RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant / Manufacturer	:	Action Electronics Co.,Ltd.
Address	:	2480,TINGKAT PERUSAHAAN ENAM,PRAI FREE TRADE ZONE, 13600, PERAI,, PENANG, Malaysia
Factory	:	ACTION ASIA (SHENZHEN) CO., LTD
Address	:	4 Floor, Block 1, No.25 Jinxing Industrial Park, Jian'an Road, Fuyong Town, Bao'an District, Shenzhen, China
E.U.T.	:	10.1" IN-CAR SEATBACK MONITOR
Brand Name	:	VOXX, moviestoGO, Audiovox
Model No.	:	SB10M1, SBA71012, SBB71013, SB10UHD (For model difference, refer to section 1.)
FCC ID	:	ATI9R3SBA71012
Measurement Standard	:	FCC PART 15.239: 2017
Date of Receiver	:	October 12, 2018
Date of Test	:	October 12, 2018 to October 26, 2018
Date of Report	:	October 26, 2018

This Test Report is Issued Under the Authority of :

Prepared by	Approved & Authorized Signer
Rose Hu / Engineer	Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

TEL: +86-769-22022444 FAX: +86-769-22022799 Web: www.ntc-c.com
Address: Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong, China

Table of Contents

Revision History of This Test Report

Report Number	Description	Issued Date
NTC1810184FV00	Initial Issue	2018-10-26

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Product name	:	10.1” IN-CAR SEATBACK MONITOR
Main model number	:	SB10M1
Additional Model number	:	SBA71012, SBB71013, SB10UHD
Description of model difference	:	These models have the same circuity, electrical mechanical, PCB layout and physical construction. The difference in model number.
Power Supply	:	DC 12V come from vehicle power supply
Adapter	:	N/A
Test voltage	:	DC 12V battery
Hardware version	:	V1.0
Software version	:	V1.0
Serial number	:	N/A
Note	:	All tests were carried on model SB10M1.

Technical parameters

Frequency Range	:	88.1~107.9MHz
Modulation	:	FM
Channel space	:	100KHz
Number of Channel	:	199
Antenna Type	:	wire Antenna
Antenna Gain	:	1.0 dBi

Test Frequency

FM	
Channel	**Frequency (MHz)**
Low	88.1
Mid	97.9
High	107.9

Note 1 : According to section 15.31(m), regards to the operating frequency range over 10MHz, the Lowest, middle, and the Highest frequency of channel were selected to perform the test. The selected frequency see below:

Note 2 : All the requirements have been tested by modulating the transmitter with a 2.5KHz tone at a level 16dB higher than that required to produce a frequency deviation of 75KHz.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **ATI9R3SBA71012** filing to comply with Section 15.239 of the FCC Part 15(2016), Subpart C Rule.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

FM Signal Generator	:	Manufacturer: LEADER M/N: 3214 S/N: 1100164

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2019
The Laboratory has been assessed and proved to be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-9743

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Uncertainty	Result
§15.207 (a)	AC Power Conducted Emission	±1.06dB	N/A
§15.239(a)/ §2.1049	Occupied Bandwidth	±1.42 x10^{-4}%	Compliance
§15.239(b)	Field strength of the fundamental signal	±3.70dB	Compliance
§15.239(b)(c)/ §15.209/ §2.1053	Spurious emissions	±3.70dB	Compliance
§ 15.203	Antenna requirements	---	Compliance

Note: The EUT powered by DC 12V come from vehicle power source, therefore the AC Power Conducted Emission is not applicable.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

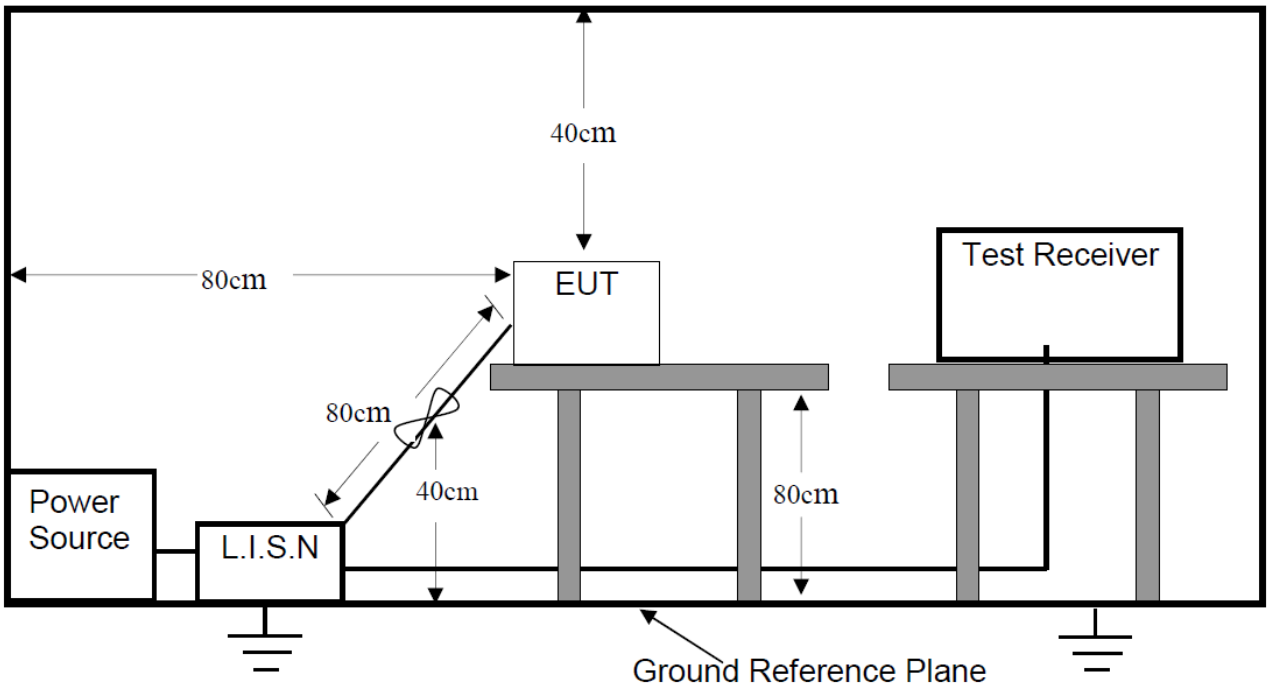
Not available for this EUT intended for grant.

