Actions and responses to FCC comments of February 3rd 2012 on Tracking Number 277209

Nokia thanks FCC for the additional details of their concerns with the filing application for our RM-808 product. Each item detailed in FCC's response is addressed in the text below:

1) LTE

a) The UE category of the device was not identified

The RM-808 device is an LTE category 3 device. This information has been added into Section 2 of the revised SAR report which is attached.

b) No information was provided on MPR

The RM-808 device is hard-coded with the MPR values stipulated in Table 6.2.3-1 of 3GPP TS 36.101; the MPR values are dependent on the modulation, channel bandwidth and resource block allocation:

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

This information has been added into Section 3.2 of the revised SAR report.

c) It was not confirmed that A-MPR was disabled for testing

The RM-808 device has no additional MPR included in its coding and, as a consequence, no A-MPR settings were applied during the SAR testing. This information has been added into Section 3.2 of the revised SAR report.

d) When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless

configurations and frequency bands; and also include details of the power reduction implementation and measurement setup

As explained in Section 2 of the attached SAR report, power reductions are only introduced when the device is operating in Wireless Router mode. At the beginning of the Wireless Router results section (Appendix G), the following table is included; it details the power reductions in each band/mode along with the target tuning powers in all bands:

Power reductions in Wireless Router mode

Band	Power reduction in WR mode	Target tuning power in WR mode		
LTE700	0dB	23.0dBm		
GSM/GPRS850	1dB in 2-slot mode	GSM: 32.5dBm	2-slot GPRS: 30.0dBm	
WCDMA850	0dB	23.0dBm		
WCDMA1700/2100	4dB	19.0dBm		
LTE1700/2100	3.5dB	19.0dBm		
GSM1900	0dB	GSM: 29.5dBm	2-slot GPRS: 28.5dBm	
WCDMA1900	1dB	22.0dBm		
WLAN2450 b-mode	0dB	Ch 1: 18.0dBm	Ch 6: 18.0dBm	Ch 11: 18.0dBm
WLAN2450 g-mode	0dB	Ch 1: 13.0dBm	Ch 6: 18.0dBm	Ch 11: 13.0dBm
WLAN2450 n-mode	0dB	Ch 1: 13.0dBm	Ch 6: 15.0dBm	Ch 11: 13.0dBm

The measured conducted powers for each of the bands/modes are included in the individual results tables in Appendix G (note that all powers quoted are time-averaged output powers apart from the two GSM/GPRS bands, for which the peak power in the slot is given).

Power reduction in this device is only available in Wireless Router mode. For power reduction to be active, it is necessary that 'Internet Sharing' is turned on within the

'Settings' menu and for the WLAN API to receive notification that the supporting application for Wifi hotspot mode is switched on.

e) Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission

Power reduction is only introduced when the device is operating in Wireless Router mode. At the time of Certification SAR testing, suitable control software was not available to activate the bands with their appropriate power levels for this mode of operation, so the relevant power levels were individually set within the SAR test samples.

f) The SAR procedures shall be applied independently to the device and exposure configurations required for head & body, handset flip or slide positions.

i) Right cheek, left cheek, touch and tilt were not performed for largest channel bandwidth with 50% resource block allocation and 50% offset for QPSK and 16QAM

ii) Right cheek, left cheek, touch and tilt were not performed for largest channel bandwidth with 1 resource block allocation and 0% offset for QPSK and 16QAM

ii) Right cheek, left cheek, touch and tilt were not performed for largest channel bandwidth with 1 resource block allocation and 100% offset for QPSK and 16QAM.

These tests have now been completed and are fully reported with the revised SAR report attached.

Measurement results beyond those required may be provided. However, they do not obviate submitting the required measurements.

It had been discovered during the development phase of this product that, in both of the LTE bands, the 1RB, 50% offset modes in both QPSK and 16QAM modulations exhibited the highest time-averaged output powers amongst the tested modes. Since, time-averaged output power and SAR are directly proportional, Nokia has included full SAR results for this

modulation in addition to the stipulated requirements of FCC KDB 941225 D05 SAR for LTE Devices v01.

