EMI TEST REPORT

Test Report No. : 25FE0008-HO-1A

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Navigation ECU**
Model No.	:	**DNNS016**
Test standard	:	**FCC Part 15 Subpart C** **Section 15.207, Section 15.247 : 2004**
FCC ID	:	**HYQDNNS016**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.

Date of test:

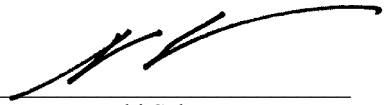
January 17 to 27, 2005

Tested by:

Mitsuru Fujimura
EMC Service

Makoto Kosaka
EMC Service

Approved by :



Naoki Sakamoto
Group Leader of
EMC Service

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SECTION 1: Client information

Company Name	:	DENSO CORPORATION
Address	:	1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan
Telephone Number	:	+81-566-25-5947
Facsimile Number	:	+81-566-25-4548
Contact Person	:	Toshiharu Kamiya

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Navigation ECU
Model No.	:	DNNS016
Serial No.	:	1CB00003
Country of Manufacture	:	Japan
Receipt Date of Sample	:	January 17, 2005
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No: DNNS016 is the Navigation ECU.

Clock frequency	BT: 13MHz , CPU: 579.792MHz
Feature of EUT	EUT shall provide visual and verbal route guidance plan according to the desired destination selected by the user from information database. The system shall use GPS technology, dead reckoning and map matching to determine where the vehicle is located. And EUT has bluetooth communication with Portable phone.
Equipment Type	Transceiver
Frequency of Operation	2402 – 2480MHz
Bandwidth & Channel spacing	1MHz & 1MHz/CH
Type of Modulation	FHSS
Duty Cycle	DH1:0.5, DH3:0.75, DH5:0.78
Antenna Type	Board Antenna (ANT0410-16B/U-BT)
Antenna Connector Type	UFL-LP-066(Hirose)
Antenna Gain	0 dBi
Mode of Operation	Duplex
Method of frequency generation	Crystal
ITU code	F1D
Operating voltage (Inner)	DC3.1V to 3.5V
Operating temperature range	-30 deg.C. to +85 deg.C.

FCC 15.31 (e)
This EUT provides stable voltage(DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C : 2004
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits : 2004
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz : 2004

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin*0)	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	N/A*1)	N/A
2	Carrier Frequency Separation	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)	Conducted	N/A	*See data.	Complied
3	20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)	Conducted	N/A		Complied
4	Number of Hopping Frequency	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)(iii)	Conducted	N/A		Complied
5	Dwell time	ANSI C63.4:2003 13.Measurement of intentional radiators	Section15.247(a)(1)(iii)	Conducted	N/A		Complied
6	Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(b)(1)	Conducted	N/A		Complied
7	Band Edge Compliance	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(d)	Conducted	N/A		Complied
8	Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(d)	Conducted/ Radiated	N/A	2.4dB 579.787MHz Vertical, QP	Complied

Note: UL Apex's EMI Work Procedures No.QPM05.
*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
*1) The test is not applicable since EUT does not have AC mains.

Uncertainty:
*In case of the margin below the EMC Head Office's uncertainty.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.
Conducted Emission
The measurement uncertainty (with a 95% confidence level) for this test is ±1.3dB.
Spurious Emission (Radiated)
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB(3m)/ ±4.7dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB(3m)/ ±3.8dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.
Other test except Conducted Emission and Spurious Emission (Radiated)
The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.

*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".
*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004 + Amendment4: 2004	RSS-210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004 + Amendment4: 2004	Conducted	N/A	N/A	N/A

3.4 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

	Listed date (for FCC)	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.5 Test set up, Test instruments and Data of EMI

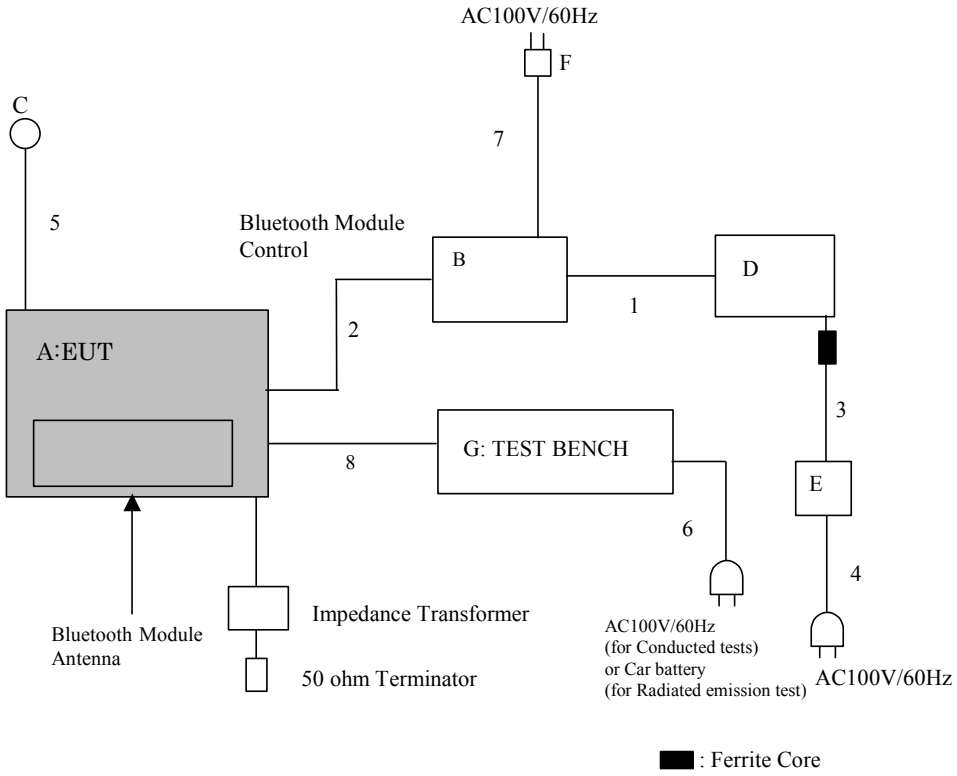
Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : Transmitting mode
Low channel: 2402MHz
Mid channel: 2441MHz
High channel: 2480MHz
*There is no inquiry mode based on the product specification.

4.2 Configuration and peripherals



* Cabling was taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Navigation ECU	DNNS016	1CB00003	DENSO	HYQDNNS016
B	IEBUS Monitor	MLT 3rd	1078	Prism	-
C	GPS Antenna	-	-	-	-
D	Note PC	CF-W2	4BKSA77825	Panasonic	DoC
E	AC Adapter	CF-AA1625A	03Z08862B	Panasonic	-
F	AC Adapter for IEBUS Monitor	PAD-0523CM	-	Prism	-
G	TEST BENCH *1	-	-	-	-

*1 This item is used only for the test.

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	USB Cable	1.0	N	Polyvinyl chloride
2	System Harness	1.0	N	Polyvinyl chloride
3	DC Cable for Note PC	0.85	N	Polyvinyl chloride
4	AC Cable for Note PC	1.25	N	Polyvinyl chloride
5	GPS Antenna Cable	3.0	N	Polyvinyl chloride
6	AC Cable	2.6	N	Polyvinyl chloride
7	DC Cable	1.6	N	Polyvinyl chloride
8	Signal and DC power cable	1.0	N	Polyvinyl chloride

SECTION 5: Spurious Emission

[Conducted]

Test Procedure
The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

[Radiated]

Test Procedure
EUT was placed on a platform of nominal size, 0.5m by 1.0m, raised 80cm above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).
The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver or the Spectrum Analyzer.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

***Delta Marker Method (Measurement for Band-edge)**
STEP 1) Perform an in-band field strength measurement of the fundamental emission using the RBW table below.
STEP 2) Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 1% of the total span, and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission.
STEP 3) Subtract the delta measured in STEP 2) from the field strengths measured in STEP 1). The result is the field strength of band-edge.

20dBc was applied to the frequency over the limit of FCC 15.209 and outside the restricted band of 15.205.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz(T/R) 20dBc : RBW: 100kHz VBW: 300kHz (S/A)	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

The test was made on EUT in the normal use position.
(The result had the worst margin when the tilt is leaned one step forward.)

SECTION 6: 20dB Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 7: Maximum Peak Output Power

Test Procedure
The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 8: Carrier Frequency Separation

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 9: Number of Hopping Frequency

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 10: Dwell time

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

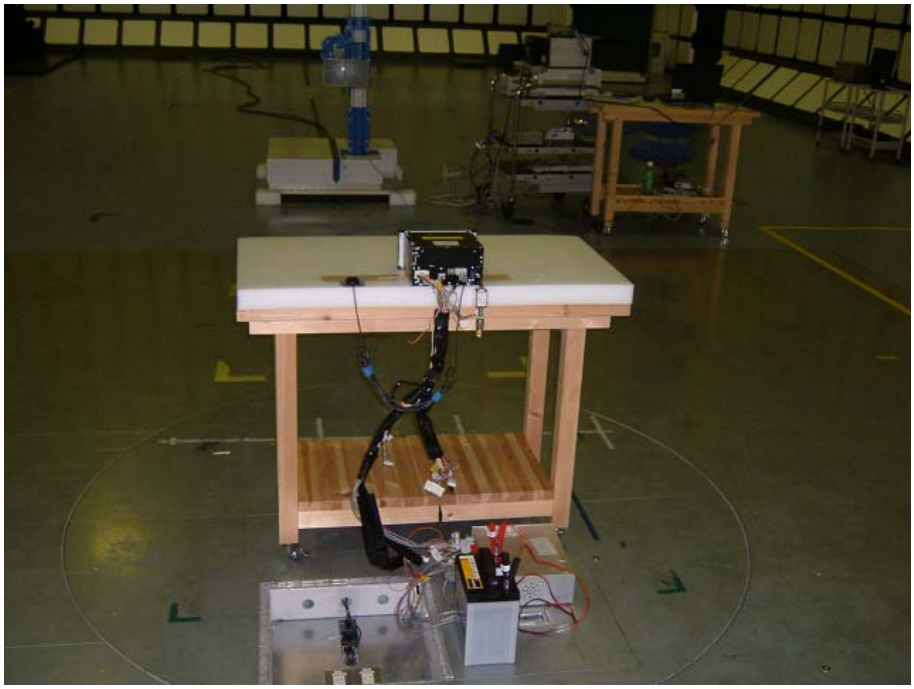
Test data : APPENDIX 3
Test result : Pass