2.3 Description of test modes

The EUT has been tested under operating condition. The Lowest, middle and highest channel were chosen for testing.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: FM Mode

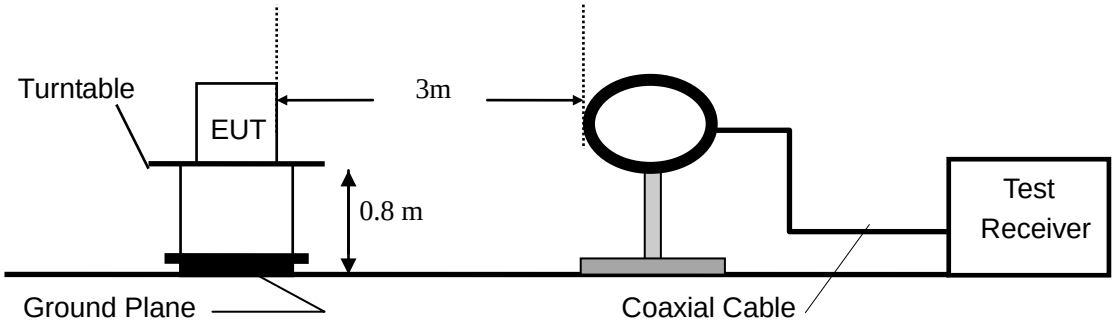
3.3 Measurement Results

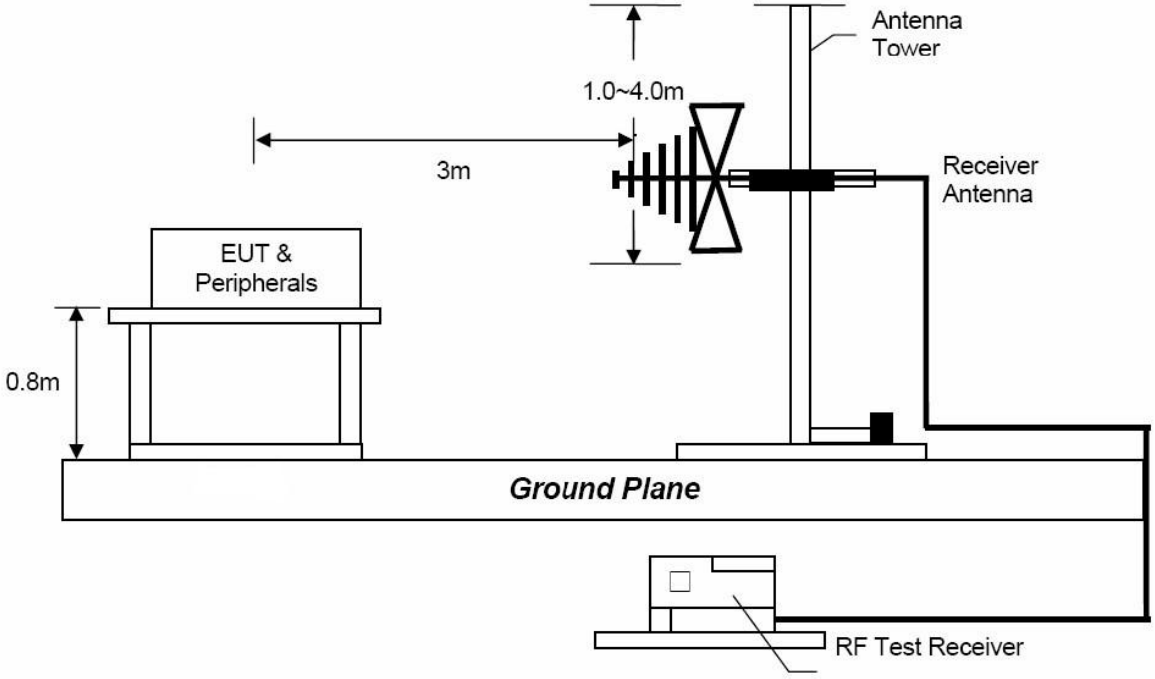
Not applicable.

