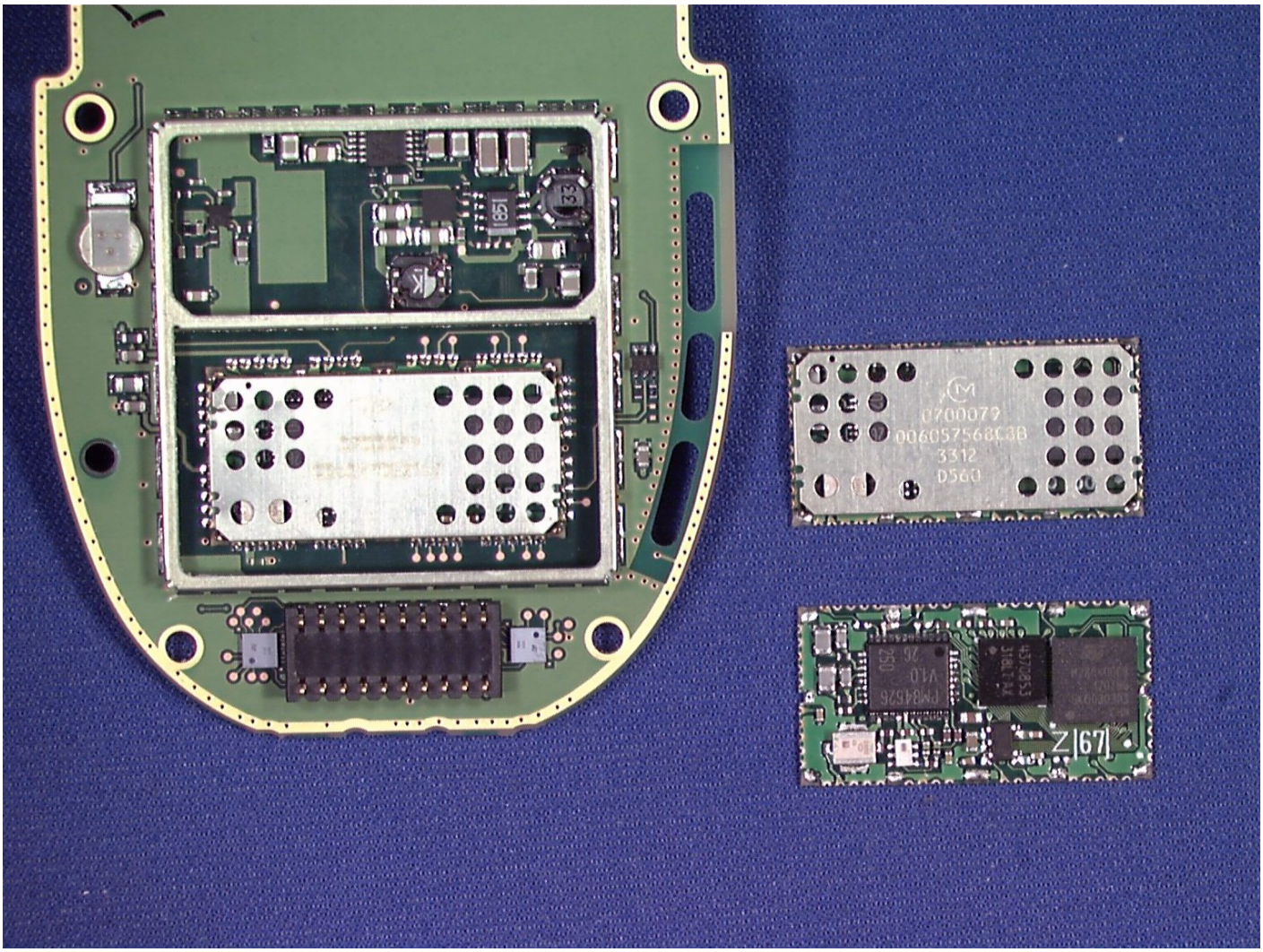
Response to Issues raised on the NHM-10X FCC Application

1) Please provide an additional photograph with the second sub-shield removed (page 6 of 8 in the Internal Photos exhibit).

