CERTIFICATION TEST REPORT

Report Number. : 12554903-E3V3

Applicant	:	Dish Technologies LLC 9601 Meridian Blvd Englewood, CO, 80112 USA
Model	:	NHGBC
FCC ID	:	DKNBC
EUT Description	:	Battery Charger with BLE
Test Standard(s)	:	FCC Part 1 Subpart I FCC Part 2 Subpart J

Date Of Issue:
January 02, 2019

Prepared by:
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	12/19/2018	Initial Issue	--
V2	12/27/2018	Updated sections 2&6	E.Yu
V3	1/2/2019	Updated sections 2	E.Yu

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Dish Technologies LLC
9601 Meridian Blvd
Englewood, CO, 80112
USA

EUT DESCRIPTION: Battery Charger with BLE

MODEL: NHGBC

SERIAL NUMBER: NOVA P2-1 Prototype

DATE TESTED: DECEMBER 11 –DECEMBER 18, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC Part 1 Subpart I	Complies
FCC Part 2 Subpart J	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:

Francisco de Anda
Consumer Technology Division
UL Verification Services Inc.

2. TEST METHODOLOGY

All calculations were made in accordance with KDB 447498 D01 and KDB 447498 D03.

3. REFERENCES

All measurements were made as documented in test report UL Verification Services Inc. Document 12554903-E1V2 FCCIC Charger BLE Report, for operation in the 2.4 GHz band.

Duty cycle data is excerpted from the applicable test reports.

Output power is excerpted from the applicable test reports and the manufacturing tolerance (see note on section 6) is added to the final levels.

Antenna gain data is excerpted from product documentation provided by the applicant.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

5. MAXIMUM PERMISSIBLE RF EXPOSURE

5.1. FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Notes:

(1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

(2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

5.2. EQUATIONS

POWER DENSITY

Power density is given by:

S = EIRP / (4 * Pi * D^2)

Where

S = Power density in mW/cm^2
EIRP = Equivalent Isotropic Radiated Power in mW
D = Separation distance in cm

Power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by 10.

DISTANCE

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

Where

D = Separation distance in cm
EIRP = Equivalent Isotropic Radiated Power in mW
S = Power density in mW/cm^2

SOURCE-BASED DUTY CYCLE

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

Where

DC = Duty Cycle in %, as applicable
EIRP = Equivalent Isotropic Radiated Power in W

MIMO AND COLOCATED TRANSMITTERS (IDENTICAL LIMIT FOR ALL TRANSMITTERS)

For multiple chain devices, and colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the EIRP (in linear units) of each transmitter.

Total EIRP = (EIRP1) + (EIRP2) + ... + (EIRPn)

where

EIRPx = Source-based time-averaged EIRP of chain x or transmitter x

The total EIRP is then used to calculate the Power Density or the Distance as applicable.

MIMO AND COLOCATED TRANSMITTERS

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply:

The Power Density at the specified separation distance is calculated for each transmitter chain or transmitter.

The fraction of the exposure limit is calculated for each chain or transmitter as
(Power Density of chain or transmitter) / (Limit applicable to that chain or transmitter).

The fractions are summed.

Compliance is established if the sum of the fractions is less than or equal to one.

6. RF EXPOSURE RESULTS

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

(Single chain transmitters, no colocation, MPE distance > 20 cm)

Single Chain and non-colocated transmitters									
Band	**Mode**	**FCC Limit (mW/cm^2)**	**IC Limit (W/m^2)**	**Output AVG Power (dBm)**	**Antenna Gain (dBi)**	**EIRP (dBm)**	**Duty Cycle (%)**	**EIRP (mW)**	**Minimum Separation distance needed for compliance (cm)**
2.4 GHz	BLE	1.00	10.0	2.98	3.35	6.33	100.0	4.3	0.58

Band	**@ Distance**	**FCC Power Density (mW/cm^2)**	**IC Power Density (W/m^2)**	**FCC Power Density (mW/cm^2) Limit**	**IC Power Density (W/m^2) Limit**
2.4 GHz BLE	20.00	0.0009	0.009	1.00	10.0

The device operates above 300 MHz and below 6 GHz with a maximum EIRP less than or equal to 2.7 Watts in 2.4GHz band as a fixed mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation under RSS-102.

Notes:

1) A tolerance value of from the table below was included in the output power values above to cover the output power tolerance of under extreme conditions as declared by the client.

Radio	Manufacturing Tolerance	Tolerance Included in calculations
BLE	±0.25dB	0.25dB

2) The output power in the tables above is the maximum power per chain among various channels and various modes within the specific band.

3) The antenna gain in the tables above is the maximum antenna gain among various channels within the specified band.

END OF REPORT