Test Report

Product Name	ThereGate
Model No.	TG800Z
FCC ID.	X35-TG800Z

Applicant	There Corporation Oy
Address	Rantakatu 2A Vaasa 65100 Finland

Date of Receipt	June 23, 2009
Issued Date	Jan. 19, 2010
Report No.	096355R-RFUSP07V01
Report Version	V1.0

Test Report Certification

Issued Date: Jan. 19, 2010
Report No. : 096355R-RFUSP07V01

Product Name	ThereGate
Applicant	There Corporation Oy
Address	Rantakatu 2A Vaasa 65100 Finland
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD.
Model No.	TG800Z
FCC ID.	X35-TG800Z
EUT Rated Voltage	AC 100-240V /50-60Hz
EUT Test Voltage	AC 120V/ 60Hz
Trade Name	ThereGate
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2009
	ANSI C63.4: 2003
Test Result	Complied

NVLAP Lab Code: 200533-0

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

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(Engineering Adm. Specialist / Rita Huang)

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Approved By :
(Manager / Vincent Lin)

Testing Laboratory
0914

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	ThereGate
Trade Name	ThereGate
FCC ID.	X35-TG800Z
Model No.	TG800Z
Frequency Range	908.42MHz
Type of Modulation	FSK
Number of Channels	1
Channel Control	Auto
Antenna Type	PIFA
Antenna Gain	Refer to the table “Antenna List”
Power Adapter	MFR: Powertron, M/N: PA1030-1HU Input: AC 100-240V, 50-60Hz, 0.8A Output: DC 5V, 4.0A Cable Out: Non-Shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Invax	NB0122-B	0.39 dBi in 2.4 GHz

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	908.42MHz				

Note:

1. The EUT is a ThereGate with a built-in Z-Wave transceiver module.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

EMI Test Mode	Mode 1: Transmitter

1.2. Operation Description

The EUT is a ThereGate with a built-in Z-Wave transceiver module. The EUT operation frequency is 908.42MHz. The signals modulated by FSK are transmitted from the PIFA Antenna of the EUT.

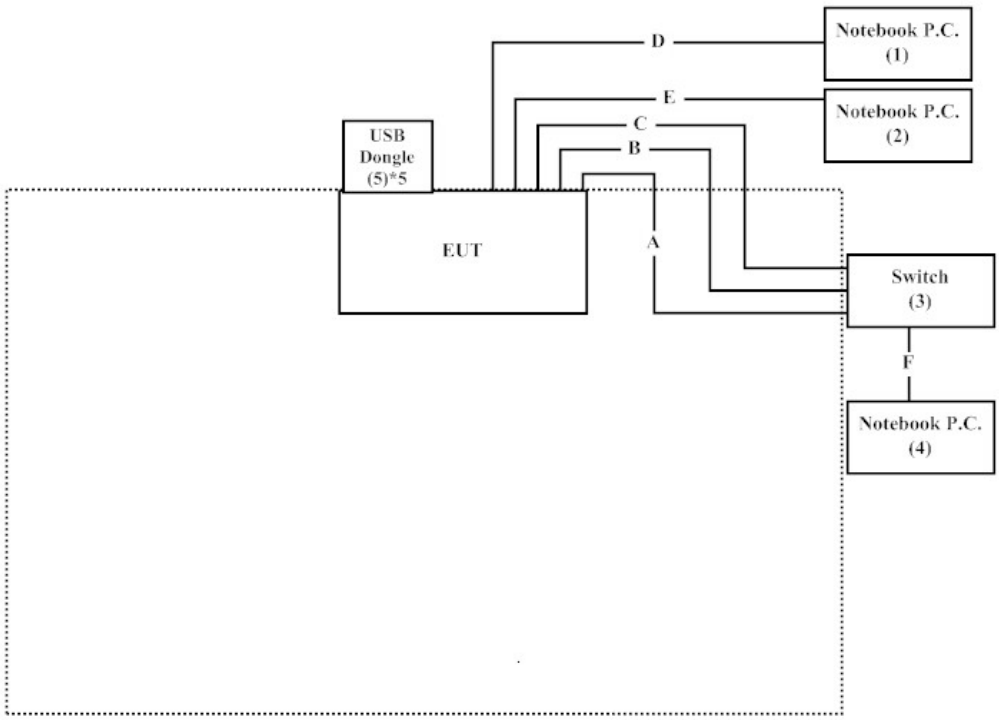
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1.	Notebook P.C.	DELL	PP04X	2D2ZM1S	Non-Shielded, 1.8m
2.	Notebook P.C.	DELL	PP04X	C8YYM1S	Non-Shielded, 1.8m
3.	Switch	D-Link	DGS-1008D	F37S276000079	Non-Shielded, 1.8m
4.	Notebook P.C.	DELL	PP04X	7607342512	Non-Shielded, 1.8m
5.	USB Dongle	G-COM	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded, 7.0m
B	LAN Cable	Non-Shielded, 7.0m
C	LAN Cable	Non-Shielded, 7.0m
D	LAN Cable	Non-Shielded, 7.0m
E	LAN Cable	Non-Shielded, 7.0m
F	LAN Cable	Non-Shielded, 7.0m

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4.

