W	Stackpole Electronics	RMCF0201ZT0R00
55	1	R908	220R 0201 1/20 1%	RES SMD 1% 1/20W 0201 220R 1/20W	Yageo	RC0201FR-07220RL
56	1	R917	30k 0201 1/20 1%	RES SMD 1% 1/20W 0201 30K 1% 1/20W	Yageo	RC0201FR-0730KL
57	1	R918	120k 0201 1/20 1%	RES SMD 1% 1/20W 0201 120K 1% 1/20W	Panasonic Electronic	ERJ-1GNF1203C
58	1	R919	51k 0201 1/20 1%	RES SMD 1% 1/20W 0201 51K 1% 1/20W	MULTICOMP	ERJ-MCRE000181
59	1	R920	20R 0201 1/20 1%	RES SMD 5% 1/20W 0201 20R 5% 1/20W	Panasonic Electronic	ERJ-1GNJ200C
60	1	R921	0R 0402 (1005 Metric) 1/16W 1%	CHIP RESISTOR SMD 5% 1/16W 0402	Yageo	RC0402JR-070RL
61	1	R922	33R 0201 1/20 1%	RES SMD 1% 1/20W 0201 33R 5% 1/20W	Panasonic Electronics	ERJ-1GNJ330C
62	2	R925 R926	100k 0201 1/20 1%	RES SMD 1% 1/20W 0201	MULTICOMP	MCRE000188
63	1	R923	1M 0201 1/20 1%	RES SMD 1% 1/20W 0201 1M 1/20W (not mounted)	Yageo	RC0201FR-071ML
64	1	R927	82R 0201 1/20 5%	RES SMD 1% 1/20W 0201 82R 5% 1/20W	Panasonic Electronic	ERJ-1GNJ820C
65	7	SB903 SB915 SB916 SB920 SB921 SB930 SB932	0R 0201 1/20 1%	RES SMD 1% 1/20W 0201 0R 1/20W (not mounted)	Stackpole Electronics	RMCF0201ZT0R00
66	1	SH1	Shield MS190-10S	19 X 13.9 X 2MM EMI/RF SHIELD	Masach Tech Ltd.	MS190-10S
67	1	TP900	TP	Test point (not mounted)	-	-
68	1	TP901	TP	Test point (not mounted)	-	-
69	66	TPB900 TPB901 TPB902 TPB903	TPB	Test point (not mounted)	-	-

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
		TPB904 TPB905 TPB906 TPB907 TPB908 TPB909 TPB910 TPB911 TPB912 TPB913 TPB914 TPB915 TPB916 TPB917 TPB918 TPB919 TPB920 TPB921 TPB922 TPB923 TPB924 TPB925 TPB926 TPB927 TPB928 TPB929 TPB930 TPB931 TPB932 TPB933 TPB934 TPB935 TPB936 TPB937 TPB938 TPB939 TPB940 TPB941 TPB942 TPB943 TPB944 TPB945 TPB946 TPB947 TPB948 TPB949 TPB950 TPB951 TPB952 TPB953 TPB954 TPB955 TPB956 TPB957 TPB958 TPB959 TPB960 TPB961 TPB962 TPB963 TPB964 TPB965				
70	56	TPE130 TPE131 TPE132 TPE133 TPE134 TPE148 TPE149 TPE150 TPE151 TPE152 TPE900 TPE901 TPE902 TPE903 TPE904 TPE905 TPE906 TPE907 TPE908 TPE909 TPE910 TPE911 TPE912 TPE913 TPE914 TPE915 TPE916 TPE917 TPE918 TPE919 TPE920 TPE921 TPE922 TPE923 TPE924 TPE925 TPE926 TPE927 TPE928 TPE930 TPE932 TPE934 TPE936 TPE943 TPE944 TPE945 TPE946 TPE947 TPE948 TPE949 TPE950 TPE951 TPE952 TPE953 TPE954 TPE955	TPE	Test point (not mounted)	-	-
71	2	FB1 FB2	470Ohms@100M Hz 0201 (0603 Metric)	FERRITE BEAD 470 OHM 0201 1LN	Murata Electronics	BLM03BD471SN1D
72	1	U900	ST1PS02CQTR MLPQ/QFN 1.7x2.0x0.55 12L P0.4	400 mA nano-quiescent synchronous step- down converter	ST	ST1PS02CQTR

