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Ke Mei Ou Lab Corp.
FEDERAL COMMUNICATIONS COMMISSION
Registration Number: 125782
INDUSTRY CANADA
Registration Number: IC4986

R&TTE TEST REPORT

Under:
ETSI EN 300 328 V1.7.1 (2006-10)

Prepared For:

Fortat Skymark Electronic Company

Dunbei Industrial Area, Sanlian Village, Longhua Town, Baoan District, Shenzhen

EUT: Bluetooth USB Dongle
Model: CK0039H

November 26, 2009

Report Type: Original Report
Test Engineer: Jacky Huang
Test Date: November 24, 2009
Review By: _____ Apollo Liu / Manager

TABLE OF CONTENTS

1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Site on File with the Federal Communications Commission – United Sates
Registration Number: 963441

Site Listed with Industry Canada of Ottawa, Canada
Registration Number: 7353A

1. 3 Details of Applicant

Name : Fortat Skymark Electronic Company
Address : Dunbei Industrial Area, Sanlian Village, Longhua Town, Baoan District, Shenzhen
Contact : Jane Wang / Sales
Tel : + 86 755 28177638
Fax : + 86 755 28177998

1. 4 Application Details

Date of Receipt of Application : November 19, 2009
Date of Receipt of Test Item : November 24, 2009
Date of Test : November 24~November 26, 2009

1. 5 Test Item

Manufacturer : Same Applicant
Address : Same Applicant
Trade Name : N/A
Model No. : CK0039H
Description : Bluetooth USB Dongle

Additional Information

Frequency : 2400~2483.5MHz
Number of Channels : 79
Power Supply : DC 5V(by Host)
Operation Distance : N/A
Resolution : N/A

Note: Classification according to CEPT/ERC Recommendation 70-03

1. 6 Test Standards

ETSI EN 300 328 V1.7.1 (2006-10) Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2. 1 Summary of Test Results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (only "Passed" if all single measurements are "Passed")	**Passed**

2. 2 Test Report

Test Report Reference

List of Measurements	
Parameter to be Measured	**Clause**
Transmitter Parameters	
Technical requirements	Clause 4.3
Maximum transmit power	Clause 4.3.1
Maximum e.i.r.p. spectral density	Clause 4.3.2
Frequency range	Clause 4.3.3
Frequency hopping requirements	Clause 4.3.4
Medium access protocol	Clause 4.3.5
Transmitter spurious emissions	Clause 4.3.6
Receiver Parameters	
Receiver spurious emissions	Clause 4.3.7

Note: The clause numbers are referenced to ETSI EN 300 328 V1.7.1 (2006-10)

Clause 4.3 Technical Requirements

Clause 4.3.1 Equivalent Isotropically Radiated Power (eirp)

For Transmitter

See clause 5.3 for the test conditions.
The equivalent isotropic radiated power shall be determined and recorded.
The following shall be applied to the combination(s) of the radio device and its intended antenna(e). In the case that the RF power level is user adjustable, all measurements shall be made with the highest power level available to the user for that combination.
The following methods of measurement shall apply.

Radiated measurements

This method shall only be used for integral antenna equipment that does not have a temporary antenna connector provided.
In the case of radiated measurements, using a test site as described in annex B and applicable measurement procedures as described in annex C, the equivalent isotropic radiated power as defined in clause 4.3.1.1 shall be measured and recorded.

Conducted measurements

In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator. The RF power as defined in clause 4.3.1.1 shall be measured and recorded.
The measurement shall be performed using normal operation of the equipment with the test modulation applied.
The test procedure shall be as follows:
step 1:
- using a suitable means, the output of the transmitter shall be coupled to a matched diode detector;
- the output of the diode detector shall be connected to the vertical channel of an oscilloscope;
- the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal;
- the observed duty cycle of the transmitter (Tx on/(Tx on + Tx off)) shall be noted as x, ($0 < x < 1$) and recorded. For the purpose of testing, the equipment shall be operated with a duty cycle that is equal to or more than 0,1.

step 2:
- the average output power of the transmitter shall be determined using a wideband, calibrated RF power meter with a matched thermocouple detector or an equivalent thereof and, where applicable, with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
- the e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:

$P = A + G + 10 \log (1/x)$;

P shall not exceed the value specified in clause 4.3.1.2.
The measurement shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range. These frequencies shall be recorded. FHSS equipment shall be made to hop continuously to each of these three frequencies separately.
These measurements shall be performed at normal and extreme test conditions, see clause 5.3.
The method of measurement shall be documented.
The results obtained shall be compared to the limits in clause 4.3.1.2 in order to prove compliance with the requirement.

