



Clarion (M) Sdn Bhd

Application
For
Certification

Car Stereo with FM/SD Card/Bluetooth combination

(FCC ID: Q2ZFB275BT)

07176801
TL/ ac
September 17, 2007

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LIST OF EXHIBITS

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MEASUREMENT/TECHNICAL REPORT

Clarion (M) Sdn Bhd - Model: FB275BT
FB275BTB
FCC ID: Q2ZFB275BT

This report concerns (check one:) Original Grant Class II Change

Equipment Type : DXT - Pt 15 Low Pwr Transceiver, Rx Verified

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No

If yes, defer until : _____
date

Company Name agrees to notify the Commission
by: _____

date

of the intended date of announcement of the product so that the grant can be issued
on that date.

Transition Rules Request per 15.37 ? Yes No

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [05-04-07
Edition] Provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri1.pdf, descri2.pdf
Test Setup Photo	Radiated Emission	config photos.doc
Test Report	Emission Plot	emission.pdf
Test Report	Duty Cycle Calculation and Measurement	txon.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Request	request.pdf

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EXHIBIT 1 GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Car Stereo with FM/SD Card/Bluetooth combination. Bluetooth module operates from 2402MHz to 2480MHz. It is powered by 12V lead acid cell installed in vehicle. It consists of radio, SD card music playing, Bluetooth audio streaming, external music playing and mobile phone handsfree mode when operating with Bluetooth.

The antennas used in the Bluetooth module is integral, and the tested sample is a prototype.

Model(s) FB275BTB is the same as model FB275BT in hardware aspect. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

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1.2 Related Submittal(s) Grants

This is an Application for Certification of a DXT - Part 15 Low Power Transceiver, RX Verified. One Transmitter is included in this application.

A verification report has been prepared for Bluetooth module's digital device portion & FM radio receiver portion.

1.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test site measurement data have been fully placed on file with the FCC.

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EXHIBIT 2 SYSTEM TEST CONFIGURATION

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2.0 System Test Configuration

2.1 Justification

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

2.2 EUT Exercising Software

The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

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2.3 Details of EUT and Description of Peripherals

Details of EUT:

There are no special accessories necessary for compliance of this product.

Description of Peripherals:

- (1) SD Card, Sandisk, S/N: AX0616104179D (Supplied by Client)
- (2) Microphone, 2.4m long (Supplied by Client)
- (3) 47kohm termination (Supplied by Intertek)

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2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty test has been considered.

2.5 Equipment Modification


Any modifications installed previous to testing by Clarion (M) Sdn Bhd will be incorporated in each production model sold/leased in the United States.

No modifications were installed by ETL Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

*Leung Wai Leung, Tommy
Manager
Intertek Testing Services
Agent for Clarion (M) Sdn Bhd*



Signature

September 17, 2007

Date

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**EXHIBIT 3
EMISSION RESULTS**

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3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 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:

$$FS = RA + AF + CF - AG$$

where FS = Field Strength in dB μ V/m
 RA = Receiver Amplitude (including preamplifier) in dB μ V
 CF = Cable Attenuation Factor in dB
 AF = Antenna Factor in dB
 AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

$$FS = RR + LF$$

where FS = Field Strength in dB μ V/m
 RR = RA - AG in dB μ V
 LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dB μ V/m

RR = 23.0 dB μ V
LF = 9.0 dB

Level in μ V/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

at 65.689 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

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3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 7.6 dB margin

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer
Typed/Printed Name

September 17, 2007
Date

INTERTEK TESTING SERVICES

Company: Clarion (M) Sdn Bhd
 Model: FB275BT
 Mode : TX-Channel 0

Date of Test: August 21-September 14, 2007

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	2402.000	87.6	33	29.4	84.0	114.0	-30.0
H	*4804.000	55.4	33	34.9	57.3	74.0	-16.7
H	7206.000	41.4	33	37.9	46.3	74.0	-27.7
H	9608.000	39.6	33	40.4	47.0	74.0	-27.0
H	*12010.000	41.3	33	40.5	48.8	74.0	-25.2

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	2402.000	87.6	33	29.4	31.7	52.3	94.0	-41.7
H	*4804.000	55.4	33	34.9	31.7	25.6	54.0	-28.4
H	7206.000	41.4	33	37.9	31.7	14.6	54.0	-39.4
H	9608.000	39.6	33	40.4	31.7	15.3	54.0	-38.7
H	*12010.000	41.3	33	40.5	31.7	17.1	54.0	-36.9

- NOTES:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Clarion (M) Sdn Bhd
 Model: FB275BT
 Mode : TX-Channel 39

Date of Test: August 21-September 14, 2007

Table 2

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	2441.000	88.5	33	29.4	84.9	114.0	-29.1
H	*4882.000	55.7	33	34.9	57.6	74.0	-16.4
H	*7323.000	41.7	33	37.9	46.6	74.0	-27.4
H	9764.000	39.7	33	40.4	47.1	74.0	-26.9
H	*12205.000	42.4	33	40.5	49.9	74.0	-24.1

