R&TTE (Radio) TEST REPORT
for
Gembird Europe B.V.

Bluetooth keyboard
Model No.: DR-TA-KBT97-001, TA-KBT97-001, ACT-TA-KBT97-001

Prepared for	:	Gembird Europe B.V.
Address	:	Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	201403687T-1
Date of Test	:	Mar. 17~ Apr. 01, 2014
Date of Report	:	Apr. 02, 2014

TABLE OF CONTENT

Description

Page

Test Report

1. GENERAL INFORMATION....4
1.1. Description of Device (EUT)....4
1.2. Description of Test Facility....5
1.3. Measurement Uncertainty....5
1.4. Test Standards....5
2. TECHNICAL TEST....6
2.1. Summary of Test Results....6
2.2. Test Report....6
3.3. TECHNICAL REQUIREMENTS....7
3.3.1. MAXIMUM TRANSMIT POWER....7
3.3.2. MAXIMUM SPECTRAL POWER DENSITY....10
3.3.3. FREQUENCY RANGE....11
3.3.4. FREQUENCY HOPPING REQUIREMENTS....12
3.3.4.1. DWELL TIME....12
3.3.4.2. HOPPING CHANNEL....15
3.3.4.3. HOPPING SEQUENCE....19
3.3.5. MEDIUM ACCESS PROTOCOL....21
3.3.6. TRANSMITTER SPURIOUS EMISSIONS....22
3.3.7. RECEIVER SPURIOUS EMISSIONS....24
4. PHOTOGRAPH....26
4.1. Photo of Emission Test....26

APPENDIX I (Test Photographs) (1 Page)

TEST REPORT

Applicant	:	Gembird Europe B.V.
Manufacturer	:	Gembird Europe B.V.
EUT	:	Bluetooth keyboard
Model No.	:	DR-TA-KBT97-001, TA-KBT97-001, ACT-TA-KBT97-001
Serial No.	:	N.A.
Trade Mark	:	Maxxter, Gembird or N.A.
Rating	:	DC 3.7V-5V, <5mA

Measurement Procedure Used:
ETSI EN 300 328 V1.8.1 (2012-06)

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 300 328 requirements.
This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Mar. 17~ Apr. 01, 2014

Prepared by : Rock Zeng
(Engineer / Rock Zeng)

Reviewer : Amy Ding
(Project Manager/Amy Ding)

Approved & Authorized Signer : Tom Chen
(Manager/Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Bluetooth keyboard
Model No.	:	DR-TA-KBT97-001, TA-KBT97-001, ACT-TA-KBT97-001 (Note: All samples are the same except the model number and appearance, so we prepare "DR-TA-KBT97-001" for EMC test only.)
Test Power Supply	:	DC 3.7V
Frequency	:	2402 ~ 2480MHz
Antenna Gain	:	0 dBi
Applicant	:	Gembird Europe B.V.
Address	:	Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands
Manufacturer	:	Gembird Europe B.V.
Address	:	Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands
Factory	:	Gembird Europe B.V.
Address	:	Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands
Date of receiver	:	Mar. 17, 2014
Date of Test	:	Mar. 17~ Apr. 01, 2014

1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503
Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021
Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

IC-Registration No.: 8058A-1
Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, February. 22, 2013.

Test Location
All Emissions tests were performed at
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.3. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

1.4. Test Standards

ETSI EN 300 328 V1.8.1 (2012-06) Electromagnetic compatibility and Radio spectrum Matters (ERM); wideband transmission systems; Data transmission equipment operating in the 2,4GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

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		
Description of Test	Rule	Result
Maximum transmit power	Section 4.3.1	Complies
Maximum e.i.r.p spectral density	Section 4.3.2	N/A
Frequency range	Section 4.3.3	Complies
Dwell time	Section 4.3.4.1	Complies
Hopping channel	Section 4.3.4.2	Complies
Hopping sequence	Section 4.3.4.3	Complies
Medium access protocol	Section 4.3.5	Complies
Transmitter spurious emissions	Section 4.3.6	Complies
Receiver spurious emissions	Section 4.3.7	Complies

Note: The clause numbers are referenced to ETSI EN 300 328 V1.8.1 (2012-06)
N/A means Not Applicable.

