FCC MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE

PRODUCT	:	**Wireless Calling Bell**
MODEL/TYPE NO	:	**HCM100-500**
FCC ID	:	**WCNHCM100-500**
TRADE NAME	:	JM COREA
APPLICANT	:	**J.M.Corea Co., Ltd.** **#401, Myungdong B/D, 1132-2, Sanbon-Dong, Gunpo-Si, Kyungki-Do, Korea** **Jo, Hyun Guan / Senior Engineer**
CLASSIFICATION	:	**DSC Part 15 Security/Remote Control Transmitter**
RULE PART(S)	:	**FCC Part 15 Subpart C Section 15.231**
FCC PROCEDURE	:	**Certification**
DATES OF TEST	:	**May 19 to 28, 2008**
DATES OF ISSUE	:	**May 29, 2008**
TEST REPORT No.	:	**BWS-08-RF-0007**
TEST LAB.	:	**BWS TECH Inc. (Registration No. : 553281)**

This Wireless Calling Bell "HCM100-500" has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 and ANSI/TIA-603-B-2002 at the BWS TECH/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part 15.231.

I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment may not necessarily produce the same results due to production tolerance and measurement uncertainties.

May 29, 2008
(Date)

Tested by **CY-Choi**

May 29, 2008
(Date)

Reviewed by **TaeHyun, Nam**

BWS TECH Inc.
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FCC TEST REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

1. General Information

Applicant

Company Name	J.M.Corea
Company Address	#401, Myungdong B/D, 1132-2, Sanbon-Dong, Gunpo-Si, Kyungki-Do, Korea
Contact Person	Jo, Hyun Guan **/** Senior Engineer / kwan224@yahoo.co.kr
Phone/Fax	Tel No. : +82.31.399.2381 Fax No. : +82.31.399.2386

Manufacturer

Company Name	J.M.Corea
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Phone/Fax	Tel No. : +82.31.399.2381 Fax No. : +82.31.399.2386

- **EUT Type** Wireless Calling Bell
- **Model Number** HCM100-500
- **FCC Identifier** WCNHCM100-500
- **S/N** Prototype
- **FCC Rule Part(s)** FCC Part 15 Subpart C Section 15.231
- **FCC Classification** DSC / Part 15 Security/Remote Control Transmitter
- **Freq. Range** 433.92 MHz
- **Channel** Single Channel
- **Modulation Method** ASK
- **Test Procedure** ANSI C63.4-2003 and ANSI/TIA-603-B-2002
- **Dates of Tests** May 19 to 28, 2008
- **Place of Tests** BWS TECH Inc.(FCC Registration Number : 553281)
  #611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea
  TEL: +82 31 333 5997 FAX: +82 31 333 0017
- **Test Report No.** BWS-08-RF-0007

2. Description of Test Facility

The measurement for radiated and conducted emission test were conducted at the open area test site of BWS TECH Inc. facility located at #611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-2000 and CISPR Publication 16. The BWS TECH measurement facility has been filed to the Commission with the FCC for 3 and 10-meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (Registration Number : 553281).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-2003) was used in determining radiated and conducted emissions from the J.M.Corea Co., Ltd. Wireless Calling Bell Model : HCM100-500.

3. Product Information

3.1 Equipment Description

The Equipment Under Test (EUT) is RF transmitter by the J.M.Corea Co., Ltd.

Wireless Calling Bell Transmitter model: HCM100 (FCC ID: WCNHCM100-500).

This product is just push the button on the transmitter, then it will show all the pre-set beeping numbers with an alarm noise.
It is a simple method, but a very powerful solution for the services needed.

3.2 General Specification

Model	HCM 100-500	
Power Supply	Transmitter	DC 12V / 23A / Alkaline
	Receiver	DC 3.6V / 600mA / Li-Ion
Transmission Output Power	5 dBm	
Sensitivity of Reception	-105 dBm	
Method	Sending and Receiving - ASK	
Frequency	433.92 MHz ±1 MHz	
Operating Temperature	-10 ℃ to +50 ℃	
Operating Humidity	95%	
Dimension (WxHxT)	Transmitter	60mm x 60mm x 25mm
	Receiver	40mm x 70mm x 30mm
Weight (g)	Transmitter	38 g
	Receiver	76 g

4. Summary of Test Results

4.1 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2003. The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10kHz or for "quasi-peak" within a bandwidth of 9kHz.

