

FREQUENCY CHARTS

FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]	FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
1	896.0125	935.0125	51	896.6375	935.6375
2	896.0250	935.0250	52	896.6500	935.6500
3	896.0375	935.0375	53	896.6625	935.6625
4	896.0500	935.0500	54	896.6750	935.6750
5	896.0625	935.0625	55	896.6875	935.6875
6	896.0750	935.0750	56	896.7000	935.7000
7	896.0875	935.0875	57	896.7125	935.7125
8	896.1000	935.1000	58	896.7250	935.7250
9	896.1125	935.1125	59	896.7375	935.7375
10	896.1250	935.1250	60	896.7500	935.7500
11	896.1375	935.1375	61	896.7625	935.7625
12	896.1500	935.1500	62	896.7750	935.7750
13	896.1625	935.1625	63	896.7875	935.7875
14	896.1750	935.1750	64	896.8000	935.8000
15	896.1875	935.1875	65	896.8125	935.8125
16	896.2000	935.2000	66	896.8250	935.8250
17	896.2125	935.2125	67	896.8375	935.8375
18	896.2250	935.2250	68	896.8500	935.8500
19	896.2375	935.2375	69	896.8625	935.8625
20	896.2500	935.2500	70	896.8750	935.8750
21	896.2625	935.2625	71	896.8875	935.8875
22	896.2750	935.2750	72	896.9000	935.9000
23	896.2875	935.2875	73	896.9125	935.9125
24	896.3000	935.3000	74	896.9250	935.9250
25	896.3125	935.3125	75	896.9375	935.9375
26	896.3250	935.3250	76	896.9500	935.9500
27	896.3375	935.3375	77	896.9625	935.9625
28	896.3500	935.3500	78	896.9750	935.9750
29	896.3625	935.3625	79	896.9875	935.9875
30	896.3750	935.3750	80	897.0000	936.0000
31	896.3875	935.3875	81	897.0125	936.0125
32	896.4000	935.4000	82	897.0250	936.0250
33	896.4125	935.4125	83	897.0375	936.0375
34	896.4250	935.4250	84	897.0500	936.0500
35	896.4375	935.4375	85	897.0625	936.0625
36	896.4500	935.4500	86	897.0750	936.0750
37	896.4625	935.4625	87	897.0875	936.0875
38	896.4750	935.4750	88	897.1000	936.1000
39	896.4875	935.4875	89	897.1125	936.1125
40	896.5000	935.5000	90	897.1250	936.1250
41	896.5125	935.5125	91	897.1375	936.1375
42	896.5250	935.5250	92	897.1500	936.1500
43	896.5375	935.5375	93	897.1625	936.1625
44	896.5500	935.5500	94	897.1750	936.1750
45	896.5625	935.5625	95	897.1875	936.1875
46	896.5750	935.5750	96	897.2000	936.2000
47	896.5875	935.5875	97	897.2125	936.2125
48	896.6000	935.6000	98	897.2250	936.2250
49	896.6125	935.6125	99	897.2375	936.2375
50	896.6250	935.6250	100	897.2500	936.2500

FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]	FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
101	897.2625	936.2625	151	897.8875	936.8875
102	897.2750	936.2750	152	897.9000	936.9000
103	897.2875	936.2875	153	897.9125	936.9125
104	897.3000	936.3000	154	897.9250	936.9250
105	897.3125	936.3125	155	897.9375	936.9375
106	897.3250	936.3250	156	897.9500	936.9500
107	897.3375	936.3375	157	897.9625	936.9625
108	897.3500	936.3500	158	897.9750	936.9750
109	897.3625	936.3625	159	897.9875	936.9875
110	897.3750	936.3750	160	898.0000	937.0000
111	897.3875	936.3875	161	898.0125	937.0125
112	897.4000	936.4000	162	898.0250	937.0250
113	897.4125	936.4125	163	898.0375	937.0375
114	897.4250	936.4250	164	898.0500	937.0500
115	897.4375	936.4375	165	898.0625	937.0625
116	897.4500	936.4500	166	898.0750	937.0750
117	897.4625	936.4625	167	898.0875	937.0875
118	897.4750	936.4750	168	898.1000	937.1000
119	897.4875	936.4875	169	898.1125	937.1125
120	897.5000	936.5000	170	898.1250	937.1250
121	897.5125	936.5125	171	898.1375	937.1375
122	897.5250	936.5250	172	898.1500	937.1500
123	897.5375	936.5375	173	898.1625	937.1625
124	897.5500	936.5500	174	898.1750	937.1750
125	897.5625	936.5625	175	898.1875	937.1875
126	897.5750	936.5750	176	898.2000	937.2000
127	897.5875	936.5875	177	898.2125	937.2125
128	897.6000	936.6000	178	898.2250	937.2250
129	897.6125	936.6125	179	898.2375	937.2375
130	897.6250	936.6250	180	898.2500	937.2500
131	897.6375	936.6375	181	898.2625	937.2625
132	897.6500	936.6500	182	898.2750	937.2750
133	897.6625	936.6625	183	898.2875	937.2875
134	897.6750	936.6750	184	898.3000	937.3000
135	897.6875	936.6875	185	898.3125	937.3125
136	897.7000	936.7000	186	898.3250	937.3250
137	897.7125	936.7125	187	898.3375	937.3375
138	897.7250	936.7250	188	898.3500	937.3500
139	897.7375	936.7375	189	898.3625	937.3625
140	897.7500	936.7500	190	898.3750	937.3750
141	897.7625	936.7625	191	898.3875	937.3875
142	897.7750	936.7750	192	898.4000	937.4000
143	897.7875	936.7875	193	898.4125	937.4125
144	897.8000	936.8000	194	898.4250	937.4250
145	897.8125	936.8125	195	898.4375	937.4375
146	897.8250	936.8250	196	898.4500	937.4500
147	897.8375	936.8375	197	898.4625	937.4625
148	897.8500	936.8500	198	898.4750	937.4750
149	897.8625	936.8625	199	898.4875	937.4875
150	897.8750	936.8750	200	898.5000	937.5000

