



TECHNICAL MEMORANDUM

DIN:	MEM-016-20121010-01
TO:	Kyle, Green Mountain Electromagnetics
CC:	
DATE:	November 14, 2012
FROM:	Aaron Buck
SUBJECT:	Riddell InSite – Description of Product Operation for FCC

Hello Kyle –

Here is an outline of the RF system and operation for the Riddell InSite product:

1. System Technology

- a. Our system uses the CC2530 family of components from Texas Instruments, specifically the CC2530 variant in the Player Unit , and CC2531 variant in the Alert Monitor (handheld transceiver). We are using a custom time division multiplexing protocol developed to optimize power consumption given required data throughput. Here are some representative specifications on the technology:

Characteristic	Specification	Value
RF Link	Communication Range (m)	<=50
	# of nodes supported	150
	Data throughput (kbps)	250
	Operating Frequency (Mhz)	2.405 to 2.480 Ghz in 5 Mhz increments ISM
	Data Modulation	Direct-sequence Spread Spectrum (DSSS – 16 channels)
	PHY and MAC Layer	802.15.4 compatible
	Network Toplogy	Primarily Star with Coordinators (other Basestations)
Environmental	Operating Temperature (°C)	-20 to +40 deg C
	Relative Humidity (%RH)	100% non-condensing
	Impact resistance (g)	>= 300 g
	Water Resistance	1m waterproof (Player Unit), rain & splash resistant (Alert Monitor)
Operating	Battery Life, Player Unit	1-year, battery replaced yearly @ factory reconditioning
	Battery Life, Alert Monitor	1-week, rechargeable via USB
Measurement capabilities	Impact Linear Acc Proxy Range(g)	15-300
	Impact HIC/GSI Proxy range	>= 2000
	Impact Location	90 degree increments in coronal plane to determine impact

		quadrant (front,L/R,back) and top of head
	Cumulative (days)	Cumulative HITsp Index - 7 day time-weighted rolling window
	Sensor Type	Thin Film
	Alert Threshold	Adjustable HITSp threshold, specific to playing position & skill level. Single- and multiple-event Alert types.
Physical	Size (width" x length" x height")	3.8" x 1.5" x 0.5" (Helmet-mounted Player Unit)
	Weight (grams)	76 g (2.7 oz)
	Helmet fit	Models available for Riddell 360 & Revolution Speed helmets
	Warranty	1 year
	Reconditioning Interval	1-year (recondition each year)
	Removable	Yes
	Washable (Laundry)	No