Response to TCB Findings

There appears to be hardware differences between 12.5kHz and 25kHz versions. Are there multiple versions of the device to achieve this? Please clarify.

Differences between 12.5kHz and 25kHz:

PCB	REF	12,5kHz	25kHz
CTR	F1	CFWCA455KGFA	CFWC455E4T (IF Filter)
	R128	33K	18K
CFB	C85,C88	10nF	4,7nF
	C82,C84	150pF	82pF

and R76 (variable resistor) is set to a different value of frequency deviation

Schematics, bill of materials and layout diagrams show CFB35, CTR40_465, CFB30, CFB31 names. Please clarify what these symbols mean and what portions of the device they represent.

Explanation on CTR/CFB (individual PCB names)

CTRxx_yyy_zzz - main PCB of the RF part

xx - RACOM's internal marking
yyy - base frequency of radio part
zzz - channel separation

for example

CTR40_465_12k5 - PCB of the RF part for base frequency 465,0MHz with channel separation 12,5kHz

CFBxx - main PCB of the digital part of MR400

Please clarify if confidentiality is requested on this application. If requested, it must be requested by a letter, otherwise all the exhibits will be available to the public.

Confidentiality not requested by the client!

The label supplied does not show "FCC ID" and there is a space between SQT and MR400. The label must show "FCC ID: SQTMR400" in a single line together. Please supply corrected label sample and its placement photo.

Corrected label attached to this e-mail

Please specify the label material.

All the labels on the MR400 are engraved by laser i.e. there is no label material.

Please specify the minimum data rates that the device supports for 12.5 and 25kHz channel spacing. How does the device comply with the spectrum efficiency standard of 90.203(j)(3), when operated on lower data rates than tested? Please clarify.

25 kHz: 21.68, 10.84 and 5.42 kBPS
12.5 kHz: 10.84, 5.42 and 2.71 kBPS
The lower rates are never used except for testing
90.203(j)(3) requires a minimum data rate of 9.6kb/s for 12.5kHz equipment and 19.2kb/s for 25kb/s for 25kHz equipment; therefore operational data rates are compliant.

Please specify the DC voltages and currents in final RF stage of the device as required by 2.1033(c)(8).

It is the supply voltage minus 0.6 volts, i.e. nominally 13.2 V, 1.2 A

A tune-up procedure is needed as required by 2.1033(c)(9).

There is a broadband power amplifier followed by broadband matching
circutry (to 50 ohms) and a low-pass filter. No tune-up is possible.

Please specify the measurement system settings (RBW, VBW) used to measure the RF power output, occupied bandwidth (mask), conducted and radiated spurious emissions tests and corresponding detector settings (peak, etc.).

Power output RBW = VBW = 1MHz Peak detector & broadband power meter
Spectral Mask RBW = VBW = 100 Hz Peak detector
Conducted spurious below 1000 MHz RBW = VBW = 100 kHz Peak detector
Conducted spurious above 1000 MHz RBW = VBW = 1MHz Peak detector
Radiated spurious below 1000 MHz RBW = VBW = 100 kHz Quasi-Peak detector
Radiated spurious above 1000 MHz RBW = VBW = 1MHz Peak detector, 1MHz RBW 10Hz VBW Average detector.

The emission designators must be selected in accordance with 90.207 and justified. Please clarify.

Revised Emission Designators

25kHz Models 19k74F1D
12.5kHz Models 9k87F1D
The necessary bandwidths were calculated from the following formula derived from the NTIA Manual of Regulations and Procedures for Federal Radio Frequency management May 2003 Edition and based on ITU-R SM.328-8 (1994) and SM.853 (1994).

$$B = (R/\log_2 S) + 2DK$$

B = Necessary bandwidth
R = Data Rate (21.68 kbs for 25 kHz and 10.84 for 12.5kHz)
S = No of signaling states = 4
D = system deviation (5 kHz for 25 kHz and 2.5 kHz for 12.5 kHz)
K = 0.89 for 20 dB Bandwidth

Please note that the spurious emissions limit (conducted / radiated) for "Mask D" is -20dBm per 90.210(d)(3). -13dBm has been used in the report. This is for future reference.

Noted