

## FCC email 5th Oct - response 15<sup>th</sup> Nov 2011

1) We note that the tune-up exhibit at page 9 appears to indicate a duty factor different from as used in the RFI-Global lab SAR report, as well as the RFI-Global lab EMC/radio report indicates duty factor different from the SAR report; at minimum for any future filings for similar devices and/or technologies please ensure device setups and descriptions of maximum rated and normal operating capabilities are consistent across all exhibits within an application.

[Sulis] Thank you - noted

2) FCC does not consider that SAR testing for 10 MHz channel bandwidth using only 17 sub-channels, then multiplying results by a factor two, is appropriate nor acceptable for FCC Certification compliance demonstration purposes where normal WiMAX operations require 35 sub-channels to be active. SAR report needs revision please to instead use full 35 sub-channel device setup.

[RFI Test Lab] - Although SAR test was performed using 17 sub-channels (setting of 102) this was then checked against 35 sub-channels (setting of 175) to ensure that the value measured were adequate. The SAR measurement was checked on 16-QAM and the valued measured with 17 sub-channels was found to be approximately half of the level of 35 sub-channels. As indicated in the table below.

### 17 sub-channels vs 35 sub-channels

EUT Position	Phantom Config	Frequency (MHz)	1g Level (W/kg) 17 sub ch	1g Level (W/kg) 35 sub-ch	10g Level (W/kg) 17 sub-ch	10g Level (W/kg) 35 sub-ch
Horizontal-Down	Flat (SAM)	3675	0.166 <sup>1</sup>	0.316 <sup>2</sup>	0.057 <sup>1</sup>	0.109 <sup>2</sup>
Horizontal-Down	Flat (SAM)	3655	0.170 <sup>1</sup>	0.302 <sup>2</sup>	0.060 <sup>1</sup>	0.111 <sup>2</sup>

Note:

1. Output power = 18dBm, SAR Power Reference at the end of test = 4.313 V/m
2. Output power = 21dBm, SAR Power Reference at the end of test = 6.341 V/m

3) Especially for purposes of supporting SAR evaluation results and confirming compliance it is important for application filings to identify the device maximum rated output power for the operating modes and modulations. Also it is important for the measured power data and associated descriptions of device setups and specific measurement techniques and instrumentation to be fully explained and described especially when there may be variations in results for whatever reasons. Generally SAR and EMC tests must show compliance for the maximum rated output power for which a device will operate in US networks, and the maximum rated power will also be listed on the grant certificate. The following shows a comma-delineated listing for what we see as power levels listed throughout the filing. In the first row, the numbers 5 and 10 are channel bandwidths, loc. means exhibit / place in the filing, and parameter column indicates that the test reports have varied freq. ranges. parameter, loc., QPSK 5, 16QAM 5, QPSK 10, 16QAM 10 - , f-731, 50, 50, 90, 90 3650-3700, emc-SGS, 51, 49, 87, 90 3650-3675, emc-RFI, 59, 59, 110, 110 3650-3700, SAR meas., 93, 89, 85, 71 max rated, SAR pg7, 79, 79, 200, 200 max rated, SAR pg14, 141, 141, 251, 251

Please revise at minimum the SAR report for consistent listing of max. power capability and with device testing using appropriate corresponding power. Where results in EMC/radio reports might differ, please include appropriate explanations and attestations about device maximum outputs and as represented by the test results.

[Sulis] Documents have been updated as follows:

location	Power (dBm)			
	QPSK 5	16QAM 5	QPSK 10	16QAM 10
Rated power (conducted)	18.0	18.0	21.0	21.0
Rated power (EIRP) – Form 731v2	22.5	22.5	25.5	25.5
emc-SGS	17.1	16.9	19.4	19.5
EMC-RFI (V2) (conducted)	17.7	17.7	20.4	20.4
EMC-RFI (V2) (EIRP)	22.2	22.2	24.9	24.9
SAR (V4) meas (conducted)	19.7	19.5	19.3	18.5
max rated SAR (V4) pg7 (conducted)	18.0	18.0	21.0	21.0
max rated SAR (V4)pg14 (conducted)	18.0	18.0	21.0	21.0

location	Power (mW)			
	QPSK 5	16QAM 5	QPSK 10	16QAM 10
Rated power (conducted)	63.1	63.1	125.9	125.9
Rated power (EIRP) – Form 731v2	177.8	177.8	354.8	354.8
emc-SGS	51.0	49.0	87.0	90.0
EMC-RFI (V2) (conducted)	59.0	59.0	110.0	110.0
EMC-RFI (V2) (EIRP)	166.0	166.0	309.0	309.0
SAR (V4) meas (conducted)	93.0	89.0	85.0	71.0
max rated SAR (V4) pg7 (conducted)	63.1	63.1	126.0	126.0
max rated SAR (V4)pg14 (conducted)	63.1	63.1	126.0	126.0

