IQRF FCC compliant design

for TR-8xG transceivers

Application note AN020

IQRF®
Smarter Wireless. Mesh.

This document is intended for integrators using the **TR-8xGx** series of IQRF modular transceivers. It describes the steps the integrator must take to ensure compliance with FCC rules.

RF output power

The RF output power value can be configured to level **0**, **1** or **2**. The factory default value is **2**.
This corresponds to ERP (effective radiated power) according to the following table:

level	ERP [dBm]		
	Channel 0	Channel 104	Channel 255
2	-24	-24	-24
1	**-34**	**-34**	**-35**
0	**-42**	**-42**	**-44**

Spurious emissions

The maximum interference emission values are in accordance with FCC Part 15.249.

RF channels

Modular transceivers TR-8xGx are designed for communication in the ISM frequency band 902 MHz to 928 MHz. Communication is carried out in the selected communication channels whose fundamental frequencies are specified in the following table:

Channel	Center frequency [MHz]
0	902.25
1	902.35
2	902.45
3	902.55
4	902.65
5	902.75
6	902.85
7	902.95
8	903.05
9	903.15
10	903.25
11	903.35
12	903.45
13	903.55
Service channel 1	903.60
14	903.65
15	903.75
16	903.85
17	903.95
18	904.05
19	904.15
20	904.25
21	904.35
22	904.45
23	904.55
24	904.65
25	904.75
26	904.85
27	904.95
28	905.05
29	905.15
30	905.25
31	905.35
Service channel 2	905.40
32	905.45
33	905.55
34	905.65
35	905.75
36	905.85
37	905.95
38	906.05
39	906.15
40	906.25
41	906.35
42	906.45
43	906.55
44	906.65
45	906.75
46	906.85
47	906.95
48	907.05
49	907.15
50	907.25
51	907.35
52	907.45
53	907.55
54	907.65
55	907.75
56	907.85
57	907.95
Service channel 3	908.00
58	908.05
59	908.15
60	908.25
61	908.35
62	908.45
63	908.55
64	908.65
65	908.75
66	908.85
67	908.95
68	909.05
69	909.15
70	909.25
71	909.35
72	909.45
73	909.55
74	909.65
75	909.75
76	909.85
77	909.95
78	910.05
79	910.15
80	910.25
81	910.35
82	910.45
83	910.55
84	910.65
85	910.75
86	910.85
87	910.95
88	911.05
89	911.15
90	911.25
91	911.35
92	911.45
93	911.55
94	911.65
95	911.75
96	911.85
97	911.95
98	912.05
99	912.15
100	912.25
101	912.35
102	912.45
103	912.55
104	**912.65**
105	912.75
106	912.85
107	912.95
108	913.05
109	913.15
110	913.25
111	913.35
112	913.45
113	913.55
114	913.65
115	913.75
116	913.85
117	913.95
118	914.05
119	914.15
120	914.25
121	914.35
122	914.45
123	914.55
124	914.65
125	914.75
126	914.85
127	914.95
128	915.05
129	915.15
130	915.25
131	915.35
132	915.45
133	915.55
134	915.65
135	915.75
136	915.85
137	915.95
138	916.05
139	916.15
140	916.25
141	916.35
142	916.45
143	916.55
144	916.65
145	916.75
146	916.85
147	916.95
148	917.05
149	917.15
150	917.25
151	917.35
152	917.45
153	917.55
154	917.65
155	917.75
156	917.85
157	917.95
158	918.05
159	918.15
160	918.25
161	918.35
162	918.45
163	918.55
164	918.65
165	918.75
166	918.85
167	918.95
168	919.05
169	919.15
170	919.25
171	919.35
172	919.45
173	919.55
174	919.65
175	919.75
176	919.85
177	919.95
178	920.05
179	920.15
180	920.25
181	920.35
182	920.45
183	920.55
184	920.65
185	920.75
186	920.85
187	920.95
188	921.05
189	921.15
190	921.25
191	921.35
192	921.45
193	921.55
194	921.65
195	921.75
196	921.85
197	921.95
198	922.05
199	922.15
200	922.25
201	922.35
202	922.45
203	922.55
204	922.65
205	922.75
206	922.85
207	922.95
208	923.05
209	923.15
210	923.25
211	923.35
212	923.45
213	923.55
214	923.65
215	923.75
216	923.85
217	923.95
218	924.05
219	924.15
220	924.25
221	924.35
222	924.45
223	924.55
224	924.65
225	924.75
226	924.85
227	924.95
228	925.05
229	925.15
230	925.25
231	925.35
232	925.45
233	925.55
234	925.65
235	925.75
236	925.85
237	925.95
238	926.05
239	926.15
240	926.25
241	926.35
242	926.45
243	926.55
244	926.65
245	926.75
246	926.85
247	926.95
248	927.05
249	927.15
250	927.25
251	927.35
252	927.45
253	927.55
254	927.65
255	927.75