4. Radiated Spurious Emissions and Restricted Bands

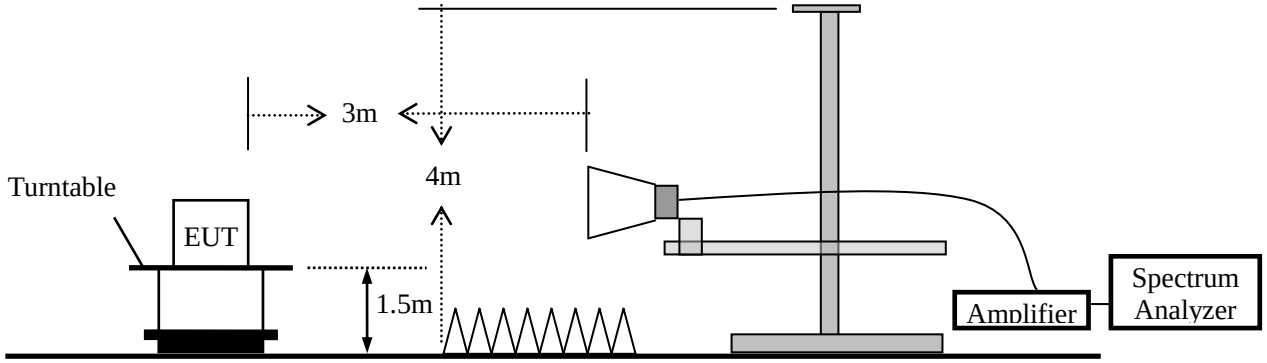
4.1 Test SET-UP (Block Diagram of Configuration)

4.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz





4.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



4.2 Measurement Procedure

a. Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
b. For the radiated emission test above 1GHz:
   The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

4.3 Limit

(1) Limit for Field strength of the fundamental signal

Frequency	Limit	
	Average Value (dBuv/m @3m)	Peak Value (dBuv/m @3m)
88-108MHz	47.96	67.96

Note: FCC part 15.239(b) the field strength of any emissions with the permitted 200KHz band shall not exceed 250microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provision in section 15.35 for limiting peak emissions apply.

(2) Limit for Spurious emission

Frequency MHz	Limit
	Quasi-peak Value (dBuv/m @3m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

4.4 Measurement Results

Pass.

Please refer to following plots for items Spurious Emissions.

Dongguan NTC Co., Ltd.
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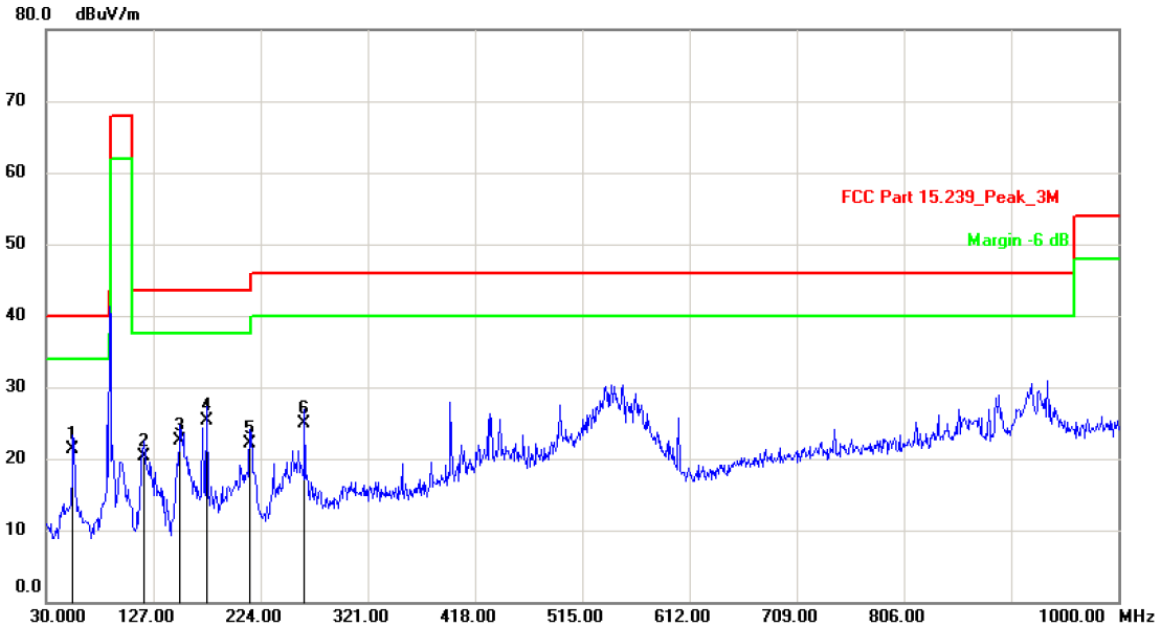
Radiated Emission Measurement