Duty Cycle Measurement X: (Ton/Ton+Toff) =	0.43
Antenna Assembly Gain:	2.0 dBi
Cable Loss =	0.6 dB
P=A(Average Power) + G + 10 log (1/X)	

Test Conditions		Transmitter Power (dBm) EIRP					
		Low Freq. (CH Low)		Mid Freq. (CH Mid)		High Freq. (CH High)	
T_{nom}(+25)℃	V_{nom}(230)	Pk	**-19.59**	Pk	**-19.64**	Pk	**-18.89**
		Av	**-25.86**	Av	**-25.91**	Av	**-25.16**
T_{min}(-20)℃	V_{min}(207)	Pk	**-20.16**	Pk	**-20.25**	Pk	**-19.81**
		Av	**-26.43**	Av	**-26.52**	Av	**-26.08**
	V_{max}(253)	Pk	**-19.91**	Pk	**-19.97**	Pk	**-19.59**
		Av	**-26.18**	Av	**-26.24**	Av	**-25.86**
T_{max}(+55)℃	V_{min}(207)	Pk	**-20.62**	Pk	**-20.68**	Pk	**-20.05**
		Av	**-26.89**	Av	**-26.95**	Av	**-26.32**
	V_{max}(253)	Pk	**-20.07**	Pk	**-20.19**	Pk	**-19.86**
		Av	**-26.34**	Av	**-26.46**	Av	**-26.13**
Limit		**Average Limit = 20 dBm**					

Note:
(1) The EUT is a internal power source radio device (see the clause 5.3 of EN 300 328). The EUT is powered by the PC. So, the normal test voltage shall be that declared by the equipment applicant. (see clause 5.3.4.2.3 of EN 300 328).
(2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits: EN 300 328 Clause 4.3.1.2

The equivalent isotropic radiated power shall be equal to or less than -10 dBW (100 mW) e.i.r.p. This limit shall apply for any combination of power level and intended antenna assembly.

Clause 4.3.2 Maximum Spectral Power Density

For Transmitter

See ETSI EN 300328 clause 5.3 for the test conditions and clause 5.7.3 for the measurement method.

Duty Cycle Measurement X: (Ton/Ton+Toff) =	0.43
Antenna Assembly Gain:	2.0 dBi
Cable Loss =	0.6 dB
P=A(Average Power) + G + 10 log (1/X)	

Test Conditions	Peak Power Density Measurement		
	(CH Low) dBm/100kHz	(CH Mid) dBm/100kHz	(CH High) dBm/100kHz
Measure Power Density Reading(A)	-	-	-
10LOG(1/x)(B)	-		
Antenna Gain(C)	-		
Cable Loss(D)	-		
Measurement Power Density Result (A+B+C+D)	-	-	-
Limit	**20 dBm/100kHz**		

Note:
(1) The EUT is a internal power source radio device (see the clause 5.3 of EN 300 328). The EUT is powered by the PC. So, the normal test voltage shall be that declared by the equipment applicant. (see clause 5.3.4.2.3 of EN 300 328).
(2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits: EN 300 328 Clause 4.3.2.2

For wide band modulations other then FHSS (e.g. DSSS, OFDM, etc.), the maximum spectrum power density is limited to 10 mW per MHz e.i.r.p.

Note: Not applicable, The device is FHSS modulation.

Clause 4.3.3 Frequency Range

For Transmitter

See ETSI EN 300328 clause 5.3 for the test conditions and clause 5.7.4 for the measurement method.

Test Conditions		Frequency (MHz) at which –30 dBm occurs	
		Low Frequency (f_L)	High Frequency (f_H)
T_{nom}(+25)℃	V_{nom}(230.0)	2400.240	2482.220
T_{nom}(-20)℃	V_{min}(230.0)	2400.270	2482.280
T_{nom}(+55)℃	V_{min}(230.0)	2400.340	2482.450

Note:
(1) The EUT is a internal power source radio device (see the clause 5.3 of EN 300 328). The EUT is powered by the PC. So, the normal test voltage shall be that declared by the equipment applicant. (see clause 5.3.4.2.3 of EN 300 328).
(2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits EN 300 328 Clause 4.3.3.2

Under Normal Test Conditions	f_L > 2400 MHz	f_H< 2483.5 MHz

For all equipment the frequency range shall lie within the band 2,4 GHz to 2,4835 GHz (fL > 2,4 GHz and fH < 2,4835 GHz).

Clause 4.3.4 Transmitter Spurious Emissions
(Radiated)