2) GSM / WCDMA

a) Maximum output power results for all applicable physical channel configurations should be tabulated in the SAR report.

The measured Maximum Output Power results for the SAR samples are tabulated, along with the measured SAR values, within Section 7 of the SAR report for all bands, including both GSM/GPRS bands and all 3 WCDMA bands. In addition, Appendix C details the WCDMA Maximum Output Powers and the Maximum Output Powers with HS-DPCCH and E-DCH i.e. HSUPA powers for SubTest modes 1 to 5 for all 3 WCDMA/HSUPA bands within the RM-808 device. The power measurements given in Appendix C were taken from representative sample devices that were not used in the SAR testing; they were, however, identically setup for RF power in the WCDMA/HSUPA bands to the SAR samples.

b) The default test condition for head measurements is to measure SAR with an established radio link between the device under test and a communication test set using 12.2 kbps RMC configured in Test Loop Mode 1.

Within Section 3.2 of the attached SAR report, a description of the test modulation used for WCDMA SAR tests is given as: "The transmission mode of the device in all WCDMA tests was configured to 12.2kbps RMC with all TPC bits set as "1".**"**

c) MPR implementation needs to be identified.

MPR is implemented in all the HSUPA modes within this device. Appendix C of the attached SAR report details the measured conducted powers of all the 5 SubTest modes in WCDMA850, WCDMA1700/2100 and WCDMA1900 bands. In addition, full descriptions of the power algorithms running in HSUPA mode as well as tables giving the measured MPR values in all bands are included.

d) FCC test reduction procedures for both head and body SAR measurements were not followed.

The test reduction procedures used in this filing application have been re-considered in three mains areas. These areas are: GSM/GPRS, device and exposure configurations for Head and Body-worn SAR testing and Simultaneous Transmissions.

Regarding GSM and 2-slot GPRS modes in both the 850 and 1900MHz bands: full Head SAR test results (i.e. Left Cheek, Left Tilt, Right Cheek & Right Tilt test configurations) in both 1-slot GSM and 2-slot GPRS modes are now presented in Section 7 of the revised SAR report. The relative power settings of 1- and 2-slot modes are 32.5 and 31.0dBm in 850MHz band, 29.5 and 28.5dBm in 1900MHz band indicating that 2-slot mode should give the highest SAR values in both bands; the tabulated SAR test results clearly confirm this theoretical conclusion. Equivalent 8PSK EGPRS power levels are a minimum of 3dB below the GSM/GPRS powers, so a single SAR test in both bands in the maximum test configuration for 2-slot GPRS was performed; these results are also reported in the results tables.

Regarding the device and exposure test configurations used in Head and Body-worn SAR testing: this device possesses an internal antenna and is of monobloc construction i.e. it does not possess a retractable antenna, it has no flip and it has no slides of any description. As a result, there are no alternative device and exposure configurations of the device available, so the maximum SAR modes identified during Head SAR testing translate directly to Body-worn SAR testing at 15mm. Consequently, Body-worn SAR testing in both of the GSM/GPRS bands has been limited to the 2-slot GPRS modes, which were identified during Head SAR testing as giving the highest SAR values.

Regarding Simultaneous Transmissions: the capability of this device to simultaneously transmit different modes is described within Section 2 of the attached SAR report. For each combination of transmissions, the maximum SAR values in each test configuration (for both Head and Body-worn) are computed in the 'Combined' tables within Section 7 of the SAR report. The 2nd 'Combined' table presents SAR values calculated as:

{max cellular/AWS/PCS SAR value + max WLAN2450 SAR value},

and for those combinations > 1.6W/kg, the 'Antenna pair SAR to peak location ratio' was calculated. Only for the Head SAR combination of 2-slot GPRS850 + WLAN 2450 transmissions was the {max + max} value > 1.6W/kg and the 'Antenna pair SAR to peak location ratio' > 0.3; hence Simultaneous Transmission Procedures as described in FCC KDB648474 (i.e. expanded zoom scan tests) were performed for this combination of transmissions only.