Note:

- EMC-RFI (V2) is report "RFI-RPT-RP81975JD01A V2.0" uploaded as exhibit 15 Nov 2011. This report contains some repeat measurements in section 5.2.5 with emissions masks correctly placed – an error we had spotted in reviewing this data.
- SAR (V4) is report "Draft RFI-SAR-RP79027JD01A V4.01" – this has been emailed as it is a draft – formal report will be issued if issue is now resolved.

4) Further also to item 3), due to different max. power ratings shown at pages 7 vs. 14 of SAR report, the results in 7.2 and 7.3 of SAR report at minimum will need revision for whatever is the actual rated power.

[Sulis] Report "Draft RFI-SAR-RP79027JD01A V4.01" addresses this

5) SAR page 7 shows 18/48, means control symbols inactive, AND 15/48 meaning control symbols active; in case testing using control symbols active, that contradicts the descriptions and results in 5.1 and 7.2 - please revise to use appropriate and consistent test setups and descriptions and data reductions. Please also double-check and/or revise all SAR plots and results to ensure that the correct crest factor was applied.

**[RFI Test Lab]** –All test was performed with 15/48 and the crest factor used was 1/(15/48), page 7 of the SAR report has been amended to reflect this and 5.1 and 7.2 no longer contradicts. As the test was performed with the correct crest factor there is no need to revise the SAR plots.

**[Sulis]** Response Formal report in preparation - Report “Draft RFI-SAR-RP79027JD01A V4.01”

6) For clarification purposes, when a KDB tracking number is listed we request that also be identified as either inquiry or publication - at SAR page 9 please indicate that 602952 was a KDB inquiry.

**[RFI Test Lab]** –This has now been changed to KDB inquiry number.

**[Sulis]** Response Formal report in preparation - Report “Draft RFI-SAR-RP79027JD01A V4.01”

7) The uncertainty value listed for probe calibration in the 8.1 table does not appear to match the probe certificate - please revise (with re-calculate of expanded uncertainty).

**[RFI Test Lab]** –The probe was calibrated for 3.7 GHz was an added frequency to the already calibrated probe. The probe had a general calibration and 2 further calibration to add additional frequencies. The report now included all 3 calibration certificates for the year 2010 which is valid for 1 year. The certificates cover both the extra frequency calibration which includes the axial isotropy, hemispherical isotropy and spatial resolution.

Please note that in the original report the probability distribution used for these parameters was  $k=2$  and not  $k=1$  and the divisor used was 2 and not 1. Therefore if the values below are changed to reflect  $k=1$  using the divisor of 1 the expanded uncertainty will remain the same. Please see below.

## **k=2**

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$C_i$ (10g)	Standard Uncertainty		$u_i$ or $u_{eff}$
							+ u (%)	- u (%)	
B	Probe calibration	13.100	13.100	normal ( $k=2$ )	2.0000	1.0000	6.550	6.550	$\infty$
B	Axial Isotropy	0.500	0.500	normal ( $k=2$ )	2.0000	1.0000	0.250	0.250	$\infty$
B	Hemispherical Isotropy	2.600	2.600	normal ( $k=2$ )	2.0000	1.0000	1.300	1.300	$\infty$
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	$\infty$

## **K=1**

B	Probe calibration	6.550	6.550	normal ( $k=1$ )	1.0000	1.0000	6.550	6.550	$\infty$
B	Axial Isotropy	0.250	0.250	normal ( $k=1$ )	1.0000	1.0000	0.250	0.250	$\infty$
B	Hemispherical Isotropy	1.300	1.300	normal ( $k=1$ )	1.0000	1.0000	1.300	1.300	$\infty$
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	$\infty$

## **Calibration certificate values:**

Please see page 5 of 7 of calibration certificate EX3-3508\_sep10 for the probe calibration value. See page 7 of 8 of calibration certificate EX3-3508\_Jul10 for the spherical isotropy value. See page 7 of 10 of calibration certificate EX3-3508\_Feb10 for the axial isotropy value.

8) At SAR appendix 1, listing of D2450V2 and its serial no. seems incorrect - please revise.

**[RFI Test Lab]** –This has now been changed to D3700V2 and serial no. 1003.

**[Sulis]** Response Formal report in preparation - - Report “Draft RFI-SAR-RP79027JD01A V4.01”