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	2441.000	88.5	33	29.4	31.7	53.2	94.0	-40.8
H	*4882.000	55.7	33	34.9	31.7	25.9	54.0	-28.1
H	*7323.000	41.7	33	37.9	31.7	14.9	54.0	-39.1
H	9764.000	39.7	33	40.4	31.7	15.4	54.0	-38.6
H	*12205.000	42.4	33	40.5	31.7	18.2	54.0	-35.8

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Clarion (M) Sdn Bhd
 Model: FB275BT
 Mode : TX-Channel 78

Date of Test: August 21-September 14, 2007

Table 3

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
H	2480.000	88.7	33	29.4	85.1	114.0	-28.9
H	*4960.000	55.1	33	34.9	57.0	74.0	-17.0
H	*7440.000	42.1	33	37.9	47.0	74.0	-27.0
H	9920.000	39.9	33	40.4	47.3	74.0	-26.7
H	*12400.000	41.7	33	40.5	49.2	74.0	-24.8

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
H	2480.000	88.7	33	29.4	31.7	53.4	94.0	-40.6
H	*4960.000	55.1	33	34.9	31.7	25.3	54.0	-28.7
H	*7440.000	42.1	33	37.9	31.7	15.3	54.0	-38.7
H	9920.000	39.9	33	40.4	31.7	15.6	54.0	-38.4
H	*12400.000	41.7	33	40.5	31.7	17.5	54.0	-36.5

- NOTES:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Clarion (M) Sdn Bhd
Model: FB275BT
Mode: Bluetooth Streaming

Date of Test: August 21-September 14, 2007

Table 4

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	38.474	36.4	16	10.0	30.4	40.0	-9.6
V	65.689	39.4	16	9.0	32.4	40.0	-7.6
H	135.543	35.6	16	14.0	33.6	43.5	-9.9
H	162.786	34.1	16	16.0	34.1	43.5	-9.4
H	214.384	33.2	16	17.0	34.2	43.5	-9.3
H	308.629	26.9	16	23.0	33.9	46.0	-12.1

- NOTES:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.

Test Engineer: Jess Tang

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3.4 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz and 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Please refer to the following plots for radiated emission on the bandedge:

Plot B1A* - Low Channel Emissions

Plot B1B- High Channel Emissions

For electronic filing, the above plots are saved with filename: emission.pdf

* Bandedge compliance is determined by applying marker-delta method, i.e.

$$\begin{aligned}\text{Peak Resultant field strength} &= \text{Fundamental emissions} - \text{delta from the plot} \\ &= 84\text{dB}\mu\text{V/m} - 44.3\text{dB} \\ &= 39.7\text{dB}\mu\text{V/m}\end{aligned}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB μ V/m.

$$\begin{aligned}\text{Average Resultant field strength} &= \text{Fundamental emissions} - \text{delta from the plot} \\ &= 52.3\text{dB}\mu\text{V/m} - 44.3\text{dB} \\ &= 8\text{dB}\mu\text{V/m}\end{aligned}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 54dB μ V/m.

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Company: Clarion (M) Sdn Bhd
Model: FB275BT

Date of Test: August 21-September 14, 2007

3.5 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

Talk:

$$\begin{aligned} \text{Duty cycle (DC)} &= \text{Maximum ON time in } 98.75\text{ms}/98.75\text{ms} \\ &= (0.400\text{ms} \times 1)/98.75\text{ms} \end{aligned}$$

$$\begin{aligned} \text{Duty cycle correction, dB} &= 20 \times \log (\text{DC}) \\ &= 20 \times \log (0.00405) \\ &= -47.8 \text{ dB} \end{aligned}$$

X	See attached spectrum analyzer chart (s) for transmitter timing Plot B7A
	See transmitter timing diagram provided by manufacturer
	Not applicable, duty cycle was not used.

Paging:

$$\begin{aligned} \text{Duty cycle (DC)} &= \text{Maximum ON time in } 20\text{ms}/20\text{ms} \\ &= (0.260\text{ms} \times 2)/20\text{ms} \end{aligned}$$

$$\begin{aligned} \text{Duty cycle correction, dB} &= 20 \times \log (\text{DC}) \\ &= 20 \times \log (0.026) \\ &= -31.7 \text{ dB} \end{aligned}$$

X	See attached spectrum analyzer chart (s) for transmitter timing Plot B7B
	See transmitter timing diagram provided by manufacturer
	Not applicable, duty cycle was not used.

For electronic filing, the above plots are saved with filenames: txon.pdf

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EXHIBIT 4 EQUIPMENT PHOTOGRAPHS

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc

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**EXHIBIT 5
PRODUCT LABELLING**

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5.0 Product Labelling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf

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EXHIBIT 6 TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

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**EXHIBIT 7
INSTRUCTION MANUAL**

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7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

The required FCC Information to the User is stated on P.3 of the Instruction Manual.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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**EXHIBIT 8
CONFIDENTIALITY REQUEST**

INTERTEK TESTING SERVICES

8.0 Confidentiality Request

For electronic filing, a preliminary copy of the Confidentiality Request is saved with filename: request.pdf