Response 1) The shield to which you refer is the shield associated with the Bluetooth Module, which is used in its entirety in the design of this product. To clarify the use of the module within the device, similar modules have been photographed (in the same orientation, with and without shield) adjacent to main circuit board.



2) The 731 form lists GSM frequencies for AMPS band as 824.2 - 848.2. It is our understanding that this should be 824.2 - 848.8 which does also match the test report. Please explain.

Response 2) You are correct; an error was made during the completion of the form.

3) For purposes of correctly listing information on the grant, is this phone a dual-band or tri-band. Note that the theory of operation mentions dual-band Cell phone, but section 2 of the EMC report states tri-band. Please explain.

Response 3) An error in the report was not noticed prior to inclusion in the application documents

4) It does not appear that the DC voltages/currents applied into the several elements of the final radio frequency amplifying device for normal operation over the power range as required by 2.1033(c)(8) are listed. Please explain where this information is located, or provide this information separately.

Response 4) The following table has been provided to identify the voltages and current required

These measurements have been made on an unmodified NHM-10X device operating into 50R load. Ambient temperature, mid channel both bands. Battery voltage = 3.6V. Current and voltage is measured mid burst.

2.1033.c.8 does not state whether the max and min or the full range is necessary. These tables cover all.

GSM850

PCL	Current / mA
19	75
18	100
17	120
16	145
15	178
14	220
13	275
12	345
11	435
10	545
9	680
8	860
7	1085
6	1370
5	1650

GSM 1900

PCL	Current / mA
15	50
14	55
13	65
12	78
11	95
10	110
9	140
8	180
7	220
6	280
5	353
4	450
3	560
2	710
1	890
0	1090

5) The highest emissions shown in the plots in section 8.2 & 8.8 do not appear to be listed in the final data. Please explain.

Response 5) There is a comment that accompanies the plots that explains they are pre-scans and thus for indication purposes only. Because of the nature of screen rooms on RF signals the limit was derived through substitution. It is not realistic to perform screen room substitution at every frequency point. Thus substitution is performed at the point that exhibits the worst response of the room. The limit is then constructed around this point. This ensures the tightest possible limit and this ultimately leads to over testing. The fact the pre-scan data is over the limit does not necessarily indicate a failure as it may have been over tested. Any spurious that resides within 20dB of the displayed limit, or over the limit is further analysed. The final data is thus recorded in a table that accompanies the graphs. The fact that no data has been reported for the spurious shown on the plot is an indication of the considerable effect the reflections of the screen room

had on the emission, it was thus greatly reduced falling 20 dB below the appropriate limit once the EUT was set-up on the open area teat site (OATS).

6) It is not certain how the 232 hops in 31.5 seconds was obtained in section 8.6 of the test report. Note that if the device has 79 channels and occupies each for 454.909820uS, that this equates to a period for TX on all 79 channels of about 35.938 msec. Therefore in 30 seconds, the device will occupy a channel for 30/period of 834.8 times in 30 seconds. 834.8* TX duration measured is 379.7 msec. Please explain.

Response 6) The 232 hops were noted by counting the number of peaks on the 3rd Plot on page 24. The standard states that *"The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed"*. From this a channel was picked, the pulse width and number of transmissions in the defined time were measured and counted.

Thus :-

79 Channels x .4 Secs = 31.6 Secs

Number of transmissions on any one channel in 31.6 Secs = 232

Maximum Packet Width on a Chosen Channel = 454.909820 µS

Total transmission period in 31.6 Seconds on any one channel :-

232 * 454.909820 µS = 0.105539 Secs.

