



RF Exposure Evaluation Declaration

FCC ID: O9C-BJNGABB0038
IC: 2299L-BJNGABB0038
APPLICANT: Hewlett Packard Company

Application Type: Certification
Product: HPE MSR954-W 1GbE+SFP LTE (AM) Rtr
Model No.: BJNGA-BB0038
Brand Name: Hewlett Packard Enterprise
FCC Rule Part(s): FCC CFR 47 §2.1091
IC Specification(s): RSS-102 Issue 5
FCC Classification: Digital Transmission System (DTS)

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The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1504RSU00604	Rev. 01	Initial report	10-08-2015
1504RSU00604	Rev. 02	Update the MC7354 module antenna list	10-28-2015

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	HPE MSR954-W 1GbE+SFP LTE (AM) Rtr
Model No.	BJNGA-BB0038
Power Type	AC 120V/60Hz
Frequency Range	802.11b/g/n-HT20: 2412 ~ 2462 MHz 802.11n-HT40: 2422 ~ 2452 MHz
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Maximum Average Output Power	802.11b: 20.24dBm 802.11g: 20.56dBm 802.11n-HT20: 20.37dBm 802.11n-HT40: 18.24dBm
MC7354 Module Specification	
FCC ID	N7NMC7355
IC	2417C-MC7355
Supported Bands	GPRS/EDGE 850/1900 WCDMA Band II/V CDMA2000 BC0/BC1/BC10 LTE Band 2/4/5/13/17/25

1.2. Antenna Description

Antenna Type	Frequency Band (MHz)	Manufacturer	Max Peak Gain (dBi)
Dipole Antenna	2400~2500	DONGGUAN SENLING INDUSTRIAL CO., LTD	3.00
Dipole Antenna	750	PCTEL, Inc	1.26
	850		1.22
	1710		1.24
	1880		0.88
	1990		1.09
	2170		1.43

2. RF Exposure Evaluation

2.1. Limits

FCC Rules:

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

IC Rules:

IC has adopted the RF field strength limits established in Health Canada's RF exposure guideline. The limits are shown in Table 4 below per RSS-102.

RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Formula as follows:

f= Frequency in MHz

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

Where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$\pi = 3.1416$

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

P_d is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	HPE MSR954-W 1GbE+SFP LTE (AM) Rtr
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.0dBi for Wi-Fi band and 2.0dBi for LTE band in logarithm scale.

For 2.4GHz Band:

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at $r = 20 \text{ cm}$ (mW/cm^2)	FCC Limit (mW/cm^2)	IC Limit (mW/cm^2)
802.11b	2412 ~ 2462	20.24	0.0419	1	0.537
802.11g	2412 ~ 2462	20.56	0.0452	1	0.537
802.11n-HT20	2412 ~ 2462	20.37	0.0432	1	0.537
802.11n-HT40	2422 ~ 2452	18.24	0.0265	1	0.537

For 2G/3G/LTE Band:

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Duty Cycle Factor (dB)	Power Density at $r = 20 \text{ cm}$ (mW/cm^2)	FCC Limit (mW/cm^2)	IC Limit (mW/cm^2)
GSM 850	824 ~ 849	32.71	-6	0.1235	0.549	0.258
PCS 1900	1850 ~ 1910	30.43	-6	0.0676	1	0.448
WCDMA Band II	1850 ~ 1910	23.11	0	0.0499	1	0.448
WCDMA Band V	824 ~ 849	23.37	0	0.0572	0.549	0.258
CDMA2000 BC0	824 ~ 849	24.40	0	0.0726	0.549	0.258
CDMA2000 BC1	1850 ~ 1910	24.40	0	0.0671	1	0.448
CDMA2000 BC10	817 ~ 824	24.40	0	0.0726	0.545	0.256
LTE Band 2	1850 ~ 1910	23.45	0	0.0539	1	0.448
LTE Band 4	1710 ~ 1755	23.54	0	0.0598	1	0.424
LTE Band 5	824 ~ 849	23.57	0	0.0599	0.549	0.258
LTE Band 13	777 ~ 787	23.39	0	0.0580	0.518	0.247
LTE Band 17	704 ~ 716	23.34	0	0.0574	0.469	0.231
LTE Band 25	1850 ~ 1915	23.41	0	0.0534	1	0.448

CONCULISON:

Both of the WLAN and 2G/3G/4G can transmit simultaneously. Therefore, the Max Power Density at r (20 cm) = $0.1235\text{mW/cm}^2 + 0.0452\text{mW/cm}^2 = 0.1687\text{mW/cm}^2 < 0.231\text{mW/cm}^2$.

So the EUT complies with the FCC and IC requirement.

The End