Default operational channel: 104

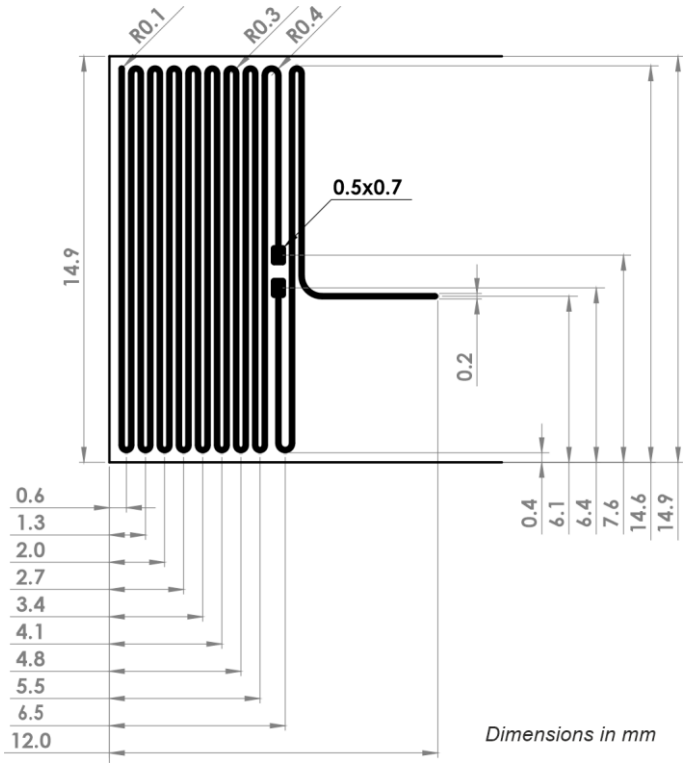
Specific operational use conditions

A typical application scenario for modular transceivers TR-8xGx is wireless transmission of sensor data or control of actuators and controllers. Modular transceivers TR-8xGx must not be operated in direct contact with the human body, on aircraft, and in areas where radio communication is restricted by local regulations, such as mines.

Further, the operation of these transceivers is subject to ISM band restrictions, which are set by the local telecommunications authority.

Trace antenna design

In the case of a TR module variant requiring an external antenna, the host device manufacturer may create a trace antenna on the host PCB (printed circuit board). This antenna must exactly match the following layout:



The inductance of the SMT coil at the PCB is 8.2 nH.

The transceiver manufacturer assumes no responsibility for any change from these defined parameters of the trace antenna.

RF exposure considerations

Modular transceivers TR-8xGx are certified as mobile, portable and must be used as such. The minimum permissible distance from a person's body is 20 cm.

Due to the low radiation power, if the requirements for the antenna part are met, no further restrictions are required.

Antennas

For variants of the modular transceiver where an external antenna is used, professional installation is required. The transceiver manufacturer permits the use of only the AN-06 external antenna for which compliance with the parameters required by FCC Part 15.249 can be guaranteed. Refer to https://www.iqrf.org/an-06.

If another type of external antenna is used, a separate FCC certification is required for the host device.

Label and compliance information

In accordance with KDB Publication 784748, the host device manufacturer is required to provide the device with a label stating "Contains FCC ID: R24-TR8xGx".

Information on test modes and additional testing requirement

Modular transceivers TR-8xGx are delivered with software that guarantees compliance with FCC requirements.

These parameters do not need to be re-verified during design. When designing the host device, it is only necessary to use the antenna design specified by the transceiver manufacturer, or the exact AN-06 antenna type specified by the transceiver manufacturer. See chapters Trace antenna design and Antennas. For transceiver modules with an integrated antenna, the antenna design is verified and complies with the FCC.

Additional testing, Part 15 Subpart B disclaimer

The TR-x8Gx modular transceivers are **only** FCC authorized for the FCC Part 15.249. The host device manufacturer is responsible for compliance with any other FCC rules.

Document revision

240919 First release.

Sales and Service

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