APPENDIX 1: Photographs of test setup

Spurious Emission (Radiated)

Front

Rear



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2004/11/13 * 12
MRENT-11	Spectrum Analyzer	Advantest	R3273	RE	2005/01/22 * 12
MCC-01	Coaxial Cable 0.1-3000Mz	Suhner/storm/ Agilent/TSJ	-	RE	2004/12/19 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2004/05/25 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2004/12/16 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2004/10/14 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2004/10/14 * 12
MCC-05	Microwave Cable	Storm	421-011	RE	2005/01/05 * 12
MPA-05	Pre Amplifier	TSJ	TSJ 1-26.5GHz PreAmp	RE	2004/06/12 * 12
MCC-23	Microwave Cable	Storm	-	RE	2004/05/01 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2005/01/10 * 12
APRCV03	Test Receiver	MEB	SMV41	RE	2004/10/12 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	Other	2004/11/12 * 12
MAT-20	Attenuator(10dB)(above1GHz)	Hirose Electric CO., LTD.	AT-110	Other	2005/01/11 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	Other	2004/02/18 * 12
MHF-02	High Pass Filter	Tokimec	TF323DCA	RE	2004/09/18 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

RE: Radiated Spurious Emission

Other : Antenna Terminal Conducted Spurious Emission
Maximum Peak Output Power
Carrier Frequency Separation[FHSS]
20dB Bandwidth[FHSS] / 99% Occupied Bandwidth
Number of Hopping Frequency[FHSS]
Dwell time[FHSS]

APPENDIX 3: Data of EMI test

Carrier Frequency Separation

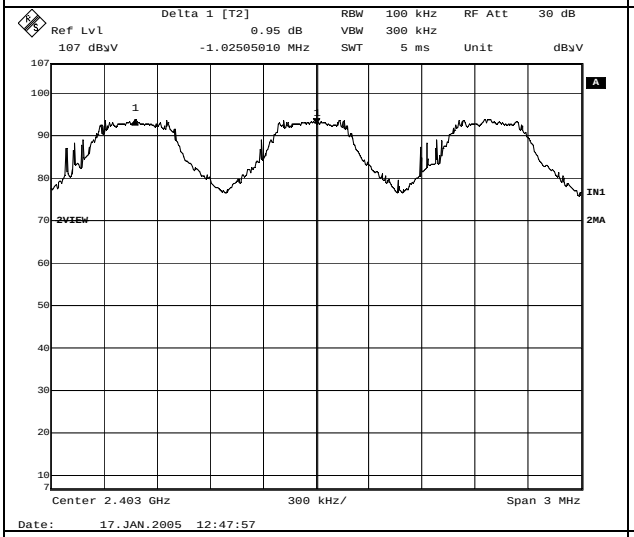
UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Shielded Room

COMPANY	: DENSO CORPORATION	REGULATION	: Fcc Part15 Subpart C 15.247(a)(1)
EQUIPMENT	: Navigation ECU	TEST DISTANCE	: -
MODEL	: DNNS016	DATE	: 01/17/2005
S/ N	: 1CB00003	TEMPERATURE	: 18deg.C
POWER	: DC 12.0 V	HUMIDITY	: 37%
MODE	: Tx(Hopping on)	ENGINEER	: Makoto Kosaka

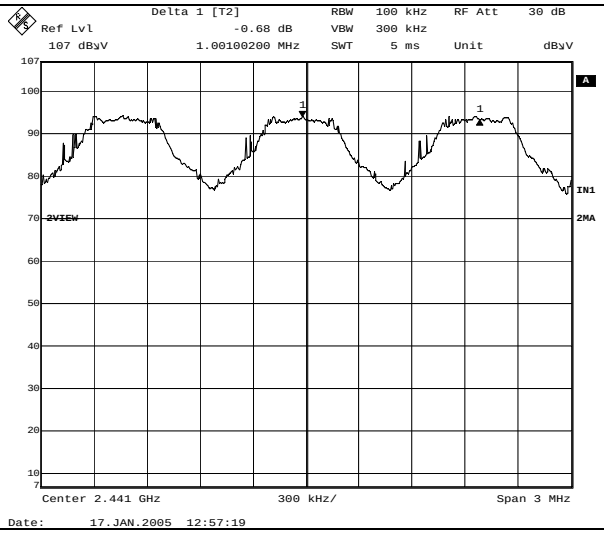
Ch	Freq. [MHz]	Channel separation [MHz]	Limit
Low	2402.0	1.025	>20dB Bandwidth and 25[kHz]
Mid	2441.0	1.001	>20dB Bandwidth and 25[kHz]
High	2480.0	1.001	>20dB Bandwidth and 25[kHz]

Carrier Frequency Separation

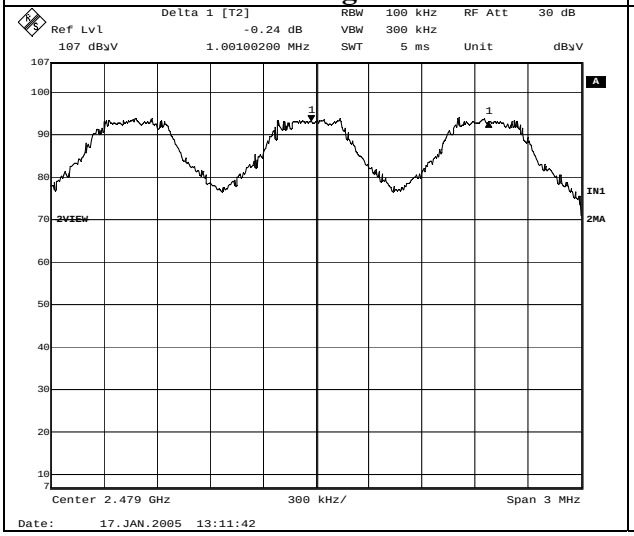
Ch:Low



Ch:Mid



Ch:High



20dB Bandwidth

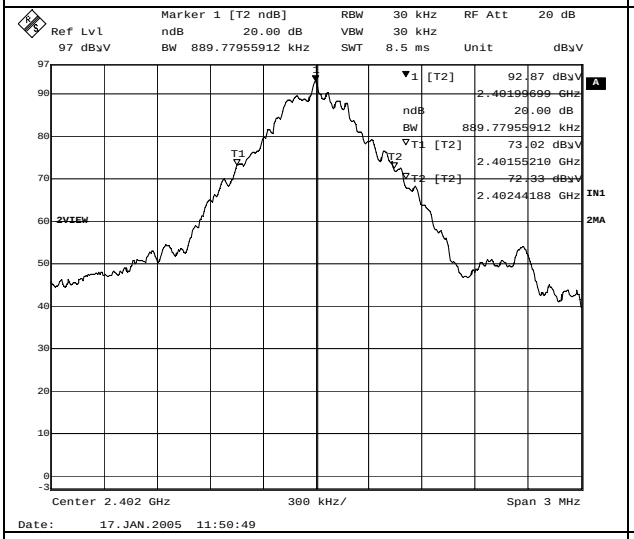
UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Shielded Room

COMPANY	: DENSO CORPORATION	REGULATION	: Fcc Part15 Subpart C 15.247(a)(1)
EQUIPMENT	: Navigation ECU	TEST DISTANCE	: -
MODEL	: DNNS016	DATE	: 01/17/2005
S/ N	: 1CB00003	TEMPERATURE	: 18deg.C
POWER	: DC 12.0 V	HUMIDITY	: 37%
MODE	: Tx (Hopping off)	ENGINEER	: Makoto Kosaka

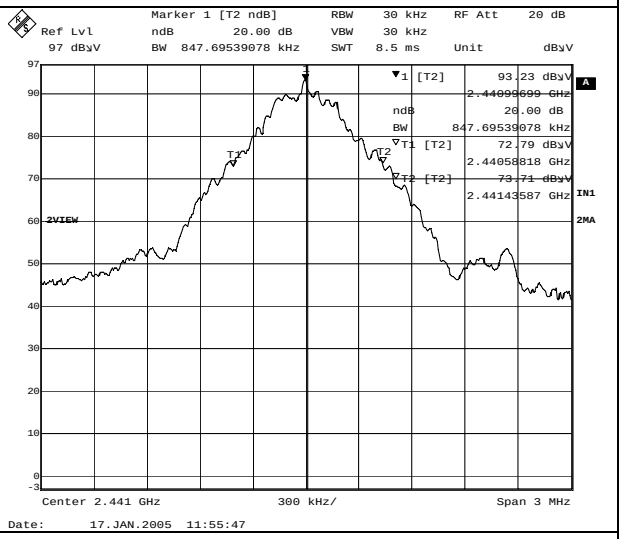
Ch	Freq. [MHz]	20dB Bandwidth [MHz]	Limit [MHz]
Low	2402.0	0.890	-
Mid	2441.0	0.848	-
High	2480.0	0.842	-

20dB Bandwidth

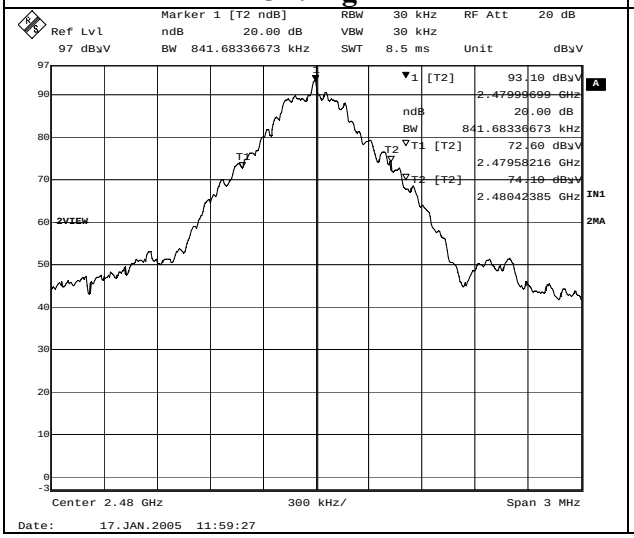
Ch:Low



Ch:Mid



Ch:High



Number of Hopping Frequency

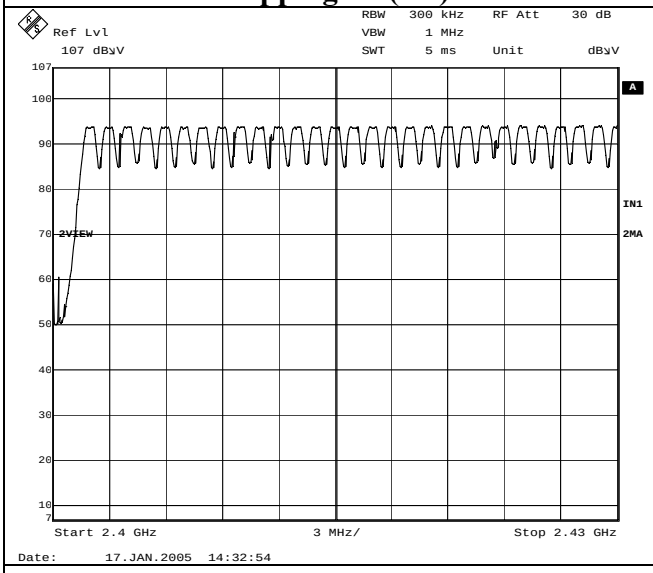
UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Shielded Room