(2) Provide the AC Power Source.

(3) Start transmits continually.

(4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://tw.quietek.com/tw/emc/accreditations/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

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0914

2. Conducted Emission

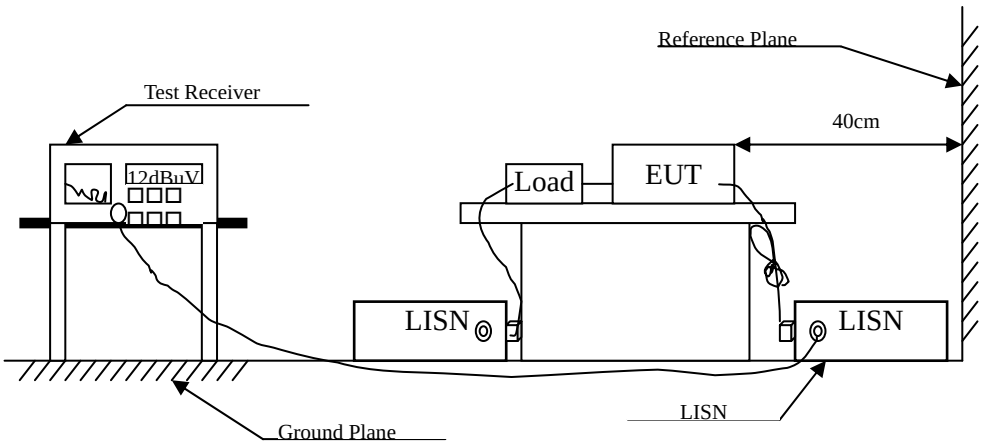
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2009	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2009	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2009	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2009	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : ThereGate
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmitter

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 1					
Quasi-Peak					
0.201	9.706	41.870	51.576	-12.967	64.543
0.326	9.650	34.880	44.530	-16.441	60.971
0.662	9.630	21.730	31.360	-24.640	56.000
1.357	9.670	20.520	30.190	-25.810	56.000
4.701	9.700	15.880	25.580	-30.420	56.000
17.337	9.990	17.290	27.280	-32.720	60.000
Average					
0.201	9.706	28.510	38.216	-16.327	54.543
0.326	9.650	23.150	32.800	-18.171	50.971
0.662	9.630	11.150	20.780	-25.220	46.000
1.357	9.670	4.880	14.550	-31.450	46.000
4.701	9.700	3.130	12.830	-33.170	46.000
17.337	9.990	4.860	14.850	-35.150	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : ThereGate
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmitter

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.205	9.713	41.290	51.003	-13.426	64.429
0.334	9.660	32.620	42.280	-18.463	60.743
0.673	9.650	22.640	32.290	-23.710	56.000
1.873	9.680	18.640	28.320	-27.680	56.000
3.974	9.700	17.060	26.760	-29.240	56.000
17.380	10.000	15.160	25.160	-34.840	60.000
Average					
0.205	9.713	23.100	32.813	-21.616	54.429
0.334	9.660	22.390	32.050	-18.693	50.743
0.673	9.650	12.830	22.480	-23.520	46.000
1.873	9.680	3.070	12.750	-33.250	46.000
3.974	9.700	2.490	12.190	-33.810	46.000
17.380	10.000	4.280	14.280	-35.720	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the radiated emission test:

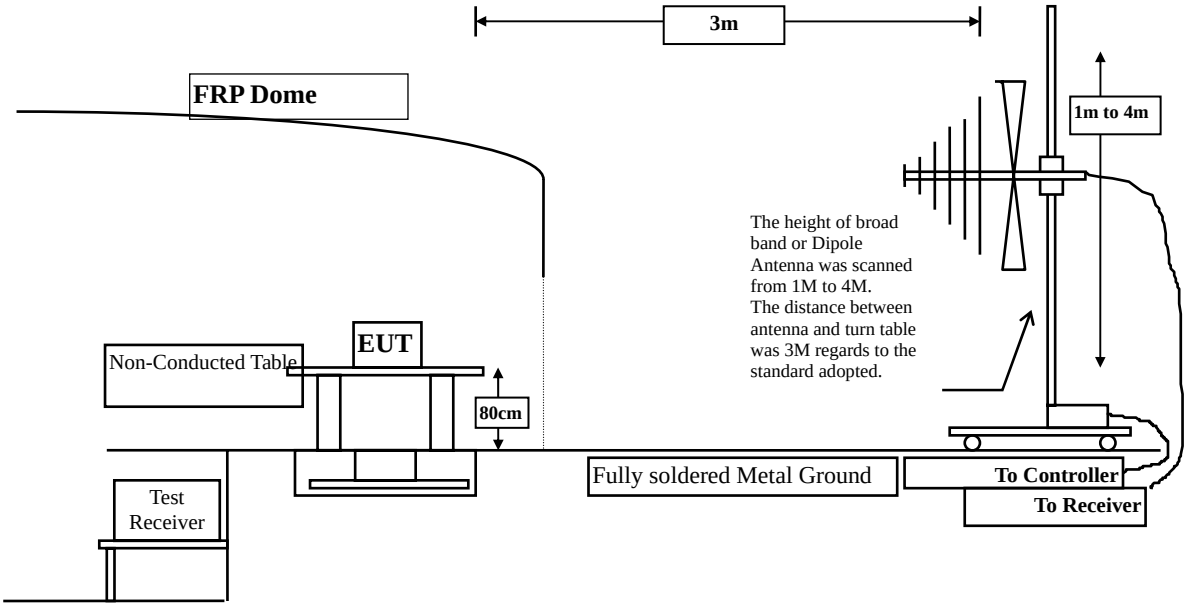
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☐Site # 1		Test Receiver	R & S	ESVS 10 / 834468/003	May, 2009
		Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2009
		Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2009
		Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2009
☐Site # 2		Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2009
		Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2009
		Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2009
		Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2009
		Horn Antenna	ETS	3115 / 0005-6160	Sep., 2009
		Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2009
☒Site # 3	X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2009
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2009
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2009

Note: 1. All equipments are calibrated every one year.

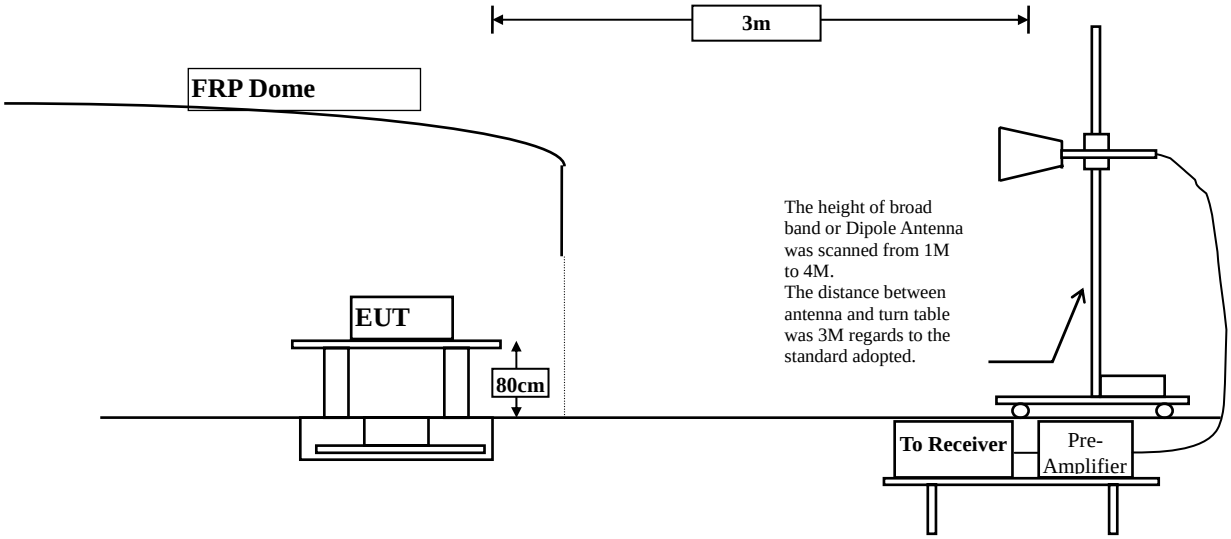
2. Test equipments marked by “X” are used to measure the final test results.