File :SBA71012 Data :#2 Date: 2018-10-18 Time: 9:39:38



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 88.1MHz
Note:

Polarization: ***Horizontal***
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		54.2500	38.94	-17.64	21.30	40.00	-18.70	QP			
2		118.2700	34.08	-13.68	20.40	43.50	-23.10	QP			
3		151.2500	38.07	-15.47	22.60	43.50	-20.90	QP			
4	*	175.5000	39.77	-14.47	25.30	43.50	-18.20	QP			
5		214.3000	35.23	-13.13	22.10	43.50	-21.40	QP			
6		263.7700	36.24	-11.34	24.90	46.00	-21.10	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

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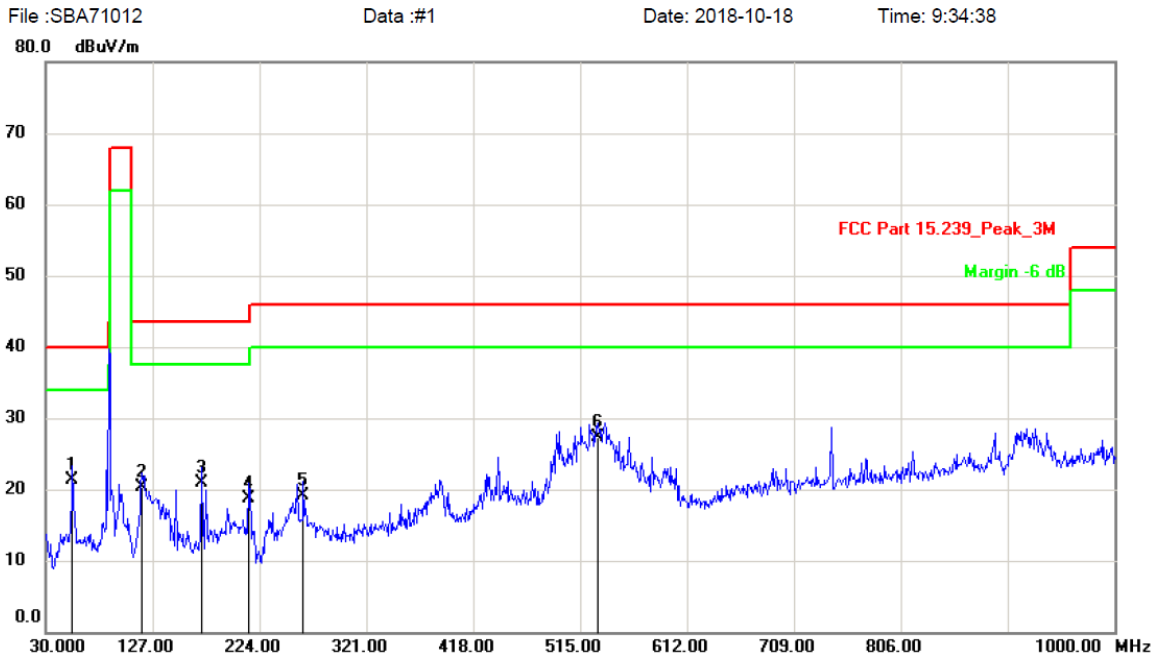
Radiated Emission Measurement



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 88.1MHz
Note:

Polarization: *Vertical*
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	54.2500	34.94	-13.64	21.30	40.00	-18.70	QP			
2		117.3000	36.76	-16.46	20.30	43.50	-23.20	QP			
3		171.6200	38.71	-17.71	21.00	43.50	-22.50	QP			
4		214.3000	34.93	-16.13	18.80	43.50	-24.70	QP			
5		263.7700	32.44	-13.34	19.10	46.00	-26.90	QP			
6		530.5200	35.99	-8.69	27.30	46.00	-18.70	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