The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1m x 1.5m x 0.8m wooden table, which is placed 40cm away from the vertical wall, and 1.5m away from the sidewall of the chamber room. Two LISNs are bonded to the shielded room. The EUT is powered from the PMM LISN and the support equipment is powered from the LISN. Power to the LISNs is filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling (serpentine fashion) to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the Spectrum Analyzer to determine the frequency producing the max. Emission from the EUT. The frequency producing the max. Level was reexamined using the detector function set to the CISPR Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0.45 to 30MHz. The bandwidth of the Spectrum Analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was maximized by switching power lines, varying the mode of operation or resolution, clock or data exchange speed, if applicable, whichever determined the worst-case emission. Each emission reported was calibrated using self-calibrating mode.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup.

4.2 Radiated Emission Measurement

Preliminary measurements were made at indoors 3-meter semi EMC Anechoic Chamber using broadband antennas, broadband amplifier, and spectrum analyzer to determine the emission frequencies producing the maximum EME.

Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configurations, mode of operation, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000MHz using bi-log antenna and above 1000MHz, linearly polarized double ridge horn antennas were used. Above 1GHz, linearly polarized double ridge horn antennas were used. The measurements were performed with three frequencies, which were selected as bottom, middle, and top frequency in the operating band. Emission level from the EUT with various configurations was examined on the spectrum analyzer connected with the RF amplifier and plotted graphically.

Final measurements were made outdoors open site at 3-meter test range using biconical and log periodic, Horn antenna. The output from the antenna was connected, via a preselector or a preamplifier, to the input of the EMI Measuring Receiver and Spectrum analyzer (for above 25GHz). The detector function was set to the quasi-peak or peak mode as appropriate. The measurement bandwidth on the Field strength receiver was set to at least 120kHz (1MHz for measurement above 1GHz), with all post-detector filtering no less than 10 times the measurement bandwidth. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during preliminary measurement was examined and investigated as the same set up and configuration which produced the maximum emission The EUT, support equipment and interconnecting cables were configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1m x 1.5 meter table. The turntable containing the system was rotated and the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.

Varying the mode of operating frequencies of the EUT maximized each emission. The system was tested in all the three orthogonal planes and changing the polarity of the antenna. The worst-case emissions are recorded in the data tables. If necessary, the radiated emission measurement could be performed at a closer distance to ensure higher accuracy and the results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20dB/decade) as per section 15.31(f).

5. Test Condition

5.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner, which tends to maximize its emission level in a typical application.

Radiated Emission Test

Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/2000 Clause 8.3.1.1 to determine the worst operating condition. Final radiated emission tests were measured at 3-meter open field test site. To complete the test configuration required by the FCC, the EUT was tested in all three orthogonal planes.

5.2 EUT operation

EUT was tested according to the operation modes provided by the specifications given by the manufacturer, and reported the worst emissions.

5.3 Peripherals / Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

Type of Peripheral Equipment Used:

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	HCM100-500	prototype	J.M.Corea Co., Ltd.	WCNHCM100-500

Type of Cables Used:

Device from	Device to	Type of Cable	Length(m)	Type of shield
-	-	-	-	-

6. Test Results

Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

APPLIED STANDARD : 47 CFR Part 15, Subpart C			
FCC Rule	**Description of Test**	**Limit**	**Result**
15.207	Conducted Emission	Various	N/A
15.231(a)	Transmission Time	Less than 5s with switch	Pass
15.231(b)	Field Strength of Fundamental	Various	Pass
15.231(b) 15.209	Radiated Emission	Various	Pass
15.231(c)	20dB Bandwidth	Less than 0.25%	Pass

N/A : use battery only

Note : Modification to EUT

The device tested is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified.

7. Test Procedure & Measurement Data

7.1 Field strength of fundamental

Test Standard : FCC Part15 Subpart C Section 15.231(b)

Test Date : May 21, 2008

Operating Condition : The EUT was operated at transmitting condition continuously during the test.

