Client:	Topcon Positioning Systems	Job Number:	J90335
Model:	GR5	T-Log Number:	T90831
		Account Manager:	Deepa Shetty
Contact:	Ferdinand Riodique		
Standard:	FCC 15.247	Class:	N/A

Maximum Permissible Exposure

Test Specific Details

Objective: Evaluate the RF Exposure requirements per FCC 1.1310, 2.1091 and RSS-102.

Date of Test: 3/20/2013
Test Engineer: Mark Hill

General Test Configuration

Calculation uses the free space transmission formula:

$$S = (PG)/(4 \pi d^2)$$

Where: S is power density (W/m^2), P is output power (W), G is antenna gain relative to isotropic, d is separation distance from the transmitting antenna (m).

Summary of Results

Device complies with Power Density requirements at 20cm separation:	No
If not, required separation distance (in cm):	22.2

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Notes:

FCC ID: LCB-F90901, 900MHz and BT radio can be co-located with FCC ID: RI7T56KL1 HSPA module. As the 900MHz and the HSPA share the same antenna, only one can transmit at the same time.

Time average power values used for the HSPA module, not peak power.

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Total EIRP calculation - BT + 900MHz radio, no co-location with HSPA

Band	Mode	Output Power		Antenna	EIRP		Channels	Channels	Total EIRP	
		Peak	Average	gain (Max)	dBm	W	Available	Used	W	dBm
2400-2483	BT	1.9	-	-4.0	-2.1	0.001	79	1	0.001	-2.10
900MHz FHSS	-	29.1	-	2.5	31.6	1.445	Varies	1	1.445	-
							Totals:	2	1.446	31.60

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
900	-	-	-	-	-	1445.44	0.736	0.600
2400	-	-	-	-	-	0.000	0.000	1.000
						Total:	0.736	

Freq. MHz	Power Density at 20 cm mW/cm^2	MPE Limit at 20 cm mW/cm^2	Distance where S <= MPE Limit cm
900	0.736	0.600	22.2

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Total EIRP calculation - BT + HSPA combination

Band	Mode	Output Power		Antenna	EIRP		Channels	Channels	Total EIRP	
		Peak	Average	gain (Max)	dBm	W	Available	Used	W	dBm
850	HSPA	-	26.0	4.3	30.3	1.074	Varies	1	1.074	30.31
1900	HSPA	-	23.9	2.5	26.4	0.440	Varies	0	0.000	-
2400-2483	BT	1.9	-	-4.0	-2.1	0.001	79	1	0.001	-2.10
							Totals:	2	1.075	30.31

Freq.	EUT Power		Cable Loss	Ant Gain	Power at Ant	EIRP	Power Density (S) at 20 cm	MPE Limit at 20 cm
MHz	dBm	mW*	dB	dBi	dBm	mW	mW/cm^2	mW/cm^2
824	-	-	-	-	-	1074.06	0.547	0.549
2400	-	-	-	-	-	0.001	0.000	1.000
						Total:	0.547	

Freq. MHz	Power Density at 20 cm mW/cm^2	MPE Limit at 20 cm mW/cm^2	Distance where S <= MPE Limit cm
824	0.547	0.549	20.0

The original HSPA MPE exhibit calculated MPE by:

$$S = 2.56*(PG)/(4\ \pi d^2)$$

Where: S is power density (W/m^2), P is output power (W), G is antenna gain relative to isotropic, d is separation distance from the transmitting antenna (m). The 2.56 factor was used to account for ground reflections.

This approach was used in these calculations for the HSPA operation. The 2.56 factor was not applied to the BT operation.