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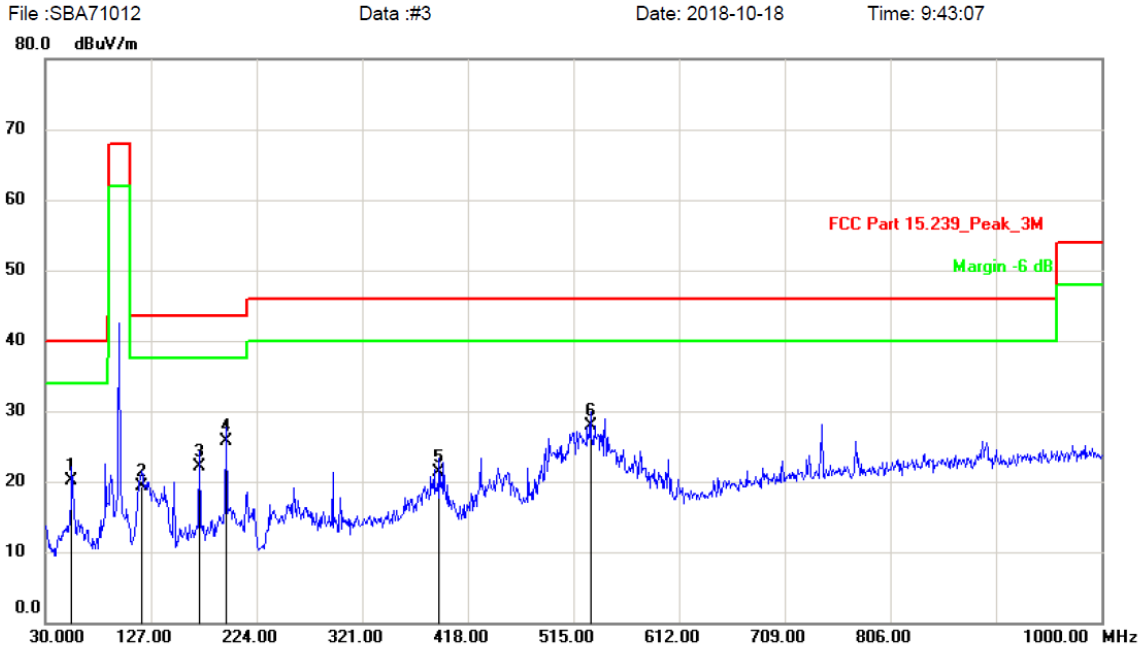
Radiated Emission Measurement



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 97.9MHz
Note:

Polarization: ***Hormonic***
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		54.2500	33.74	-13.64	20.10	40.00	-19.90	QP			
2		118.2700	36.08	-16.68	19.40	43.50	-24.10	QP			
3		171.6200	39.91	-17.71	22.20	43.50	-21.30	QP			
4	*	195.8700	42.12	-16.42	25.70	43.50	-17.80	QP			
5		391.8100	32.44	-11.14	21.30	46.00	-24.70	QP			
6		530.5200	36.59	-8.69	27.90	46.00	-18.10	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

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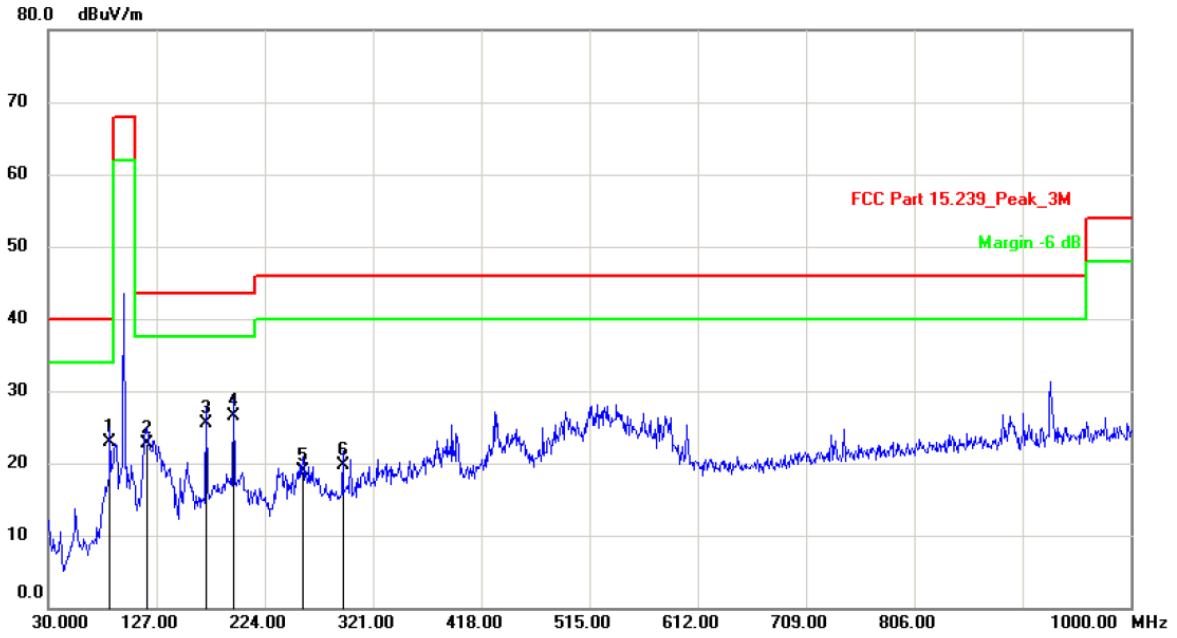
Radiated Emission Measurement

File :SBA71012 Data :#4 Date: 2018-10-18 Time: 9:48:26



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 97.9MHz
Note:

Polarization: *Vertical*
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		85.2900	41.01	-18.11	22.90	40.00	-17.10	QP			
2		118.2700	39.48	-16.68	22.80	43.50	-20.70	QP			
3		171.6200	43.31	-17.71	25.60	43.50	-17.90	QP			
4	*	195.8700	43.02	-16.42	26.60	43.50	-16.90	QP			
5		257.9500	32.37	-13.47	18.90	46.00	-27.10	QP			
6		293.8400	32.34	-12.64	19.70	46.00	-26.30	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

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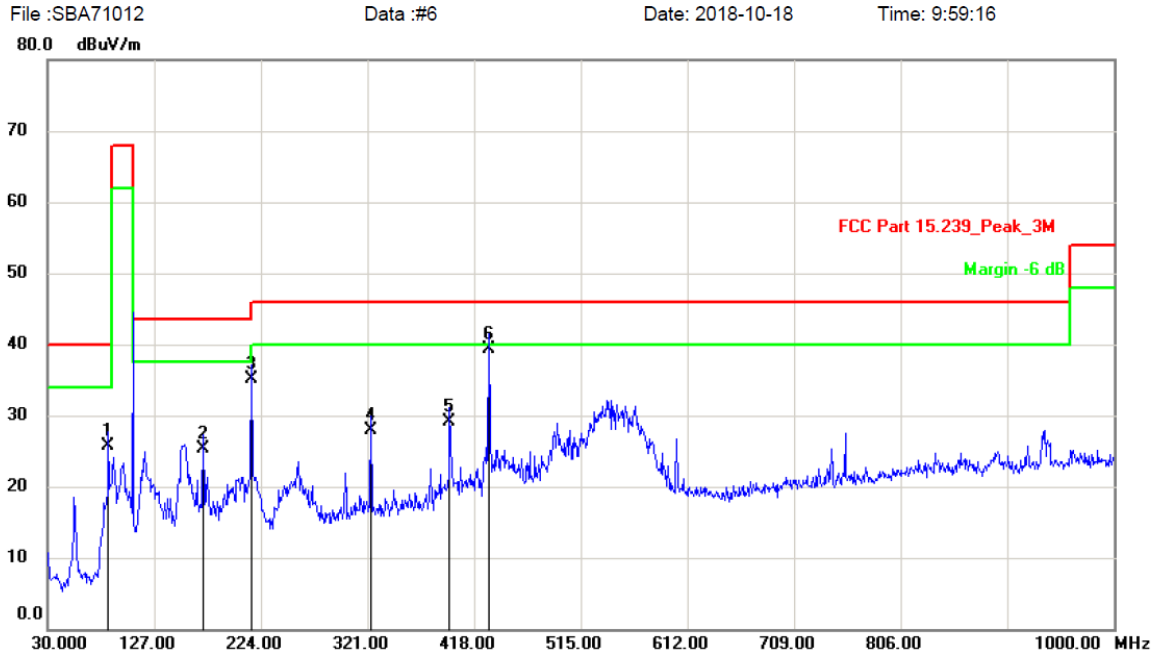
Radiated Emission Measurement



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 107.9MHz
Note:

Polarization: ***Horizontal***
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		85.2900	40.81	-15.11	25.70	40.00	-14.30	QP			
2		171.6200	40.11	-14.71	25.40	43.50	-18.10	QP			
3		215.2700	48.21	-13.11	35.10	43.50	-8.40	QP			
4		323.9100	37.71	-9.81	27.90	46.00	-18.10	QP			
5		395.6900	38.23	-9.13	29.10	46.00	-16.90	QP			
6	*	431.5800	47.79	-8.39	39.40	46.00	-6.60	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

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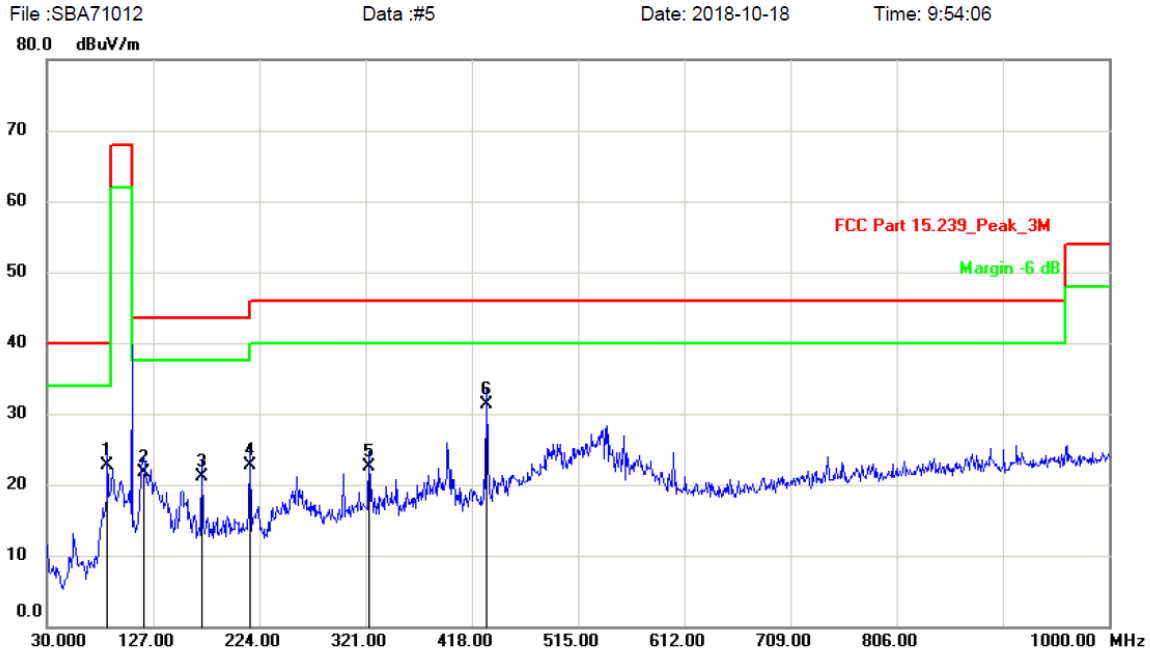
Radiated Emission Measurement