Environment Condition : 26 °C / 36 %

Result : Passed

Test Data

Frequency [MHz]	Reading [dBμV]	Detector Mode	Polarization [*H/**V]	A.F. [dB/m]	C.L. [dB]	Limit [dBμV/m]	Emission Level [dBμV/m]	Margin [dB]
433.940	57.34	QP	V	16.56	4.70	100.83	78.60	22.23
433.940	48.84	AVG	V	16.56	4.70	80.83	70.10	10.73
433.940	65.84	QP	H	16.56	4.70	100.83	87.10	13.73
433.940	57.04	AVG	H	16.56	4.70	80.83	78.30	2.53

NOTES :

1. A.F. = Antenna Factor C.L. = Cable Loss
2. POL H = Horizontal POL V = Vertical

7.2 Radiated Emission

Test Standard : FCC Part15 Subpart C Section 15.231(b)
Test Date : May 21, 2008
Operating Condition : The EUT was operated at transmitting condition continuously during the test.
Environment Condition : 26 °C / 36 %
Result : Passed

Test Data

Frequency [MHz]	Reading [dBμV]	Detector Mode	Polarization [*H/**V]	A.F. [dB/m]	C.L. [dB]	Limit [dBμV/m]	Emission Level [dBμV/m]	Margin [dB]
867.880	27.54	QP	V	23.15	7.00	80.83	57.70	23.13
867.880	19.44	AVG	V	23.15	7.00	60.83	49.60	11.23
867.880	35.14	QP	H	23.15	7.00	80.83	65.30	15.53
867.880	26.74	AVG	H	23.15	7.00	60.83	56.90	3.93
The other emissions are below noise floor of 22 dBuV/m.								

NOTES :
1. All modes of operation were investigated and the worst-case emissions are reported.
2. A.F. = Antenna Factor C.L. = Cable Loss
3. POL H = Horizontal POL V = Vertical

7.3 20 dB Bandwidth

Test Standard : FCC Part15 Subpart C Section 15.231(c)
Test Date : May 21, 2008
Operating Condition : The EUT was operated at transmitting condition continuously during the test.
Environment Condition : 26 °C/ 36 %
Result : Passed

Test Data

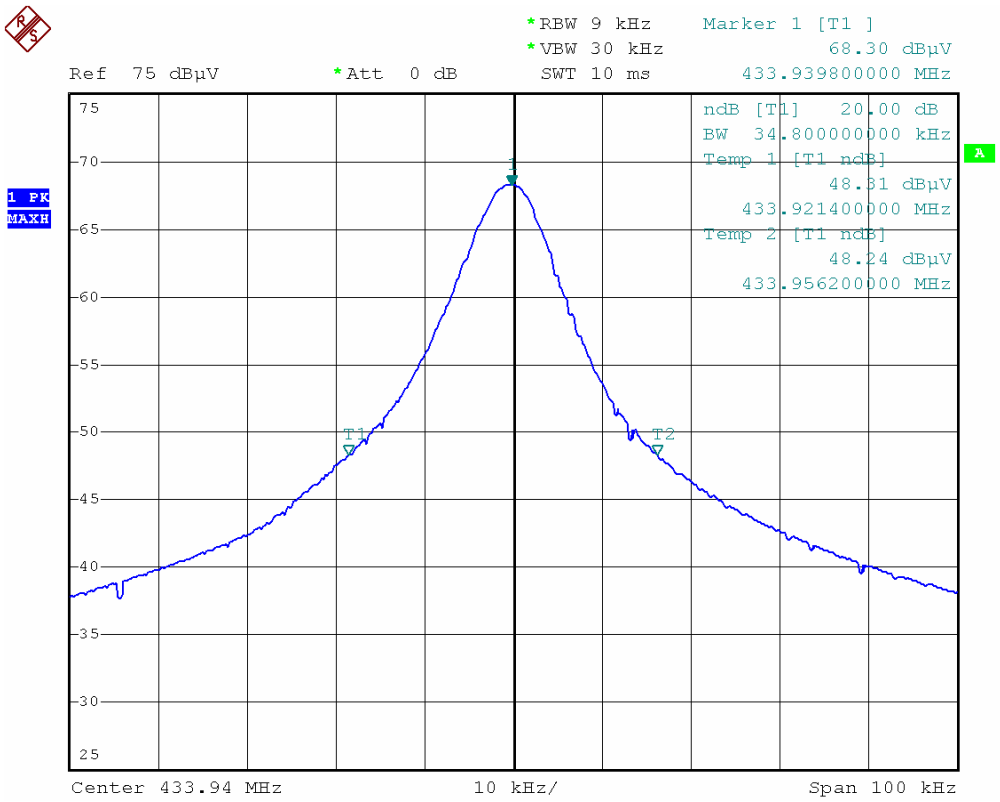
Frequency (MHz)	RBW	20 dB Bandwidth (kHz)	Limit (kHz)	Limit
433.940	9 kHz	34.8	1084.85	Less than 0.25%
	120 kHz	412.0		