COMPANY	:	DENSO CORPORATION	REGULATION	:	Fcc Part15 Subpart C 15.247(a)(1)(iii)
EQUIPMENT	:	Navigation ECU	TEST DISTANCE	:	-
MODEL	:	DNNS016	DATE	:	01/17/2005
S/ N	:	1CB00003	TEMPERATURE	:	18deg.C
POWER	:	DC 12.0 V	HUMIDITY	:	37%
MODE	:	Tx (Hopping on)	ENGINEER	:	Makoto Kosaka

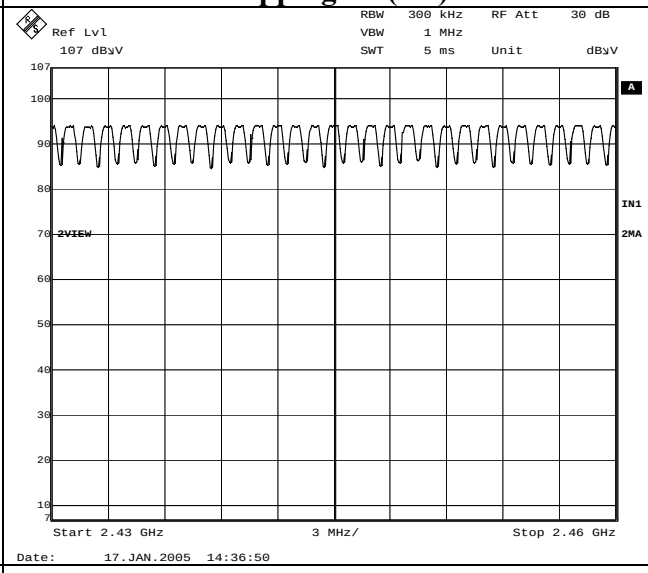
Mode	Number of channel [time]	Limit [time]
Tx(Hoppng on)	79	≧15

Number of Hopping Frequency

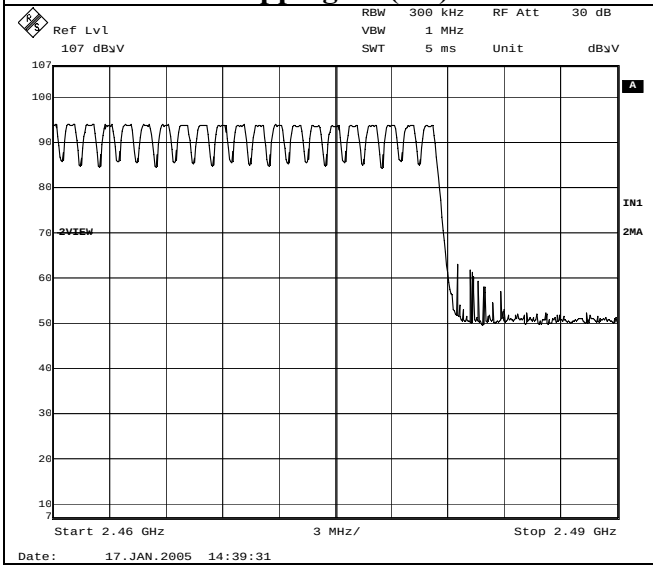
Hopping on (1/3)



Hopping on (2/3)



Hopping on (3/3)



Dwell time

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY	:	DENSO CORPORATION	REGULATION	:	Fcc Part15 Subpart C 15.247(a)(1)
EQUIPMENT	:	Navigation ECU	TEST DISTANCE	:	-
MODEL	:	DNNS016	DATE	:	01/17/2005
S/ N	:	1CB00003	TEMPERATURE	:	18deg.C
POWER	:	DC 12.0 V	HUMIDITY	:	37%
MODE	:	Tx (Hopping on)	ENGINEER	:	Makoto Kosaka

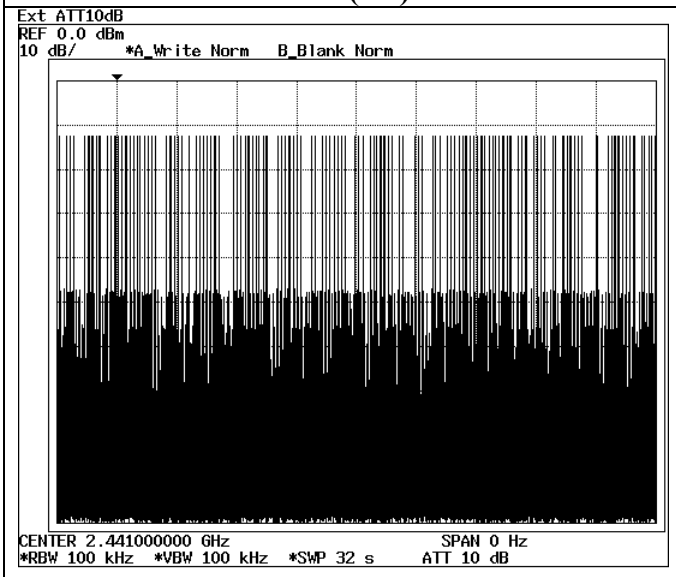
(DH1) times	Number of Hoppings	Length of transmission time [msec]	Dwell time [msec]	Result [msec]	Limit [msec]
1	153	0.459	138.6 * 0.459	63.62	400
2	126				
3	144				
4	114				
5	156				
Averege	138.6				

(DH3) times	Number of Hoppings	Length of transmission time [msec]	Dwell time [msec]	Result [msec]	Limit [msec]
1	108	1.710	85.2 * 1.71	145.69	400
2	87				
3	69				
4	72				
5	90				
Averege	85.2				

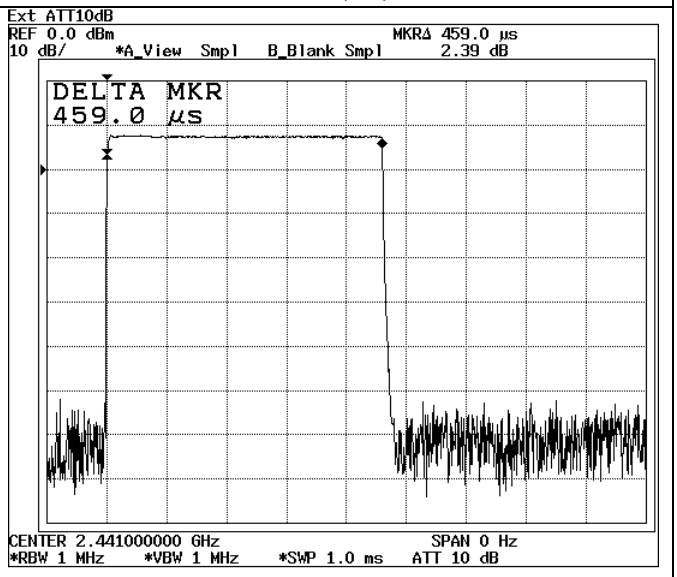
(DH5) times	Number of Hoppings	Length of transmission time [msec]	Dwell time [msec]	Result [msec]	Limit [msec]
1	45	2.955	61.6 * 2.955	182.03	400
2	81				
3	59				
4	63				
5	60				
Averege	61.6				

Dwell time

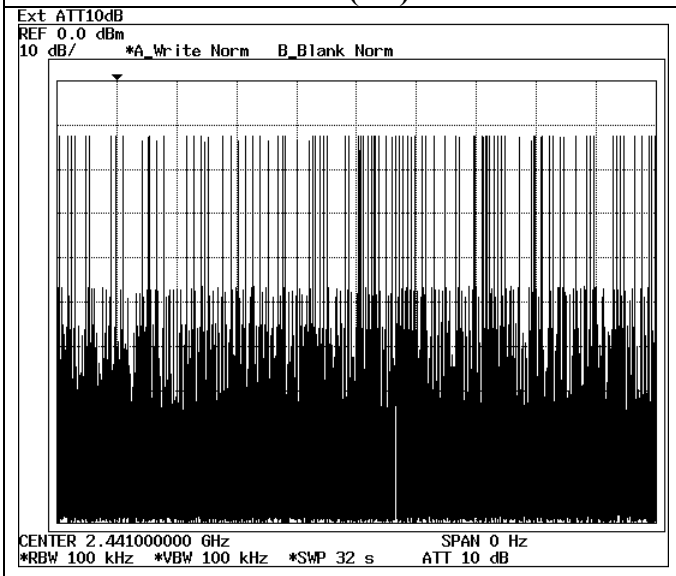
DH1 (1/2)



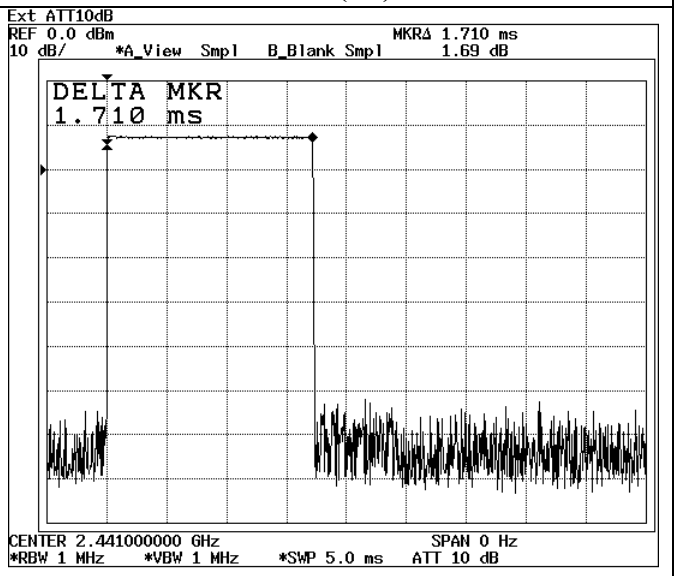
DH1 (2/2)



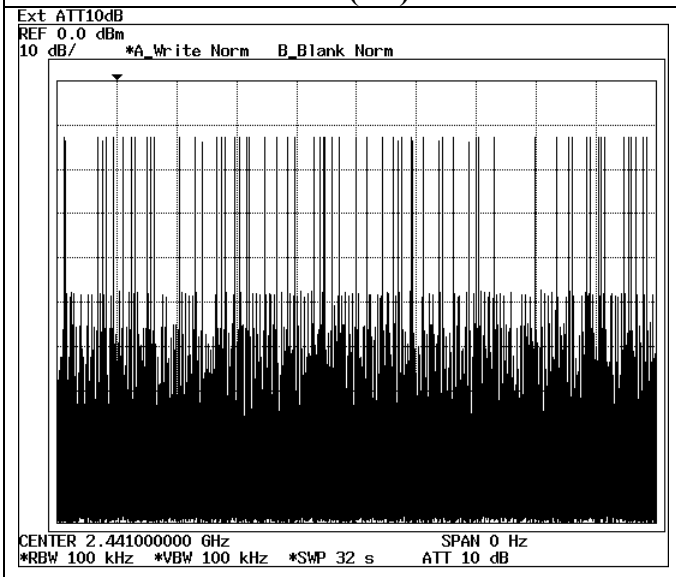
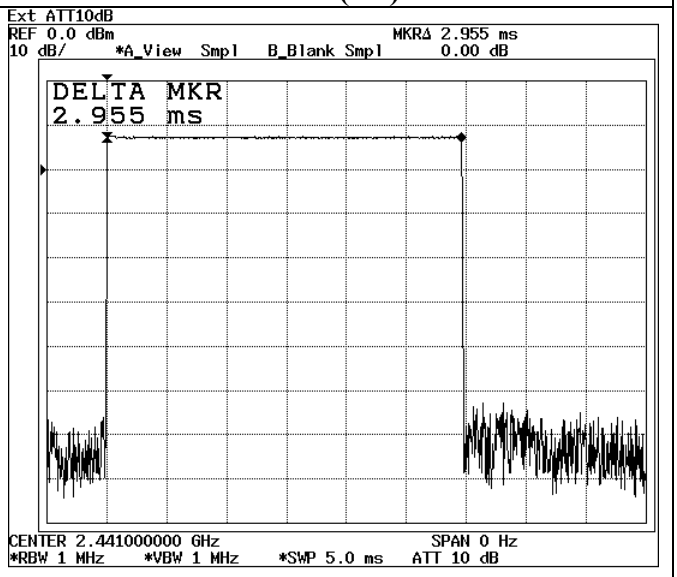
DH3 (1/2)



DH3 (2/2)



Dwell time

DH5 (1/2)	DH5 (2/2)
	

Maximum Peak Output Power

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 shielded room

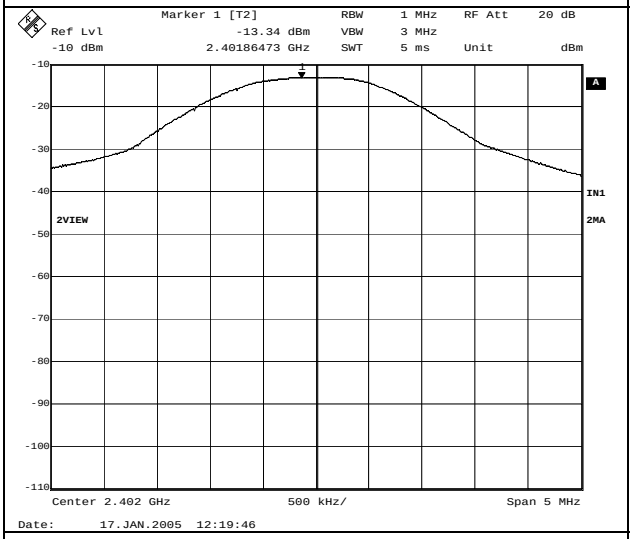
COMPANY	:	DENSO CORPORATION	REGULATION	:	Fcc Part15 Subpart C 15.247(b)(1)
EQUIPMENT	:	Navigation ECU	TEST DISTANCE	:	-
MODEL	:	DNNS016	DATE	:	01/17/2005
S/ N	:	1CB00003	TEMPERATURE	:	18deg.C
POWER	:	DC 12.0 V	HUMIDITY	:	37%
MODE	:	Tx(Hopping off)	ENGINEER	:	Makoto Kosaka

Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit (1W) [dBm]	Margin [dB]
Low	2402.0	-13.34	2.65	10.00	-0.69	30.00	30.69
Mid	2441.0	-13.10	2.84	10.00	-0.26	30.00	30.26
High	2480.0	-13.20	2.89	10.00	-0.31	30.00	30.31

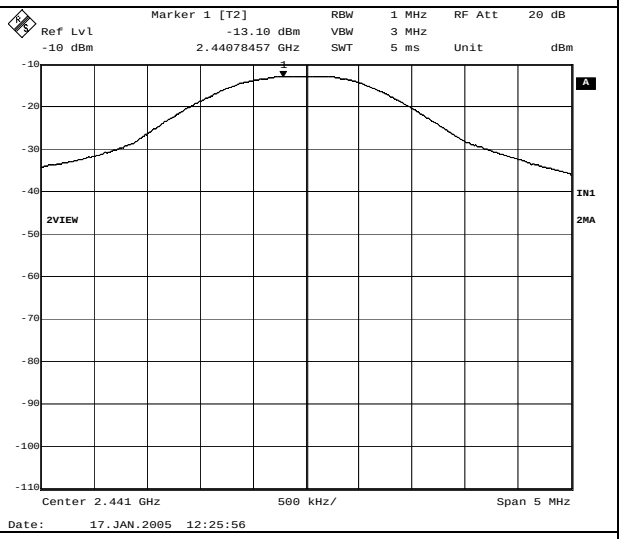
Sample Calculation:
Result = Reading + Cable Loss (supplied by customer)+ Attenuator
* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

Maximum Peak Output Power

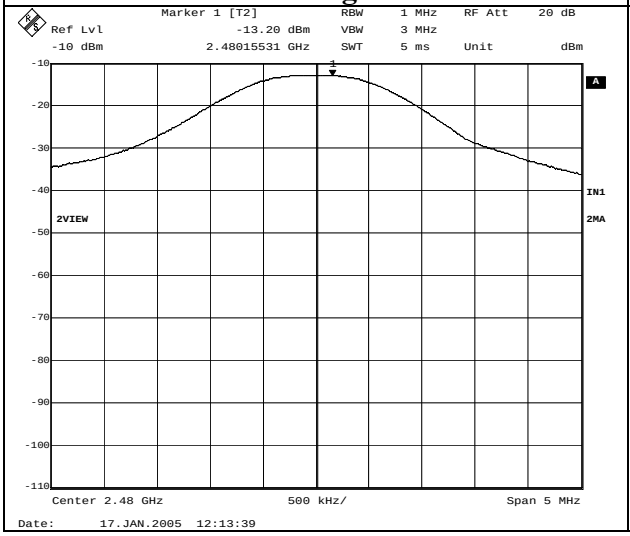
Ch:Low



Ch:Mid



Ch:High



Radiated Spurious Emission

DATA OF RADIATED EMISSION TEST

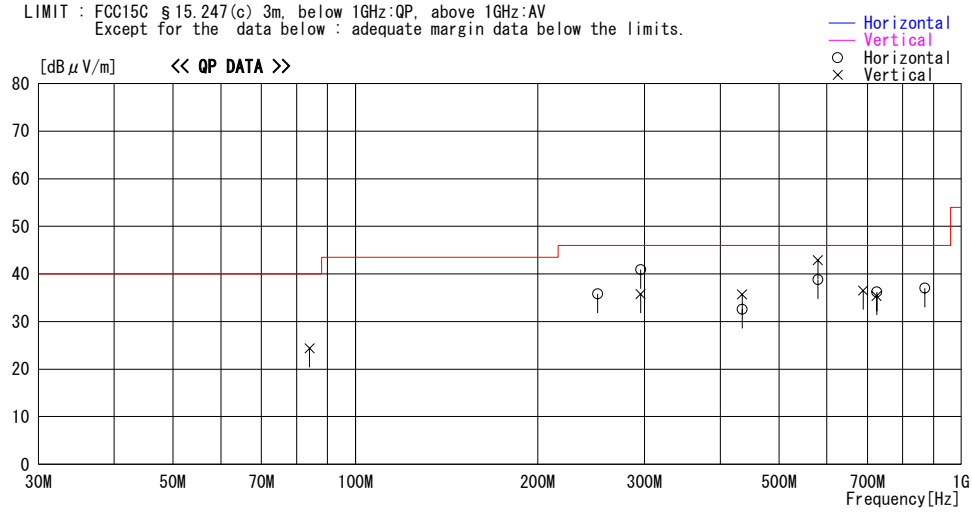
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber

Applicant : DENSO CORPORATION
Kind of EUT : Navigation ECU
Model No. : DNNS016
Serial No. : 1CB00003

Report No. : 25FE0008-HO
Power : DC12V
Temp℃/Humi% : 22℃ / 25%
Operator : Mitsuru Fujimura

Mode / Remarks : Bluetooth, Tx 2402MHz

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	251.195	35.7	17.5	9.6	27.0	35.8	46.0	10.2	127	265
2	295.667	38.0	20.2	9.9	27.2	40.9	46.0	5.1	121	336
3	434.846	31.6	18.2	10.9	28.1	32.6	46.0	13.4	113	119
4	724.747	31.6	20.9	12.4	28.7	36.2	46.0	9.8	111	182
5	579.806	36.3	19.6	11.7	28.8	38.8	46.0	7.2	132	122
6	869.685	31.4	21.3	12.9	28.6	37.0	46.0	9.0	100	290
----- Vertical ------										
7	84.018	37.1	7.3	7.8	27.8	24.4	40.0	15.6	100	0
8	295.665	32.9	20.2	9.9	27.2	35.8	46.0	10.2	100	190
9	434.846	34.7	18.2	10.9	28.1	35.7	46.0	10.3	136	318
10	579.792	40.4	19.6	11.7	28.8	42.9	46.0	3.1	117	349
11	688.505	32.5	20.7	12.2	28.9	36.5	46.0	9.5	100	0
12	724.741	30.8	20.9	12.4	28.7	35.4	46.0	10.6	100	0

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated Spurious Emission

DATA OF RADIATED EMISSION TEST

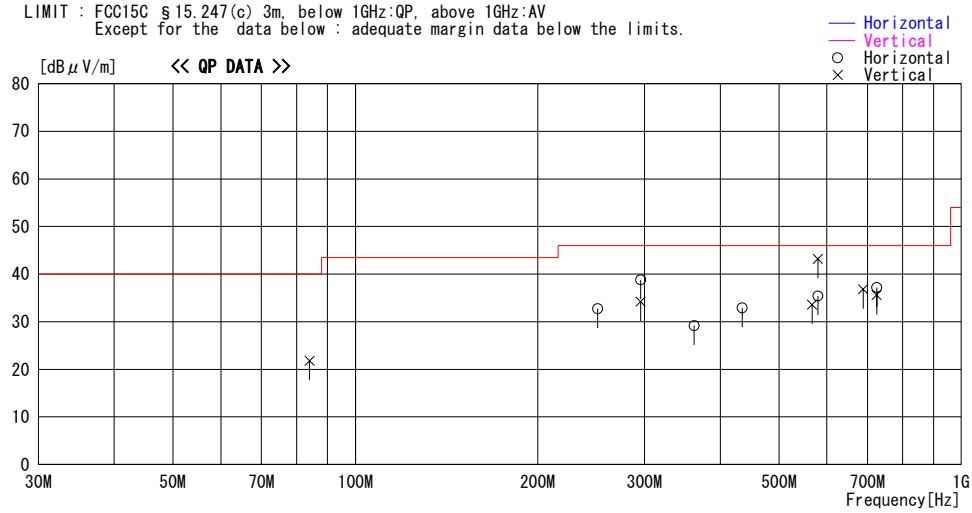
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber

Applicant : DENSO CORPORATION
Kind of EUT : Navigation ECU
Model No. : DNNS016
Serial No. : 1CB00003

Report No. : 25FE0008-HO
Power : DC12V
Temp℃/Humi% : 22℃ / 25%
Operator : Mitsuru Fujimura

Mode / Remarks : Bluetooth, Tx 2441MHz

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	251.195	32.6	17.5	9.6	27.0	32.7	46.0	13.3	128	112
2	295.665	35.9	20.2	9.9	27.2	38.8	46.0	7.2	117	305
3	362.387	29.5	16.7	10.5	27.5	29.2	46.0	16.8	100	307
4	434.848	31.9	18.2	10.9	28.1	32.9	46.0	13.1	181	251
5	579.798	32.9	19.6	11.7	28.8	35.4	46.0	10.6	266	279
6	724.747	32.6	20.9	12.4	28.7	37.2	46.0	8.8	109	196
----- Vertical ------										
7	84.010	34.5	7.3	7.8	27.8	21.8	40.0	18.2	118	220
8	295.657	31.3	20.2	9.9	27.2	34.2	46.0	11.8	310	229
9	567.014	31.2	19.5	11.6	28.7	33.6	46.0	12.4	116	0
10	579.799	40.7	19.6	11.7	28.8	43.2	46.0	2.8	120	345
11	688.507	32.8	20.7	12.2	28.9	36.8	46.0	9.2	100	0
12	724.748	31.0	20.9	12.4	28.7	35.6	46.0	10.4	100	348

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated Spurious Emission

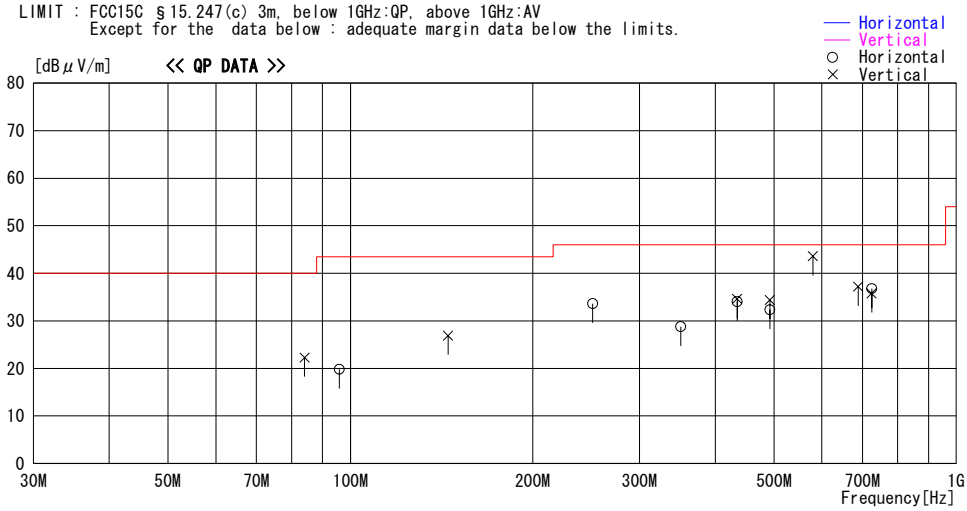
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber

Applicant	: DENSO CORPORATION	Report No.	: 25FE0008-HO
Kind of EUT	: Navigation ECU	Power	: DC12V
Model No.	: DNNS016	Temp℃/Humi%	: 22℃ / 25%
Serial No.	: 1CB00003	Operator	: Mitsuru Fujimura

Mode / Remarks : Bluetooth, Tx 2480MHz

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	95.930	30.1	9.4	7.9	27.6	19.8	43.5	23.7	167	89
2	251.174	33.5	17.5	9.6	27.0	33.6	46.0	12.4	140	100
3	351.013	29.6	16.3	10.4	27.5	28.8	46.0	17.2	100	255
4	434.849	33.0	18.2	10.9	28.1	34.0	46.0	12.0	190	251
5	492.277	31.0	18.6	11.2	28.5	32.3	46.0	13.7	195	332
6	724.745	32.2	20.9	12.4	28.7	36.8	46.0	9.2	110	194
----- Vertical ------										
7	84.020	35.0	7.3	7.8	27.8	22.3	40.0	17.7	120	180
8	144.957	31.3	14.7	8.6	27.7	26.9	43.5	16.6	100	107
9	434.846	33.6	18.2	10.9	28.1	34.6	46.0	11.4	145	0
10	492.336	33.1	18.6	11.2	28.5	34.4	46.0	11.6	110	242
11	579.787	41.1	19.6	11.7	28.8	43.6	46.0	2.4	115	352
12	688.506	33.2	20.7	12.2	28.9	37.2	46.0	8.8	100	0
13	724.748	31.2	20.9	12.4	28.7	35.8	46.0	10.2	100	0

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated Spurious Emission

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: DENSO CORPORATION	REPORT NO	: 25FE0008-HO
Equipment	: Navigtion ECU	REGULATION	: Fcc Part15 Subpart C 15.247(d)
Model	: DNNS016	TEST DISTANCE	: 3/1m
Sample No.	: 1CB00003	DATE	: 01/27/2005
Power	: DC12V	TEMPERATURE	: 22deg.C
Mode	: Bluetooth, Tx 2402MHz	HUMIDITY	: 25%
Remarks	: Hor X-axis/Ver X-axis	ENGINEER	: Mitsuru Fujimura

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	PK	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.6	58.6	63.0	23.0	39.9	3.9	0.0	45.6	50.0	74.0	28.4	24.0
2	2390.0	64.8	56.1	31.0	39.9	5.5	0.0	61.4	52.7	74.0	12.6	21.3
3*	2400.0	84.8	74.9	30.9	39.9	5.5	0.0	81.3	71.4	74.0	-7.3	2.6
4	4804.2	55.4	53.1	34.9	41.2	8.0	1.0	58.1	55.8	74.0	15.9	18.2
5	7206.0	46.1	45.7	37.6	40.4	10.0	0.4	53.7	53.3	74.0	20.3	20.7
6	9608.0	43.2	44.0	36.3	39.5	11.8	0.1	51.9	52.7	74.0	22.1	21.3
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
7	12010.0	45.6	45.6	41.4	39.6	13.7	0.1	51.7	51.7	74.0	22.3	22.3
8	14412.0	45.0	44.2	41.7	41.0	15.6	0.2	52.0	51.2	74.0	22.0	22.8
9	16814.0	45.4	45.9	44.7	41.7	17.1	1.1	57.1	57.6	74.0	16.9	16.4
10	19216.0	42.5	42.4	41.7	40.3	18.7	0.0	53.1	53.0	74.0	20.9	21.0
11	21618.0	43.3	42.2	40.4	35.4	19.3	0.0	58.1	57.0	74.0	15.9	17.0
12	24020.0	43.8	43.7	41.0	32.9	21.5	0.0	63.9	63.8	74.0	10.1	10.2

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	AV	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.6	53.6	60.0	23.0	39.9	3.9	0.0	40.6	47.0	54.0	13.4	7.0
2	2390.0	36.9	36.2	31.0	39.9	5.5	0.0	33.5	32.8	54.0	20.5	21.2
3*	2400.0	68.5	60.7	30.9	39.9	5.5	0.0	65.0	57.2	54.0	-11.0	-3.2
4	4804.2	47.8	45.0	34.9	41.2	8.0	1.0	50.5	47.7	54.0	3.5	6.3
5	7206.0	33.4	33.2	37.6	40.4	10.0	0.4	41.0	40.8	54.0	13.0	13.2
6	9608.0	30.9	30.9	36.3	39.5	11.8	0.1	39.6	39.6	54.0	14.4	14.4
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
7	12010.0	32.5	32.5	41.4	39.6	13.7	0.1	38.6	38.6	54.0	15.4	15.4
8	14412.0	31.5	31.5	41.7	41.0	15.6	0.2	38.5	38.5	54.0	15.5	15.5
9	16814.0	32.9	33.0	44.7	41.7	17.1	1.1	44.6	44.7	54.0	9.4	9.3
10	19216.0	29.5	29.6	41.7	40.3	18.7	0.0	40.1	40.2	54.0	13.9	13.8
11	21618.0	30.1	30.1	40.4	35.4	19.3	0.0	44.9	44.9	54.0	9.1	9.1
12	24020.0	30.8	30.8	41.0	32.9	21.5	0.0	50.9	50.9	54.0	3.1	3.1

* Reference data

20dBc(Fundamental 2402MHz) (RBW: 100kHz, VBW: 300kHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	20dBc	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
0	2402.0	105.2	95.7	30.9	39.9	5.5	0.0	101.7	92.2	-	-	-
3	2400.0	64.2	55.3	30.9	39.9	5.5	0.0	60.7	51.8	Funda-20dB	21.0	20.4

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
*In the frequency over the fifth harmonic, the noise from the EUT was not seen.The data above is its base noise.
*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

Radiated Spurious Emission

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: DENSO CORPORATION	REPORT NO	: 25FE0008-HO
Equipment	: Navigtion ECU	REGULATION	: Fcc Part15 Subpart C 15.247(d)
Model	: DNNS016	TEST DISTANCE	: 3/1m
Sample No.	: 1CB00003	DATE	: 01/27/2005
Power	: DC12V	TEMPERATURE	: 22deg.C
Mode	: Bluetooth, Tx 2441MHz	HUMIDITY	: 25%
Remarks	: Hor X-axis/Ver X-axis	ENGINEER	: Mitsuru Fujimura

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	PK	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.7	58.3	63.1	23.0	39.9	3.9	0.0	45.3	50.1	74.0	28.7	23.9
2	2319.1	52.9	53.1	31.1	39.8	5.4	0.0	49.6	49.8	74.0	24.4	24.2
3	4881.8	55.2	53.1	35.3	41.2	8.0	1.0	58.3	56.2	74.0	15.7	17.8
4	7323.0	45.7	45.5	37.8	40.4	10.0	0.5	53.6	53.4	74.0	20.4	20.6
5	9764.0	43.6	43.9	36.2	39.6	12.0	0.2	52.4	52.7	74.0	21.6	21.3
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	12205.0	46.2	45.8	41.5	39.8	13.8	0.3	52.5	52.1	74.0	21.5	21.9
7	14646.0	43.7	44.1	42.2	40.9	15.8	0.2	51.5	51.9	74.0	22.5	22.1
8	17087.0	45.4	44.5	44.5	41.8	17.1	1.1	56.8	55.9	74.0	17.2	18.1
9	19528.0	42.3	41.8	41.4	39.8	18.9	0.0	53.3	52.8	74.0	20.7	21.2
10	21969.0	42.9	42.0	40.5	35.9	19.2	0.0	57.2	56.3	74.0	16.8	17.7
11	24410.0	44.0	44.1	41.1	33.8	21.6	0.0	63.4	63.5	74.0	10.6	10.5

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	AV	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.7	53.4	58.9	23.0	39.9	3.9	0.0	40.4	45.9	54.0	13.6	8.1
2	2319.1	45.5	46.4	31.1	39.8	5.4	0.0	42.2	43.1	54.0	11.8	10.9
3	4881.8	47.3	44.1	35.3	41.2	8.0	1.0	50.4	47.2	54.0	3.6	6.8
4	7323.0	33.0	32.9	37.8	40.4	10.0	0.5	40.9	40.8	54.0	13.1	13.2
5	9764.0	31.2	31.2	36.2	39.6	12.0	0.2	40.0	40.0	54.0	14.0	14.0
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	12205.0	32.5	32.5	41.5	39.8	13.8	0.3	38.8	38.8	54.0	15.2	15.2
7	14646.0	31.3	31.2	42.2	40.9	15.8	0.2	39.1	39.0	54.0	14.9	15.0
8	17087.0	32.3	32.3	44.5	41.8	17.1	1.1	43.7	43.7	54.0	10.3	10.3
9	19528.0	29.1	29.1	41.4	39.8	18.9	0.0	40.1	40.1	54.0	13.9	13.9
10	21969.0	30.1	30.1	40.5	35.9	19.2	0.0	44.4	44.4	54.0	9.6	9.6
11	24410.0	30.9	30.9	41.1	33.8	21.6	0.0	50.3	50.3	54.0	3.7	3.7

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
*In the frequency over the fifth harmonic, the noise from the EUT was not seen.The data above is its base noise.
*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

Radiated Spurious Emission

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: DENSO CORPORATION	REPORT NO	: 25FE0008-HO
Equipment	: Navigtion ECU	REGULATION	: Fcc Part15 Subpart C 15.247(d)
Model	: DNNS016	TEST DISTANCE	: 3/1m
Sample No.	: 1CB00003	DATE	: 01/27/2005
Power	: DC12V	TEMPERATURE	: 22deg.C
Mode	: Bluetooth, Tx 2480MHz	HUMIDITY	: 25%
Remarks	: Hor X-axis/Ver X-axis	ENGINEER	: Mitsuru Fujimura

PK DETECT (RBW: 1MHz, VBW: 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	PK	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.7	61.9	62.3	23.0	39.9	3.9	0.0	48.9	49.3	74.0	25.1	24.7
2*	2483.5	78.6	70.7	30.8	40.0	5.5	0.0	74.9	67.0	74.0	-0.9	7.0
3	4960.4	51.5	52.4	35.8	41.3	8.1	1.1	55.2	56.1	74.0	18.8	17.9
4	7440.0	45.9	45.3	37.9	40.3	10.2	0.7	54.4	53.8	74.0	19.6	20.2
5	9920.0	44.5	44.1	36.2	39.6	12.1	0.3	53.5	53.1	74.0	20.5	20.9
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	12400.0	45.1	45.6	41.6	40.0	14.0	0.4	51.6	52.1	74.0	22.4	21.9
7	14880.0	44.0	43.8	42.6	40.9	15.9	0.5	52.6	52.4	74.0	21.4	21.6
8	17360.0	45.4	45.2	44.4	41.6	17.2	0.9	56.8	56.6	74.0	17.2	17.4
9	19840.0	42.2	42.4	41.1	39.4	19.3	0.0	53.7	53.9	74.0	20.3	20.1
10	22320.0	42.7	42.1	40.4	35.3	19.6	0.0	57.9	57.3	74.0	16.1	16.7
11	24800.0	42.6	42.3	41.1	34.6	21.5	0.0	61.1	60.8	74.0	12.9	13.2

AV DETECT (RBW: 1MHz, VBW: 10Hz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	AV	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1159.7	57.1	58.7	23.0	39.9	3.9	0.0	44.1	45.7	54.0	9.9	8.3
2*	2483.5	57.1	50.7	30.8	40.0	5.5	0.0	53.4	47.0	54.0	0.6	7.0
3	4960.4	41.9	43.5	35.8	41.3	8.1	1.1	45.6	47.2	54.0	8.4	6.8
4	7440.0	33.0	33.0	37.9	40.3	10.2	0.7	41.5	41.5	54.0	12.5	12.5
5	9920.0	31.4	31.4	36.2	39.6	12.1	0.3	40.4	40.4	54.0	13.6	13.6
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
6	12400.0	32.8	32.7	41.6	40.0	14.0	0.4	39.3	39.2	54.0	14.7	14.8
7	14880.0	31.2	31.2	42.6	40.9	15.9	0.5	39.8	39.8	54.0	14.2	14.2
8	17360.0	32.6	32.6	44.4	41.6	17.2	0.9	44.0	44.0	54.0	10.0	10.0
9	19840.0	28.9	28.9	41.1	39.4	19.3	0.0	40.4	40.4	54.0	13.6	13.6
10	22320.0	29.7	29.7	40.4	35.3	19.6	0.0	44.9	44.9	54.0	9.1	9.1
11	24800.0	29.6	29.7	41.1	34.6	21.5	0.0	48.1	48.2	54.0	5.9	5.8

* Reference data

Marker-Delta Method (RBW:100kHz)

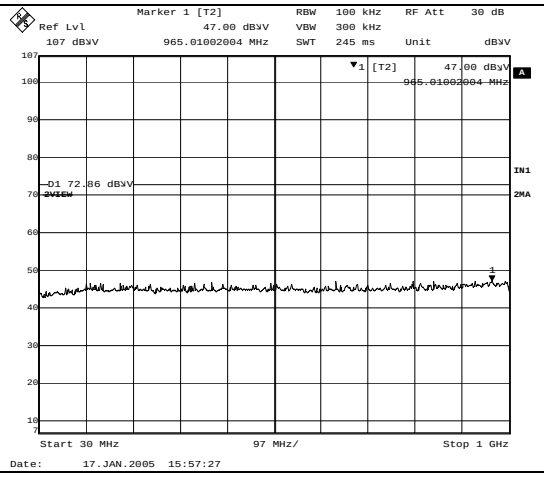
No.	FREQ	S/A READING		ANT	AMP	CABLE	Hi-Pass	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER		HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
PK DETECT												
2	2483.5	58.6	49.4	30.8	40.0	5.5	0.0	54.9	45.7	74.0	19.1	28.3
AV DETECT												
2	2483.5	34.4	32.0	30.8	40.0	5.5	0.0	30.7	28.3	54.0	23.3	25.7

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
*In the frequency over the fifth harmonic, the noise from the EUT was not seen.The data above is its base noise.
*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

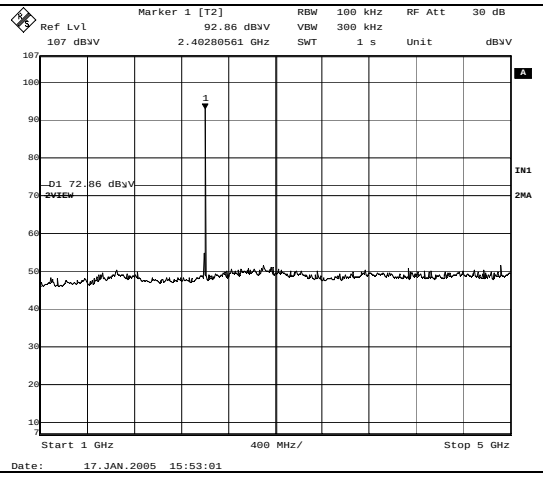
Conducted Spurious Emission

Ch:Low

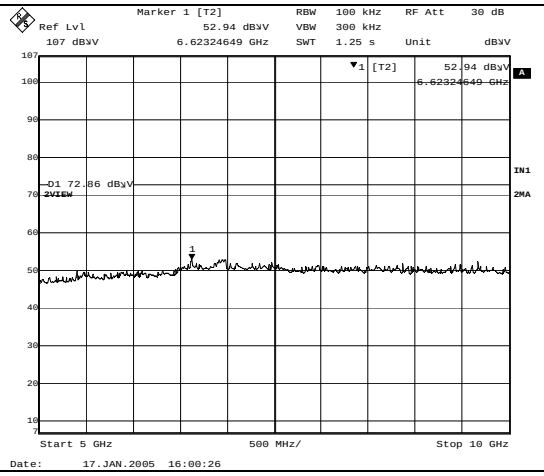
30MHz-1GHz



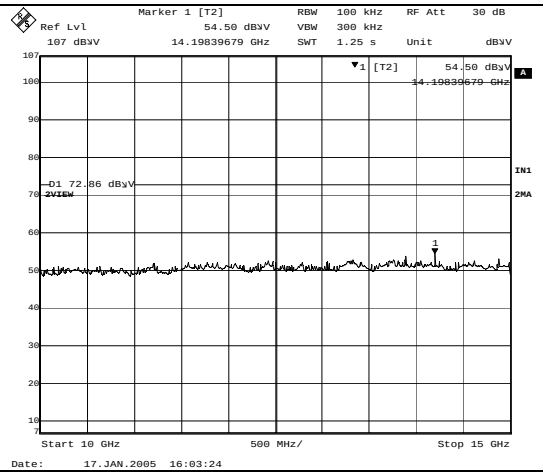
1GHz-5GHz



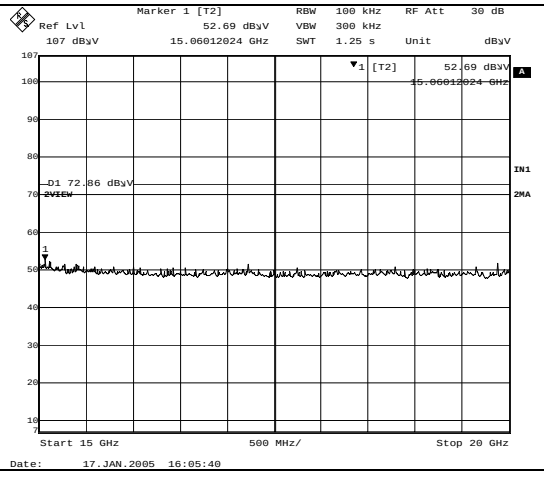
5GHz-10GHz



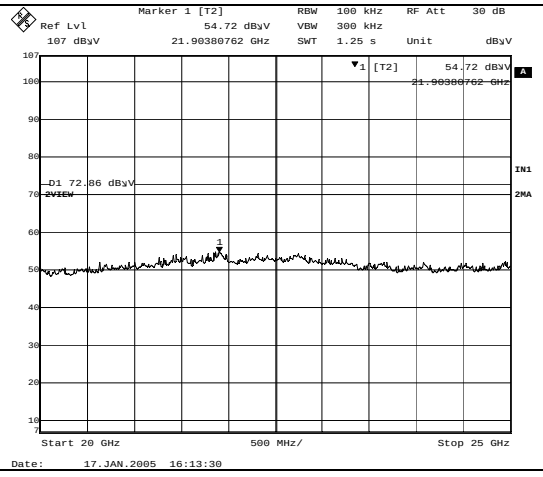
10GHz-15GHz



15GHz-20GHz



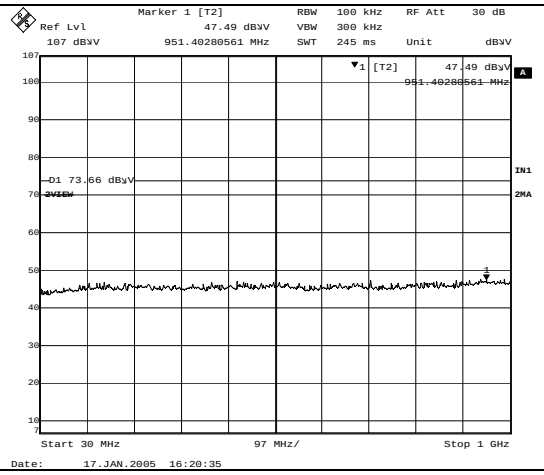
20GHz-25GHz



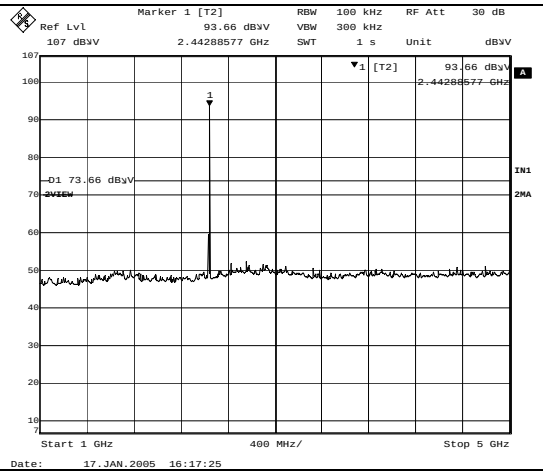
Conducted Spurious Emission

Ch:Mid

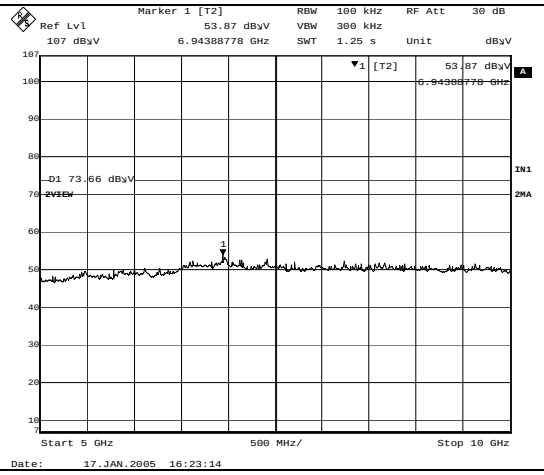
30MHz-1GHz



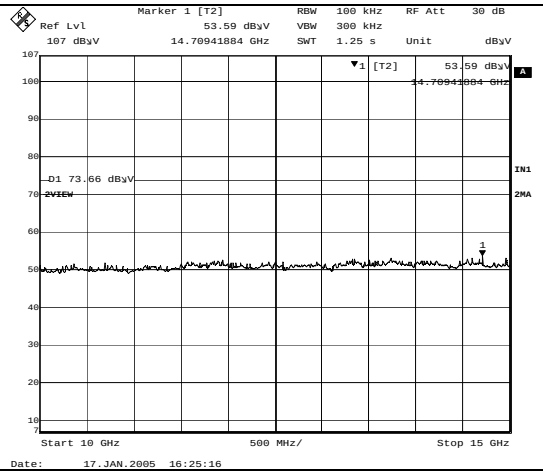
1GHz-5GHz



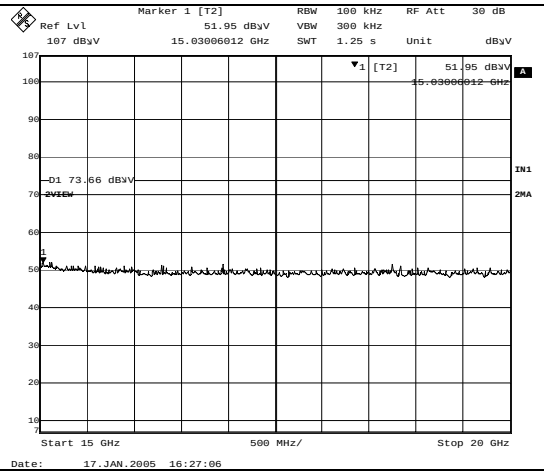
5GHz-10GHz



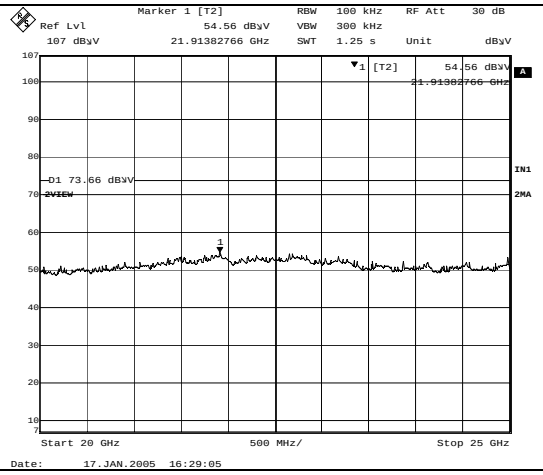
10GHz-15GHz



15GHz-20GHz



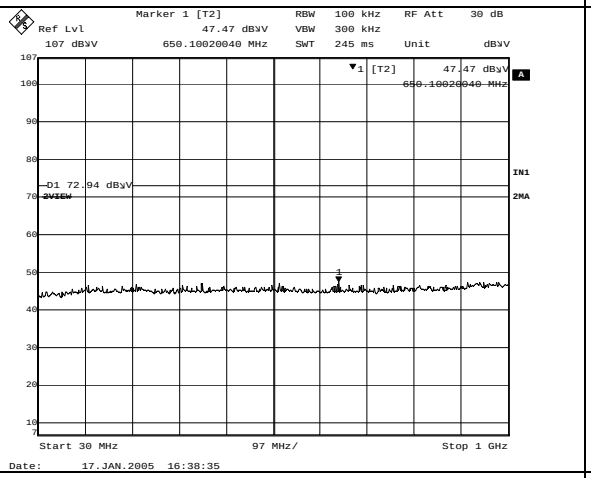
20GHz-25GHz



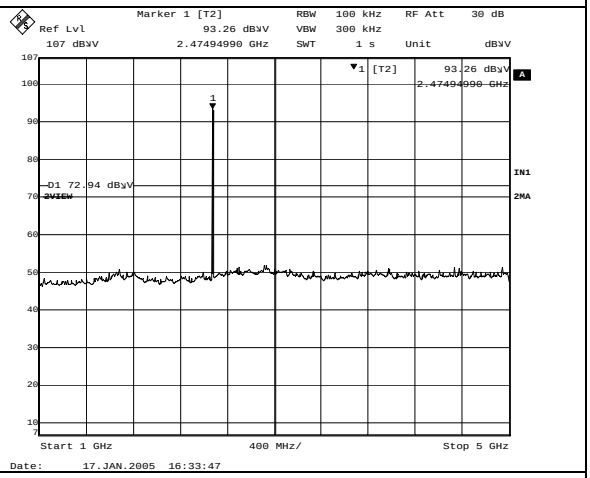
Conducted Spurious Emission

Ch:High

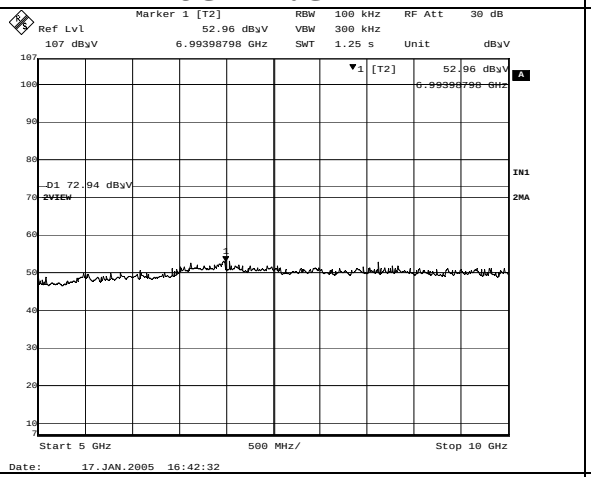
30MHz-1GHz



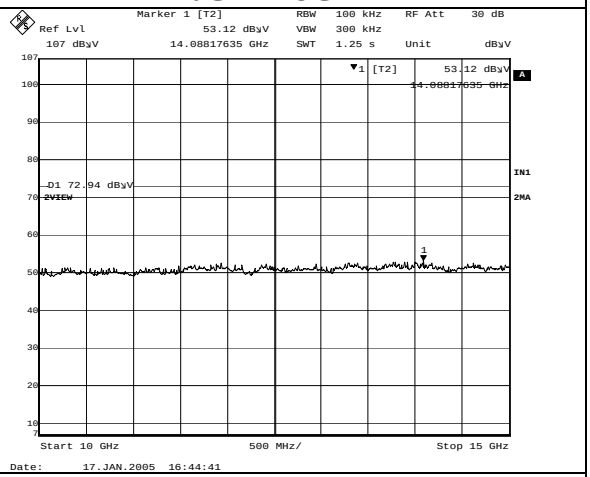
1GHz-5GHz



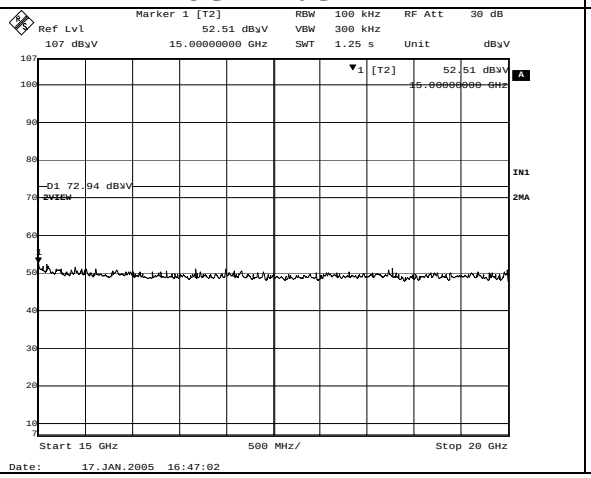
5GHz-10GHz



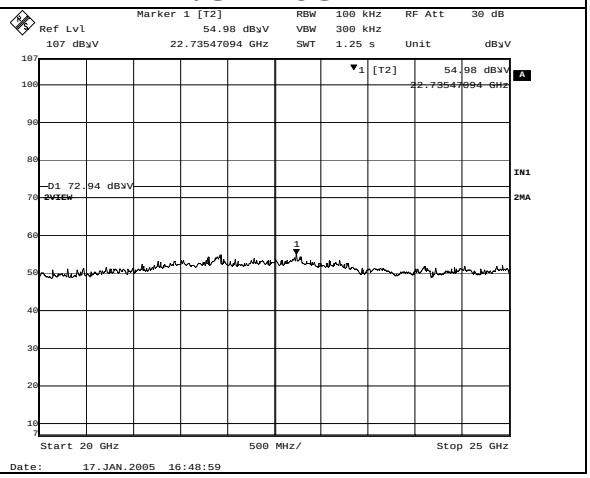
10GHz-15GHz



15GHz-20GHz

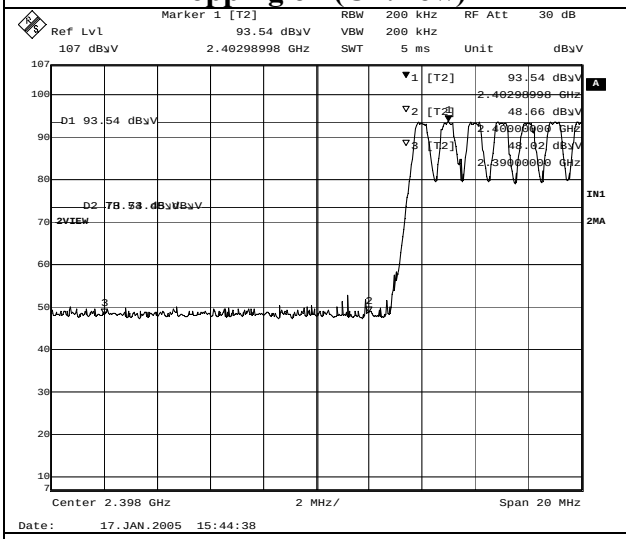


20GHz-25GHz

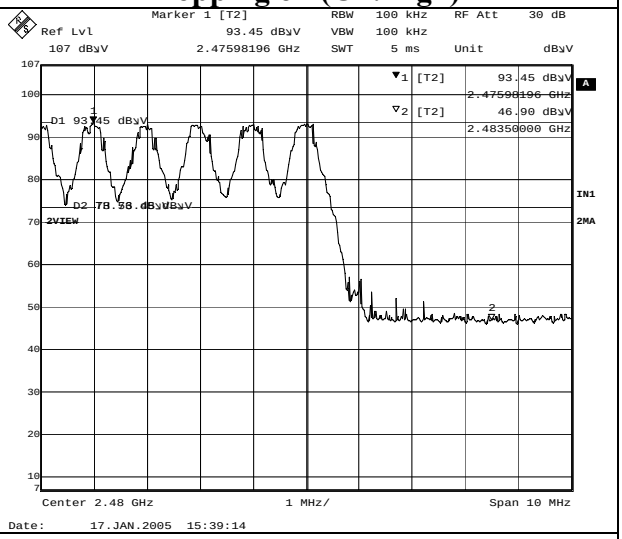


Conducted Spurious Emission
Band Edge compliance

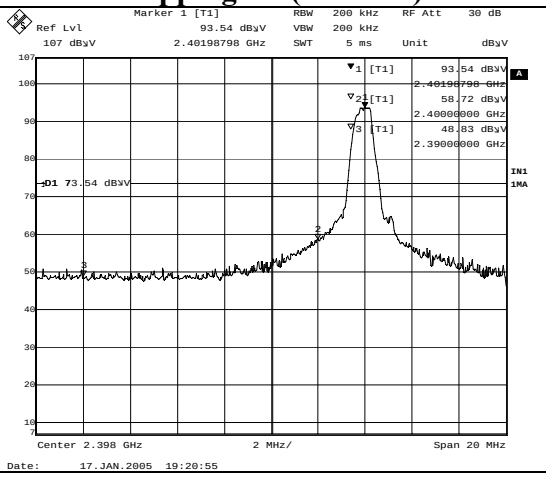
Hopping on (Ch:Low)



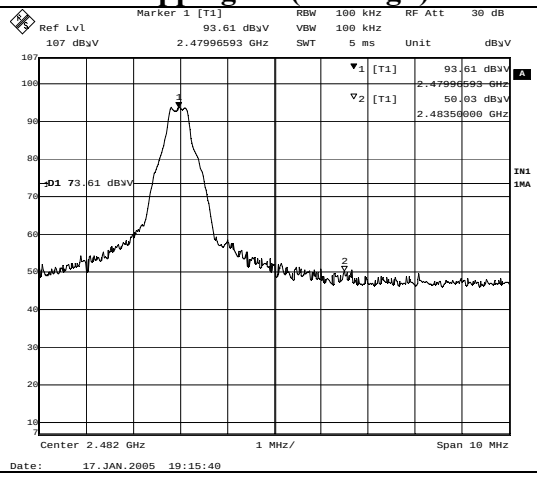
Hopping on (Ch:High)



Hopping off (Ch:Low)

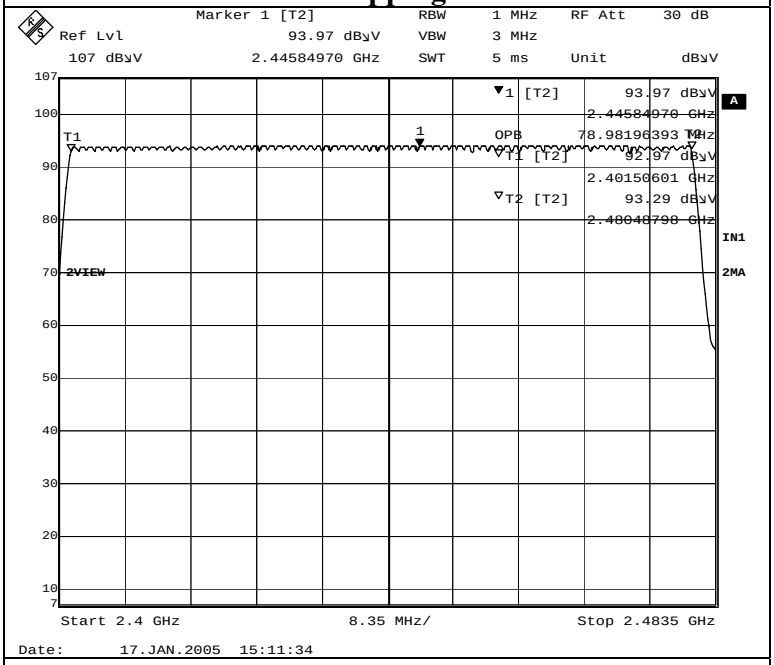


Hopping off (Ch:High)



99% Occupied Bandwidth

Hopping



Ch Mid