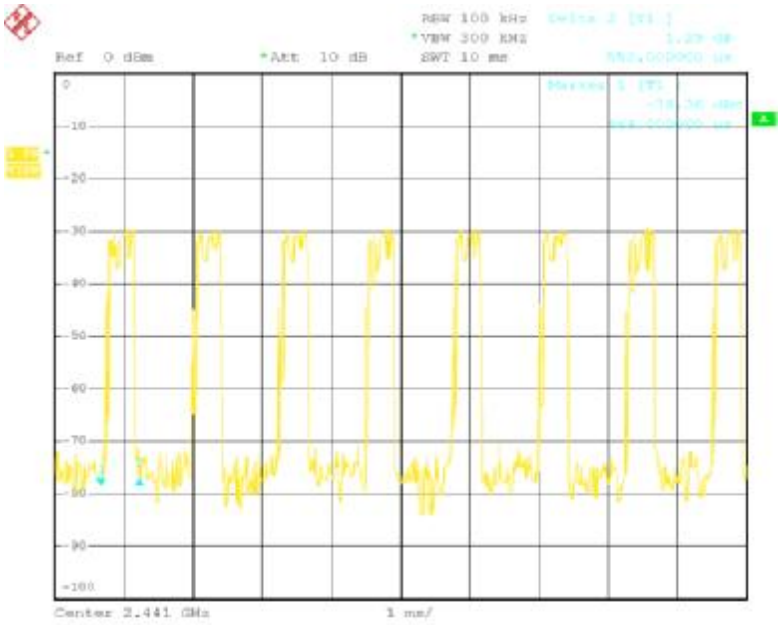
See ETSI EN 300328 clause 5.3 for the test conditions and clause 5.7.5 for the measurement method.

Product	: Bluetooth USB Dongle	Test Mode	: CH Low~CH High
Test Item	: Spurious Emissions Data	Temperature	: 25 ℃
Test Voltage	: DC 5V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

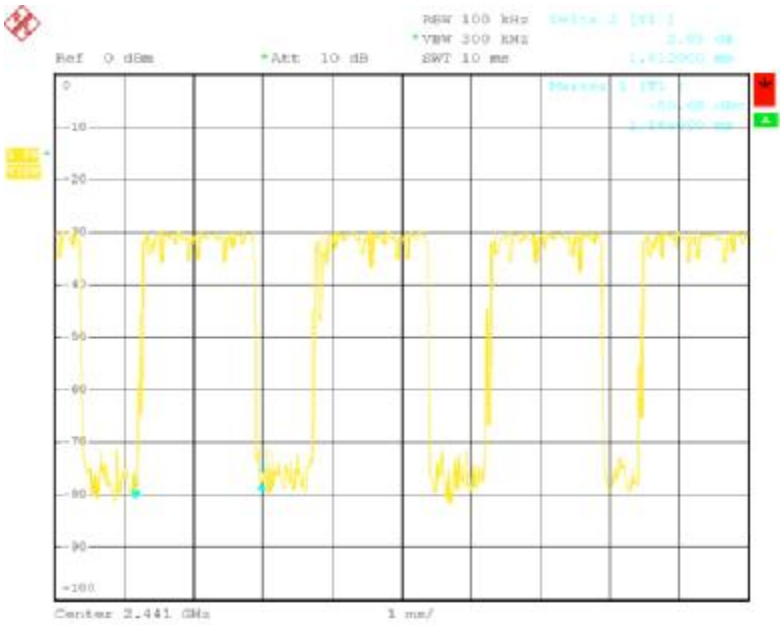
Channel	Channel Frequency(MHz)	Dwell Time (ms)	Time of occupancy on the Tx channel in 31.6sec	Average time of occupancy Limit(ms)
DH1	2441	0.552	176.64	400
DH3	2441	1.812	289.92	400
DH5	2441	3.100	330.67	400

DH1 Dwell time = 0.552 ms x (1600/2)/79 x 31.6 = 176.64(ms)
DH3 Dwell time = 1.812 ms x (1600/4)/79 x 31.6 = 289.92(ms)
DH3 Dwell time = 3.100 ms x (1600/6)/79 x 31.6 = 330.67(ms)

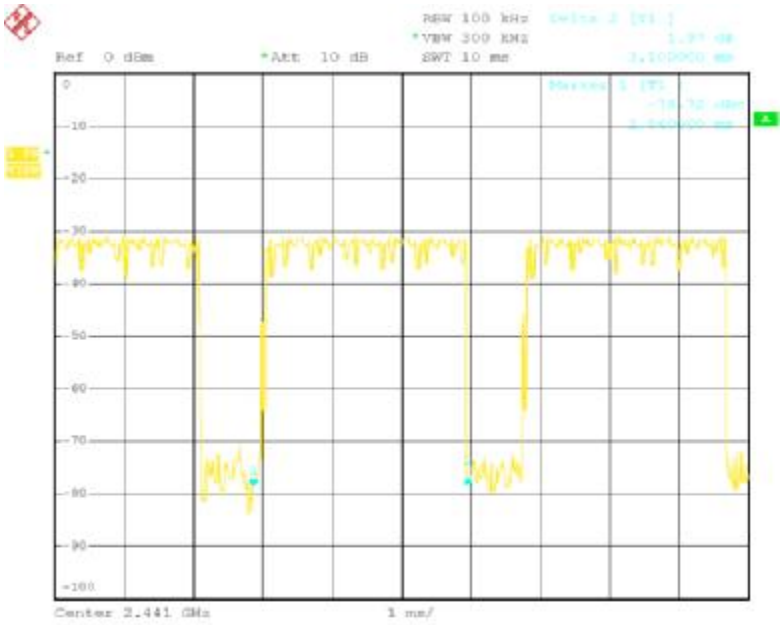
DH1



DH3



DH5



Limits: EN 300 328 Clause 4.3.4.1.2
The maximum dwell time shall be 0.4 s.