NOTES :
1. Measure conducted 20 dB bandwidth of relevant channel using Spectrum Analyzer.
2. 20 dB less than both bandwidth than maximum peak power.

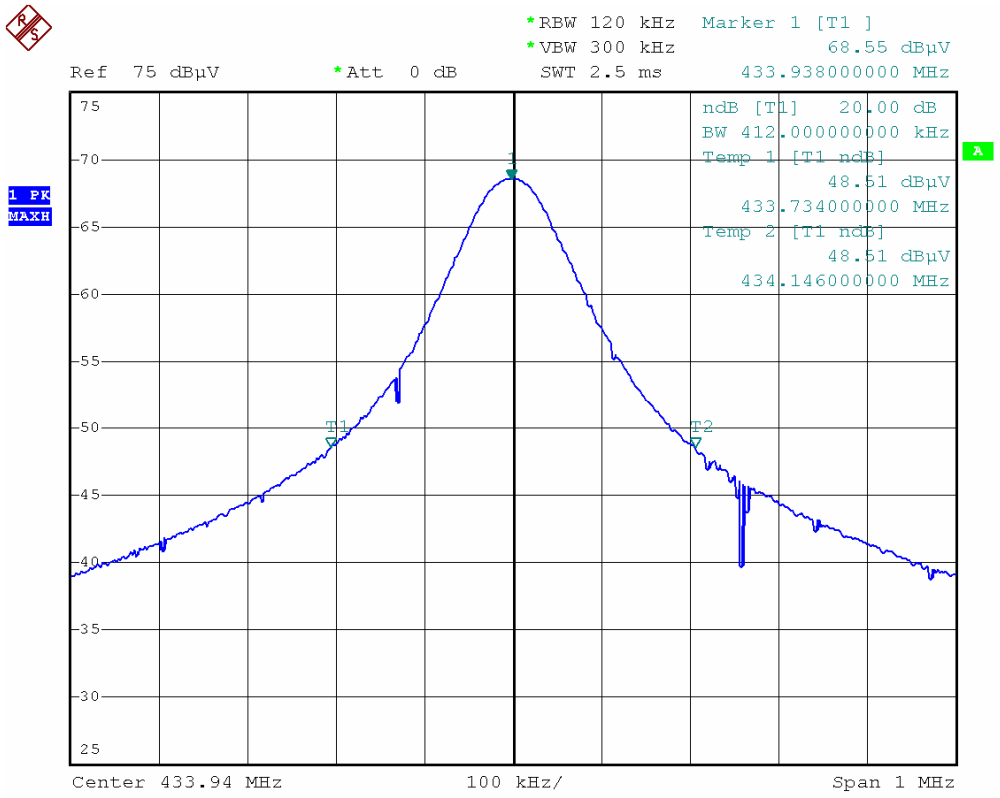
The plot of test result is attached as next page.

Plots of 20 dB Bandwidth

1. 34.8 kHz by 9 kHz of RBW



2. 412.0 kHz by 9 kHz of RBW



7.4 Transmission time

Test Standard : FCC Part15 Subpart C Section 15.231(c)
Test Date : May 23, 2008
Operating Condition : The EUT was operated at transmitting condition normally during the test.
Environment Condition : 22 °C/ 48 %
Result : Passed

