EXTERNAL CELLULAR ANTENNA

For purposes of this exhibit the external antenna gain is defined as the gain of the antenna minus all path losses.

The cartridge containing the cellular module has provisions for a cable connection to an external antenna. The alarm system installer may offer the end user an external antenna installation option, provided they have an antenna which meets the maximum gain values specified by the updated grant. The maximum external antenna gain for compliance to exemption limits are calculated in this exhibit. Honeywell is requesting the maximum cellular antenna gain values specified on the updated grant to be set to 9.3dBi for the low band (AMPS) and 8.2dBi for the high band (PCS).

LOW BAND EMISSIONS

The information in this table is from (1) the radiated emissions lab report included with Sierra's N7N-SL5011 original FCC listing, and (2) the radiated emissions lab report included with Sierra's N7N-SL5011 FCC listing for the class 2 permissive change.

Files:
(1) SL5011 Test Report FOR FCC and IC Certifications IC: 2417C-SL5011 FCC ID: N7NSL5011 (Original Filing)
(2) SL3010T Test Report FOR FCC Certifications FCC ID: N7NSL5011 (PC2)
Sierra Wireless Report Dates: February 18, 2011 (Orig. Filing), August 22, 2013 (PC2)
CDMA-2000 Max Duty Cycle = 100%

MEASUREMENTS FROM REPORT FOR: N7N-SL5011 850 MHz and 1900 MHz Band RF Power Output §2.0153, §22.917						
BAND:	MODE:	TEST:	CHANNEL:	FREQ (MHz):	PEAK (dbm):	RMS while XMIT (dbm): (note 1)
850	CDMA 2000	Lab Meas. for Orig. Filing	1013	824.7	28.48	23.98
850	CDMA 2000	Lab Meas. for Orig. Filing	384	836.52	28.43	23.89
850	CDMA 2000	Lab Meas. for Orig. Filing	777	848.31	28.32	23.82
850	CDMA 2000	Lab Meas. for PC2	1013	824.7	27.88	23.38
850	CDMA 2000	Lab Meas. for PC2	384	836.52	28.18	23.64
850	CDMA 2000	Lab Meas. for PC2	777	848.31	28.04	23.54
Maximum Conducted Power in 850MHz Band					28.48	23.98

note 1 - This column is the average taken during transmitter-on time only; duty-factor is not included.

HIGH BAND EMISSIONS

The information in this table is from the radiated emissions lab report included with Sierra's N7N-SL5011 FCC listing.

Files:
(1) SL5011 Test Report FOR FCC and IC Certifications IC: 2417C-SL5011 FCC ID: N7NSL5011 (Original Filing)
(2) SL3010T Test Report FOR FCC Certifications FCC ID: N7NSL5011 (PC2)
Sierra Wireless Report Dates: February 18, 2011 (Orig. Filing), August 22, 2013 (PC2)
CDMA-2000 Max Duty Cycle = 100%

MEASUREMENTS FROM REPORT FOR: N7N-SL5011 850 MHz and 1900 MHz Band RF Power Output §2.0153, §24.238						
BAND:	MODE:	TEST:	CHANNEL:	FREQ (MHz):	PEAK (dbm):	RMS while XMIT (dbm): (note 1)
1900	CDMA 2000	Lab Meas. for Orig. Filing	25	1851.25	28.63	24.13
1900	CDMA 2000	Lab Meas. for Orig. Filing	600	1880	28.54	24.04
1900	CDMA 2000	Lab Meas. for Orig. Filing	1175	1908.75	28.59	24.09
1900	CDMA 2000	Lab Meas. for PC2	25	1851.25	28.35	23.85
1900	CDMA 2000	Lab Meas. for PC2	600	1880	28.44	23.94
1900	CDMA 2000	Lab Meas. for PC2	1175	1908.75	28.28	23.78
Maximum Conducted Power in 850MHz Band					28.63	24.13

note 1 - This column is the average taken during transmitter-on time only; duty-factor is not included

ANTENNA GAIN CALCULATIONS

PATH LOSS

For 'worst case' calculations, the path loss of the external antenna connector is considered to be 0dB.

GAIN CALCULATIONS: WORST CASE ANTENNA GAIN

BAND MEASURED ANT GAIN		HONEYWELL'S REQUESTED MAX ANTENNA GAIN	DATA FROM SIERRA LAB REPORT							DETERMINATION OF COMPLIANCE TO EXEMPTION LIMIT				
col 1	col 2	col 3	col 6	col 7	col 8	col 9	col 10	col 11	col 12	col 13	col 14	col 15	col 16	col 17
Band	Freq. (Mhz)	Honeywell's Requested Max Ext Antenna Gain on Updated Grant (from p.1)	Technology	Max 'Avg. during xmit' Pwr (dBm) (note 1)	Inherent Duty Factor (dBi)	Max Time-Averaged Pwr (note 2)	Freq. (MHz)	Sierra Test Report Filenames	Sierra Test Report Page	FCC: 1.1310(e) Exposure Limit (all intentional radiators) (avg with duty factor) (note 2) (note 4)	FCC: 2.1091(c)(1) RF Exposure Eval (Mobile devices only) (avg with duty factor) (note 2)	**<1.5G:** FCC: Effective Radiated Pwr Limit from 22.913(a)(2) (ERP)(Cellular Devices Only) (avg while xmit), for <1.5G (note 1) ——— **>1.5G:** FCC: EMC Limit from 24.232(c) (EIRP) (Cellular Devices Only) (avg while xmit), for >1.5G (note 1)	**Calculated Worst Case Allowed External Antenna Net Gain + Loss (dBi)** (note 3)	Is Calc. Worst Case Allowed Ext Gain Compliant With Honeyell's Requested Max Gain?
LOW BAND GAIN (AMPS)	(824 - 896)	9.3dBi	CDMA-2000	23.98	0	23.98	836.52	TR1.pdf, TR2.pdf	5, 5	2.76W_EIRP =34.41dBm	=2.46W_EIRP =33.91dBm	7W_ERP = 11.48W_EIRP = 40.60dBm	9.9	Y
HIGH BAND GAIN (PCS)	(1850 – 1990)	8.2dBi	CDMA-2000	24.13	0	24.13	1880.0	TR1.pdf, TR2.pdf	5, 5	5.03W_EIRP =37.01dBm	4.92W_EIRP =36.92dBm	1.22W_ERP =2W_EIRP =33.01dBm	8.9	Y

note 1 - This is the average taken during transmitter-on time only; duty-factor is not included.
note 2 - This is time-averaged maximum power. It includes duty-factor.
note 3 - This is the worst case (minimum) of these three calculations: (1) col 13- col 9, (2) col 14-col 9, and (3) col 15-col 7. This lists the worst case antenna gain to meet all FCC exemption/power limits for the transmit technology in col 6.
note 4 - =[f(in MHz)/1500] mW/cm^2, averaged over 30 min
=[824.20/1500] mW/cm^2
= 0.5495 mW/cm2 @20cm limit
=2.76W_EIRP