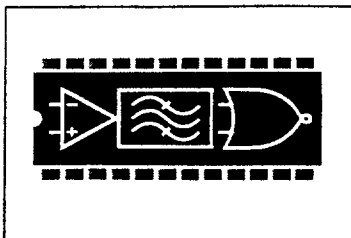
FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]	FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
201	898.5125	937.5125	251	899.1375	938.1375
202	898.5250	937.5250	252	899.1500	938.1500
203	898.5375	937.5375	253	899.1625	938.1625
204	898.5500	937.5500	254	899.1750	938.1750
205	898.5625	937.5625	255	899.1875	938.1875
206	898.5750	937.5750	256	899.2000	938.2000
207	898.5875	937.5875	257	899.2125	938.2125
208	898.6000	937.6000	258	899.2250	938.2250
209	898.6125	937.6125	259	899.2375	938.2375
210	898.6250	937.6250	260	899.2500	938.2500
211	898.6375	937.6375	261	899.2625	938.2625
212	898.6500	937.6500	262	899.2750	938.2750
213	898.6625	937.6625	263	899.2875	938.2875
214	898.6750	937.6750	264	899.3000	938.3000
215	898.6875	937.6875	265	899.3125	938.3125
216	898.7000	937.7000	266	899.3250	938.3250
217	898.7125	937.7125	267	899.3375	938.3375
218	898.7250	937.7250	268	899.3500	938.3500
219	898.7375	937.7375	269	899.3625	938.3625
220	898.7500	937.7500	270	899.3750	938.3750
221	898.7625	937.7625	271	899.3875	938.3875
222	898.7750	937.7750	272	899.4000	938.4000
223	898.7875	937.7875	273	899.4125	938.4125
224	898.8000	937.8000	274	899.4250	938.4250
225	898.8125	937.8125	275	899.4375	938.4375
226	898.8250	937.8250	276	899.4500	938.4500
227	898.8375	937.8375	277	899.4625	938.4625
228	898.8500	937.8500	278	899.4750	938.4750
229	898.8625	937.8625	279	899.4875	938.4875
230	898.8750	937.8750	280	899.5000	938.5000
231	898.8875	937.8875	281	899.5125	938.5125
232	898.9000	937.9000	282	899.5250	938.5250
233	898.9125	937.9125	283	899.5375	938.5375
234	898.9250	937.9250	284	899.5500	938.5500
235	898.9375	937.9375	285	899.5625	938.5625
236	898.9500	937.9500	286	899.5750	938.5750
237	898.9625	937.9625	287	899.5875	938.5875
238	898.9750	937.9750	288	899.6000	938.6000
239	898.9875	937.9875	289	899.6125	938.6125
240	899.0000	938.0000	290	899.6250	938.6250
241	899.0125	938.0125	291	899.6375	938.6375
242	899.0250	938.0250	292	899.6500	938.6500
243	899.0375	938.0375	293	899.6625	938.6625
244	899.0500	938.0500	294	899.6750	938.6750
245	899.0625	938.0625	295	899.6875	938.6875
246	899.0750	938.0750	296	899.7000	938.7000
247	899.0875	938.0875	297	899.7125	938.7125
248	899.1000	938.1000	298	899.7250	938.7250
249	899.1125	938.1125	299	899.7375	938.7375
250	899.1250	938.1250	300	899.7500	938.7500

FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
301	899.7625	938.7625
302	899.7750	938.7750
303	899.7875	938.7875
304	899.8000	938.8000
305	899.8125	938.8125
306	899.8250	938.8250
307	899.8375	938.8375
308	899.8500	938.8500
309	899.8625	938.8625
310	899.8750	938.8750
311	899.8875	938.8875
312	899.9000	938.9000
313	899.9125	938.9125
314	899.9250	938.9250
315	899.9375	938.9375
316	899.9500	938.9500
317	899.9625	938.9625
318	899.9750	938.9750
319	899.9875	938.9875
320	900.0000	939.0000
321	900.0125	939.0125
322	900.0250	939.0250
323	900.0375	939.0375
324	900.0500	939.0500
325	900.0625	939.0625
326	900.0750	939.0750
327	900.0875	939.0875
328	900.1000	939.1000
329	900.1125	939.1125
330	900.1250	939.1250
331	900.1375	939.1375
332	900.1500	939.1500
333	900.1625	939.1625
334	900.1750	939.1750
335	900.1875	939.1875
336	900.2000	939.2000
337	900.2125	939.2125
338	900.2250	939.2250
339	900.2375	939.2375
340	900.2500	939.2500
341	900.2625	939.2625
342	900.2750	939.2750
343	900.2875	939.2875
344	900.3000	939.3000
345	900.3125	939.3125
346	900.3250	939.3250
347	900.3375	939.3375
348	900.3500	939.3500
349	900.3625	939.3625
350	900.3750	939.3750

FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
351	900.3875	939.3875
352	900.4000	939.4000
353	900.4125	939.4125
354	900.4250	939.4250
355	900.4375	939.4375
356	900.4500	939.4500
357	900.4625	939.4625
358	900.4750	939.4750
359	900.4875	939.4875
360	900.5000	939.5000
361	900.5125	939.5125
362	900.5250	939.5250
363	900.5375	939.5375
364	900.5500	939.5500
365	900.5625	939.5625
366	900.5750	939.5750
367	900.5875	939.5875
368	900.6000	939.6000
369	900.6125	939.6125
370	900.6250	939.6250
371	900.6375	939.6375
372	900.6500	939.6500
373	900.6625	939.6625
374	900.6750	939.6750
375	900.6875	939.6875
376	900.7000	939.7000
377	900.7125	939.7125
378	900.7250	939.7250
379	900.7375	939.7375
380	900.7500	939.7500
381	900.7625	939.7625
382	900.7750	939.7750
383	900.7875	939.7875
384	900.8000	939.8000
385	900.8125	939.8125
386	900.8250	939.8250
387	900.8375	939.8375
388	900.8500	939.8500
389	900.8625	939.8625
390	900.8750	939.8750
391	900.8875	939.8875
392	900.9000	939.9000
393	900.9125	939.9125
394	900.9250	939.9250
395	900.9375	939.9375
396	900.9500	939.9500
397	900.9625	939.9625
398	900.9750	939.9750
399	900.9875	939.9875

FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]	FCC CH#	Tx FREQ.[MHz]	Rx FREQ.[MHz]
400	901.0000	940.0000	450	901.6250	940.6250
401	901.0125	940.0125	451	901.6375	940.6375
402	901.0250	940.0250	452	901.6500	940.6500
403	901.0375	940.0375	453	901.6625	940.6625
404	901.0500	940.0500	454	901.6750	940.6750
405	901.0625	940.0625	455	901.6875	940.6875
406	901.0750	940.0750	456	901.7000	940.7000
407	901.0875	940.0875	457	901.7125	940.7125
408	901.1000	940.1000	458	901.7250	940.7250
409	901.1125	940.1125	459	901.7375	940.7375
410	901.1250	940.1250	460	901.7500	940.7500
411	901.1375	940.1375	461	901.7625	940.7625
412	901.1500	940.1500	462	901.7750	940.7750
413	901.1625	940.1625	463	901.7875	940.7875
414	901.1750	940.1750	464	901.8000	940.8000
415	901.1875	940.1875	465	901.8125	940.8125
416	901.2000	940.2000	466	901.8250	940.8250
417	901.2125	940.2125	467	901.8375	940.8375
418	901.2250	940.2250	468	901.8500	940.8500
419	901.2375	940.2375	469	901.8625	940.8625
420	901.2500	940.2500	470	901.8750	940.8750
421	901.2625	940.2625	471	901.8875	940.8875
422	901.2750	940.2750	472	901.9000	940.9000
423	901.2875	940.2875	473	901.9125	940.9125
424	901.3000	940.3000	474	901.9250	940.9250
425	901.3125	940.3125	475	901.9375	940.9375
426	901.3250	940.3250	476	901.9500	940.9500
427	901.3375	940.3375	477	901.9625	940.9625
428	901.3500	940.3500	478	901.9750	940.9750
429	901.3625	940.3625	479	901.9875	940.9875
430	901.3750	940.3750			
431	901.3875	940.3875			
432	901.4000	940.4000			
433	901.4125	940.4125			
434	901.4250	940.4250			
435	901.4375	940.4375			
436	901.4500	940.4500			
437	901.4625	940.4625			
438	901.4750	940.4750			
439	901.4875	940.4875			
440	901.5000	940.5000			
441	901.5125	940.5125			
442	901.5250	940.5250			
443	901.5375	940.5375			
444	901.5500	940.5500			
445	901.5625	940.5625			
446	901.5750	940.5750			
447	901.5875	940.5875			
448	901.6000	940.6000			
449	901.6125	940.6125			