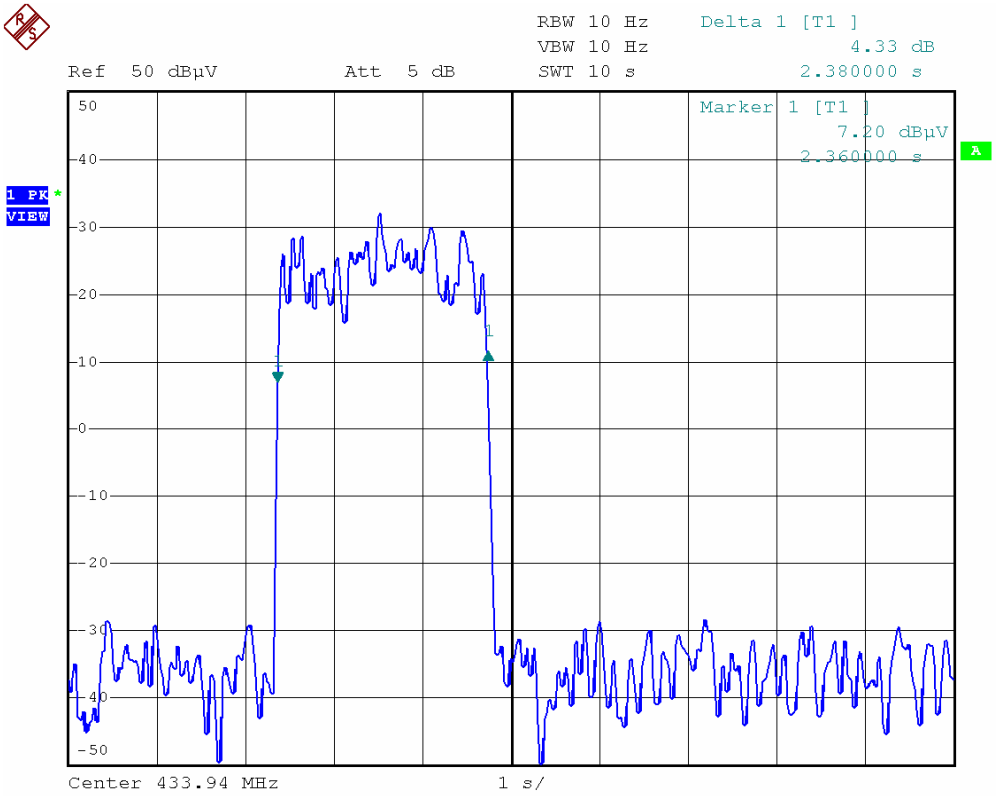
Test Data

Frequency (MHz)	Transmission time (s)	Limit
433.940	2.38	Less than 5s

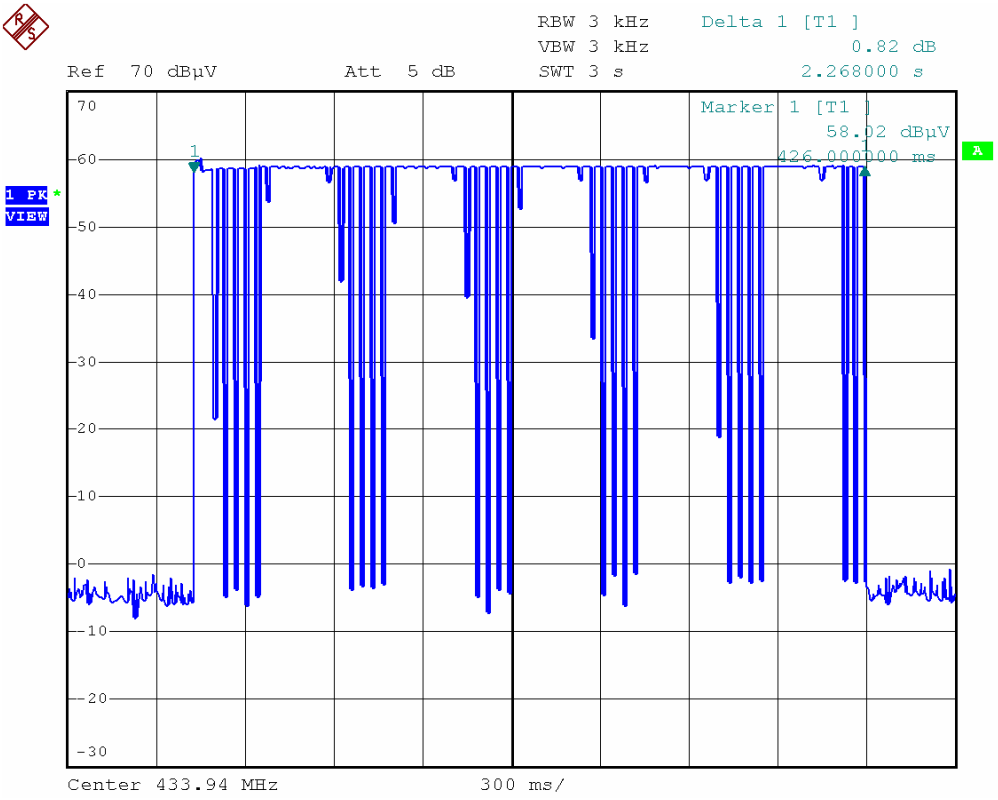
The plot of test result is attached as next page.