3.3. Technical Requirements

3.3.1. Maximum Transmit Power

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

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 (Rx on/(Rx on + Rx 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 + C+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) =	1
Antenna Assembly Gain:	0 dBi
Cable Loss=	0.6 dB
P=A(Average Power)+C + G + 10 log (1/x)	

Test Conditions			Low Freq. (2402MHz)	Mid Freq. (2441MHz)	High Freq. (2480MHz)
Tmin(-10)℃	Vmin(3.33V)	Measured Power	4.19	3.95	3.57
		EIRP	4.79	4.55	4.17
	Vmax(4.07V)	Measured Power	4.17	3.98	3.62
		EIRP	4.77	4.58	4.22
Tnom(+25)℃	Vnom(3.7V)	Measured Power	4.22	3.96	3.63
		EIRP	**4.82**	4.56	4.23
Tmax(+55)℃	Vmin(3.33V)	Measured Power	4.16	3.94	3.55
		EIRP	4.76	4.54	4.15
	Vmax(4.07V)	Measured Power	4.14	3.93	3.53
		EIRP	4.74	4.53	4.13
Limit		Average Limit = 20 dBm			

Note:
(1) 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 20 dBm (100 mW) e.i.r.p. This limit shall apply for any combination of power level and intended antenna assembly.

3.3.2. Maximum Spectral Power Density

For Transmitter
See ETSI EN 300 328 clause 5.3 for the test conditions and clause 5.7.3 for the measurement method.

Duty Cycle Measurement X: (Ton/Ton+Toff) =	1
Antenna Assembly Gain:	0 dBi
Cable Loss=	0.6 dB
P=A(Average Power) +C+ 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 clause5.3 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.

3.3.3. Frequency range

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

For Transmitter

See ETST EN 300 328 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)
Tmin(-10)℃	Vnom(3.7V)	2401.880	2481.650
Tnom(+25)℃	Vnom(3.7V)	2401.760	2481.530
Tmax(+55)℃	Vnom(3.7V)	2401.810	2481.590

Note:
(1) The EUT is a internal power source radio device (See the clause5.3 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 > 2400 MHz and FH < 2483.5 MHz).

Passed.

3.3.4. Frequency Hopping Requirements

3.3.4.1. Dwell time

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

Limits EN 300 328 Clause 4.3.4.1.2

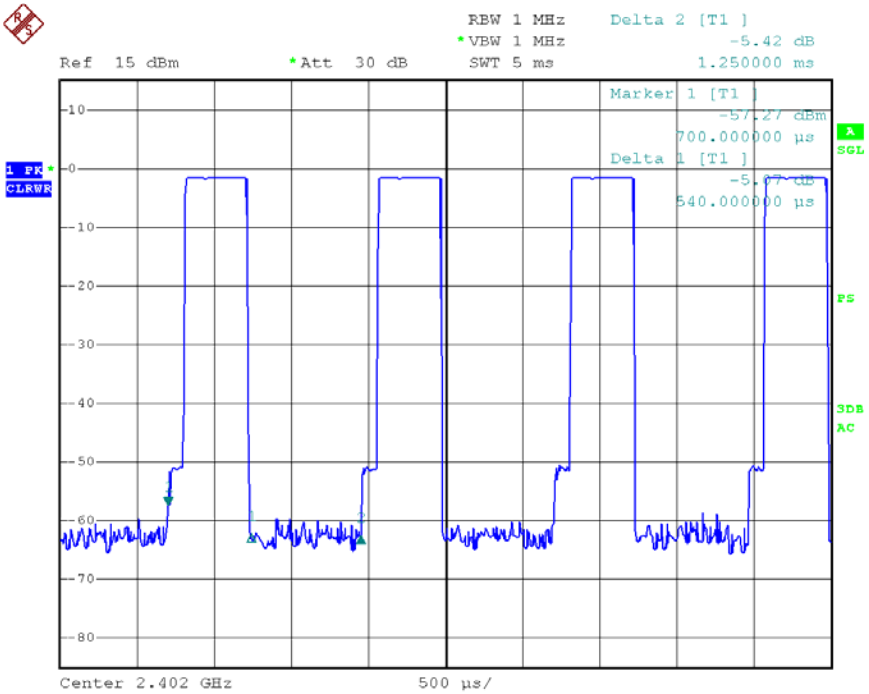
The dwell time is the time spent at a particular frequency during any single hop. According to ETSI EN 300 328 V1.8.1 section 4.3.4.1.2 ,the maximum dwell time shall be 0.4S.

Test Item	:	Time of Occupancy	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

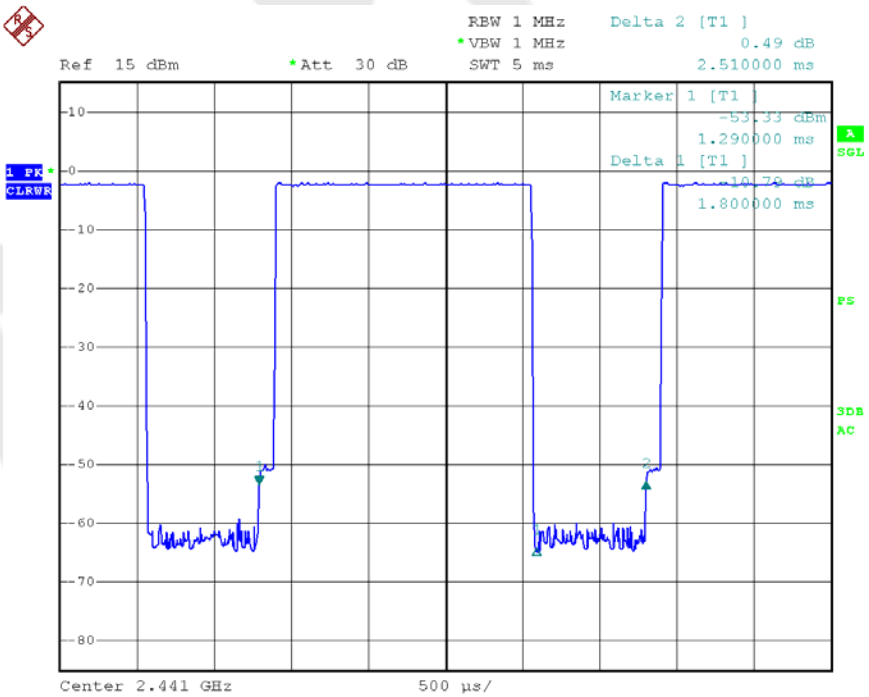
Channel	***Pulse width (ms)***	**Time slot length(ms)**	**Dwell time (ms)**	**Limit (ms)**
Low Channel	0.540	time slot length *1600/2 /79 * 31.6	172.79	400
Mid Channel	1.800	time slot length *1600/4 /79 * 31.6	287.79	400
High Channel	3.040	time slot length *1600/6 /79 * 31.6	324.27	400

Passed.

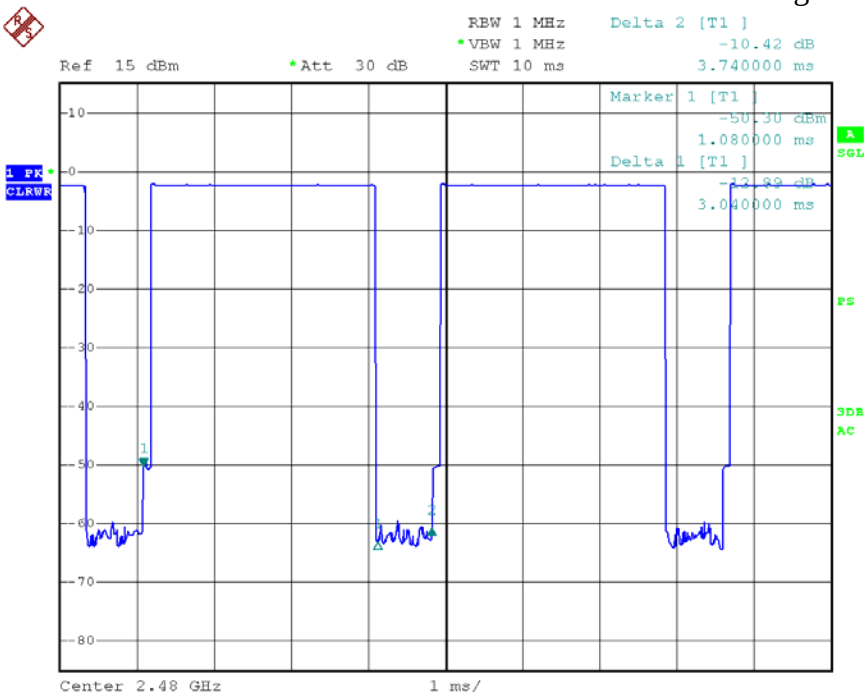
Low Channel



Mid Channel



High Channel



3.3.4.2. Hopping channel

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

Limits EN 300 328 Clause 4.3.4.2.2

A hopping channel is any of the centre frequencies defined within the hopping sequence of a FHSS system.

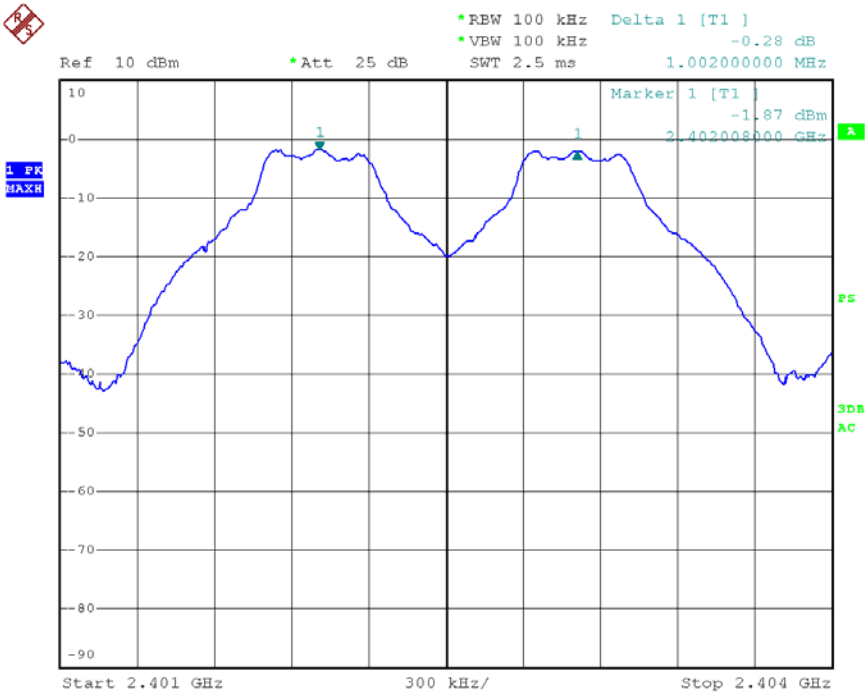
Non-adaptive Frequency Hopping systems shall make use of non-overlapping hopping channels separated by the channel bandwidth as measured at 20 dB below peak power.

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

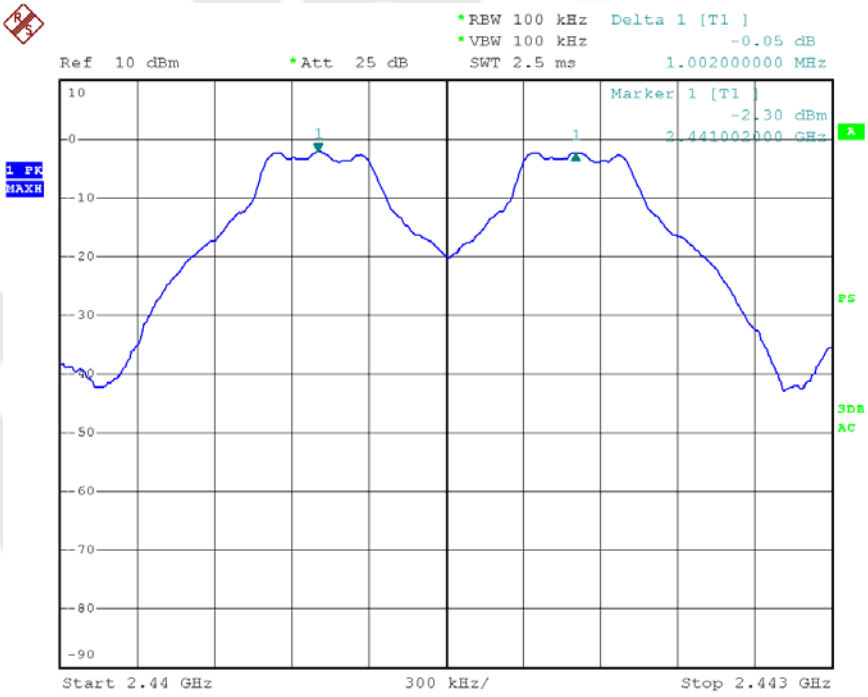
Test Item	:	Frequency Separation	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Channel	Frequency (MHz)	Separation Read Value (kHz)
Low	2401	1002
Mid	2441	1002
High	2480	1002

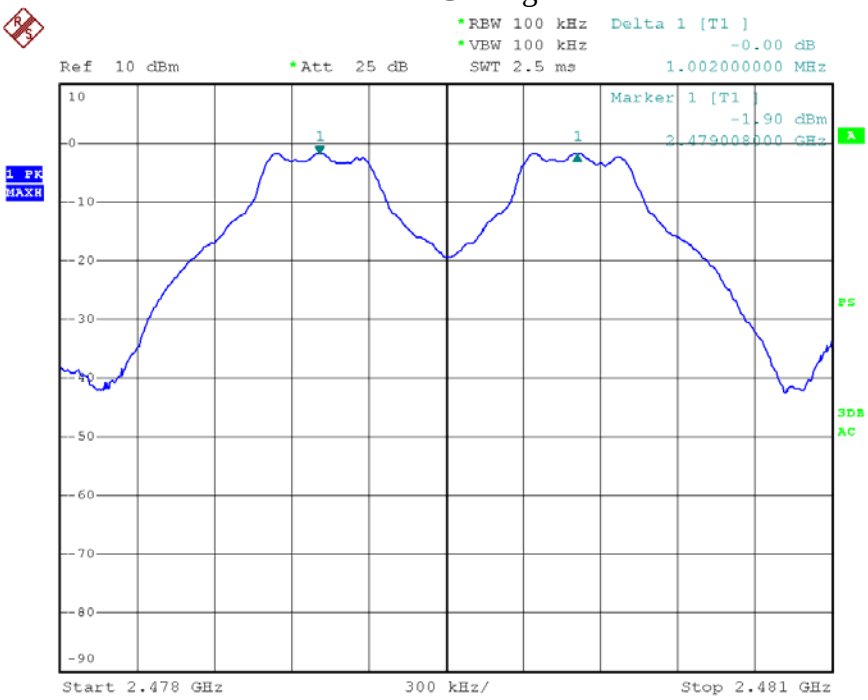
CH Low


RBW 100 kHz
VBW 100 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.28 dB
1.002000000 MHz
Ref 10 dBm
Att 25 dB
Marker 1 [T1]
-1.87 dBm
2.402008000 GHz
1 PK MAXH
Start 2.401 GHz
300 kHz/
Stop 2.404 GHz

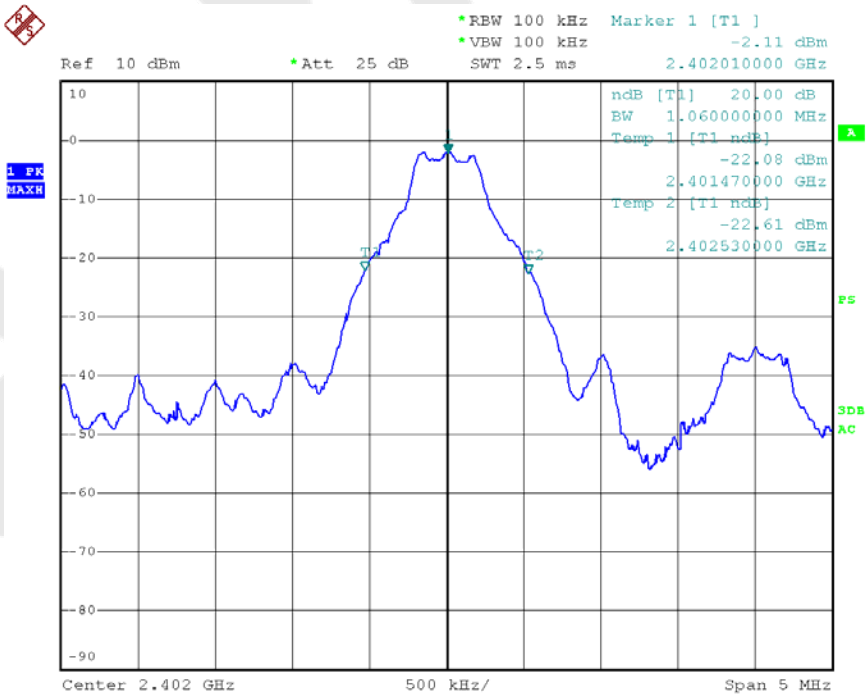
CH Mid

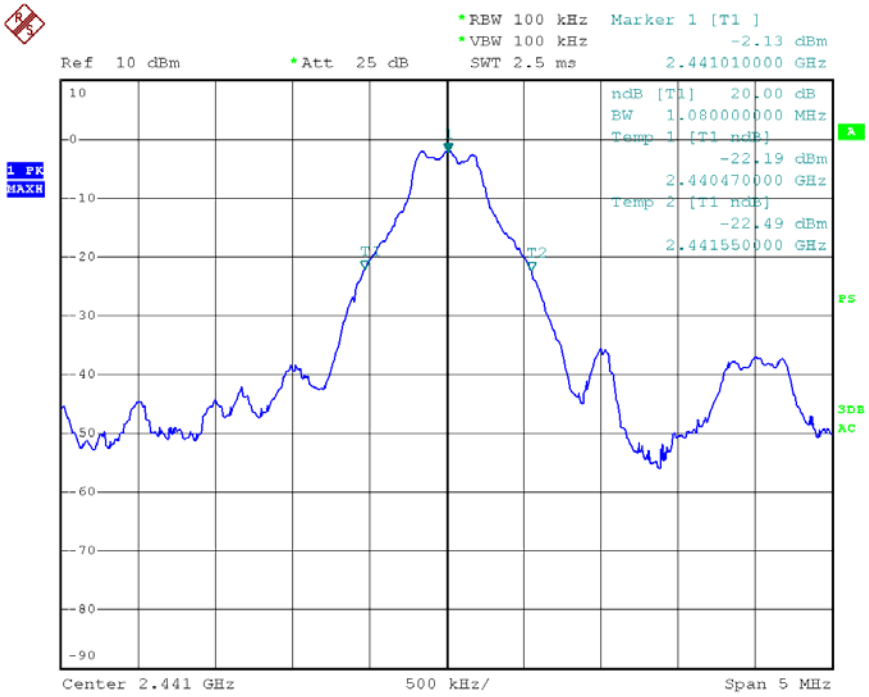

RBW 100 kHz
VBW 100 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.05 dB
1.002000000 MHz
Ref 10 dBm
Att 25 dB
Marker 1 [T1]
-2.30 dBm
2.441002000 GHz
1 PK MAXH
Start 2.44 GHz
300 kHz/
Stop 2.443 GHz

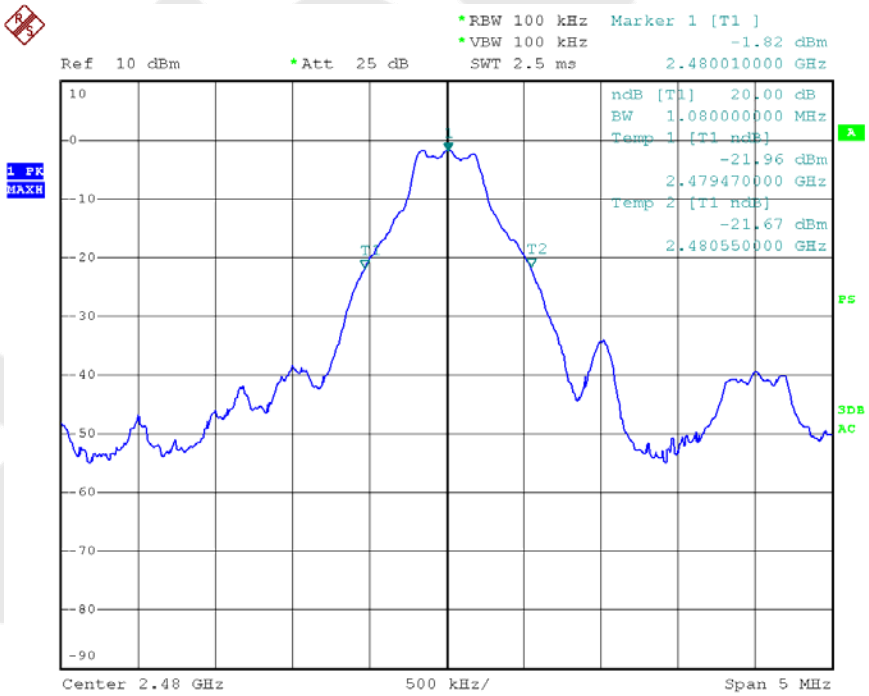
CH High



20dB Down




*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Marker 1 [T1]
-2.13 dBm
2.441010000 GHz
Ref 10 dBm
*Att 25 dB
ndB [T1] 20.00 dB
BW 1.080000000 MHz
Temp 1 [T1 ndB]
-22.19 dBm
2.440470000 GHz
Temp 2 [T1 ndB]
-22.49 dBm
2.441550000 GHz
1 PK
MAXH
A
FS
3DB
AC
T1
T2
Center 2.441 GHz
500 kHz/
Span 5 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Marker 1 [T1]
-1.82 dBm
2.480010000 GHz
Ref 10 dBm
*Att 25 dB
ndB [T1] 20.00 dB
BW 1.080000000 MHz
Temp 1 [T1 ndB]
-21.96 dBm
2.479470000 GHz
Temp 2 [T1 ndB]
-21.67 dBm
2.480550000 GHz
1 PK
MAXH
A
FS
3DB
AC
T1
T2
Center 2.48 GHz
500 kHz/
Span 5 MHz

3.3.4.3. Hopping sequence

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

Limits EN 300 328 Clause 4.3.4.3.2

The hopping sequence of a FHSS system is the sequence of the hopping channels used by the equipment.

Non-adaptive Frequency Hopping systems shall make use of a hopping sequence(s) that contains at least 15 hopping channels.