Clause 4.3.4.2 Hopping Channel

For Transmitter

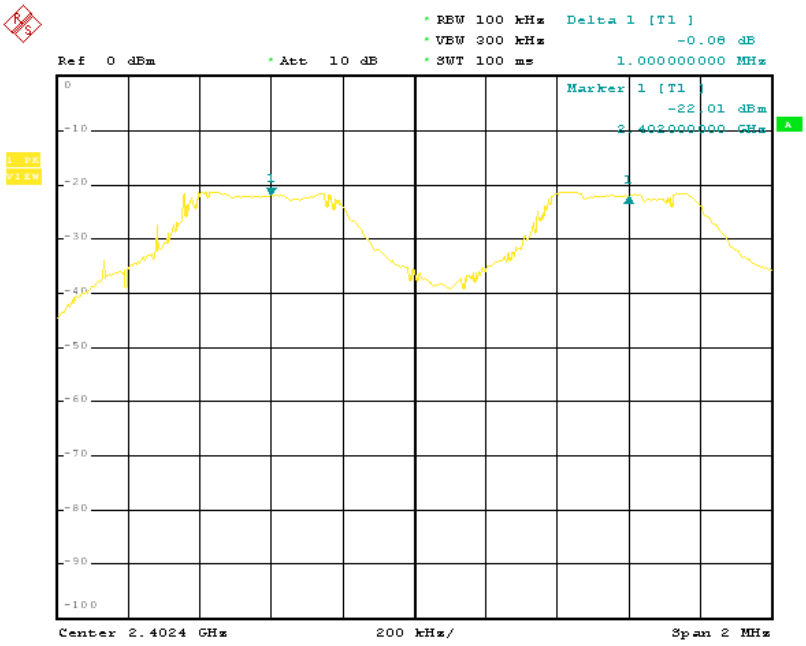
See ETSI EN 300328 clause 5.3 for the test conditions

Frequency Separation

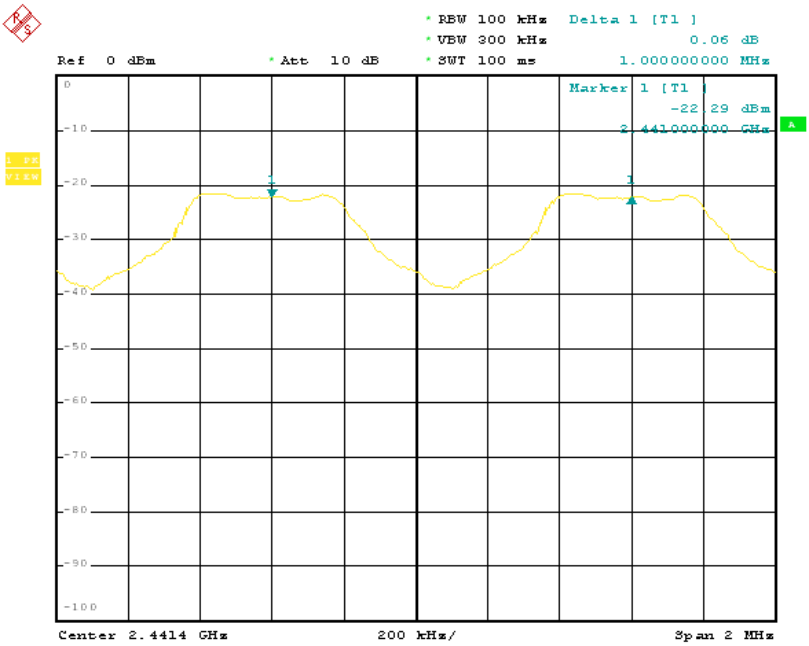
Product	: Bluetooth USB Dongle	Test Mode	: CH Low ~ CH High
Test Item	: Frequency Separation	Temperature	: 25 ℃
Test Voltage	: DC 5V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Channel	Channel Frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
Low	2402	1000	>25kHz
Mid	2441	1000	>25kHz
High	2480	1000	>25kHz

