RF Exposure Report

Report No.:	SA200514C16A
FCC ID:	T8GSAN9000
Test Model:	SA-N9000 OEM D1
Received Date:	May 14, 2020
Test Date:	Aug. 08 ~ Dec. 21, 2020
Issued Date:	Dec. 22, 2020
Applicant:	Harman Connected Car Division
Address:	Parking 3, 85748 Garching Germany
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
SA200514C16A	Original release	Dec. 22, 2020

1 Certificate of Conformity

Product:	Module
Brand:	Harman
Test Model:	SA-N9000 OEM D1
Sample Status:	Standard Sample
Applicant:	Harman Connected Car Division
Test Date:	Aug. 08 ~ Dec. 21, 2020
Standards:	FCC Part 2 (Section 2.1091) IEEE C95.3 -2002
References Test Guidance:	KDB 447498 D01 General RF Exposure Guidance v06

The above equipment 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 RF characteristics under the conditions specified in this report.

Prepared by : Celine Chou , **Date:** Dec. 22, 2020

Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Dec. 22, 2020

Bruce Chen / Senior Project Engineer

2 RF Exposure

2.1 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

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$
where
Pd = power density in mW/cm^2
Pout = 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

2.3 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**.

3 Calculation Result of Maximum Conducted Power

NSA Mode

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
NR Band 5 (SCS 15kHz)	21.99	24.14	20	0.052	0.550
NR Band 41 (SCS 30kHz)	-	26.00	20	0.079	1
NR Band 66 (SCS 15kHz)	-	26.49	20	0.089	1
NR Band 71 (SCS 15kHz)	23.76	25.91	20	0.078	0.444
LTE Band 2 + NR Band 5	-	26.01	20	0.079	1
LTE Band 66 + NR Band 5	-	26.67	20	0.092	1
LTE Band 26 (Part 22) + NR Band 41	22.55	24.70	20	0.059	0.550
LTE Band 26 (Part 90) + NR Band 41	22.52	24.67	20	0.058	0.543
LTE Band 5 + NR Band 66	22.45	24.60	20	0.057	0.550
LTE Band 12 + NR Band 66	20.78	22.93	20	0.039	0.466
LTE Band 2 + NR Band 71	-	26.02	20	0.080	1
LTE Band 66 + NR Band 71	-	26.63	20	0.092	1

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. EIRP = ERP + 2.15dB

SA Mode

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
NR Band 2 (SCS 15kHz)	-	26.71	20	0.093	1
NR Band 5 (SCS 15kHz)	23.36	25.51	20	0.071	0.550
NR Band 7 (SCS 15kHz)	-	26.30	20	0.085	1
NR Band 25 (SCS 15kHz)	-	27.07	20	0.101	1
NR Band 38 (SCS 30kHz)	-	25.78	20	0.075	1
NR Band 41 (SCS 30kHz)	-	26.00	20	0.079	1
NR Band 66 (SCS 15kHz)	-	27.54	20	0.113	1
NR Band 71 (SCS 15kHz)	23.85	26.00	20	0.079	0.444
NR Band 77 (SCS 30kHz)	-	26.30	20	0.085	1

Note:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. EIRP = ERP + 2.15dB

2G and 3G

Band	ERP Power (dBm)	EIRP Power (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
GSM 850	31.49	33.64	20	0.460	0.549
GSM 1900	-	32.94	20	0.391	1
WCDMA Band 2	-	26.97	20	0.099	1
WCDMA Band 4	-	27.36	20	0.108	1
WCDMA Band 5	23.47	25.62	20	0.073	0.550

Note:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. EIRP = ERP + 2.15dB

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

NSA Mode

LTE Band 2 + NR Band 5 = 0.079 / 1 + 0.052 / 0.550 = 0.174
LTE Band 66 + NR Band 5 = 0.092 / 1 + 0.052 / 0.550 = 0.187
LTE Band 26 (Part 22) + NR Band 41 = 0.059 / 0.550 + 0.079 / 1 = 0.186
LTE Band 26 (Part 90) + NR Band 41 = 0.058 / 0.543 + 0.079 / 1 = 0.186
LTE Band 5 + NR Band 66 = 0.057 / 0.550 + 0.089 / 1 = 0.193
LTE Band 12 + NR Band 66 = 0.039 / 0.466 + 0.089 / 1 = 0.173
LTE Band 2 + NR Band 71 = 0.080 / 1 + 0.078 / 0.444 = 0.256
LTE Band 66 + NR Band 71 = 0.092 / 1 + 0.078 / 0.444 = 0.268

Therefore the maximum calculations of above situations are less than the “1” limit.

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