Plots of Transmission time

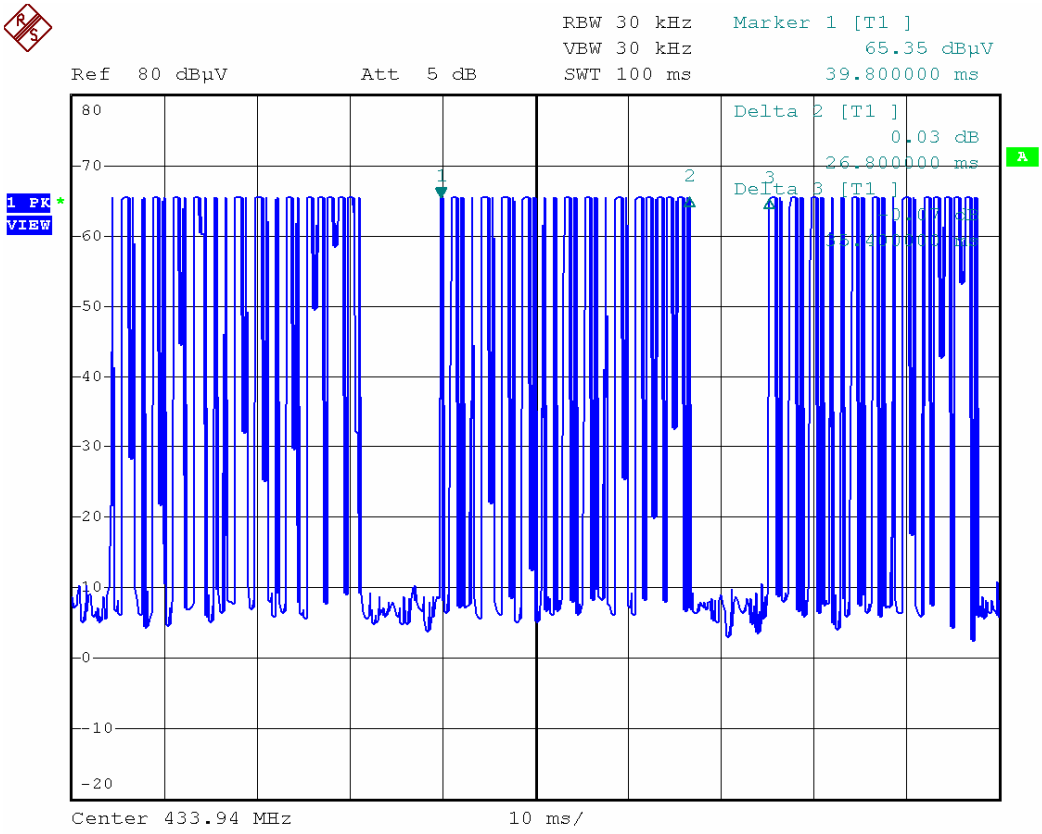
1. Transmission Time / 2.38 s



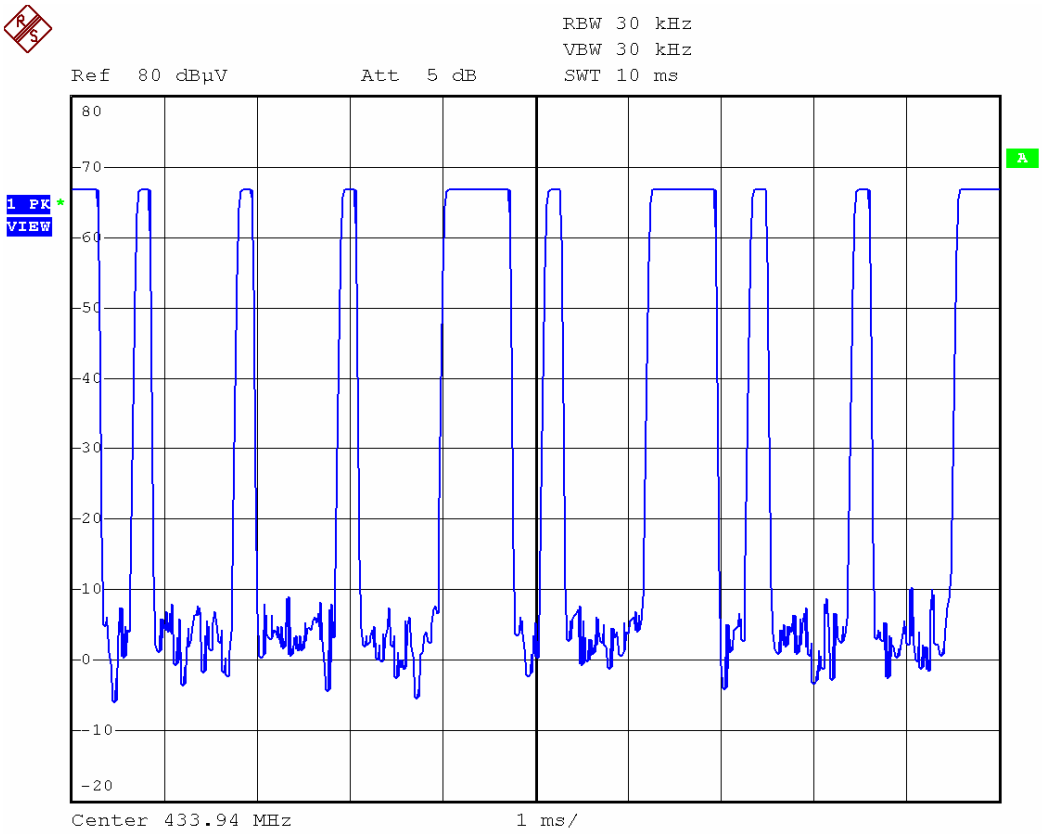
2. Form of signal



3. Contents of signal



4. Contents of pulse



8. TEST EQUIPMENTS LIST

The listing below denotes the test equipments utilized for the test(s).

EQUIPMENT		MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date
1	Receiver	ESVS30	Rohde & Schwarz	832854/010	06/22/08
2	Spectrum analyzer	FSP7	Rohde & Schwarz	100001	02/22/09
3	Signal Generator	E4432B	Agilent	US40053157	07/15/08
5	Signal Generator	GT9000	Gigatronics	9604010	02/22/09
5	Shield Room (7m x 4m x 3m)	N/A	SJEMC	0004	N/A
6	Turn Table	OSC-30	N/A	BWS-01	N/A
7	Antenna Mast	JAC-3	Dail EMC	N/A	N/A
8	Temperature & Humidity chanber	EN-GLMP-54	Enex	N/A	03/21/09
9	Bilog Antenna	VULB9160	Schwarzbeck	VULB9160-3122	12/29/08
10	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4067	12/23/08
11	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4068	12/23/08
12	Horn Antenna	BBHA 9120 D	Schwarzbeck	BBHA 9120 D 517	05/09/08
13	Horn Antenna	BBHA 9120 D	Schwarzbeck	BBHA 9120 D 234	03/15/09
14	Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170157	02/13/09
15	Power Meter	E4418A	Agilent	GB38272621	11/14/08
16	Power Sensor	E9301B	Agilent	US40010238	11/14/08
17	Power Supply	IPS-30B03DD	Interact	42052	03/20/09
18	Power Meter	E4418A	Agilent	GB38272621	11/07/08
19	Power Sensor	E9301B	Agilent	US40010238	11/07/08