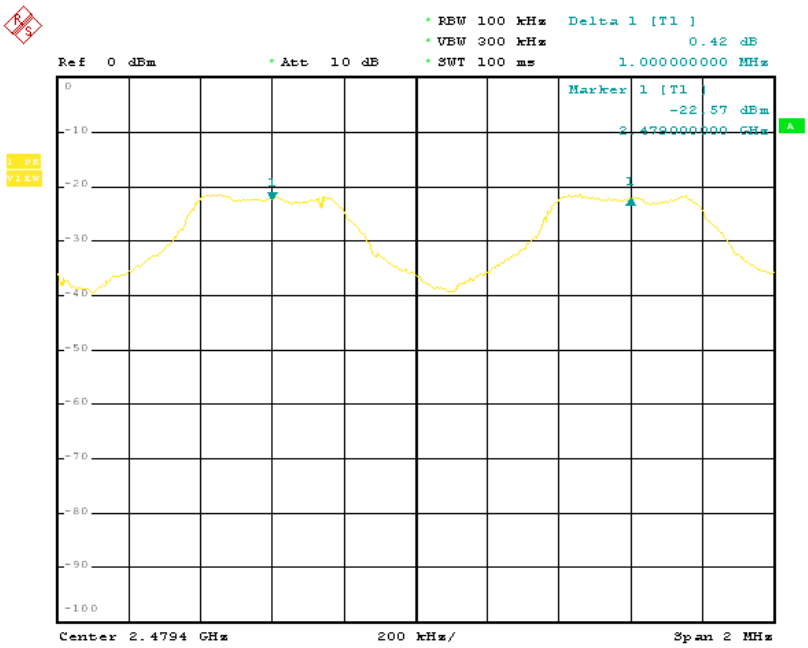
Channel: Low



Channel: Mid



Channel: High



Limits: EN 300 328 Clause 4.3.4.2.2

Non-adaptive Frequency Hopping systems shall make use of non-overlapping hopping channels separated by the channel bandwidth as measured at 20 dB below peak power.

The hopping channels defined within a hopping sequence shall be at least 1 MHz apart (channel separation).

Clause 4.3.4.2 Hopping Sequence

For Transmitter

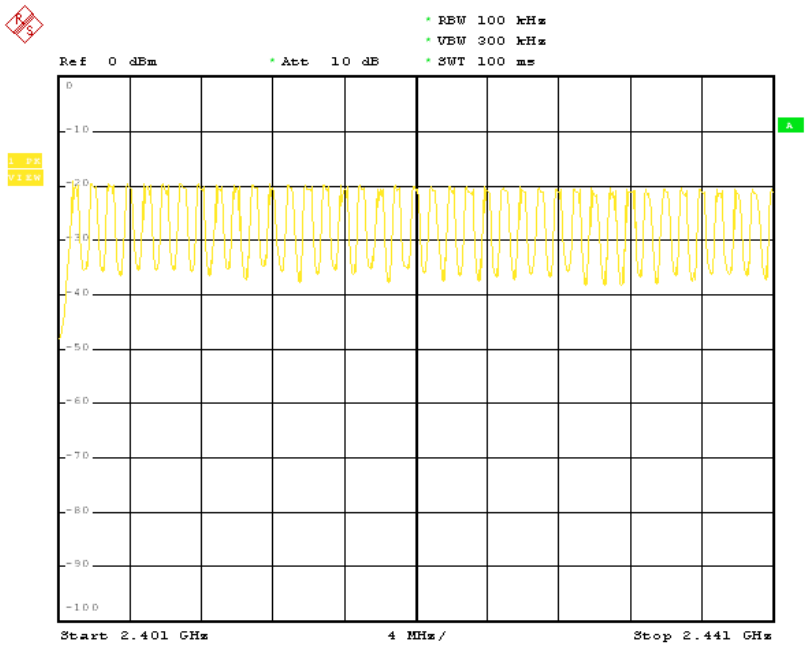
See ETSI EN 300328 clause 5.3 for the test conditions

Number of Hopping Frequency

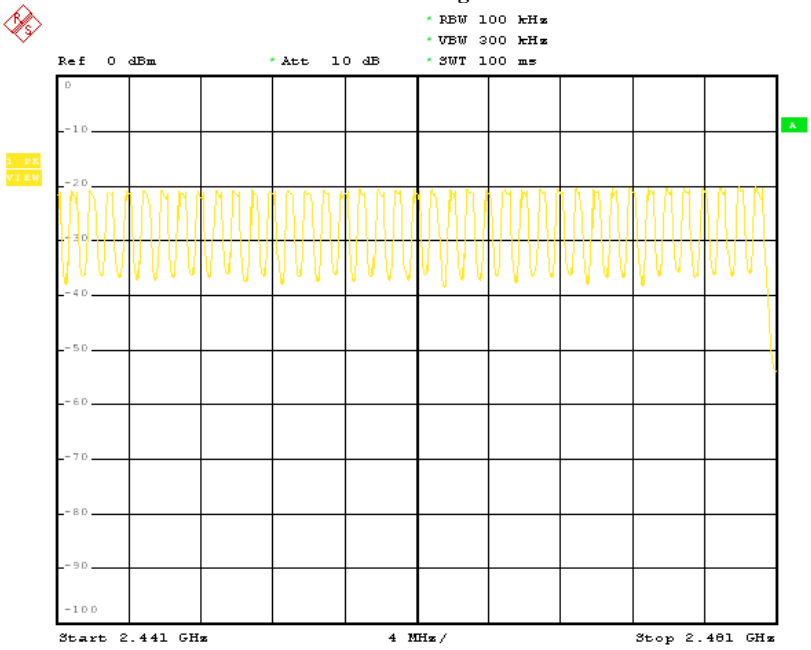
Product	: Bluetooth USB Dongle	Test Mode	: CH Low ~ CH High
Test Item	: Number of Hopping Frequency	Temperature	: 25 ℃
Test Voltage	: DC 5V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Hopping Channel Frequency Ranger	Quantity Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	20