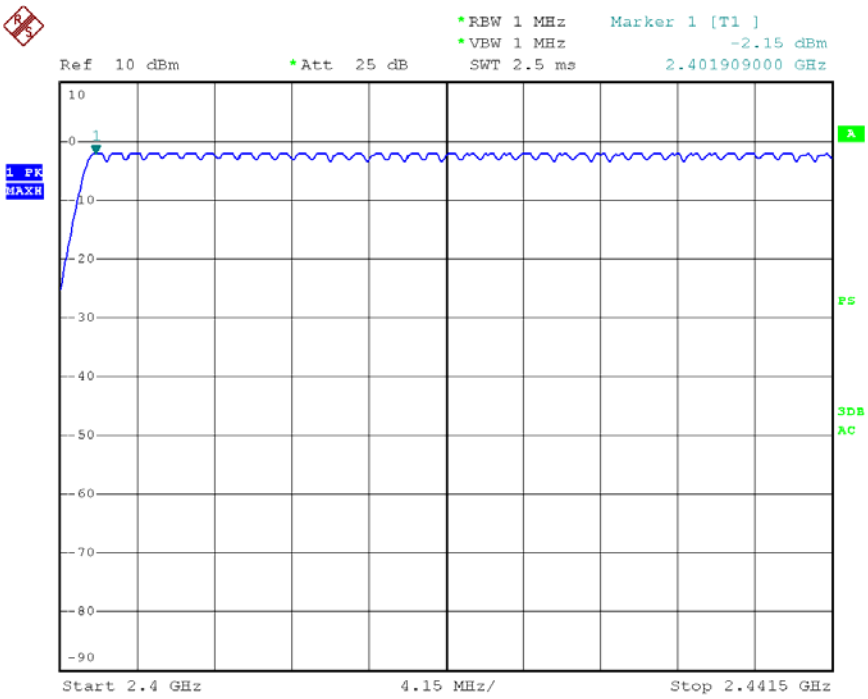
Adaptive Frequency Hopping systems shall make use of a hopping sequence(s) that is capable of operating over a minimum of 90 % of the band specified in table 1, from which at any given time a minimum of 20 hopping channels shall be used.

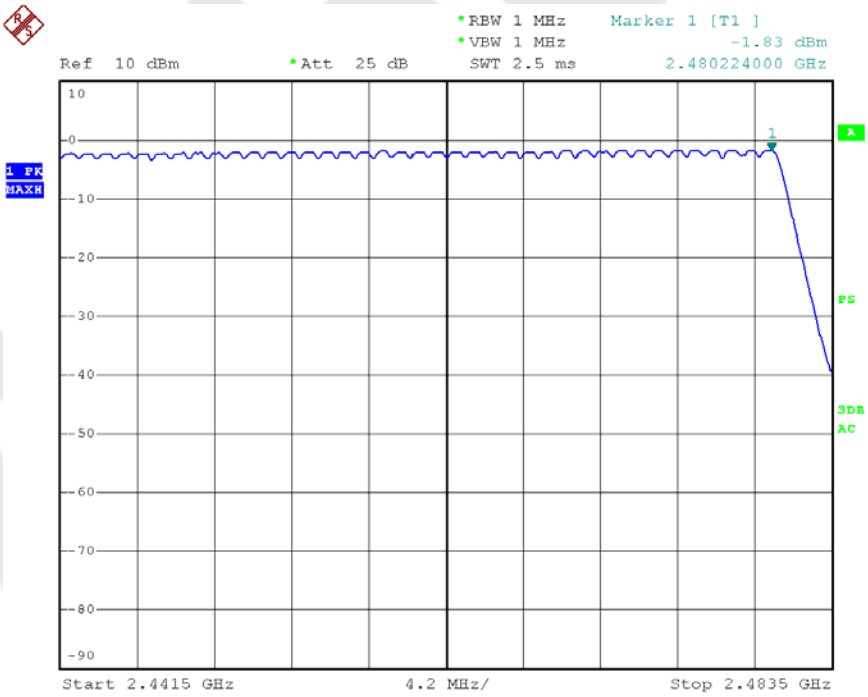
Each hopping channel of the hopping sequence shall be occupied at least once during a period not exceeding four times the product of the dwell time per hop and the number of channels.

Test Item	:	Number of Hopping Frequency	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Hopping Channel Frequency Ranger	Quantity Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402 ~ 2480	79	15

Number of Hopping Frequency


*RBW 1 MHz
*VBW 1 MHz
SWT 2.5 ms
Marker 1 [T1]
-2.15 dBm
2.401909000 GHz
Ref 10 dBm
*Att 25 dB
1 PK MAXH
A
PS
SDB
AC
Start 2.4 GHz
4.15 MHz/
Stop 2.4415 GHz


*RBW 1 MHz
*VBW 1 MHz
SWT 2.5 ms
Marker 1 [T1]
-1.83 dBm
2.480224000 GHz
Ref 10 dBm
*Att 25 dB
1 PK MAXH
A
PS
SDB
AC
Start 2.4415 GHz
4.2 MHz/
Stop 2.4835 GHz

3.3.5. Medium Access Protocol

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

Definition and Requirement

A medium access protocol is a mechanism designed to facilitate spectrum sharing with other devices in a wireless network.

A medium access protocol shall be implemented by the equipment.

Test Result

Environmental conditions:

Temperature	Relative Humidity	ATM Pressure
23℃	48%	1014 mbar

Complies

Passed.

3.3.6. Transmitter Spurious Emissions

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

(Radiated)
See ETST EN 300 328 clause 5.3 for the test conditions and clause 5.7.5 for the measurement method.

Test Item	:	Spurious Emissions	Test Mode	:	Transmitter Operating / standby
Test Voltage	:	DC 3.7V	Temperature	:	25℃
Test Result	:	PASS	Humidity	:	54%RH

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
Note: NF = No Significant Peak was Found.

Lowest Frequency			Highest Frequency		
f (MHz)	Band – Width (kHz)	Level(dBm)	f (MHz)	Band – Width (kHz)	Level(dBm)
324.210	120	-47.55	235.170	120	-49.24
4804.00	1000	-60.39	4960.10	1000	-61.94
7206.00	1000	-65.24	7440.00	1000	-72.84
-	-	-	-	-	-
Measurement Uncertainly			4.3 dB		

Transmitter Standby

Lowest Frequency			Highest Frequency		
f (MHz)	Band – Width (kHz)	Level(dBm)	f (MHz)	Band – Width (kHz)	Level(dBm)
91.560	120	-62.41	144.230	120	-61.67
-	-	-	-	-	-
Measurement Uncertainly			4.3 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.

3.3.7. Receiver Spurious Emissions

Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 09, 2013	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 09, 2013	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 23, 2013	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Aug. 09, 2013	3 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 23, 2013	3 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 23, 2013	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

(Radiated)

Test Item	:	Spurious Emissions	Test Mode	:	Receiver
Test Voltage	:	DC 3.7V	Temperature	:	25℃
Test Result	:	PASS	Humidity	:	54%RH

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.

Lowest Frequency			Highest Frequency		
f (MHz)	Band – Width (kHz)	Level(dBm)	f (MHz)	Band – Width (kHz)	Level(dBm)
132.960.	120	-63.74	175.330	120	-63.82
4804	-	-	4960	-	-
7206	-	-	7440	-	-
9608	-	-	9920	-	-
-	-	-	-	-	-
Measurement Uncertainly			4.3 dB		

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

Limits EN 300 328, Clause 4.3.5.2

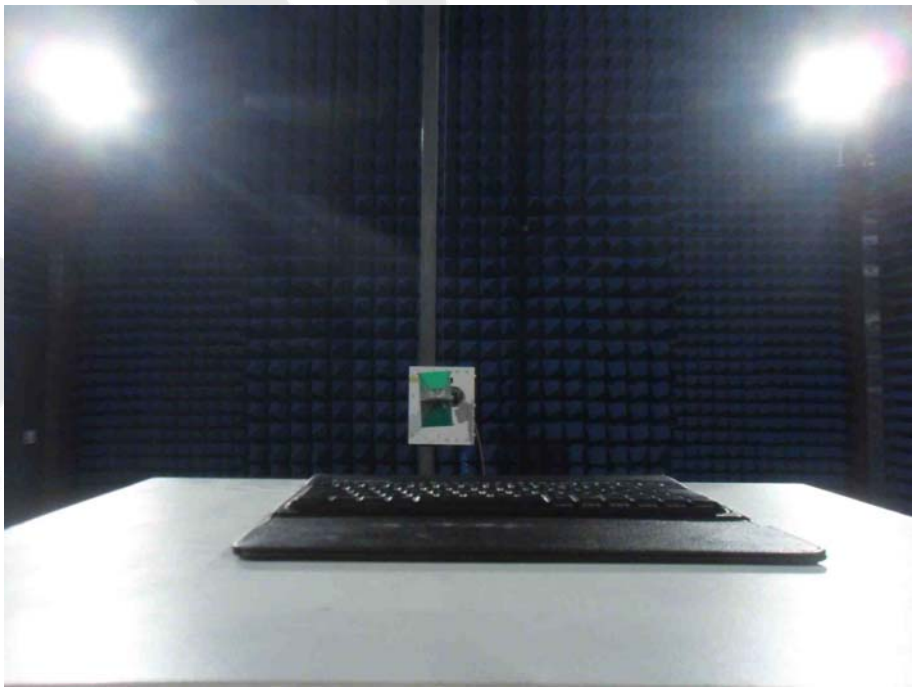
Frequency Range	Narrowband Spurious Emissions	Wideband Spurious Emissions
30 MHz ~ 1 GHz	-57 dBm	-107 dBm/Hz
Above 1 GHz ~ 12.75 GHz	-47 dBm	-97 dBm/Hz

The Spurious emissions of the receiver shall not exceed the values in table 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 achieve a reliable measurement result.

4. PHOTOGRAPH

4.1. Photo of Emission Test

Bellow 1G

Above 1G