

Device Name: **RTT2211**

FCC ID: **MIVRTT2211**

Maximum Rated Power:

Cellular 850 Band                      Rated Spec= 282mW (24.5dBm)

PCS1900                                      Rated Spec= 282mW (24.5dBm)

Maximum Measured Power:

Cellular 850Band                      Measured= 214mW (23.3dBm)

PCS1900                                      Measured= 195mW (22.9dBm)

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Source Based Time Average transmitter Power Evaluation

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The device under:

The device under is a RTT2211 that Communicates with vehicle's OBD interface and transmit GPS data OTA. The device supports CDMA technology in 1xR TT mode, voice mode is not supported. It is not possible for the user or installer to configuration the device to deviate from the operation uplink description outlined in this document.

The device source based time average transmitter power is use to determine if SAR exemption is applicable.

The device is self-contained and has no user control interface. It connects directly to the OBD-II connector in a vehicle. Among all the signals provided by OBD-II connector, only five are passed through to the device and are associated with following OBD protocols: J1850 PWM, J1850 VPW, ISO-9141-2, ISO-14230 KWP2000, and ISO-15765 CAN. 3 LEDs are used to indicate the status (GPS, Cellular, & OBD) of the device.

All communications are initiated by the device. The device requests data, such as VIN and status information, from the vehicle. The data is encrypted and then transmitted to a remote server through a Cellular network. The number of data call per day is defined by the user but limited by the software. The length of each transmission depends of the amount of data needed to be transferred. Normal transfer per message is approximately 150 bytes per transmission. In the event where data is buffered, a maximum of 650 messages will be transmitted. The output rate is firmware controlled whereby it does not allow transmissions of more than 4 messages every 2 seconds

The device enters sleep mode once it transmits a data packet. During sleep mode, no data will be exchanged between the device and the remote serve. The user is restricted from altering the functionality of the device via firmware controlled.

The actual transmission time is calculated as:

Rate for 1xRTT: 150Kbaud/s (Uplink)

$150\text{Kbaud}/8$  (8 bits in a byte)=18750 bytes per second

$150 \text{ bytes} / 18750 \text{ bytes per second} = 8 \text{ ms}$  (time it takes to transmit 1 message)

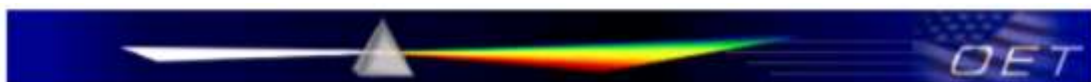
Since the device can only transmit a maximum of 4 messages every 2 seconds, the worst

case transmission case would be a transmission every 32ms every 2 second.

**Calculation for Source-base average power:**

- Source based time average duty factor =  $0.032 / 2 \text{ (sec)} = 0.016$  equ (1)
- Technology (1xRTT) Operation duty factor =  $1/1 = 1 = 100\%$  equ (2)
- Maximum duty factor =  $\text{equ}(1) * \text{equ} (2) = 0.016 * 1 = 0.016$  equ (3)
  
- At 850 MHz the device maximum rated average power = 282mW equ (4)
  - With max duty factor applied average power =  $0.016 * 282 = 4.5\text{mW}$  equ (5)
  
- At 1900 MHz the device maximum rated average power = 282mW equ (4)
  - With duty factor applied average power =  $0.0016 * 282 = 4.5\text{mW}$  equ (5)

**Limit for SAR applicability: as per FCC KDB procedure 447498 D01 Mobile Portable RF Exposure v05.**



**Appendix A**

**SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm**

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

**Conclusion:**

- SAR is not required at Cellular 850 Band as output power < SAR Test Exclusion Threshold (16mW) for 835 MHz at 5mm separation.
- SAR is not required at PCS1900 Band as output power < SAR Test Exclusion Threshold (11mW) for 1900 MHz at 5mm separation.