*** Channel number between
400~479 is not supported
in the USA.



MX-COM, INC. MiXed Signal ICs

DATA BULLETIN

MX919B

4-Level FSK Modem Data Pump

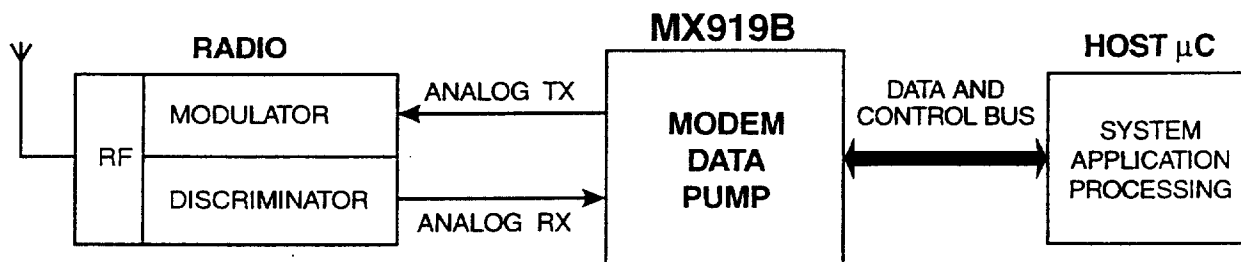
PRELIMINARY INFORMATION

Features

- 4-Level Root Raised Cosine FSK Modulation
- Half Duplex, 4800 to 19.2kbps
- Increase Channel Bit Rate/Hz
- Full Data Packet Framing
- Impulse and NRZ Signal Modes
- Enhanced Performance in Noisy Conditions
- Error Detection and Error Correction
- Low Power 3.3V/5.0V Operation

Applications

- Wireless Data Terminals
- Two Way Paging Systems
- Digital Radio Systems
- Wide Area Wireless Data Broadcasts
- Point to Point Wireless Data Links



The MX919B is a low voltage CMOS device containing all of the baseband signal processing and Medium Access Control (MAC) protocol functions required for a high performance 4-level FSK Wireless Packet Data Modem. It interfaces with the modem host μ C and the radio modulation/demodulation circuits to deliver reliable two-way transfer of the application data over a wireless link.

The MX919B assembles application data received from the host μ C, adds forward error correction (FEC) and error detection (CRC) information, and interleaves the result for burst-error protection. After automatically adding symbol and frame sync codewords, the data packet is converted into filtered 4-level analog signals for modulating the radio transmitter.

In receive mode, the MX919B performs the reverse function using the analog signals from the receiver discriminator. After error correction and removal of the packet overhead, the recovered application data is supplied to the host μ C. CRC detected residual uncorrected data errors will be flagged. A readout of the SNR value during receipt of a packet is also provided.

The MX919B uses data block sizes and FEC/CRC suitable for applications where high speed transfer of data over narrow-band wireless links is required. The device is programmable to operate at standard bit rates from a wide range of Xtal/clock frequencies.

The MX919B may be used with a 3.0V to 5.5V power supply and is available in the following package styles: 24-pin SSOP (MX919BDS), 24-pin SOIC (MX919BDW), 24-pin PLCC (MX919BLH), and 24-pin PDIP (MX919BP).

GENERAL INFORMATION

Exhibit C

TRANSMITTER (900 MHz)

High RF Power Output	2.5 watts (standard mode)
Standard Models	2.0 watts (conventional talk-around mode)
Intrinsically Safe Models	2.0 watts at less than 1.55 A (standard mode)
	1.8 watt at less than 1.60 A (talk-around mode)
Low RF Power Output	1.0 watt (all models and modes)
Spurious and Harmonic	-60 dBc
FM Hum and Noise	-34 dB
Audio Distortion	5% maximum at 1 kHz
Audio Frequency Response	+1, -3 dB from a 6 dB per octave pre-emphasis characteristic
Audio Modulation	11K0F3E
Channel Spread	6 MHz (no degradation); 45 MHz (talk-around)
Current Drain (maximum)	Low Power - 1.3 ampere
	High Power Standard Models - 1.75 ampere (2.0 ampere talk-around)
	High Power Intrin. Safe Models - 1.55 ampere (1.60 ampere talk-around)
Load Impedance	50 ohms
Duty Cycle (6-6-48 seconds)	10%
(Transmit-Receive-Standby)	

FCC ID # ATH2428152-1
EFJohnson Avenger SI HL-93
Model 242-8152

RECEIVER

<i>Sensitivity</i>	:	0.35uV(12 dB SINAD)
<i>Selectivity</i>	:	-60dB
<i>Spurious Rejection</i>	:	-65dB
<i>Hum and Noise</i>	:	-35dB
<i>Intermodulation</i>	:	-60dB
<i>Audio Output Power</i>	:	0.4Watt
<i>Audio Distortion</i>	:	Less than 5% at rated output
<i>Audio Response</i>	:	+1,-3dB from stand De-emphasis curve
<i>Channel Spread</i>	:	6MHz(935 ~941MHz)
<i>Frequency Stability</i>	:	± 1.5 ppm from -30 degrees C to 60 degrees C
<i>Antenna Impedance</i>	:	50 Ω
<i>Current Drain</i>	:	70mA(Standby), 250mA(at rated audio output)

TRANSMITTER

<i>RF Power Output</i>	:	2.0 Watts
<i>Adjacent Channel Power</i>	:	-60dBc
<i>Spurious</i>	:	-60dBc
<i>Harmonics</i>	:	-60dBc
<i>FM Hum and Noise</i>	:	-35dB
<i>Audio Distortion</i>	:	5% maximum at rated modulation
<i>Audio Response</i>	:	+1,-3dB from standard pre-emphasis curve
<i>Audio Modulation</i>	:	11K0F1D, 11K0F3E, 10k5F2D
<i>TX Channel Spread</i>	:	6MHz(896 ~902MHz) 6MHz(935 ~941MHz)
<i>Frequency Stability</i>	:	± 1.5 ppm from -30 degrees C to 60 degrees C
<i>Load Impedance</i>	:	50 Ω
<i>Current Drain</i>	:	900mAh nominal

FCC ID # F3JTP4901C
MAXON TP-4901C

EXHIBIT-E

Cleveland Mobile Radio Sales, Inc (CMR), proposes to construct a multi-tower-site, two-way Radio, mobile-data system to operate on the 900 MHz SMR frequency band. The system will consist of current production E. F. Johnson SMR Base station equipment controlled by custom designed data controllers, modulated by MX-COM Wireless Packet Data Modems.

CMR is requesting an Experimental License Authorization, to construct experimental mobile units for operation on this mobile data system. CMR proposes to repackage currently type-accepted portable radio units with MX-COM wireless data-modems, and custom designed control hardware and software per the following:

1. CMR proposes to design, construct, & operate a mobile data system consisting of existing type-accepted E.F. Johnson (EFJ) & Maxon RF transmitting equipment controlled by an MX-COM 4-Level FSK Modem Data Pump using 11K0F1D emission..
2. CMR plans to construct a package consisting of the above components along with CMR's custom control equipment. There will be no design or component changes made to modulation or amplifier circuitry in the EFJ or Maxon transmitting equipment. Changes will be made only to the control circuitry of these units, which would include replacement of the factory installed logic boards.
3. Data operation will consist of MX-COM 4-Level Root Raised Cosine FSK Modulation of the EFJ & Maxon transmitters using a maximum deviation of +/- 2.0 KHz. This equipment will operate on the 900 MHz SMR band using standard channel spacing of 12.5 KHz .
4. The channel bandwidth of the mobile data system will be the same as the originally designed EFJ and Maxon transmitters, which are currently type-accepted for 11K0F1D emission.

CMR believes that there is a commercial need for this service. It will provide two-way text messaging with features such as guaranteed delivery, e-mail access, and global positing data for vehicle tracking. CMR believes that this system will take Trunked SMR two way radio to a new level of technology. With the new wireless, internet, and data services now available, this product will be a useful accessory to those types of services.