Again, measurement results beyond those required may be provided. However, they do not obviate submitting the required measurements.

3) WLAN

a) The 802.11a/b/g default test channels are 1, 6, 11.

A revised set of WLAN SAR results are presented in Section 7 and in Appendix G of the attached SAR report. The default test channels of 1, 6 and 11 have been used in this revised testing in full accordance with FCC KDB248227 D01 SAR meas for 802.11 a, b, g v01r02.

b) No information on 802.11g output power is provided to justify test reduction.

A table detailing the conducted average powers of all the operational WLAN modes within the RM-808 device is now included in Section 3.2 of the revised SAR report. For convenience, the table is repeated here:

	Measured averaged powers				
Modulation mode	**Ch 1**	**Ch 2**	**Ch 6**	**Ch 10**	**Ch 11**
b-mode WLAN DSSS 1 Mbps	**16.73dBm**	n/m	**16.46dBm**	n/m	**17.15dBm**
b-mode WLAN DSSS 2 Mbps	15.87dBm	n/m	16.09dBm	n/m	16.55dBm
b-mode WLAN DSSS 5.5 Mbps	15.52dBm	n/m	15.63dBm	n/m	16.25dBm
b-mode WLAN DSSS 11 Mbps	15.24dBm	n/m	15.45dBm	n/m	15.83dBm
g-mode WLAN OFDM 6 Mbps	10.93dBm	15.55dBm	16.00dBm	15.94dBm	11.62dBm
g-mode WLAN OFDM 9 Mbps	10.76dBm	15.42dBm	15.54dBm	15.82dBm	11.48dBm
g-mode WLAN OFDM 12 Mbps	10.55dBm	15.23dBm	15.51dBm	15.70dBm	11.24dBm
g-mode WLAN OFDM 18 Mbps	10.21dBm	14.90dBm	15.16dBm	15.25dBm	10.73dBm
g-mode WLAN OFDM 24 Mbps	9.60dBm	14.38dBm	14.62dBm	14.80dBm	10.35dBm
g-mode WLAN OFDM 36 Mbps	9.16dBm	13.86dBm	14.00dBm	14.26dBm	9.68dBm
g-mode WLAN OFDM 48 Mbps	8.68dBm	13.22dBm	13.51dBm	13.80dBm	9.25dBm
g-mode WLAN OFDM 54 Mbps	8.29dBm	13.05dBm	13.26dBm	13.57dBm	8.78dBm
n-mode MCS 0: OFDM 6.5 / 7.25 Mbps	10.89dBm	12.71dBm	12.97dBm	13.17dBm	11.12dBm
n-mode MCS 1: OFDM 13.0 / 14.4 Mbps	10.55dBm	12.16dBm	12.29dBm	12.62dBm	10.80dBm
n-mode MCS 2: OFDM 19.5 / 21.7 Mbps	10.48dBm	12.22dBm	12.42dBm	12.59dBm	11.19dBm
n-mode MCS 3: OFDM 26.0 / 28.9 Mbps	9.51dBm	11.29dBm	11.52dBm	11.82dBm	10.15dBm
n-mode MCS 4: OFDM 39.0 / 43.3 Mbps	8.90dBm	10.73dBm	10.91dBm	11.13dBm	9.60dBm
n-mode MCS 5: OFDM 52.0 / 57.8 Mbps	8.41dBm	10.18dBm	10.52dBm	10.73dBm	8.94dBm
n-mode MCS 6: OFDM 58.5 / 65.0 Mbps	8.05dBm	9.94dBm	10.25dBm	10.47dBm	8.64dBm
n-mode MCS 7: OFDM 65.0 / 72.2 Mbps	8.02dBm	9.82dBm	10.14dBm	10.11dBm	8.56dBm

From the above table, it can clearly be seen that the b-mode WLAN DSSS 1Mbps modulation mode possesses the highest average power. As none of the g-mode or n-mode modulations has a maximum average power level > 0.25dB higher than b-mode DSSS 1Mbps, SAR testing was carried out solely using b-mode DSSS 1Mbps.