3.2. Test Setup

Below 1GHz



Above 1GHz



3.3. Limits

➢ **Fundamental and Harmonics Emission Limits**

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The frequency range from 30MHz to 10th harminics is checked.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : ThereGate
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmitter

	Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal						
Peak Detector:						
X- Axis	908.420	6.054	65.870	71.924	-42.076	114.000
Y- Axis	908.420	6.054	65.940	71.994	-42.006	114.000
Z- Axis	908.420	6.054	63.080	69.134	-44.866	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
4. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : ThereGate
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmitter

	Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical						
Peak Detector:						
X- Axis	908.420	0.507	62.270	62.777	-51.223	114.000
Y- Axis	908.420	0.507	67.680	68.187	-45.813	114.000
Z- Axis	908.420	0.507	64.060	64.567	-49.433	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
4. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : ThereGate
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
1816.840	-0.322	39.687	39.365	-34.635	74.000
2725.260	4.414	39.472	43.885	-30.115	74.000
3633.680	8.118	37.380	45.498	-28.502	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : ThereGate
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
1816.840	0.351	40.314	40.665	-33.335	74.000
2725.260	3.566	42.907	46.472	-27.528	74.000
3633.680	5.435	40.052	45.487	-28.513	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : ThereGate
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
263.267	-8.085	43.429	35.344	-10.656	46.000
374.068	-2.917	44.903	41.986	-4.014	46.000
500.421	-0.311	30.548	30.237	-15.763	46.000
624.830	4.217	38.314	42.532	-3.468	46.000
751.182	3.860	29.819	33.679	-12.321	46.000
875.591	4.380	37.474	41.854	-4.146	46.000
Vertical					
263.267	-4.783	45.408	40.625	-5.375	46.000
374.068	-3.817	38.179	34.362	-11.638	46.000
500.421	-1.580	33.602	32.022	-13.978	46.000
624.830	1.272	37.727	38.999	-7.001	46.000
751.182	2.070	33.295	35.365	-10.635	46.000
875.591	4.802	39.167	43.969	-2.031	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

4. Band Edge

4.1. Test Equipment

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2009
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2009
	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2009
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
	Pre-Amplifier	HP	8449B / 3008A01123	July, 2009

OATS No.3

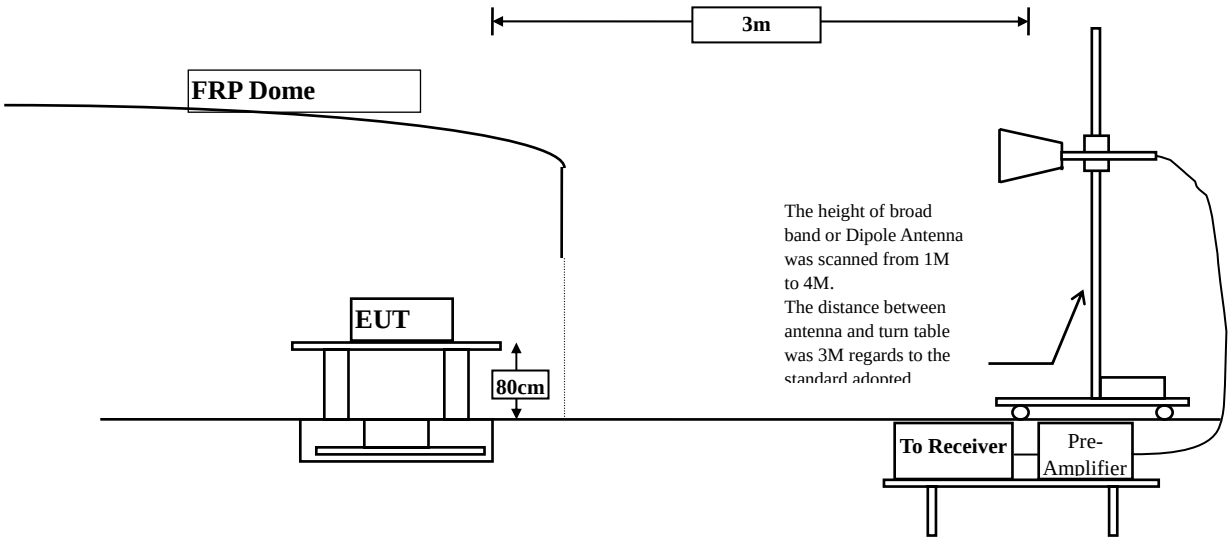
Note: 1. All equipments are calibrated every one year.

2. The test equipments marked by “X” are used to measure the final test results.

4.2. Test Setup

RF Radiated Measurement:

Above 1GHz



4.3. Limit

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

4.5. Uncertainty

Conducted is ± 1.27 dB
Radiated is ± 3.9 dB.