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
				with digital voltage selection, Power Good and AUX switch		
73	1	U901	STSAFA110DFSP L02 UFDFPN 8 2x3x0.6	Authentication, state-of-the-art security for peripherals and IoT devices	ST	STSAFA110DFSP L02
74	1	U902	STM32WB5MMG H6TR SIP LGA 86 7.3x11x1.342 mm	Ultra-low-power Module - Dual core Arm Cortex-M4 MCU 64 MHz, Cortex-M0+ 32 MHz with 1 Mbyte of Flash memory, Bluetooth LE 5.2, 802.15.4, Zigbee, Thread, USB, LCD, AES-256	ST	STM32WB5MMGH6TR
75	1	U903	STM32WL55JC16 UFBGA 73 5x5x0.6 P 0.5 mm	Sub-GHz Wireless Microcontrollers. Dual-core Arm Cortex-M4/M0+ @48 MHz with 256 Kbytes of Flash memory, 64 Kbytes of SRAM	ST	STM32WL55JC16
76	1	U904	BGS13SN8 8-XFQFN	IC RF SWITCH SP3T TSNP8-1	Infineon Technologies	BGS13SN8E6327XTSA1
77	1	Y900	32.768kHz 2-SMD, No Lead	CRYSTAL 32.768KHZ 6PF SMD	NDK America, Inc.	NX2012SA-32.768KHZ-EXS00A-MU00527
78	1	Y901	32MHz 4-SMD, No Lead	XTAL OSC VCTCXO 32.0000MHZ SMD	NDK America, Inc.	NT2016SA-32M-END4263A

Table 6. STDES-CBMLoRaBLE: flexible cable no. 1 bill of materials

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
1	1	J2	CON34-Header	CONN HDR 34POS SMD GOLD	Panasonic Electric Works	AXF6G3412A
2	2	J1 J3	CON34-Socket	CONN SOCKET 34POS SMD GOLD	Panasonic Electric Works	AXF5G3412A

Table 7. STDES-CBMLoRaBLE: flexible cable no. 2 bill of materials

Item	Q.ty	Ref.	Part/Value	Description	Manufacturer	Order code
1	1	J2	CON34-Header	CONN HDR 34POS SMD GOLD	Panasonic Electric Works	AXF6G3412A
2	1	J1	CON34-Socket	CONN SOCKET 34POS SMD GOLD	Panasonic Electric Works	AXF5G3412A

Evaluation board license agreement

Important: *All information on this document is subject to this Evaluation Board License Agreement.*

By using this evaluation board or kit (together with all related software, firmware, components, and documentation provided by ST, "Evaluation Board"), You ("You") are agreeing to be bound by the terms and conditions of this Evaluation Board License Agreement ("Agreement"). Do not use the Evaluation Board until You have read and agreed to this Agreement. Your use of the Evaluation Board constitutes Your acceptance of this Agreement.

LICENSE

STMicroelectronics ("ST") grants You the right to use the enclosed Evaluation Board offering limited features only to evaluate and test ST products solely for Your evaluation and testing purposes in a research and development setting. The Evaluation Board shall not be, in any case, directly or indirectly assembled as a part in any production of Yours as it is solely developed to serve evaluation purposes and has no direct function and is not a finished product. If software and/or firmware is accompanied by a separate end user license agreement ("EULA"), then such software and/or firmware shall be governed by such EULA.

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The Evaluation Board offers limited features allowing You only to evaluate and test the ST products. The Evaluation Board is not intended for consumer or household use. You are not authorized to use the Evaluation Board in any production system, and it may not be offered for sale or lease, or sold, leased or otherwise distributed for commercial purposes. If the Evaluation Board is incorporated in an evaluation system, the evaluation system may be used by You solely for Your evaluation and testing purposes. Such evaluation system may not be offered for sale or lease or sold, leased or otherwise distributed for commercial purposes and must be accompanied by a conspicuous notice as follows: "This device is not, and may not be, offered for sale or lease, or sold or leased or otherwise distributed for commercial purposes".

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Title to the Evaluation Board remains with ST and/or its licensors. You may not remove any copyright or other proprietary rights notices without prior written authorization from ST. You may make one copy of the software and/or firmware of the Evaluation Board for back up or archival purposes provided that You reproduce and apply to such copy any copyright or other proprietary rights notices included on or embedded in the software and/or firmware. You agree to prevent any unauthorized copying in whole or in part of the Evaluation Board.

