

Client:	Systech Corporation	Job Number:	J94250
Model:	Zwave Module 5202	T-Log Number:	T94263
Contact:	Rachel Hetzel	Account Manager:	Christine Krebill
Standard:	FCC 15.249/RSS-210	Class:	N/A

Maximum Permissible Exposure

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Evaluation: 6/6/2014

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:	Yes
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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.

All of the transmitters can operate simultaneously but only on 1 channel at a time.

Maximum eirp is calculated as follows:

Uses the average power for each radio (where given), otherwise uses the peak power; sums EIRP for each radio.

Maximum EIRP for all radios is compared to the lowest MPE limit for all transmitter frequencies.

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Use: General
 Antenna: Various

All transmitters (Cellular, Ralink Wi-Fi, Bluetooth, Zigbee and EUT)

Fusion Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		24.67	8.40	33.1	2.028	Varies	1	2.028	33.07
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.256	33.53

$S_{(20cm)} = 0.449 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **18.1cm**

Fusion Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		24.04	8.96	33.0	1.995	Varies	1	1.995	33.00
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.224	33.47

$S_{(20cm)} = 0.442 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.1cm**

EMC Test Data

Client:	Systech Corporation	Job Number:	J94250
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Standard:	FCC 15.249/RSS-210	Class:	N/A

Fusion Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		24.67	8.40	33.1	2.028	Varies	1	2.028	33.07
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.223	33.47

$S_{(20cm)} = 0.442 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.9cm**

Fusion Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		24.04	8.96	33.0	1.995	Varies	1	1.995	33.00
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.191	33.41

$S_{(20cm)} = 0.436 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.0cm**

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Standard:	FCC 15.249/RSS-210	Class:	N/A

Foxlink Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		23.91	1.26	25.2	0.329	Varies	1	0.329	25.17
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.557	27.46

$S_{(20cm)} = 0.111 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **9.0cm**

Foxlink Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		23.56	1.56	25.1	0.325	Varies	1	0.325	25.12
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.553	27.43

$S_{(20cm)} = 0.110 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **8.5cm**

EMC Test Data

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Standard:	FCC 15.249/RSS-210	Class:	N/A

Foxlink Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		23.91	1.26	25.2	0.329	Varies	1	0.329	25.17
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.524	27.20

$S_{(20cm)} = 0.104 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **8.7cm**

Foxlink Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		23.56	1.56	25.1	0.325	Varies	1	0.325	25.12
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.521	27.17

$S_{(20cm)} = 0.104 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **8.3cm**

EMC Test Data

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Contact:	Rachel Hetzel	Account Manager:	Christine Krebill
Standard:	FCC 15.249/RSS-210	Class:	N/A

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
777-787	Cellular		24.25	8.50	32.8	1.884	Varies	1	1.884	32.75
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.112	33.25

$S_{(20cm)} = 0.420 \text{ mW/cm}^2$ Limit 0.518 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **18.0cm**

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		26.98	7.00	34.0	2.500	Varies	1	2.500	33.98
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.729	34.36

$S_{(20cm)} = 0.543 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **19.9cm**

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		30.00	3.00	33.0	1.995	Varies	1	1.995	33.00
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.224	33.47

$S_{(20cm)} = 0.442 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.1cm**

EMC Test Data

Client:	Systech Corporation	Job Number:	J94250
Model:	Zwave Module 5202	T-Log Number:	T94263
Contact:	Rachel Hetzel	Account Manager:	Christine Krebill
Standard:	FCC 15.249/RSS-210	Class:	N/A

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
777-787	Cellular		24.25	8.50	32.8	1.884	Varies	1	1.884	32.75
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.079	33.18

$S_{(20cm)} = 0.414 \text{ mW/cm}^2$ Limit 0.518 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.9cm**

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
824-849	Cellular		26.98	6.10	33.1	2.032	Varies	1	2.032	33.08
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.228	33.48

$S_{(20cm)} = 0.443 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **18.0cm**

NovaTel Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average		dBm	W			W	dBm
1850 - 1910	Cellular		30.00	3.00	33.0	1.995	Varies	1	1.995	33.00
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	2.191	33.41

$S_{(20cm)} = 0.436 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **17.0cm**

Client:	Systech Corporation	Job Number:	J94250
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Contact:	Rachel Hetzel	Account Manager:	Christine Krebill
Standard:	FCC 15.249/RSS-210	Class:	N/A

Hauwei Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average ¹		dBm	W			W	dBm
824-849	Cellular		26.65	4.28	30.9	1.239	Varies	1	1.239	30.93
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	1.467	31.66

$S_{(20cm)} = 0.292 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **14.6cm**

Hauwei Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A11091301 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average ¹		dBm	W			W	dBm
1850 - 1910	Cellular		0.44	3.00	3.4	0.002	Varies	1	0.002	3.44
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.71	3.00	20.7	0.118	79	1	0.118	20.71
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.230	23.63

$S_{(20cm)} = 0.046 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **5.5cm**

¹ Maximum average power based on calculation of source based time average for cellular operation

EMC Test Data

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Standard:	FCC 15.249/RSS-210	Class:	N/A

Hauwei Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average ¹		dBm	W			W	dBm
824-849	Cellular		26.65	4.28	30.9	1.239	Varies	1	1.239	30.93
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	1.434	31.57

$S_{(20cm)} = 0.285 \text{ mW/cm}^2$ Limit 0.549 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **14.4cm**

Hauwei Cellular, SparkLAN Wi-Fi, LS Research Bluetooth, Aneran X7J-A10051702 Zigbee and EUT

Band	Mode	Output Power		Antenna gain (Max)	EIRP		Channels Available	Channels Used	Total EIRP	
		Peak	Average ¹		dBm	W			W	dBm
1850 - 1910	Cellular		0.44	3.00	3.4	0.002	Varies	1	0.002	3.44
2400 - 2483.5	WiFi	17.6	-	2.00	19.6	0.090	11	1	0.090	19.56
2401 - 2483.5	Bluetooth		11.00	2.00	13.0	0.020	79	1	0.020	13.00
2401 - 2483.5	Zigbee		17.30	2.00	19.3	0.085	79	1	0.085	19.30
908.4	FSK		-7.20	0.00	-7.2	0.000	1	1	0.000	-7.20
Totals:								5	0.198	22.96

$S_{(20cm)} = 0.039 \text{ mW/cm}^2$ Limit 0.606 mW/cm^2 Distance where $S \leq \text{MPE Limit}$ **5.1cm**

¹ Maximum average power based on calculation of source based time average for cellular operation