

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
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FCC Registration / 788550 / TW0003

Designation Number:



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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.

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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

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

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

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:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

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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