RESTRICTIONS AND WARNINGS

Before You handle or use the Evaluation Board, You must carefully review any related documentation provided by ST. Such documentation may contain important warnings. You shall comply with all such warnings and other instructions and employ reasonable safety precautions in using the Evaluation Board. Failure to do so may result in death, personal injury, or property damage. If You have any questions regarding the safe usage of the Evaluation Board, You should contact ST for guidance.

You may not sell, assign, sublicense, lease, rent or otherwise distribute the Evaluation Board for commercial purposes, in whole or in part, or use Evaluation Board in a production system, with the exception that if You are an authorized ST distributor, You may resell the Evaluation Board in compliance with the applicable terms and conditions. Except as provided in this Agreement or as explicitly permitted in the documentation of the Evaluation Board, You may not reproduce the Evaluation Board or modify, reverse engineer, de-compile or disassemble its software and/or firmware, in whole or in part.

You shall not use the Evaluation Board in any safety critical or functional safety testing, including but not limited to testing of life supporting, military or nuclear applications. ST expressly disclaims any responsibility for such usage which shall be made at Your sole risk, even if ST has been informed in writing of such usage. Unless expressly designated in writing by ST as suitable for use in testing automotive or aerospace applications, You shall not use the Evaluation Board in such testing.

Notice applicable to Evaluation Boards according to European Regulation

For the European Regulation of the Evaluation Board, the applicable EU directives are considered, with a particular attention to the Low Voltage Directive (LVD) 2014/35/EU, the Electromagnetic Compatibility (EMC) Directive 2014/30/EU, and the Radio Equipment Directive (RED) 2014/53/EU. If the Evaluation Board is outside the scope of the foregoing Directives, then the General Product Safety Directive (GPSD) 2001/95/EC and Council Directive 93/68/EEC, amending Directive 73/23/EEC on electrical equipment designed for use within certain voltage limits, are applicable.

The Evaluation Board meets the requirements of the Restriction of Hazardous Substances (RoHS 2 or RoHS recast) Directive 2011/65/EU, Annex II, as amended by Directive 2015/863/EU.

Notice applicable to Evaluation Boards not FCC-Approved

This kit is designed to allow:

1. Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and
2. Software developers to write software applications for use with the end product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of 47 CFR, Chapter I ("FCC Rules"), the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

For Evaluation Boards annotated as FEDERAL COMMUNICATIONS COMMISSION (FCC) Part 15 Compliant

- **FCC Interference Statement for Class A Evaluation Boards:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- **FCC Interference Statement for Class B Evaluation Boards:** 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 to 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 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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WARRANTY

ST WARRANTS THAT IT HAS THE RIGHT TO PROVIDE THE EVALUATION BOARD TO YOU. THIS WARRANTY IS PROVIDED BY ST IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY AS TO MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR UNINTERRUPTED OR ERROR-FREE OPERATION, ALL OF WHICH ARE EXPRESSLY DISCLAIMED. THE EVALUATION BOARD IS PROVIDED "AS IS".

YOU WARRANT TO ST THAT YOU WILL ENSURE THE EVALUATION BOARD IS USED ONLY BY ELECTRONICS EXPERTS WHO UNDERSTAND THE DANGERS OF HANDLING AND USING SUCH ITEMS, YOU ASSUME ALL RESPONSIBILITY AND LIABILITY FOR ANY IMPROPER OR UNSAFE HANDLING OR USE OF THE EVALUATION BOARD BY YOU, YOUR EMPLOYEES, AFFILIATES, CONTRACTORS, AND DESIGNEES.

LIMITATION OF LIABILITIES

IN NO EVENT SHALL ST BE LIABLE TO YOU, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR ANY OTHER LEGAL THEORY, FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, INCIDENTAL, PUNITIVE, OR EXEMPLARY DAMAGES WITH RESPECT TO ANY MATTERS RELATING TO THIS AGREEMENT, REGARDLESS OF WHETHER ST HAS BEEN ADVISED OF THE POSSIBILITY OF THE SAME. IN NO EVENT SHALL ST'S LIABILITY ARISING OUT OF THIS AGREEMENT IN THE AGGREGATE EXCEED THE AMOUNT PAID BY YOU UNDER THIS AGREEMENT FOR THE PURCHASE OF THE EVALUATION BOARD, OR TEN UNITED STATES DOLLARS (\$10.00) IF NO PURCHASE PRICE WAS PAID.

INDEMNIFICATION

You shall, at Your expense, defend ST and its Affiliates against a claim or action brought by a third party for infringement or misappropriation of any patent, copyright, trade secret or other intellectual property right of a third party to the extent resulting from (1) Your combination of the Evaluation Board with any other component, system, software, or firmware, (2) Your modification of the Evaluation Board, or (3) Your use of the Evaluation Board in a manner not permitted under this Agreement.

You shall indemnify ST and its Affiliates against and pay any resulting costs and damages finally awarded against ST or its Affiliates or agreed to in any settlement, provided that You have sole control of the defense and settlement of the claim or action, and ST cooperates in the defense and furnishes all related evidence under its control at Your expense. ST will be entitled to participate in the defense of such claim or action and to employ counsel at its own expense.

"Affiliates" means any corporation or other entity directly or indirectly controlled by, controlling or under common control with the entity in question, for so long as such ownership exists. "Control" means the direct or indirect beneficial ownership of more than fifty (50%) percent of the stock or other equity interests entitled to vote for the election of directors or an equivalent governing body. Any such corporation or other legal entity shall be deemed to be an Affiliate of such Party only as long as such Control exists.

TERMINATION

ST may terminate this Agreement without notice if You breach this Agreement. Upon termination, You shall immediately destroy or return all copies of the software, firmware, and documentation of the Evaluation Board to ST and certify in writing to ST that You have done so.

APPLICABLE LAW AND JURISDICTION

This Agreement shall be governed, construed and enforced in accordance with the laws of Switzerland, without regard to its conflict of laws rules. The UN Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. In case of dispute and in the absence of an amicable settlement, the only competent jurisdiction shall be the Courts of Geneva, Switzerland. Any breach of this Agreement by You may result in irreparable damage to ST for which ST will not have an adequate remedy at law. Accordingly, in addition to any other remedies and damages available, You acknowledge and agree that ST may immediately seek enforcement of this Agreement in any jurisdiction by means of specific performance or injunction, without any requirement to post a bond or other security.

SEVERABILITY

If any provision of this agreement is or becomes, at any time or for any reason, unenforceable or invalid, no other provision of this agreement shall be affected thereby, and the remaining provisions of this agreement shall continue with the same force and effect as if such unenforceable or invalid provisions had not been inserted in this Agreement. In addition, any unenforceable or invalid provision shall be deemed replaced by a provision that is valid and enforceable and that comes closest to expressing the intention of the unenforceable or invalid provision.

WAIVER

The waiver by either party of any breach of any provision of this Agreement shall not operate or be construed as a waiver of any other or a subsequent breach of the same or a different provision.

RELATIONSHIP OF THE PARTIES

Nothing in this Agreement shall create, or be deemed to create, any joint venture, partnership, principal-agent, employer-employee or other relationship between the Parties, except that of independent contractors. Neither Party has the authority or power to bind, to contract in the name of, or to create a liability for the other in any way or for any purpose.

SURVIVAL

Any provision of this Agreement which imposes an obligation after termination of this Agreement shall survive the termination of this Agreement.

SECTION HEADINGS

Section headings are inserted for convenience only and shall not be used to interpret this Agreement.

WASTE AND RECYCLING

The Evaluation Board is not to be disposed of as urban waste. At the end of its life cycle, differentiated waste collection must be followed. Consult the local authorities for more information on the proper disposal channels. It is mandatory to separately collect the Evaluation Board and make sure it is delivered it to the appropriate waste management and recycling centers.

As of 15 August 2018, in all the countries belonging to the European Union, the Evaluation Board is subject to the WEEE Directive 2012/19/EU requirement; therefore, it is forbidden to dispose of the Evaluation Board as undifferentiated waste or with other domestic wastes. Consult the local authorities for more information on the proper recycling centers.

Disposing of the Evaluation Board incorrectly may cause damage to the environment and may be subject to fines based on specific countries' rules.

IMPORTANT NOTICE – READ CAREFULLY

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