FCC Part 15
EMI TEST REPORT

of

E.U.T. : Vehicle Security (RX)

MODEL : VS320GN

FCC ID. : LJL010301R

for

APPLICANT : LITE-ON AUTOMOTIVE CORPORATION
ADDRESS : 37, CHUNG YANG ROAD, N.E.P.Z.
KAHOHSIUNG 811, TAIWAN, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 8 LANE 29, WENMIMG ROAD,
LOSHAN TSUN, KWEISHAN HSIANG,
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Report Number : ET90R-04-014-02

TEST REPORT CERTIFICATION

Applicant : LITE-ON AUTOMOTIVE CORPORATION
37, CHUNG YANG ROAD, N.E.P.Z. KAHOHSIUNG 811, TAIWAN, R.O.C.

Manufacturer : LITE-ON AUTOMOTIVE CORPORATION
37, CHUNG YANG ROAD, N.E.P.Z. KAHOHSIUNG 811, TAIWAN, R.O.C.

Description of EUT :

a) Type of EUT : Vehicle Security (RX)
b) Trade Name : ----
c) Model No. : VS320GN
d) Power Supply : DC 12V
e) Wokring Frequency : 433.800 MHz

Regulation Applied : FCC Rules and Regulations Part 15 Subpart B (1999)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Apr. 16, 2001

Test Engineer : Jeff Chuang
(Jeff Chuang)

Approve & Authorized Signer : Will Yauo
Will Yauo, Supervisor
EMI Test Site of ELECTRONICS TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Vehicle Security (RX)

b) Trade Name : ----

c) Model No. : VS320GN

d) Power Supply : DC 12V

1.2 Characteristics of Device

1. RECEIVER SUPER-REGENERATIVE RECEIVER.
2. OPERATION VOLTAGE = 9V TO 15V.
3. CURRENT CONSUMPTION WHEN IGNITION OFF: 5mA MAX.
4. OPERATING TEMPERATURE RANGE: -30℃ ~ +70℃.
5. STORAGE TEMPERATURE RANGE: -40℃ ~ +85℃.

1.3 Test Methodology

Both conducted, radiated, conducted RF output signal and spurious level and transfer switch isolation testing were performed according to the procedures in ANSI C63.4 (1992).

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No. 34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Feb. 10, 2000.

2 LIMITATIONS AND LABELING REQUIREMENT

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

2.2 Limitation Requirement

(1) Conducted Emission Limits

Both intentional and unintentional device, according to § 15.107 and § 15.207, Line Conducted Emission Limits is as following:

Class B Line Conducted Emission Limits :

Frequency MHz	Emissions μV	Emissions dB μV
0.45 - 30.0	250	48.0

(2) Radiated Emission Requirement

Per § 15.109(a) and § 15.209, Class B radiated emission limits and intentional radiator general limits is as following:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

According to § 15.231, Periodic operation in the band 40.66-40.70 MHz and above 70 MHz, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Frequency Band (MHz)	Field strength of Fundamental (uV/m)	Field strength of Spurious (uV/m)
40.66-40.70	2250	225
70-130	1250	125
130-174	*1,250 to 3,750	*125 to 375
174-260	3750	375
260-470	*3,750 to 12,500	*375 to 1250
Above 470	12500	1250

* Linear interpolations.

(3) Limit of transmission time

Per § 15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Per § 15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(4) Limit of emission bandwidth

Per § 15.231(c), the bandwidth of the emission shall be no wider than 25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

2.3 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.4 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in EUT is working.

The EUT was rotated to obtain the maximum level of radiated emissions .The antenna was varied in height above ground to obtain the maximum signal strength. The antenna height was varied from 1 to 4 meters.

3.2 Device for Tested System

Device	Manufacture	Model / FCC ID.	Description
Vehicle Security (RX)*	LITE-ON AUTOMOTIVE CORPORATION	VS320GN	---

Remark "*" means equipment under test.

4 RADIATED EMISSION MEASUREMENT

4.1 Description for Radiated Emission Measured

According to § 15.33 (b), radiated emission frequency was measured from 30 MHz to 5GHz.

The field strength measurements of the receiver under test which was placed on an wooden turntable 0.8 meter in height. The receiving antenna polarized horizontally was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the equipment under test. These measurements were repeated with the receiving antenna polarized vertically.

According to FCC rule, for device submitted for notification in this report, the limit below 1 GHz is quasi peak and above 1 GHz is both peak and average applied. It is considered that the emission level is also in compliance with average limit when the measurement with peak function meets average limit. *All data listed in this section is derived with peak function detector.*

The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, the limit, and margin. Explanation of the Correction Factor is given in paragraph 4.3.

4.2 Radiated Emission Data

Operation Mode : Receiving

Test Date: Apr. 02, 2001 Temperature : 21 ℃ Humidity: 60%

Frequency (MHz)	Meter Reading (dBuV)		Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
433.800	48.8	47.5	-5.5	43.2	46.0	-2.8	180	1.20
879.000	29.4	30.5	2.4	32.9	46.0	-13.1	270	1.50
1281.000	38.8	40.1	-8.5	31.6	54.0	-22.4	145	1.50
1735.200	---	---	-6.1	---	54.0	---	---	---
2169.000	---	---	-4.0	---	54.0	---	---	---
2602.800	---	---	-2.4	---	54.0	---	---	---
3036.600	---	---	-1.1	---	54.0	---	---	---
3470.400	---	---	-0.1	---	54.0	---	---	---
3904.200	---	---	1.6	---	54.0	---	---	---
4338.000	---	---	2.0	---	54.0	---	---	---

Note :

1. Remark "---" means that the emission level is too low to be measured.

4.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + CORR. FACTOR

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

And the average value is

Average = Peak Value + Duty Factor

Note : It is considered that the average results comply with average limit when measuring data with a peak function detector meets the average limit.

