Exhibit: RF Exposure – FCC/IC

FCC: QJP-PDP1000
IC: 8393A-PDP1000

Report File #: TR-7169008429MPE-000

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RF Exposure – IC/FCC

The device is a mobile device intended to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure and the body of the user or nearby persons. This is accomplished by design as the handheld portion is more than 20 cm from the radiating structure. This device mounts on a cart that is pulled around, where the RF portion is on or near the ground and the handle is well over 20 cm away from tx antenna(s). The intentional RF energy of this device is designed to be directed into the ground.

The EUT is a 540 MHz to 3751 MHz Ultra-Wideband (UWB) Ground Penetrating Radar (GPR) transmitter.

Although the antenna gain varies through the frequency band of transmit, however for the sake of simplicity a value of 0 dBi is used and is calculated by comparing the 3 meter field strength reading to the power delivered to the antenna, adjusting for the resolution bandwidth in the 3 meter reading.

Peak reading at 3 meters was 54.1 dBuV/m / MHz. This is -41.1 dBm / MHz EIRP.

99% bandwidth is 3210.9 MHz. A worst case factor of 10 log (3210.9 MHz / 1 MHz) is 35.1 dB. Applied to peak reading, this results in a worst case peak power of – 6 dBm EIRP for the UWB transmission, this is 250 uW..

RF Exposure Exemption Limits for Routine Evaluation – IC (UWB)

As per RSS 102 Section 2.5.2, RF exposure evaluation is not required if the device operating at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than:

$1.31 \times 10^{-2} \ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz

For a 540 MHz transmitter, where the tightest limit applies, this e.i.r.p limit is 0.96 W. The UWB complies with this limit and is 0.26 % of the applicable limit.

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RF Exposure Exemption Limits for Routine Evaluation – FCC (UWB)

Devices shall be evaluated for RF radiation exposure according to the provisions of FCC §2.1093 and the MPE guidelines identified in FCC §1.1310.

As per FCC §1.1310 Table 1(B), the limit for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields for General Population/Uncontrolled Exposure in the frequency range of 300 MHz to 1.5 GHz is f/1500 mW/cm^2 and in the frequency range of 1.5GHz to 100GHz is 1.0 mW/cm^2. Where f = frequency in MHz. For the purposes of compliance, a worst-case frequency of 540 MHz is used. 540/1500 = 0.36.

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The power density formula is given by:

$$P_d = (P_{out}*G) / (4*pi*R^2)$$

Where,
P_d = Power density in mW/cm^2
P_{out} = Conducted output power to antenna in mW
G = Numeric Antenna Gain
Pi = 3.1416
R = Separation distance in cm

MPE Calculation: 540 MHz to 3751 MHz UWB GPR transmitter (worst case)

Average output power at antenna input terminal: (when transmitting, based on customer provided info)	-6.00	(dBm)
Average output power at antenna input terminal:	0.251188643	(mW)
Antenna gain(worst case):	0	(dBi)
Maximum antenna gain:	1	(numeric)
Prediction distance:	20	(cm)
Prediction frequency (worst case):	540	(MHz)
FCC MPE limit for uncontrolled exposure at prediction frequency (worst case):	0.36	(mW/cm^2)
Power density at prediction frequency:	0.001000	(mW/cm^2)
FCC Margin of compliance:	-25.6 (Pass)	(dB)
This equates to	0.01 (Pass)	W/m^2
RSS-102 Issue 5 limit (worst case)	0.965137502	W/m^2

Thjs complies and is 0.28 % of the applicable FCC limit.

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Combination with Wi-Fi module (FCC ID TFB-TIWI1-01)

Maximum peak output power at antenna input terminal:	8.00	(dBm)
Maximum peak output power at antenna input terminal:	6.31	(mW)
Antenna gain(typical):	4.3	(dBi)
Maximum antenna gain:	2.691534804	(numeric)
Time Averaging:	100	(%)
Prediction distance:	20	(cm)
Prediction frequency:	2400	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.004000	(mW/cm^2)
Margin of compliance:	-24.0	(dB)
This equates to	0.04	W/m^2
RSS-102 Issue 5 limit	2.674900662	W/m^2

For FCC the RF exposure of the Wi-Fi module is 0.4% of the applicable limit

For ISED the RF exposure of the Wi-Fi module is 1.5% of the applicable limit.

The worst case combination of the 2 RF devices, 0.68% of the applicable limit for FCC and 1.76% of the applicable limit for ISED is less than 100% of the applicable limit and therefor the device complies with maximum permissible exposure requirements.

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