Site: 3m Chamber
Limit: FCC Part 15.239_Peak_3M
EUT: 10.1" IN-CAR SEATBACK MONITOR
M/N: SB10M1
Mode: FM 107.9MHz
Note:

Polarization: ***Vertical***
Power: DC12V
Distance:

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		85.2900	40.91	-18.11	22.80	40.00	-17.20	QP			
2		118.2700	38.48	-16.68	21.80	43.50	-21.70	QP			
3		171.6200	38.91	-17.71	21.20	43.50	-22.30	QP			
4		215.2700	38.91	-16.11	22.80	43.50	-20.70	QP			
5		323.9100	34.41	-11.81	22.60	46.00	-23.40	QP			
6	*	431.5800	42.79	-11.39	31.40	46.00	-14.60	QP			

Note: Below 30MHz & Above 1GHz, the emissions are lower than 20dB below the allowable limit.

Field Strength of Fundamental

Test Date :	October 23, 2018		
Frequency Range:	Below 1GHz	Temperature :	24℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
88.1	V	41.86	40.93	-14.40	27.46	26.53	67.96	47.96	-40.5	-21.43
88.1	H	52.08	51.34	-14.40	37.68	36.94	67.96	47.96	-30.28	-11.02

97.9	V	45.56	44.82	-12.40	33.16	32.42	67.96	47.96	-34.8	-15.54
97.9	H	61.98	59.86	-12.40	49.58	47.46	67.96	47.96	-18.38	-0.5

107.9	V	57.89	56.56	-12.17	45.72	44.39	67.96	47.96	-22.24	-3.57
107.9	H	39.96	38.65	-12.17	27.79	26.48	67.96	47.96	-40.17	-21.48

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level + Factor
(3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(4) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
(5) Measurement uncertainty : ±3.7dB.
(6) Horn antenna used for the emission over 1000MHz.

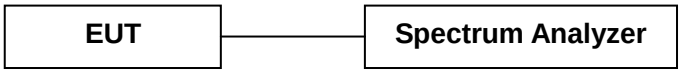
5. Occupied Bandwidth

5.1 Measurement Procedure

FCC Part 15C section 15.239(a) & §2.1049

1. Set the parameters of SPA as below:
   Centre frequency = Operation frequency
   RBW=3KHz
   VBW=10KHz
   Span: 300KHz
   Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and reported.

5.2 Test SET-UP (Block Diagram of Configuration)

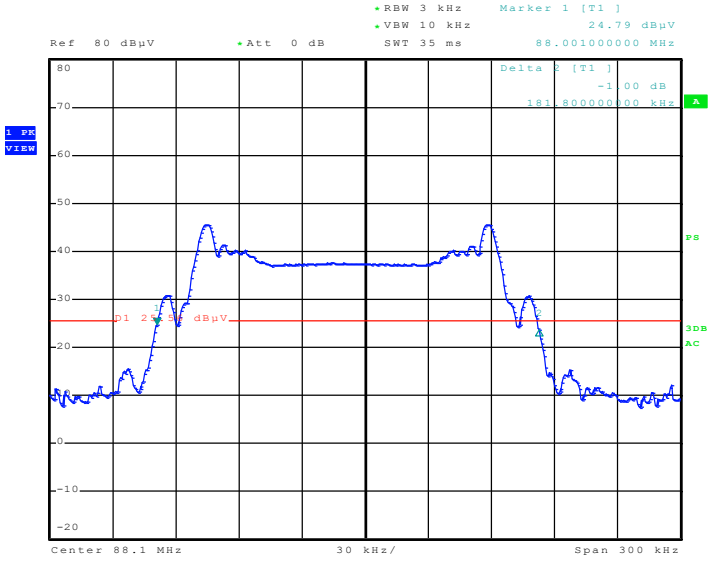


5.3 Measurement Results

Refer to attached data chart.

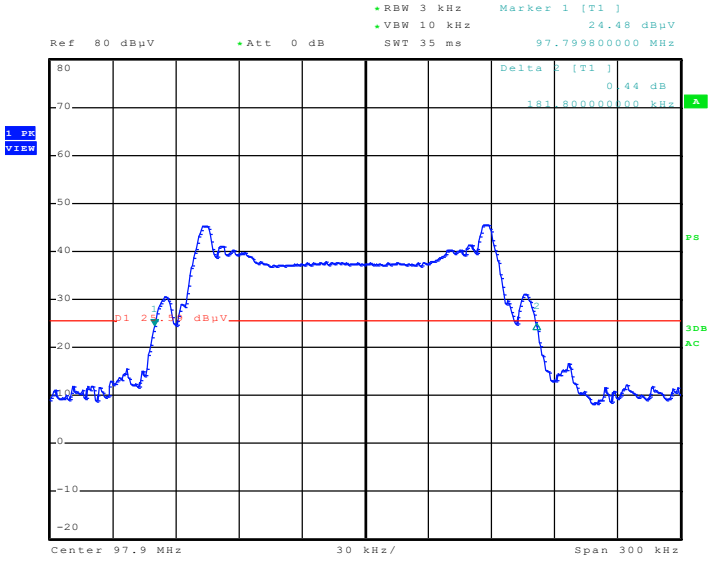
Channel Frequency(MHz)	20dB Bandwidth(kHz)	Limit (kHz)	Result
88.1	181.8	200	PASS
97.9	181.8	200	PASS
107.9	182.4	200	PASS

Lowest Channel



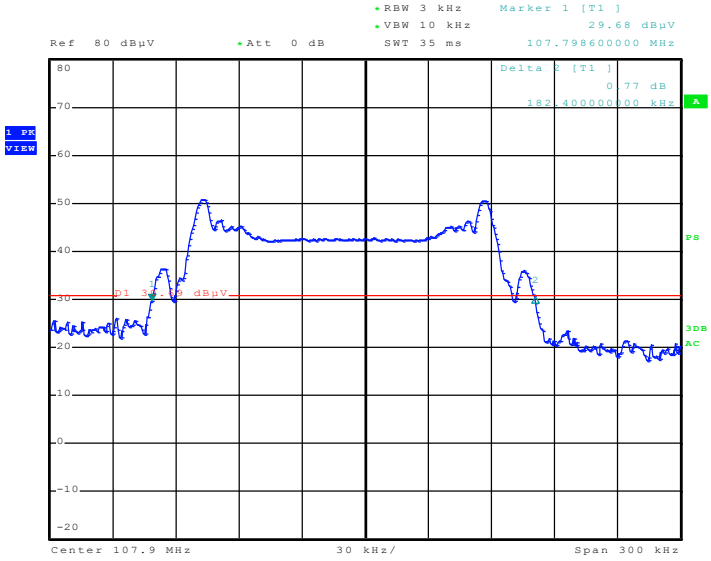
Date: 22.OCT.2018 14:36:25

Middle Channel



Date: 22.OCT.2018 14:39:33

Highest Channel



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6. Antenna Application

6.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2 Measurement Results

The antenna is wire antenna that no antenna other than that furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 1.0dBi. So, the antenna is consider meet the requirement.

7. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Mar. 14, 2018	Mar. 13, 2019
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Mar. 15, 2018	Mar. 14, 2019
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Mar. 14, 2018	Mar. 13, 2019
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Mar. 14, 2018	Mar. 13, 2019
RF Cable	Huber+Suhner	SF-104	MY16559/4	9KHz~25GHz	Apr. 25, 2018	Apr. 25, 2019
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Mar. 14, 2018	Mar. 13, 2019
Horn Antenna	Schwarzbeck	BBHA9170	9170-242	15GHz~40GHz	Mar. 14, 2018	Mar. 13, 2019
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Mar. 15, 2018	Mar. 14, 2019
RF Cable	Huber+Suhner	SF-104	N/A	9KHz~40GHz	Apr. 25, 2018	Apr. 24, 2019
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Apr. 25, 2018	Apr. 24, 2019
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Apr. 25, 2018	Apr. 24, 2019
Spectrum Analyzer	Rohde & Schwarz	FSV40	101003	10Hz~40GHz	Apr. 06, 2018	April. 05, 2019
Pre-Amplifier	EMCI	EMC 184045	980102	18GHz~40GHz	Nov. 03, 2017	Nov. 02, 2018
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Apr. 25, 2018	Apr. 24, 2019
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Mar. 14, 2018	Mar. 13, 2019
Temporary antenna connector	TESCOM	SS402	N/A	9KHz-25GHz	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	100k-65GHz	Nov. 03, 2017	Nov. 02, 2018
Power Sensor	Anritsu	MA2411B	100345	300M-40GHz	Nov. 03, 2017	Nov. 02, 2018

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

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