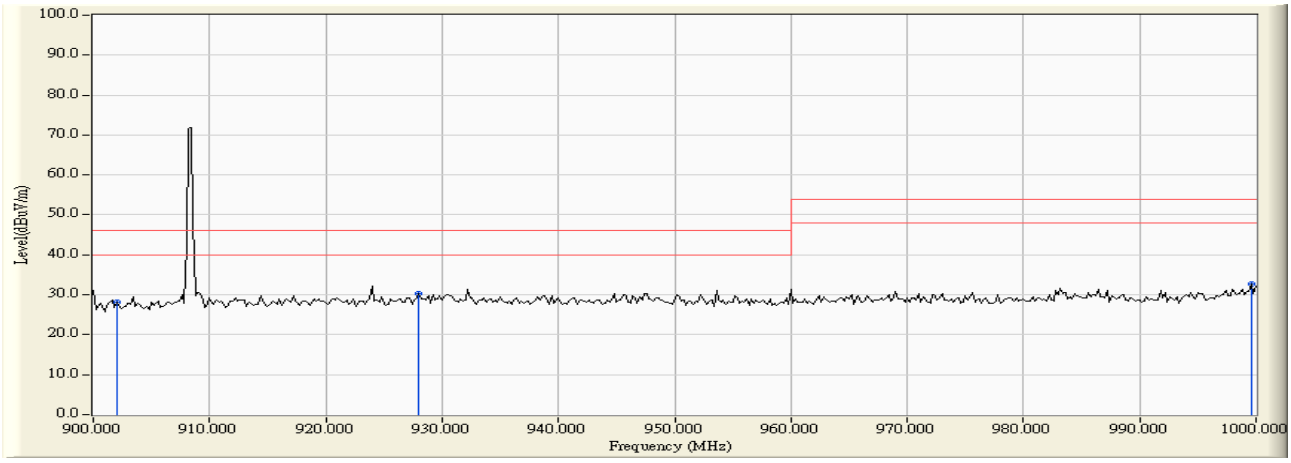
4.6. Test Result of Band Edge

Product : ThereGate
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	5.675	22.559	28.234	46.020	Pass
01(Quasi-Peak)	928.000	6.945	23.364	30.309	46.020	Pass
01(Quasi-Peak)	999.600	9.268	23.490	32.759	54.000	Pass

Figure Channel 01: Horizontal (Quasi-Peak)



Note:

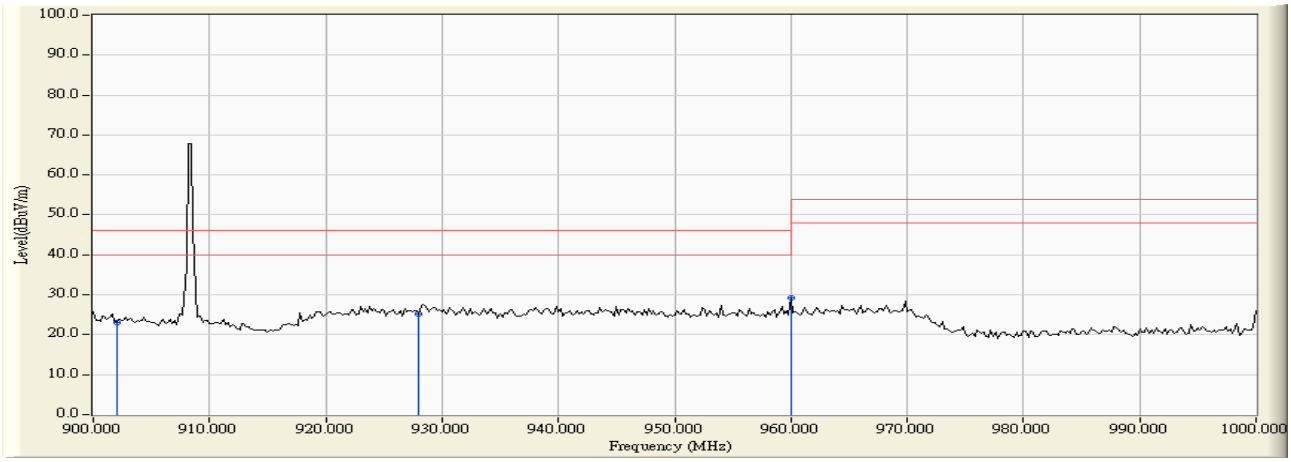
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : ThereGate
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	1.413	21.724	23.137	46.020	Pass
01(Quasi-Peak)	928.000	3.366	21.853	25.219	46.020	Pass
01(Quasi-Peak)	960.000	2.950	26.320	29.270	46.020	Pass

Figure Channel 01: Vertical (Quasi-Peak)



Note:

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs