

RF EXPOSURE REPORT

REPORT NO.: SA140116E08

COMPLIANCE ID: ADBB-GX13004A

PRODUCT NAME* : DB 6520

**For any other product variant refer to above Compliance ID*

FCC ID: MCLDB6520

RECEIVED: Jan. 16, 2014

TESTED: Feb. 26 to 27, 2014

ISSUED: May 14, 2014

APPLICANT: Hon Hai PRECISION IND.CO.,LTD

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140116E08	Original release	May 14, 2014

1. CERTIFICATION

COMPLIANCE ID: ADBB-GX13004A

PRODUCT NAME*: DB 6520

PRODUCT DESCRIPTION: VDSL/GbE WiFi Data Router

**For any other product variant refer to above Compliance ID*

BRAND NAME: ADB

TEST SAMPLE: ENGINEERING SAMPLE

APPLICANT: Hon Hai PRECISION IND.CO.,LTD

TESTED: Feb. 26 to 27, 2014

STANDARDS: FCC Part 2 (Section 2.1091)

FCC OET Bulletin 65, Supplement C (01-01)

IEEE C95.1

The above equipment (Model: DB 6520) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Midoli Peng , **DATE:** May 14, 2014
(Midoli Peng, Specialist)

APPROVED BY : May Chen , **DATE:** May 14, 2014
(May Chen, Manager)

2. RF EXPOSURE LIMIT

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm ²)	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

3. MPE CALCULATION FORMULA

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

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm

4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

5. ANTENNA GAIN

The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit (Ant. No.)	Brand	Model	Antenna Type	Gain (dBi) (including cable loss)	Diversity Function	Frequency range (GHz to GHz)	Connector Type	Cable Length (mm)
Chain (0) A2	Airgain	M2450DL CM-T1-G 100U	PIFA	3.0	Yes	5.15 to 5.35	I-PEX	100
				5.1		5.47 to 5.85		
Chain (1) A3	Airgain	M2450DL CM-T-G8 5CC20R2	PIFA	2.6	Yes	2.4 to 2.49	I-PEX	85
				2.5		5.15 to 5.35		
				3.8		5.47 to 5.85		
Chain (2) A1	Airgain	M2450DL CM-T1-G 190UR2	PIFA	1.8	Yes	2.4 to 2.49	I-PEX	190
				2.1		5.15 to 5.35		
				3.1		5.47 to 5.85		
Note. : 1. For 2.4GHz<1Tx mode>: Chain (1) was chosen for final test. 2. For 5GHz<1Tx mode>: Chain (0) was chosen for final test. 3. For 5GHz<2Tx mode>: Chain (0) & Chain (1) were chosen for final test.								

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247 (2.4GHz):

802.11b, 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2412 - 2462	211.836	2.6	20	0.07669	1.00

802.11g, 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2412 - 2462	171.396	2.6	20	0.06205	1.00

802.11n (HT20), 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2412 - 2462	166.725	2.6	20	0.06036	1.00

802.11n (HT40), 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2422 - 2452	118.577	2.6	20	0.04293	1.00

For 15.247 (2.4GHz):

802.11g, 2Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2412 - 2462	335.393	5.22	20	0.22196	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.22\text{dBi}$

802.11n (HT20), 2Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2412 - 2462	328.496	5.22	20	0.21740	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.22\text{dBi}$

802.11n (HT40), 2Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2422 - 2452	200.063	5.22	20	0.13240	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.22\text{dBi}$

For 15.247 (5GHz):

802.11a, 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5745 - 5825	174.582	5.1	20	0.11239	1.00

802.11n (HT20), 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5745 - 5825	176.604	5.1	20	0.11369	1.00

802.11n (HT40), 1Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5755 - 5795	146.893	5.1	20	0.09456	1.00

802.11n (HT20), 2Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5745 - 5825	274.861	5.1	20	0.17695	1.00

802.11n (HT40), 2Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5755 - 5795	280.831	5.1	20	0.18079	1.00

802.11a, 3Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5745 - 5825	378.121	8.81	20	0.57195	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.81\text{dBi}$

802.11n (HT20), 3Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5745 - 5825	344.956	8.81	20	0.52179	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.81\text{dBi}$

802.11n (HT40), 3Tx:

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5755 - 5795	221.806	8.81	20	0.33551	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.81\text{dBi}$

For 15.407 (5GHz):

802.11a, 1Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5180 - 5240	44.771	3	20	0.01777	1.00

802.11n (HT20), 1Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5180 - 5240	45.814	3	20	0.01819	1.00

802.11n (HT40), 1Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5190 - 5230	49.091	3	20	0.01949	1.00

802.11n (HT20), 2Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5180 - 5240	40.235	3	20	0.01597	1.00

802.11n (HT40), 2Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5190 - 5230	45.613	3	20	0.01811	1.00

802.11a, 3Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5180 - 5240	42.316	7.31	20	0.04531	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 7.31\text{dBi}$

802.11n (HT20), 3Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5180 - 5240	40.879	7.31	20	0.04378	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 7.31\text{dBi}$

802.11n (HT40), 3Tx:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
5190 - 5230	48.168	7.31	20	0.05158	1.00

NOTE: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 7.31\text{dBi}$

CONCLUSION:

Both of the 2.4GHz and 5GHz can transmit simultaneously, the formula of calculated the MPE is:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.22196 / 1 + 0.57195 / 1 = 0.794$, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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