Channel: Low



Channel: High



Limits: EN 300 328 Clause 4.3.4.3.2
Non-adaptive Frequency Hopping systems shall make use of a hopping sequence(s) that contains at least 15 hopping channels.
Adaptive Frequency Hopping systems shall make use of a hopping sequence(s) that is capable of operating over a minimum of 90 % of the band specified in table 1, from which at any given time a minimum of 20 hopping channels shall be used.
Each hopping channel of the hopping sequence shall be occupied at least once during a period not exceeding four times the product of the dwell time per hop and the number of channels.

Clause 4.3.5 Medium Access Protocol

For Transmitter
See ETSI EN 300328 clause 5.3 for the test conditions

The medium access protocol shall be implemented by the equipment.

Clause 4.3.6 Transmitter Spurious Emissions

(Radiated)
See ETSI EN 300328 clause 5.3 for the test conditions and clause 5.7.3 for the measurement method.

Product	: Bluetooth USB Dongle	Test Mode	: Transmitter Operating / Standby
Test Item	: Spurious Emissions Data	Temperature	: 25 ℃
Test Voltage	: DC 5V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Note:
1. Measurements were done on low & high channels, the worst case are submitted in the report.
2. The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges.

Transmitter Operating

Lowest Frequency			Highest Frequency		
f (MHz)	**Band – Width (kHz)**	**Level (dBm)**	**f (MHz)**	**Band – Width (kHz)**	**Level (dBm)**
139.680	120	-65.94	184.480	120	-67.74
384.040	120	-68.55	570.040	120	-69.53
4804.000	1000	NF	4960.000	1000	NF
7206.000	1000	NF	7440.000	1000	NF
					-
Measurement Uncertainly		± 6 dB			

Note: NF = No Significant Peak was Found.

Transmitter Standby

Lowest Frequency			Highest Frequency		
f (MHz)	**Band – Width (kHz)**	**Level (dBm)**	**f (MHz)**	**Band – Width (kHz)**	**Level (dBm)**
4804.000	1000	NF	4960.000	1000	NF
7206.000	1000	NF	7440.000	1000	NF
Measurement Uncertainly		± 6 dB			

Note: NF = No Significant Peak was Found.

Limits EN 300 328, Clause 4.3.4.2

Frequency Range	Narrowband Spurious Emissions		Wideband Spurious Emissions	
	Limit When Operating	Limit When In Standby	Limit When Operating	Limit When In Standby
30 MHz ~ 1 GHz	-36 dBm	-57 dBm	-86 dBm/Hz	-107 dBm/Hz
Above 1 Ghz ~ 12.75 GHz	-30 dBm	-47 dBm	-80 dBm/Hz	-97 dBm/Hz
1.8 GHz ~ 1.9 GHz 5.15 GHz ~ 5.3 GHz	-47 dBm	-47 dBm	-97 dBm/Hz	-97 dBm/Hz

The spurious emissions of the transmitter shall not exceed the values in above table in the indicated bands.
The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to achieve a reliable measurement result.

Clause 4.3.7 Receiver Spurious Emissions
(Radiated)

Product	: Bluetooth USB Dongle	Test Mode	: Receiver
Test Item	: Spurious Emissions	Temperature	: 25 ℃
Test Voltage	: DC 5V (Power by battery)	Humidity	: 56%RH
Test Result	: **PASS**		

Note:
1. Measurements were done on low & high channels, the worst case are submitted in the test report.
2. The receiver spurious emissions were done with different settings, using the relevant and pre-amplifiers for the relevant frequency ranges.

Lowest Frequency			Highest Frequency		
f (MHz)	Band – Width (kHz)	Level (dBm)	f (MHz)	Band – Width (kHz)	Level (dBm)
48.520	120	-69.58	52.960	120	-70.42
156.840	120	-70.16	275.320	120	-70.25
1206.300	1000	NF	1242.610	1000	NF
1206.300	1000	NF	1242.610	1000	NF
2392.500	1000	NF	2478.230	1000	NF
2392.500	1000	NF	2478.230	1000	NF
Measurement Uncertainly		± 6 dB			

Note: NF = No Significant Peak was Found.
Note: All reading are peak; Scan form 25MHz to 26.5GHz, find the maximum radiation frequency to measure.

Limits EN 300 328, Clause 4.3.5.2

Frequency Range	Narrowband Spurious Emissions	Wideband Spurious Emissions
30 MHz ~ 1 GHz	-57 dBm	-107 dBm/Hz
Above 1 Ghz ~ 12.75 GHz	-47 dBm	-97 dBm/Hz

The spurious emissions of the receiver shall not exceed the values in tables 4 and 5 in the indicated bands.
The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to get a reliable measurement result.

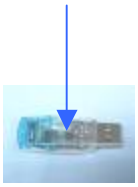
3. CE Label

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

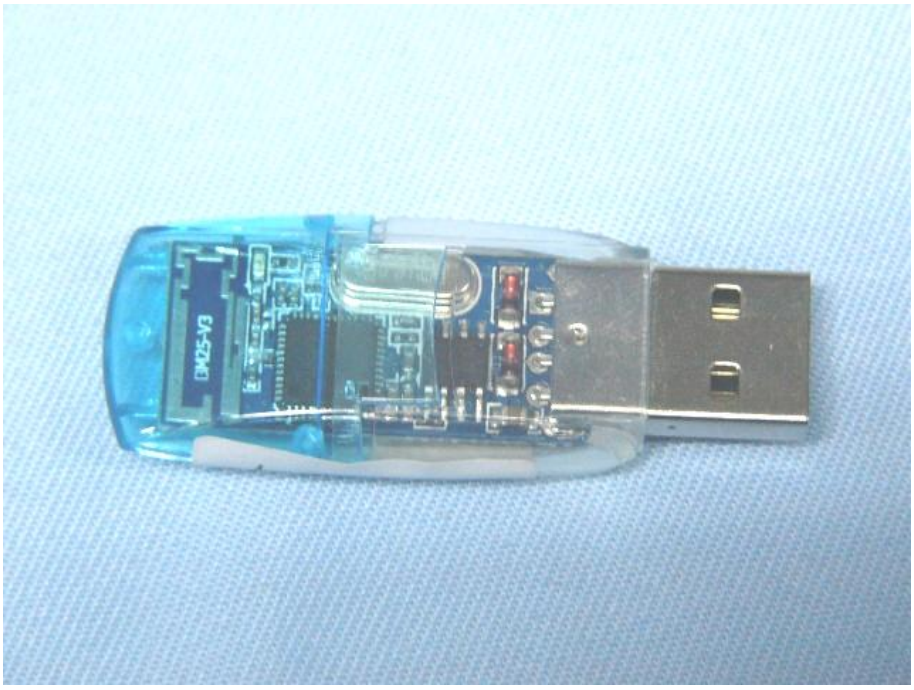
EUT Bottom View/Proposed CE Label Location