4.4 Equipment for Radiation Measurement

The following test equipment are used during the radiated test .

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8568B	12/21/2001
Pre-selector	Hewlett-Packard	85685A	01/01/2002
Quasi Peak Detector	Hewlett-Packard	85650A	01/01/2002
RF Test Receiver	Rohde & Schwarz	ESVS 30	07/27/2001
Log periodic Antenna	EMCO	3146	11/02/2001
Biconical Antenna	EMCO	3110B	11/02/2001
Horn Antenna	EMCO	3115	05/09/2001
Preamplifier	Hewlett-Packard	8449B	05/09/2001
Preamplifier	Hewlett-Packard	8447D	12/29/2001
Micro Wave EMI Test System	Hewlett-Packard	84125C	04/18/2001

4.5 Measuring Instrument Setup

Explanation of measuring instrument setup when respective function is used in any frequency band is as following :

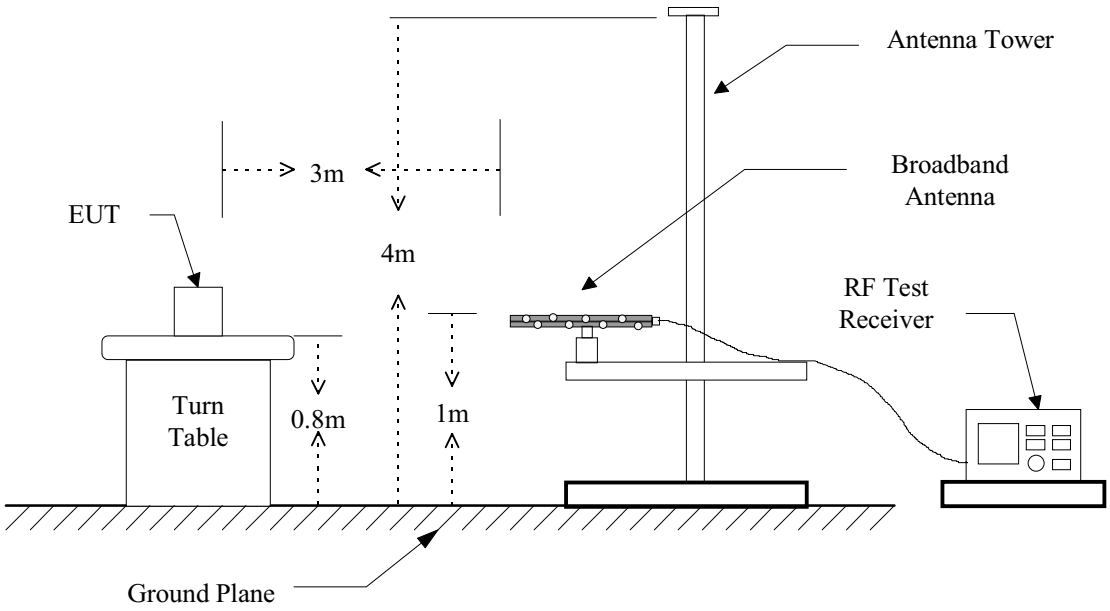
Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	300 Hz

4.6 Photos of Radiation Measuring Setup

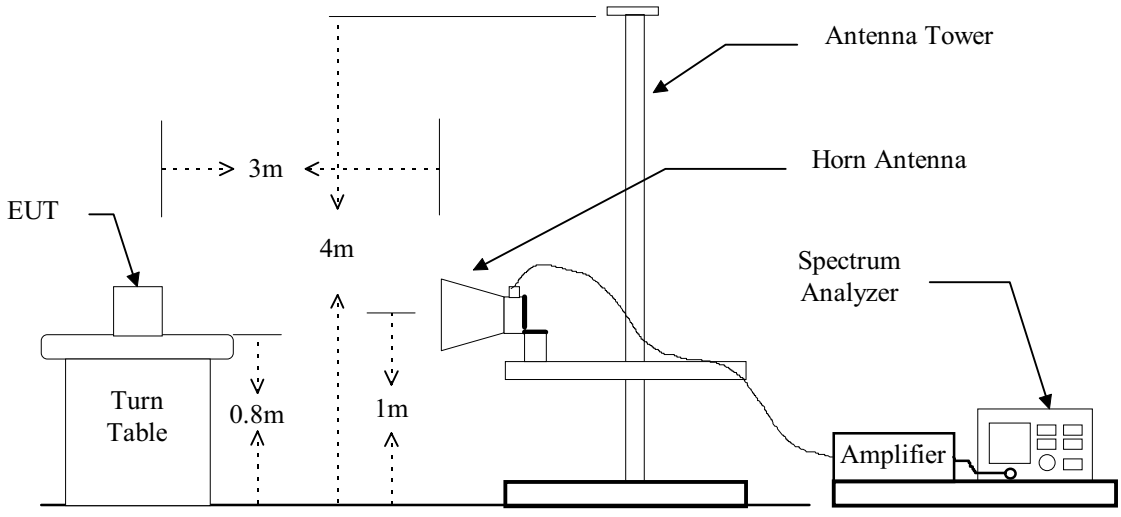
Please see Setup Photos in Exhibit F.

4.7 Open Field Test Site Setup Diagram

Radiated Emission's Frequency Below 1 GHz



Radiated Emission's Frequency Above 1 GHz



5 CONDUCTED EMISSION MEASUREMENT

5.1 Standard Applicable

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to § 15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.