7) Typically for narrow band emissions given in sections 8.8 of the report, the average to peak measurements made on this type of device are 0 to only a few dB difference. The delta between the peak and average is typically on the order of 15 dB or more. This suggests that the device was transmitting in a frequency stopped pulse mode of operation instead of a CW signal that is expected according to FCC measurements on this type of device. Due to variances in average detectors, FHSS systems or any type of pulsed waveform are mathematically corrected for the average measurement instead of actually providing measurements during pulsed modes. Otherwise any average measurements employed must assure that the RBW > 1/TX on time. Given that this device uses Bluetooth, the theory may actually be applied for these measurements. Note that Bluetooth has different packet lengths that may be used in modes with longer packets. The theory of operation for Bluetooth states that there may be 1, 3, or 5 slots used per transmit depending on the mode of operation. For a DH1 packet the TX is on 0.625 us per 49 mS per channel, while for a DH5 packet the TX is on 0.625 * 5 per 247 ms per channel. These duty cycles equal the following: 20 log (.625/49) = 37.9 dB or 20 log (3.125/100) = -30 dB. All modes are greater than the 20dB difference between the peak and average limits. Given the acceptable nature of Bluetooth duty cycles, you may apply this justification for these measurements. Alternatively, you may simply provide a statement in the report that peak measurements met with average limits without actually showing any average measurements since this is the case. Please comment and/or correct the report as necessary.

Response 7) We can confirm that the resolution bandwidth was 1 MHz and thus greater than 1/TX on Time. The TX on time was measured and found to be 454.9 µS. Thus, 1/454.9 = 0.002 MHz. This is significantly less that 1 MHz.

8) Similar concerns are noted regarding section 8.9 of the report. It is recommended to apply the mathematical correction vs. actual measurements.

Response 8) The response to this question is the same as that offered for question 7)

9) The prescan results show in section 8.2 and 10.2 appear to show results significantly above the limits. Please explain.

Response 9) The response to this question is the same as that offered for question 5)

10) The FCC asks that the SAR laboratory re-measure the peak power to ensure that the device is fully functioning during the SAR test at maximum TX power. Reported power results appear to be identical to EMC EIRP reported values. Conducted power appears to be given in the SAR report page 14. However, were conducted measurements made during EMC testing? What assurance can be provided that the device was functioning correctly at full maximum power during the SAR test.

Response 10) The product does not possess an external RF connector, so conducted measurements could not be performed. The EIRP was measured during EMC testing and was not repeated during SAR measurements because the SAR lab is not able to measure radiated power. The product was not reconfigured between EMC and SAR tests and was carefully packed for transportation between the test labs. The power settings are stored in digital memory and were the same for EMC and SAR tests.

11) Are full test configuration photographs available? If so please provide.

Response 11) Test configuration photos are provided in 5.2.1 and 5.2.2 of the SAR test report. These show the device in Cheek and Tilt positions against the head phantom and spaced by 1.5cm from the flat phantom.

12) Review of the users manual lists multiple accessories (LPS-3 Inductive Loopset, HDC-5 Headset, HDE-2 Headset, HDD-1 Headset, HDC-10 Headset, and HDB-5). However it appears that only the HDE-2 Headset was tested. Since not all combinations have been tested, a justification must be made as to the determination of the worse case configuration(s).

Response 12) All the listed accessories are fitted with the same plug connector and use the same number of wired pins. All the accessories have an identical impact on RF performance

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13) The SAR Phantom description (section 4.2) should include relative thickness and tolerance information.

Response 13) The phantom meets the shape, thickness and tolerance requirements set in IEEE P1528.

14) The FCC asks that the liquid dielectric parameters should measured at device mid-band frequencies. It appears that for the Part 24 band that these were measured at 1900 MHz vs approximately 1880. Please provide this missing information.

The SAR measurement system was verified at 1900MHz (section 4.3.2), the measurement of the device was carried out using liquid parameters measured at 1880MHz (section 4.3.3).

15) What was the probe tip distance to phantom inner surface during course scans?

The distance was 1.5mm.

16) The Distance between the measurement point (distance + offset) at the probe sensor location (geometric center behind the probe tip) and the phantom surface should be less than is < 8.0 mm and maintained at a constant distance of +/- 1.0 mm during an area scan to determine peak SAR locations. From reviewing the Z-axis scan for RH Tilt, it appears that the distance of < 8.0 mm might not have been achieved (approx 6 + 2.7 mm > 8.0 mm). Please explain.

It has been confirmed by SPEAG that Dasy3 Z-axis plots have a visualisation problem. The distance has been 4.2mm.