4. Photographs - Test Setup

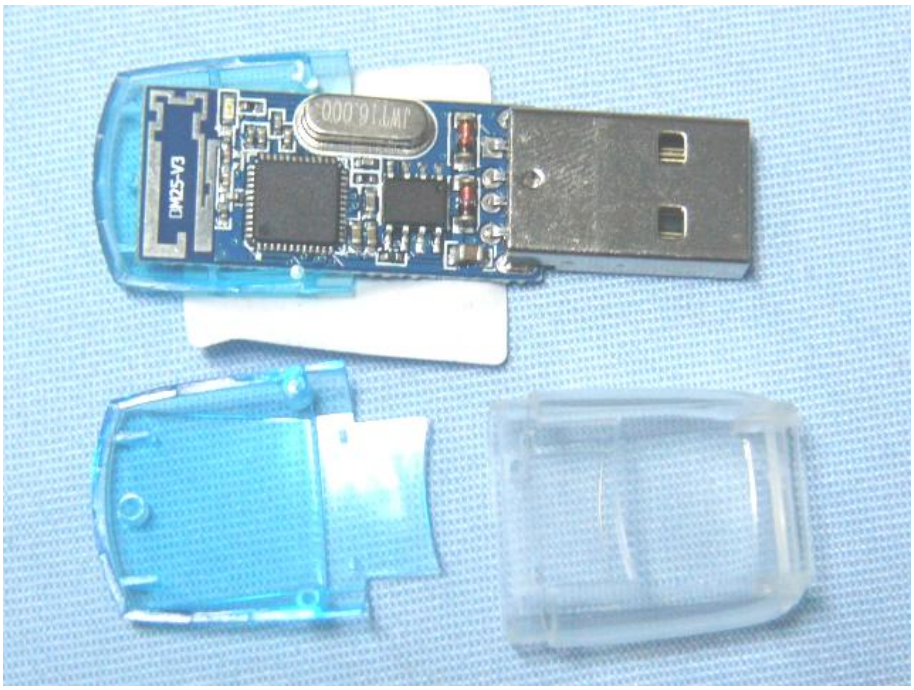
5. Photographs - EUT

EUT top view

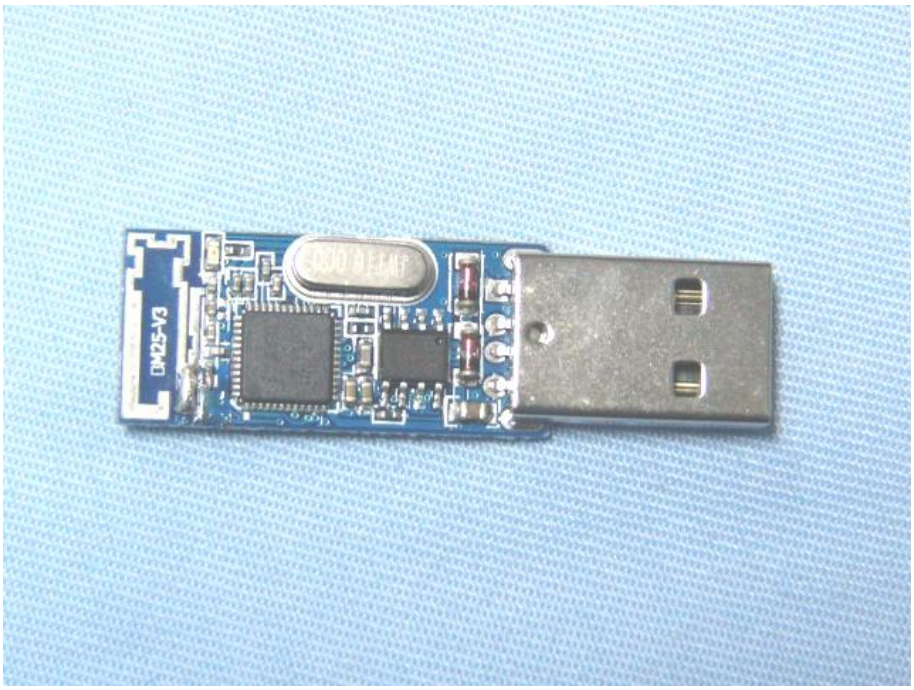


EUT bottom view

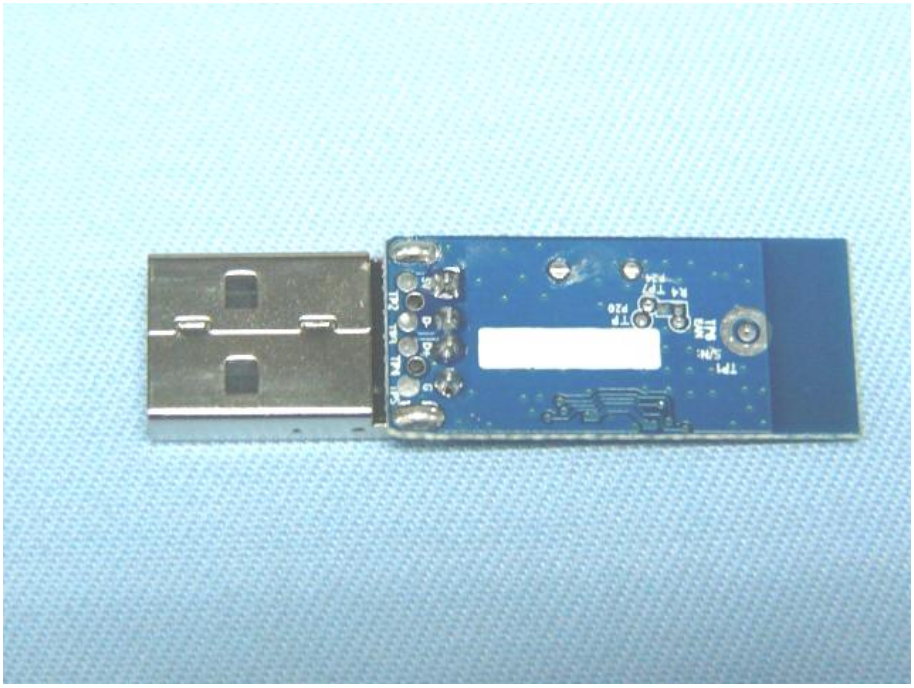
EUT inside whole view



Main & RF board component side



Main & RF board solder side



6. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	KMO	KSZ001T	200306	NCR
Antenna Tower	KMO	KSZ002AT	200307	NCR
OATS	KMO	KSZSITE001	N/A	May 29, 2010
EMI Test Receiver	Rohde & Schwarz	ESPI7	100013	July 09, 2010
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.18, 2010
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb.10, 2010
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.10, 2010
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan. 30, 2010
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2010
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2010
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2010
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2010
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2010
Ultra Broadband Antenna	Rohde & Schwarz	HL 562	100110	June.05, 2010
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23, 2010
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23, 2010
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29,2010
KMO Shielded Room	KMO	KMO-001	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2010
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.10, 2010
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.10, 2010
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.10, 2010
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb.10, 2010
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2010