Report No: DDT-RE140701

Issued Date: Oct.23,2014

ETSI EN300 220 RADIO TEST REPORT

FOR

Applicant	:	HOPE MICROELECTRONICS CO.,LTD
Address	:	2/F,Building3,pingshan Private Enterprise science and Technology Park,xili Town,Nanshan District, Shenzhen, China
Equipment under Test	:	Wireless RF module
Model No	:	RFM69CW-433S2
Trade Mark	:	/
Manufacturer	:	HOPE MICROELECTRONICS CO.,LTD
Address	:	2/F,Building3,pingshan Private Enterprise science and Technology Park,xili Town,Nanshan District, Shenzhen, China

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

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REPORT

TABLE OF CONTENTS

TEST REPORT DECLARE

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Test Standard Used: ETSI EN300 220-1 V2.4.1:2012-05; ETSI EN300 220-2 V2.4.1:2012-05

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment In Accordance with ETSI EN300 220-2 V2.4.1 about the effective uses allocated spectrum requirements of Article 3.2 of the R&TTE (1999/5/EC) Directive.

Report No:	DDT-RE140701		
Date of Test:	Oct.21,2014---Oct.22,2014	**Date of Report**:	Oct.23,2014

Prepared By: ***Approved By:***

Leo Liu/Engineer ***Jamy Yu/EMC Manager***

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

1.1. Standard description

ETSI EN 300 220-1 V2.4.1 (2012-05): Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods.

ETSI EN 300 220-2 V2.4.1 (2012-05): Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive.

1.2. Test result

Harmonized Standard EN 300 220-2 The following requirements and test specifications are relevant to the presumption of conformity under article 3.2 of the R&TTE Directive				
No	Test Parameter	Clause No	Condition	Results
1	Frequency error and frequency drift	4.2.1.1	U	PASS
2	Average power(conducted)	4.2.1.2	Applies to transmitters with permanent external antenna connector	PASS
3	Effective radiated power	4.2.1.3	Applies to transmitters with an integral or dedicated antenna	N/A
4	Frequency hopping spread spectrum devices	4.2.1.4.1	Applies to transmitters which employ FHSS	N/A
5	Direct sequence or other spread spectrum than FHSS	4.2.1.4.2	Applies to transmitters which employ DSSS & other spread spectrum than FHSS	N/A
6	Transient power	4.2.1.5	U	PASS
7	Adjacent channel power for channelized equipment	4.2.1.6	Applies to narrowband transmitters	N/A
8	Modulation bandwidth	4.2.1.7	Applies to all transmitters not covered by clause 4.2.1.6	PASS
9	Unwanted emissions in the spurious domain	4.2.1.8	U	PASS
10	Frequency stability under low-voltage conditions	4.2.1.9	Applies to battery-operated transmitters	PASS
11	Duty cycle	4.2.1.10	Applies to transmitters excluding those with a listen before talk facility with AFA	PASS
12	Minimum transmitter off-time	4.2.1.11.1	Applies to transmitters using LBT	N/A
13	Minimum listening time	4.2.1.11.2	Applies to transmitters using LBT	N/A
14	Maximum dead time	4.2.1.11.3	Applies to transmitters using LBT	N/A
15	Maximum transmitter on-time	4.2.1.11.4	Applies to transmitters using LBT	N/A

16	Time-out-timer	4.2.1.11.5	Applies to transmitters operating in the frequency bands 433,050 MHz to 434,790 MHz or 869,7 MHz to 870 MHz and supporting voice applications not employing duty cycle restriction	N/A
17	Receiver sensitivity	4.3.2	Applies to receivers with LBT	N/A
18	Receiver LBT threshold	4.3.3	Applies to receivers with LBT	N/A
19	Adjacent channel selectivity	4.3.4	Applies to Category 1 receivers	N/A
20	Blocking	4.3.5	U	PASS
21	Spurious response rejection	4.3.6	Applies to Category 1 receivers	N/A
22	Receiver spurious radiation	4.3.7	U	PASS
Note 1: N/A is an abbreviation for Not Applicable, means according technology of EUT, this test item is not applicable for this reported device. Note 2: U means unconditionally applicable.				

2. General test information

2.1. Description of EUT

EUT* Name	:	Wireless RF module
Model Number	:	RFM69CW-433S2
Trade Mark	:	/
Difference of Model number	:	/
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 4.5V from nickel-cadmium battery
Operation frequency	:	433.99MHz
Modulation	:	FSK
System type	:	Wideband system
Antenna Type	:	Dipole antenna, 2dBi maximum gain
Receiver Categories	:	Category 3, Standard reliable SRD communication media
Date of Receipt	:	Sep.26,2014
Sample Type	:	Series production

Note: EUT is the ab. Of equipment under test.

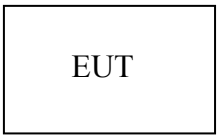
2.2. Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Serial No.	Other
/	/	/	/	1.5m

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
/	/	/	/

2.4. Block diagram of EUT configuration for test



Tested mode, channel information		
Mode	Channel	Frequency (MHz)
Unmodulated Tx mode	/	433.99
Modulated Tx mode	/	433.99
Rx Mode	/	433.99

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

	Normal Conditions	Extreme Conditions
Temperature range	21-25℃	-20℃ and 55℃
Humidity range	40-75%	40-75%
Power supply	DC 4.5V	DC 4.5V and DC 4.05V (0.9 and 1 times of nominal voltage)
Note1: The Extreme temperature range and extreme voltages are declared by the manufacturer.		

2.6. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808 Tel: +86-0769-22891499 http://www.dgddt.com

2.7. Measurement uncertainty

Test Item	Uncertainty
RF frequency	1x 10^{-8}
Radiated RF power	3.4dB
Conducted RF power	0.50dB
Maximum frequency deviation -within 300Hz and 6KHz of audio frequency -within 6KHz and 25KHz of audio frequency	 2.1% 1.5dB
Adjacent channel power	1.2dB
Conducted spurious emission	0.6dB
Radiated emission (25MHz-1GHz)	2.6dB
Radiated emission(1GHz-6GHz)	2.1dB
Temperature	0.5℃
Humidity	2.5%

Note：This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Frequency error

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y
4	Temperature controller	Dongguan Bell	BE-TH-150M3	201208153364	2013/11/13	1 Y
5	DC Power Source	ALLPower	ADC50-20	990406	2013/11/13	1 Y

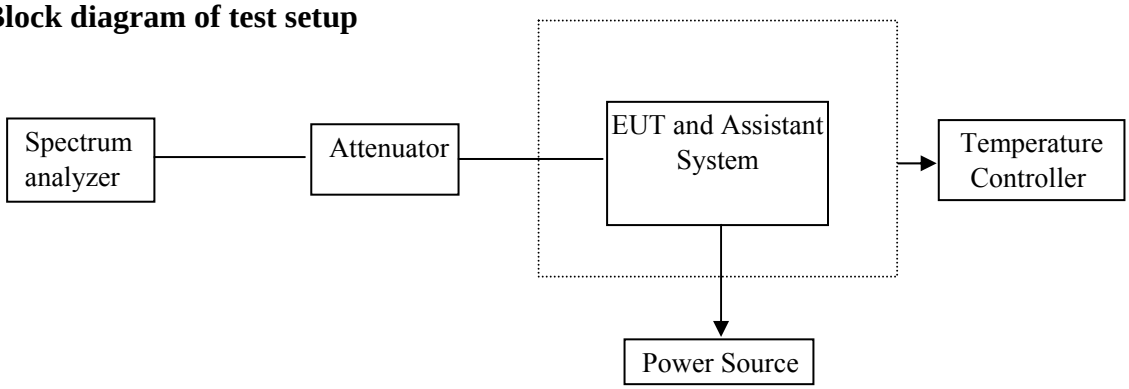
3.2. Limits

Frequency error is the difference, under normal and extreme conditions, between the measured unmodulated carrier frequency and the nominal frequency as stated by the manufacturer.

The limits for the frequency error over the normal and extreme temperature range are given in below table.

Operating frequency	Frequency error limit (ppm), see note
≤ 1 000 MHz	±100
NOTE: The frequency error measured shall not exceed the designated frequency band.	

3.3. Block diagram of test setup



3.4. Test procedure

(1) Configure EUT and assistant system according clause 2.4 and 3.3

(2) Connect EUT's antenna output to spectrum analyzer though sutiable attenuator.

(3) Configure EUT work in unmodulated carrier trasmit mode.

(4) Measure the actaul trasmitted frequency under normal and extreme conditions with spectrum analyzer set as below:

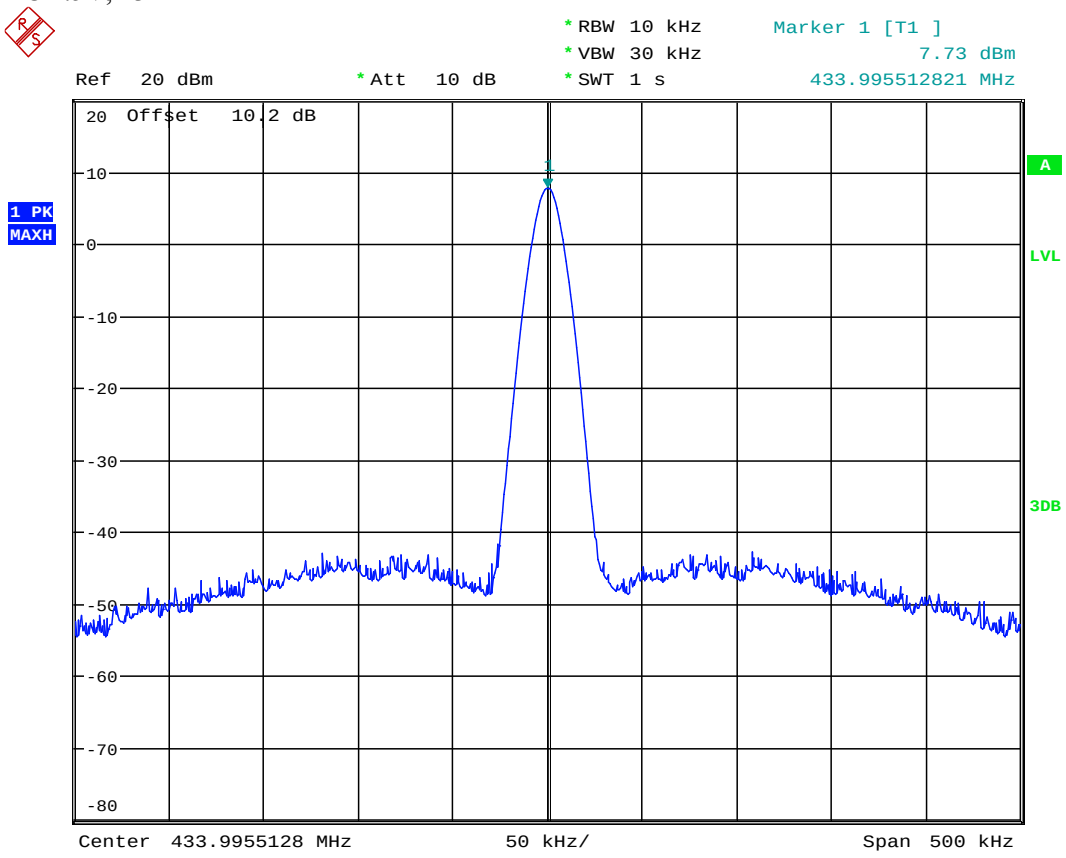
RBW= 10KHz; VBW=30KHz; Span: 500KHz; Detector: PK

3.5. Test result

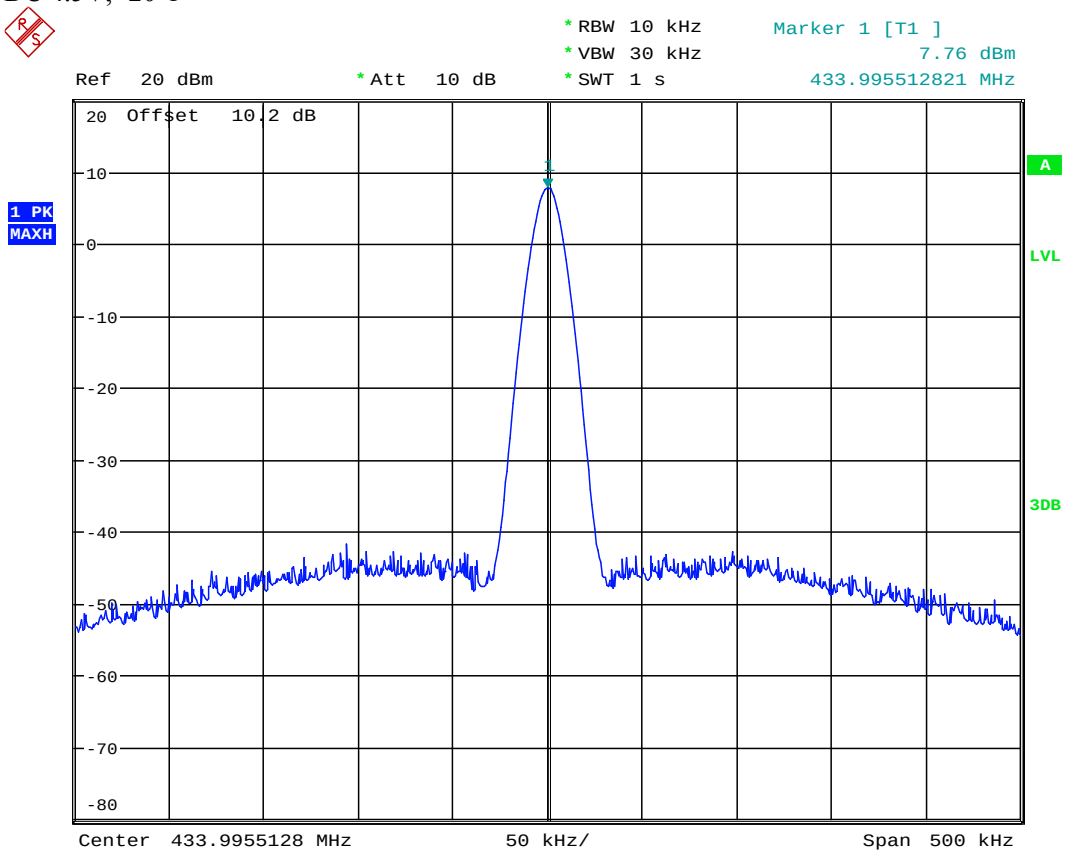
Test Conditions		Stated frequency by the manufacturer (MHz)	Measured frequency (MHz)	Frequency error		Limit ppm	Conclusion
Volt	Temp			MHz	ppm		
DC 4.5V	23℃	433.99	433.9955	0.0055	12.7	100	PASS
DC 4.5V	-20℃	433.99	433.9955	0.0055	12.7	100	PASS
DC 4.5V	55℃	433.99	433.9979	0.0079	18.2	100	PASS
DC 4.05V	-20℃	433.99	434.00	0.01	23.0	100	PASS
DC 4.05V	55℃	433.99	433.9979	0.0079	18.2	100	PASS
Test Date : Oct.21,2014				Test Engineer : Leo Liu			

3.6. Original test data

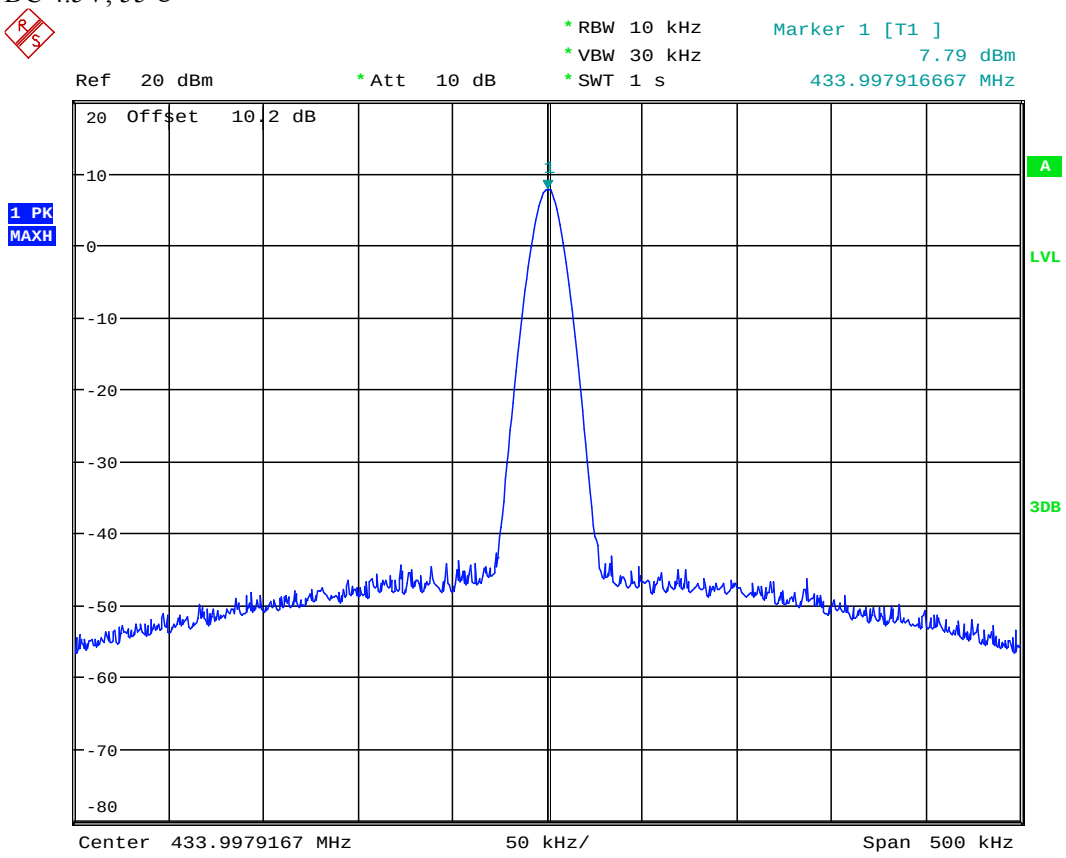
DC 4.5V, 23℃



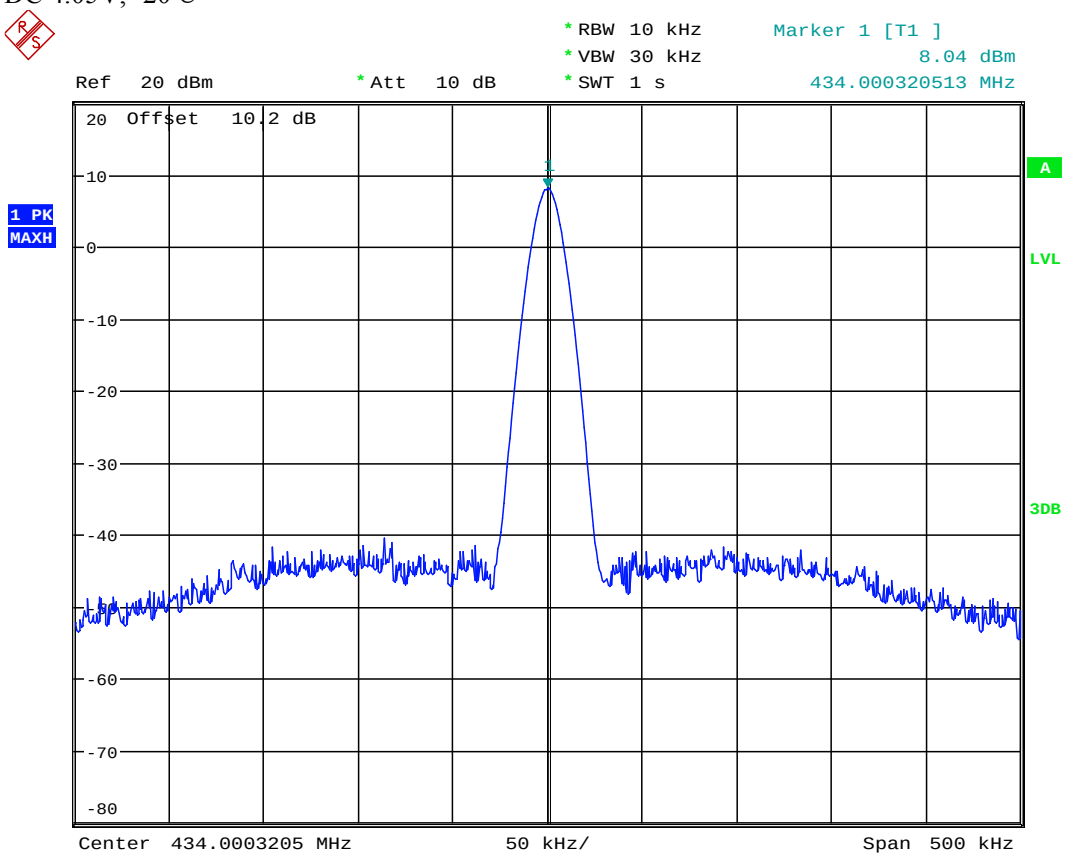
DC 4.5V, -20℃



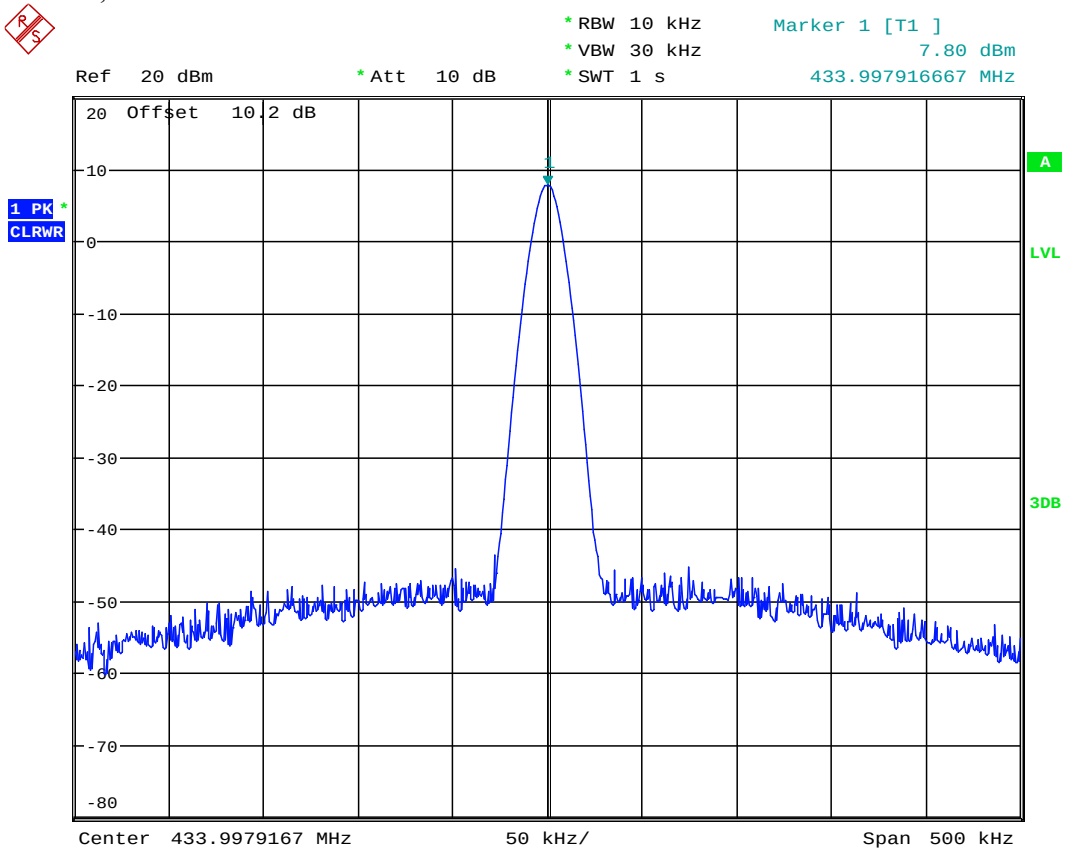
DC 4.5V, 55℃



DC 4.05V, -20℃



DC 4.05, 55℃



4. Average power (conducted)

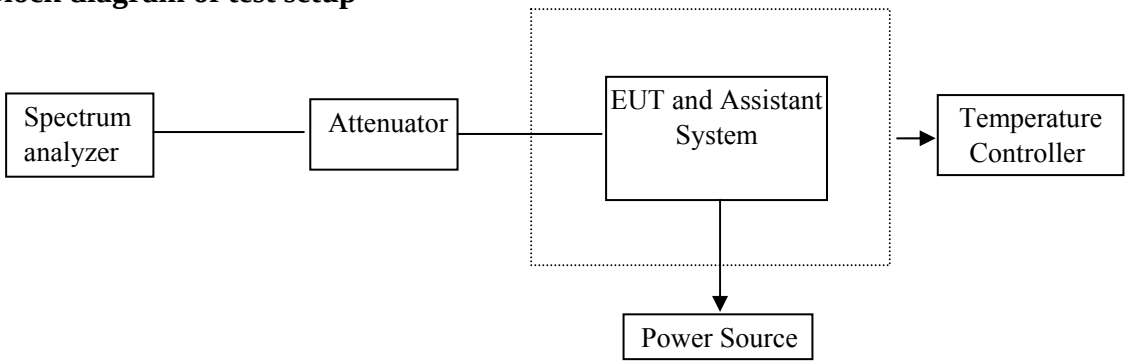
4.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y
4	Temperature controller	Dongguan Bell	BE-TH-150M3	201208153364	2013/11/13	1 Y
5	DC Power Source	ALLPower	ADC50-20	990406	2013/11/13	1 Y

4.2. Limits

Frequency Bands	Power limit	Application
433.050MHz to 434.790MHz	10mW(10dBm) e.r.p.	Non-specific use, Spectrum access and mitigation requirement below 10%

4.3. Block diagram of test setup



4.4. Test procedure

(1) Configure EUT and assistant system according clause 2.4 and 4.3.

(2) Connect EUT's antenna output to spectrum analyzer though sutiable attenuator.

(3) Configure EUT work in umodulated carrier trasmit mode.

(4) Measure the conducted output power under normal and extreme conditions with spectrum analyzer set as below:

RBW= 1MHz; VBW=3MHz; Span: 5MHz; Detector: PK

(5) Add antenna gain to the measured result in step 4, the results are the maixmum e.r.p power and shall comply with the limit.

4.5. Test result

CH/Frequency	Test Conditions		Measured Level(dBm)	Antenna Gain (dB)	Power e.r.p (dBm)
	Volt	Temp			
433.99	DC 4.5V	23℃	7.43	2	9.43
	DC 4.5V	-20℃	7.40	2	9.40
	DC 4.5V	55℃	7.41	2	9.41
	DC 4.05V	-20℃	7.38	2	9.38
	DC 4.05V	55℃	7.39	2	9.39
Limit: 10dBm			Conclusion: PASS		
Test Date:Oct.21,2014			Test Engineer : Leo Liu		

5. Transient power

5.1. Test equipment

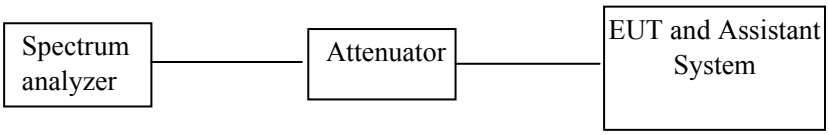
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y

5.2. Limits

Transient power is the power falling into adjacent spectrum due to switching the transmitter on and off during normal operation (e.g. cyclic keying during data transmission).

At all frequencies where the emission levels measured in clause 5.4 step 3 exceed the spurious domain limits in clause 7.2, the power level measured in step 3 shall not exceed the power level measured in below step 5 by more than 3 dB.

5.3. Block diagram of test setup



5.4. Test procedure

(1) Configure EUT and test equipment as clause 5.3, EUT's antenna output was connected to spectrum analyzer by RF cable. The RF cable's loss was input to spectrum analyzer as amplitude offset.

(2) Spectrum Analyzer was set as below: RBW:120 kHz ;Detector: Quasi-peak detector ; Span: Zero span

(3) Center frequency of Spectrum Analyzer: 100 kHz offset from the edge of the modulation bandwidth fa or fb

(4) The transmitter was operated with powering on and off at 1s respectively, measure the power level for

a period covering 10 powering on and off events when the spectrum analyzer setting above and below the wanted channel.

(5) Repeated the same setting of the spectrum analyzer as step 2, and the transmitter was set on continuous transmission mode. Measures the powers level for a period same as step 2 as spectrum analyzer setting above and below the wanted channel.

(6) Repeated step 2 test within the spectrum mask every 120KHz from the primarily adjusted point to both sides of the wanted frequencies, until either it is clearly ascertained that no power increaser or limit exceeding appear, or until the frequency offset to the wanted frequency exceeds 2MHz.

5.5. Test result

Center frequency (MHz)	Step 2 power (dBm)	Step 5 power (dBm)	Delta (dB)
Frequency f_b + 100 kHz	-9.54	-9.90	0.36
Frequency f_a - 100 kHz	-8.23	-8.89	0.66
Frequency f_b + 220 kHz	-14.24	-15.23	0.99
Frequency f_a − 220 kHz	-14.54	-15.04	0.50
Frequency f_b + 340 kHz	-19.34	-19.89	0.55
Frequency f_a − 340 kHz	-19.24	-19.90	0.66
Frequency f_b + 460 kHz	-22.10	-22.50	0.40
Frequency f_a − 460 kHz	-25.23	-25.90	0.67
Frequency f_b + 580 kHz	-25.62	-25.97	0.35
Frequency f_a − 580 kHz	-28.43	-29.02	0.59
Frequency f_b + 700 kHz	-27.67	-27.94	0.27
Frequency f_a − 700 kHz	-30.23	-30.69	0.46
Frequency f_b + 820 kHz	-29.90	-29.30	-0.60
Frequency f_a − 820 kHz	-33.23	-33.45	0.22
Frequency f_b + 940 kHz	-32.44	-32.89	0.45
Frequency f_a − 940 kHz	-36.13	-36.56	0.43
Frequency f_b + 1060 kHz	-35.65	-35.90	0.25
Frequency f_a − 1060 kHz	-38.55	-39.11	0.56
Frequency f_b + 1180 kHz	-38.93	-38.21	-0.72
Frequency f_a − 1180 kHz	-41.67	-41.89	0.22
Frequency f_b + 1300 kHz	-41.23	-41.43	0.20
Frequency f_a − 1300 kHz	-43.69	-43.84	0.15
Frequency f_b + 1420 kHz	-43.24	-43.22	-0.02
Frequency f_a - 1420 kHz	-45.69	-45.80	0.11
Frequency f_b + 1540 kHz	-45.29	-45.34	0.05
Frequency f_a - 1540 kHz	-46.65	-46.78	0.13
Frequency f_b + 1660 kHz	-46.22	-46.45	0.23
Frequency f_a - 1660 kHz	-47.53	-47.78	0.25
Frequency f_b + 1780 kHz	-47.29	-47.43	0.14
Frequency f_a - 1780 kHz	-47.23	-47.54	0.31
Frequency f_b + 1900 kHz	-47.15	-47.23	0.08
Frequency f_a - 1900 kHz	-48.56	-48.67	0.11
Frequency f_b + 2020 kHz	-48.23	-48.26	0.03
Frequency f_a - 2020kHz	-48.54	-48.65	0.11
Limit: if step 2 power >-36dBm, Delta< 3dB		Conclusion:PASS	
Test Date:Oct.21,2014		Test Engineer : Leo Liu	

Note: According 6.5, fa= 433.9577MHz, fb=434.0350MHz

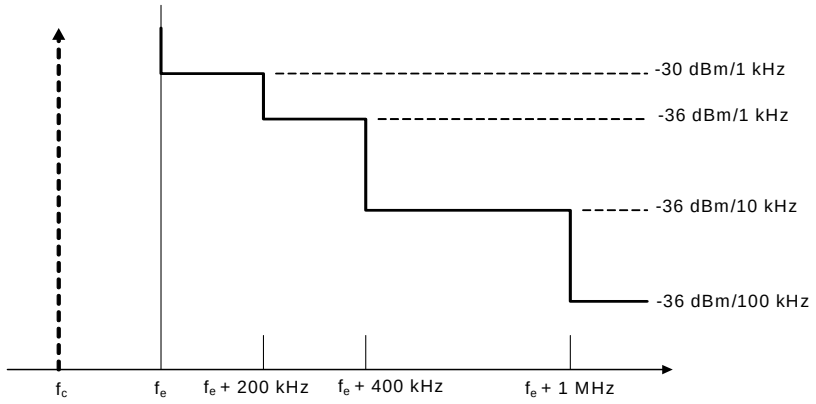
6. Modulation bandwidth

6.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
. 3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y
4	Temperature controller	Dongguan Bell	BE-TH-150M3	201208153364	2013/11/13	1 Y
5	DC Power Source	ALLPower	ADC50-20	990406	2013/11/13	1 Y

6.2. Limits

The range of modulation bandwidth includes all associated side bands above the appropriate emissions level and the frequency error or drift under extreme test conditions.



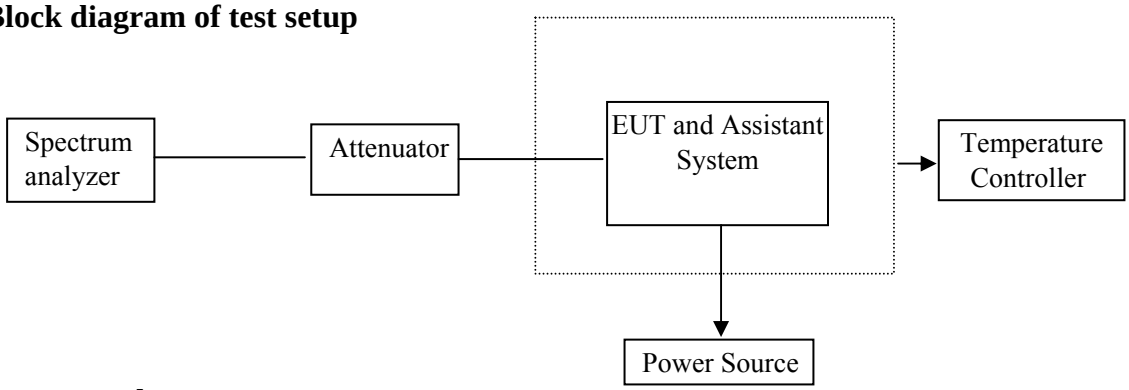
f_c is the emission center frequency
f_e is the sub-band edge frequency
Only the upper half of the emission is shown.The lower half is a mirror image

The permitted range of modulation bandwidth including the frequency error or drift as measured in clause 7.1 shall be within the limits shown in below table:

Emission Limits of the modulated signal

Reference Bandwidth (RBW)	Limit	Lower envelope point minimum frequency	Upper envelope point maximum frequency
1 kHz	1 uW	$f_{e, lower}$	$f_{e, upper}$
1 kHz	250 nW	($f_{e, lower}$ - 200 kHz)	($f_{e, upper}$ + 200 kHz)
10 kHz	250 nW	($f_{e, lower}$ - 400 kHz)	($f_{e, upper}$ + 400 kHz)
100 kHz	250 nW	($f_{e, lower}$ - 1 000 kHz)	($f_{e, upper}$ + 1 000 kHz)

6.3. Block diagram of test setup



6.4. Test procedure

(1) Configure EUT and assistant system according clause 2.4 and 6.3

(2) The transmitter was set on continuous transmission with normal modulation

(3) The output power of the transmitter was measured using a spectrum analyzer with resolution bandwidth large enough to accept all major modulation side bands. The power level calibration of the spectrum analyzer was then related to the e.r.p. measured level. The calculated relation was used to calculate absolute levels of RF power.

(4) The spectrum analyzer resolution bandwidth was changed to the values specified in the limit table. For each resolution bandwidth, the frequencies of the highest fa and lowest fb points, where the displayed power envelope of modulation equals the appropriate emission level was recorded.

(5) The difference between the two frequencies fa and fb obtained with resolution bandwidth 1 kHz and level 1 μW is the modulation bandwidth

Note: The Spectrum Analyzer was set as below:
VBW: 3 times of RBW
Detector: Peak
Sweep time: Auto

6.5. Test result

Test Conditions		Frequencies fa and fb obtained with resolution bandwidth 1 kHz and level 1 uW	Modulation Bandwidth(MHz)
Volt	Temp		
DC 4.5V	23℃	fa= 433.9577MHz	0.0773
		fb=434.0350MHz	
DC 4.5V	-20℃	fa= 433.9572MHz	0.0778
		fb=434.0350MHz	

DC 4.05V	-20℃	fa= 433.9576MHz	0.0775
		fb=434.0351MHz	
DC 4.5V	55℃	fa= 433.9575MHz	0.0075
		fb=434.0350MHz	
DC 4.05V	55℃	fa= 433.9577MHz	0.0073
		fb=434.0350MHz	
Limit: 433.050MHz to 434.790MHz			Conclusion: PASS
Test Date:Oct.21,2014			Test Engineer : Leo Liu
Note:Modulation bandwidth = fb-fa			

Condution	Measure Band	RBW	Measured Level dBm	Limit	Conclusion
Normal DC 4.5V 23℃	Fe Fe+200KHz	1KHz	-73.99	-30dBm/KHz	PASS
	Fe+200KHz Fe+400KHz	1KHz	-75.50	-36dBm/KHz	PASS
	Fe+400KHz Fe+1MHz	10KHz	-64.63	-36dBm/10KHz	PASS
	Aboue fe+1MHz	100KHz	-54.22	-36dBm/100KHz	PASS
Normal DC 4.5V -20℃	Fe Fe+200KHz	1KHz	-72.12	-30dBm/KHz	PASS
	Fe+200KHz Fe+400KHz	1KHz	-74.69	-36dBm/KHz	PASS
	Fe+400KHz Fe+1MHz	10KHz	-65.60	-36dBm/10KHz	PASS
	Aboue fe+1MHz	100KHz	-56.21	-36dBm/100KHz	PASS
Normal DC 4.5V 55℃	Fe Fe+200KHz	1KHz	-74.12	-30dBm/KHz	PASS
	Fe+200KHz Fe+400KHz	1KHz	-75.12	-36dBm/KHz	PASS
	Fe+400KHz Fe+1MHz	10KHz	-63.78	-36dBm/10KHz	PASS
	Aboue fe+1MHz	100KHz	-53.34	-36dBm/100KHz	PASS
Normal DC 4.05V -20℃	Fe Fe+200KHz	1KHz	-74.80	-30dBm/KHz	PASS
	Fe+200KHz Fe+400KHz	1KHz	-75.67	-36dBm/KHz	PASS
	Fe+400KHz Fe+1MHz	10KHz	-65.78	-36dBm/10KHz	PASS
	Aboue fe+1MHz	100KHz	-53.74	-36dBm/100KHz	PASS
Normal DC 4.05V 55℃	Fe Fe+200KHz	1KHz	-75.23	-30dBm/KHz	PASS
	Fe+200KHz Fe+400KHz	1KHz	-74.34	-36dBm/KHz	PASS
	Fe+400KHz Fe+1MHz	10KHz	-66.32	-36dBm/10KHz	PASS
	Aboue fe+1MHz	100KHz	-53.23	-36dBm/100KHz	PASS
Test Date : Oct.21,2014			Test Engineer : Leo Liu		

Condution	Measure Band	RBW	Measured Levle	Limit	Conclusion
Normal DC 4.5V 23℃	Fe Fe-200KHz	1KHz	-73.21	-30dBm/KHz	PASS
	Fe-200KHz Fe-400KHz	1KHz	-74.20	-36dBm/KHz	PASS
	Fe-400KHz Fe-1MHz	10KHz	-65.23	-36dBm/10KHz	PASS
	below fe-1MHz	100KHz	-53.36	-36dBm/100KHz	PASS
Normal DC 4.5V -20℃	Fe Fe-200KHz	1KHz	-73.40	-30dBm/KHz	PASS
	Fe-200KHz Fe-400KHz	1KHz	-72.45	-36dBm/KHz	PASS
	Fe-400KHz Fe-1MHz	10KHz	-63.95	-36dBm/10KHz	PASS
	below fe-1MHz	100KHz	-56.21	-36dBm/100KHz	PASS
Normal DC 4.5V 55℃	Fe Fe-200KHz	1KHz	-73.12	-30dBm/KHz	PASS
	Fe-200KHz Fe-400KHz	1KHz	-75.12	-36dBm/KHz	PASS
	Fe-400KHz Fe-1MHz	10KHz	-64.93	-36dBm/10KHz	PASS
	below fe-1MHz	100KHz	-54.12	-36dBm/100KHz	PASS
Normal DC 4.05V -20℃	Fe Fe-200KHz	1KHz	-75.28	-30dBm/KHz	PASS
	Fe-200KHz Fe-400KHz	1KHz	-74.19	-36dBm/KHz	PASS
	Fe-400KHz Fe-1MHz	10KHz	-65.24	-36dBm/10KHz	PASS
	below fe-1MHz	100KHz	-54.10	-36dBm/100KHz	PASS
Normal DC 4.05V 55℃	Fe Fe-200KHz	1KHz	-72.10	-30dBm/KHz	PASS
	Fe-200KHz Fe-400KHz	1KHz	-70.40	-36dBm/KHz	PASS
	Fe-400KHz Fe-1MHz	10KHz	-65.54	-36dBm/10KHz	PASS
	below fe-1MHz	100KHz	-52.43	-36dBm/100KHz	PASS
Test Date : Oct.21,2014			Test Engineer : Leo Liu		

7. Unwanted emissions in the spurious domain (Conducted)

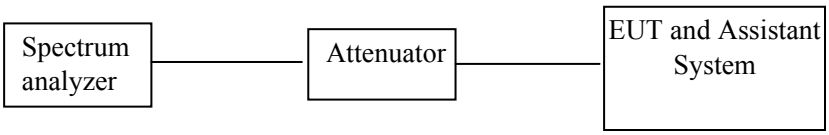
7.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
. 3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y

7.2. Limits

State	47 MHz to 74 MHz 87.5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW /-54dBm	250 nW/-36dBm	1 μW /-30dBm
Standby	2 nW /-57dBm	2 nW /-57dBm	20 nW /-47dBm

7.3. Block diagram of test setup



7.4. Test procedure

(1) Configure EUT and assistant system according clause 2.4 and 7.3

(2) The transmitter was set on continuous transmission with normal modulation.

(3) All the emissions from 9KHz to 4GHz were measured with test spectrum analyser was set as below.

Frequency band	RBW	VBW	Detector mode
Below 1GHz	100KHz	300KHz	Peak
Above 1GHz	100KHz	300KHz	Peak

(4) The measured level in step 4 add antenn gain shall comply with limit.

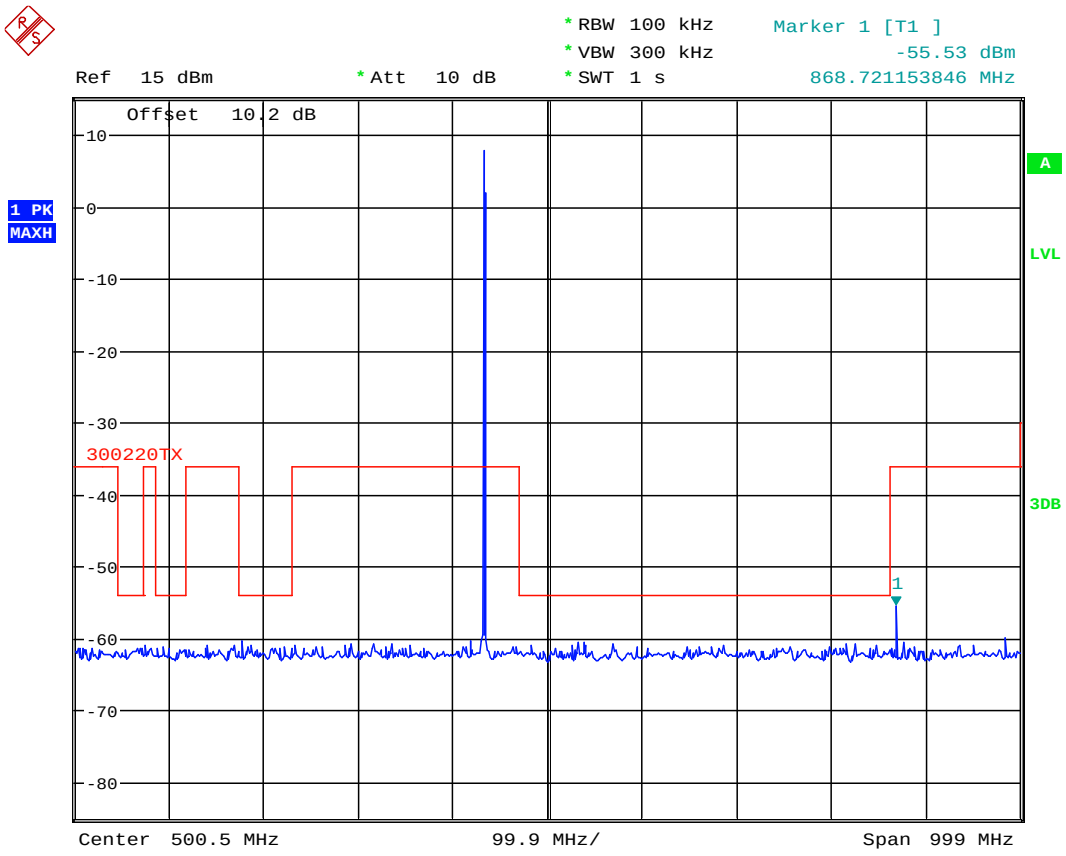
(5) Repeated test with the transmitter on stand-by.

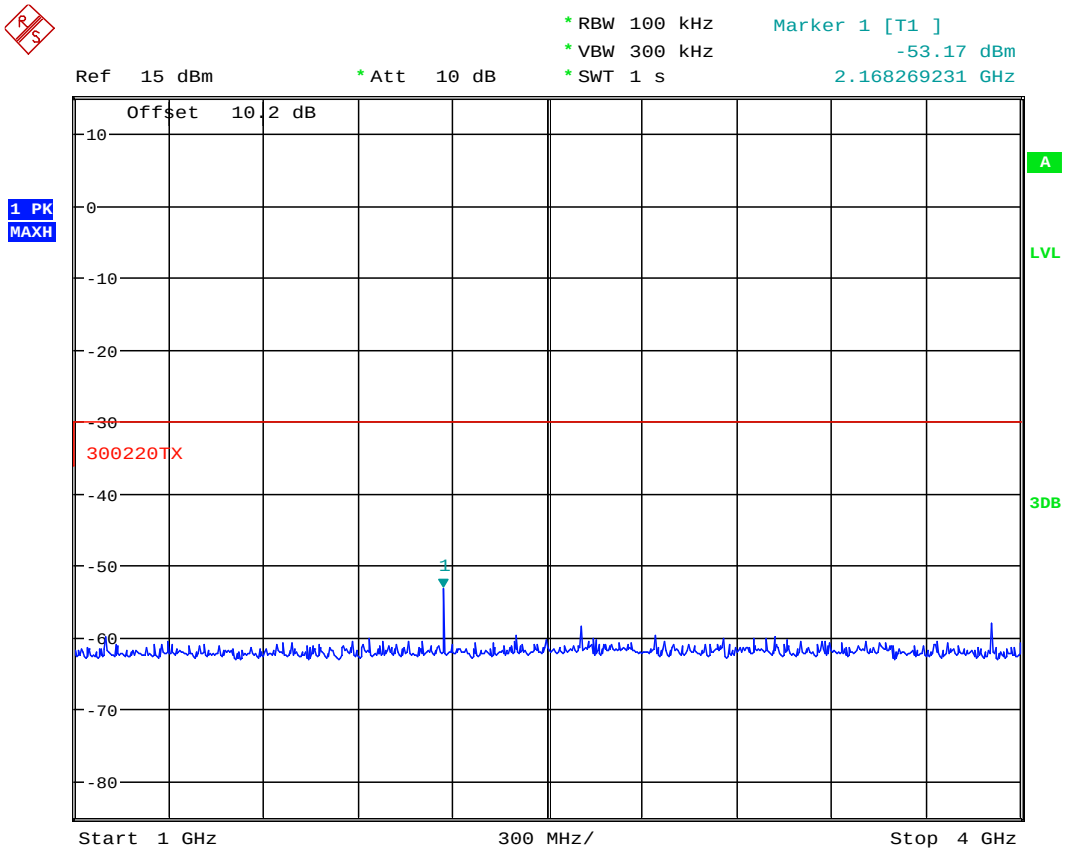
7.5. Test result

Test Mode： Tx Mode					
Frequency (MHz)	Result (dBm)	Antenna Gain (dB)	Unwanted emissions (dB)	Limit (dBm)	Margin (dB)
868.7211	-55.53	2	-53.53	-36	17.53
2168.269	-53.17	2	-51.17	-30	21.17
Test date: Oct.21,2014			Test engineer: Leo Liu		

7.6. Original Test Data

Tx Mode:




RBW 100 kHz
VBW 300 kHz
SWT 1 s
Marker 1 [T1]
-53.17 dBm
2.168269231 GHz
Ref 15 dBm
Att 10 dB
Offset 10.2 dB
1 PK
MAXH
A
LVL
3DB
300220TX
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
300 MHz/
Stop 4 GHz

8. Unwanted emissions in the spurious domain (Radiated)

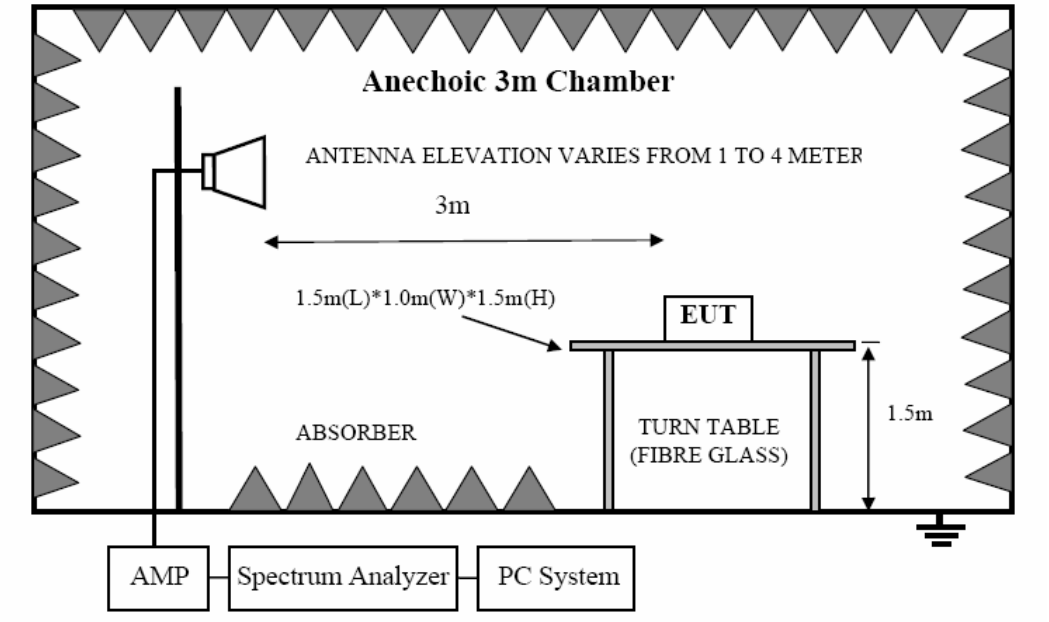
8.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU26	1166.1660.26	2013/11/13	1Y
2	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2013/11/16	1Y
3	Double Ridged Horn Antenna	R&S	HF907	100276	2013/11/16	1Y
4	Pre-Amplifier	R&S	SCU-01	10049	2013/11/13	1Y
5	Pre-amplifier	A.H.	PAM0-0118	360	2013/11/13	1Y
6	RF Cable	R&S	R01	10403	2013/11/13	1Y
7	RF Cable	R&S	R02	10512	2013/11/13	1Y
8	RF Cable	R&S	R01	10454	2013/11/13	1Y
9	RF Cable	R&S	R02	10343	2013/11/13	1Y

8.2. Limits

State	47 MHz to 74 MHz 87.5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW /-54dBm	250 nW/-36dBm	1 μW /-30dBm
Standby	2 nW /-57dBm	2 nW /-57dBm	20 nW /-47dBm

8.3. Block diagram of test setup



8.4. Test procedure

(1) EUT was placed on a non-metallic table, 1.5m above the ground plane inside a semi-anechoic chamber.

(2) Setup EUT and assistant system according clause 2.4 and 8.3.

(3) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
30MHz-1GHz	Trilog Broadband Antenna
1GHz-4GHz	Double Ridged Horn Antenna

(4) Set EUT work in fixed channel transmitting mode.

(5) All the emissions from 30MHz to 4GHz at 3m distance was measured and recorded with receive antenna in both vertical and horizontal and varied from 1 m to 4 m. in height above the reference ground plane, and rotating the turntable obtain the maximum signal strength., the test spectrum analyser was set as below

Frequency band	RBW	VBW	Detector mode
30MHz-1GHz	100KHz	300KHz	Peak
1GHz-12.75GHz	1MHz	3MHz	Peak

Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

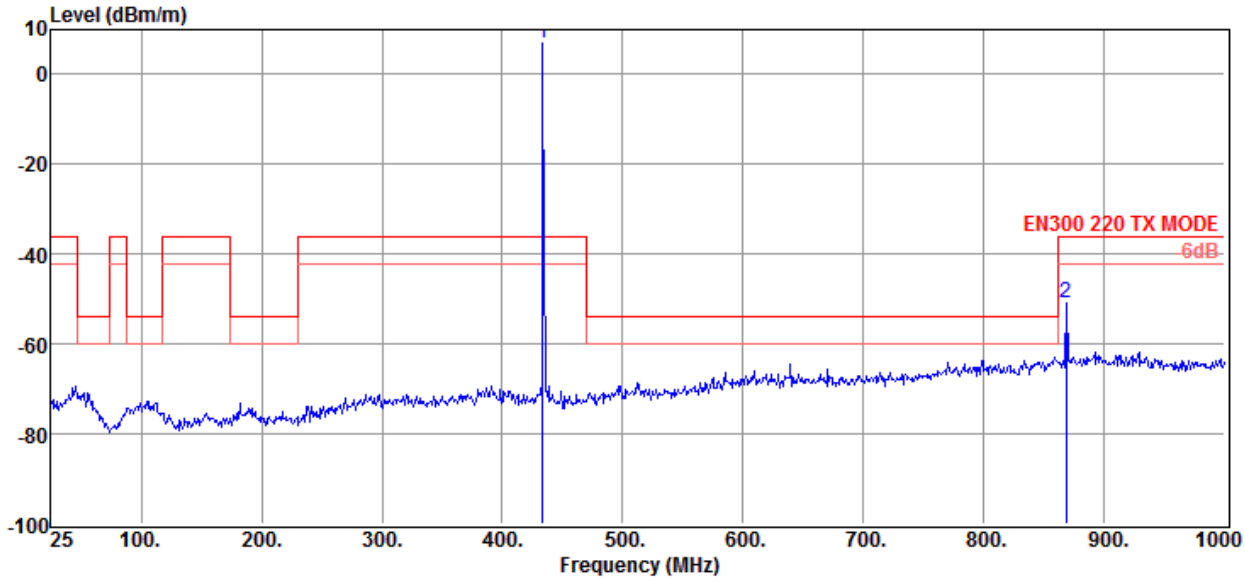
(6) A correction values from a verified site calibration was used to calculate the spurious emissions of EUT.

8.5. Test result

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-22	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Tx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: VULB 9163 2014-05/3m/VERTICAL
Memo	:		

Data: 1



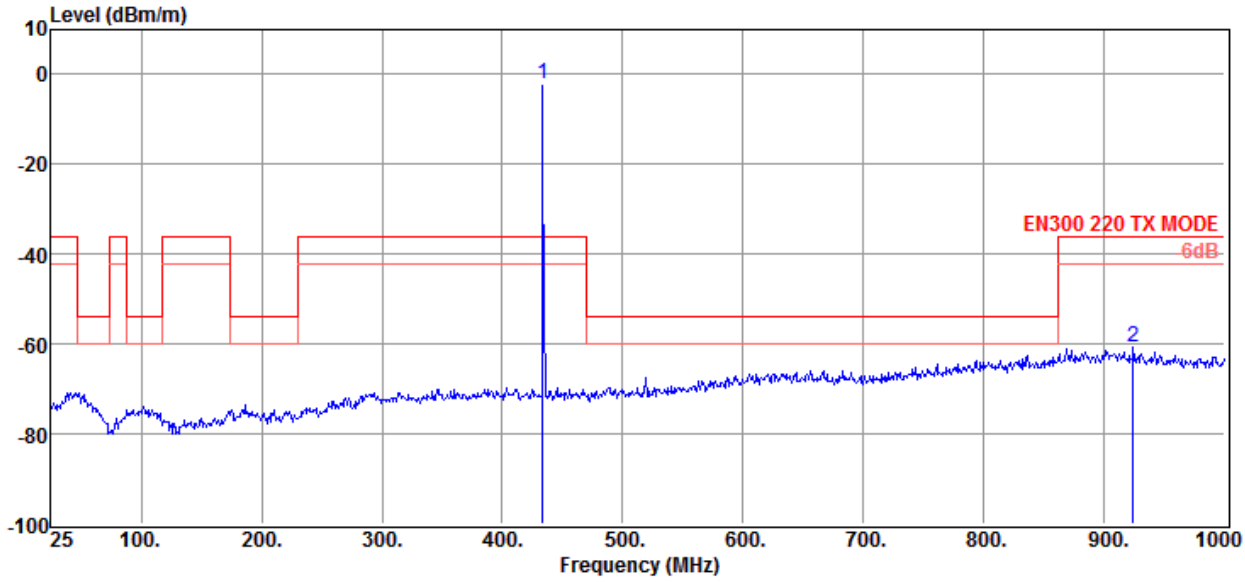
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	433.53	-20.94	15.93	0.00	3.33	8.58	6.90	-36.00	42.90	EIRP
2	868.38	-87.18	21.70	0.00	4.90	9.59	-50.99	-36.00	-14.99	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-22	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Tx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: VULB 9163 2014-05/3m/HORIZONTAL
Memo	:		

Data: 2



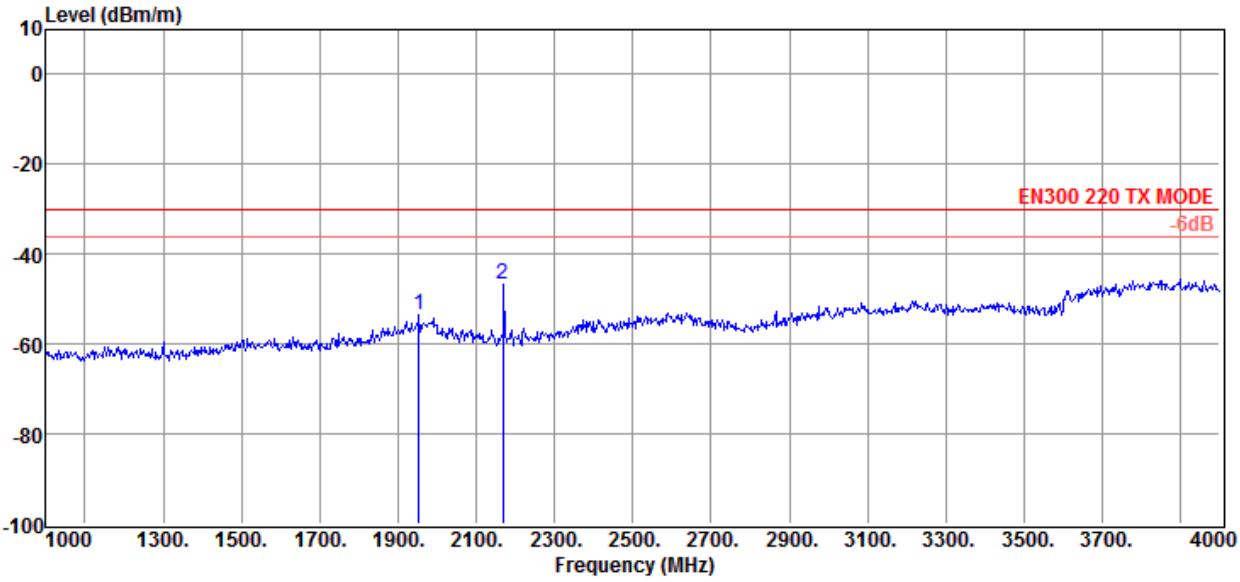
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	433.53	-30.84	15.93	0.00	3.33	9.61	-1.97	-36.00	34.03	EIRP
2	923.95	-97.41	21.94	0.00	4.98	9.73	-60.76	-36.00	-24.76	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-22	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Tx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: HF907 SN100276/3m/VERTICAL
Memo	:		

Data: 3



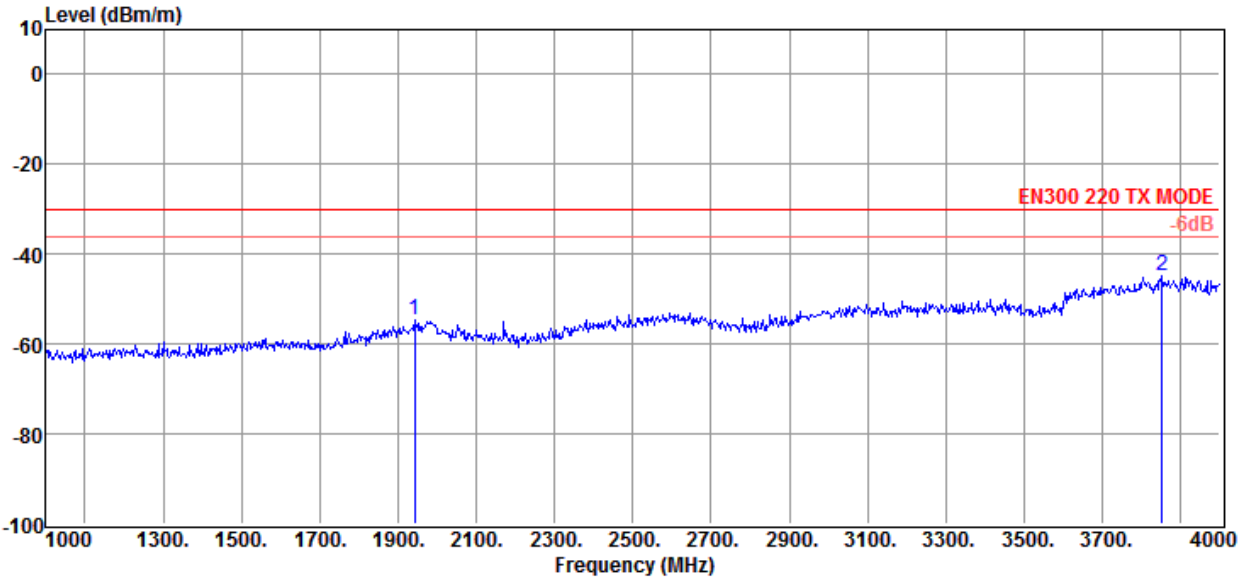
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	1954.00	-99.15	28.16	0.00	6.17	11.13	-53.69	-30.00	-23.69	EIRP
2	2168.00	-90.94	28.12	0.00	6.47	9.65	-46.70	-30.00	-16.70	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-22	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Tx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: HF907 SN100276/3m/HORIZONTAL
Memo	:		

Data: 4



Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	1942.00	-99.59	27.91	0.00	6.16	11.07	-54.45	-30.00	-24.45	EIRP
2	3853.00	-95.39	33.01	0.00	8.79	8.66	-44.93	-30.00	-14.93	EIRP

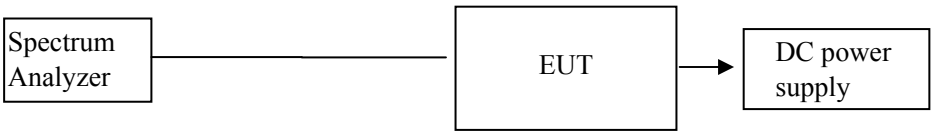
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

9. Frequency stability under low voltage conditions

9.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
. 3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y
4	DC Power Source	ALLPower	ADC50-20	990406	2013/11/13	1 Y

9.2. Block diagram of test setup



9.3. Limit

The frequency stability under low voltage condition is the ability of the equipment to remain on channel, for channelized equipment, or within the assigned operating frequency band, for non-channelized equipment, when the battery voltage falls below the lower extreme voltage level.

For non-channelized equipment,within the assigned operation frequency band, whilst the radiated or conducted power is greater than the spurious emission limit or the equipment cease to function below the providers declared operation voltage.

9.4. Test Procedure

(1) Configure EUT and test equipment as clause 9.2, EUT's antenna output was connected to spectrum analyzer by RF cable. The RF cable's loss was input to spectrum analyzer as amplitude offset.

(2) Measure the upper and lower frequency at the piont which power is the spurious emission limits in different power supply.

9.5. Test Result

Voltage	Lower frequency (MHz)	Upper frequency (MHz)	Limits		Conclusion
			Lower (MHz)	Upper (MHz)	
DC 4.5V	433.9575	434.0354	433.05	434.79	PASS
DC 4V	433.9556	434.0349	433.05	434.79	PASS
DC 3.5V	433.9580	434.0349	433.05	434.79	PASS
DC 3V	433.9575	434.0354	433.05	434.79	PASS
DC 2.5V	433.9560	434.0354	433.05	434.79	PASS
Note: When voltage below 2.5V, EUT will stop work.					
Test Date :Oct.22,2014			Test Engineer : Damon_Hu		

10. Duty cycle

10.1. Limit

Duty cycle is defined as the ratio, expressed as a percentage, of the maximum transmitter "on" time monitored over one hour, relative to a one hour period. The device may be triggered either automatically or manually and depending on how the device is triggered will also depend on whether the duty cycle is fixed or random..

In a period of 1 hour the duty cycle shall not exceed 10%

10.2. Result

According manufacturer’s declare, in a period of 1 hour, the maximum possible duty cycle is 5%.

11. Blocking

11.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
. 3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y
4	Signal Generator	R&S	SMBV100A	1407.6004K02	2013/11/13	1 Y
5	Power combiner	MINI-Circuits	ZFRSC-183-S+	F095501134	2013/11/13	1 Y

11.2. Limits

Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands.

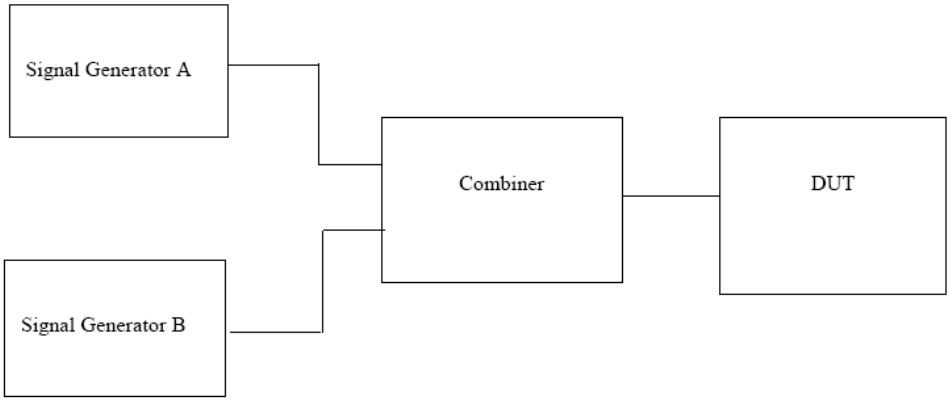
The blocking level shall not be less than the values given in below table, except at frequencies on which spurious responses are found:

Limits for receiver blocking

Receiver category	Frequency offset	Limit
1	±2 MHz	≥ 84 dB - A (see note 2)
2	±2 MHz	≥ 35 dB - A (see note 2)
3	±2 MHz	≥ 24 dB - A (see note 2)
1	±10 MHz	≥ 84 dB - A (see note 2)
2	±10 MHz	≥ 60 dB - A (see note 2)
3	±10 MHz	≥ 44 dB - A (see note 2)

NOTE 1: The limits apply also for the repeated tests in case of equipment using LBT or category 1 receivers, reduced by 13 dB or 40 dB, respectively, to account for the increased wanted signal level.
NOTE 2: A = 10 log (BW_{kHz} / 16 kHz) BW is the receiver bandwidth (see clause 8.1.4).

11.3. Block diagram of test setup



11.4. Test procedure

(1) Configure EUT and test equipment as clause 3.3, EUT's antenna output was connected to spectrum analyzer by RF cable. The RF cable's loss was input to spectrum analyzer as amplitude offset.

(2) Follow the test method described in clause 8.4.2 of EN300 220-1 V2.3.1. to measure out the blocking level of transmitter.

11.5. Test result

Signal generator A (S_W)		Signal generator B (S_U)		Delta ABS(S_u − S_w) (dB)	Minimum limit (dB)	Margin (dB)
Rx freq. (MHz)	Power level (dBm)	Freq. offset (MHz)	Power Level (dBm)			
433.99	-70.26	2	-20.69	49.57	16.04	33.53
		−2	-19.69	50.57	16.04	34.53
		10	-10.54	59.72	36.04	23.68
		−10	-9.56	60.70	36.04	24.66
Conclusion: PASS						
Test date: Oct.22,2013				Test engineer: Leo Liu		

Note: EUT is category 3 receiver. Limit Based on Bandwidth of 100KHz (limit = >X [dB] − A). A = 10 × $\log_{10}$ (BW kHz / 16 kHz).

12. Receiver spurious emissions (Conducted)

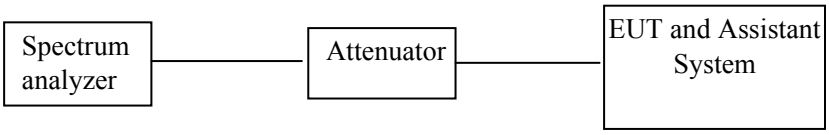
12.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1 Y
. 2	Attenuator	Mini-Circuits	BW-S10W2	101109	2013/11/13	1 Y
. 3	RF Cable	Micable	C10-01-01-1	100309	2013/11/13	1 Y

12.2. Limits

State	Other frequencies ≤1 000 MHz	Frequencies > 1 000 MHz
Receive	2 nW /-57dBm	20 nW /-47dBm

12.3. Block diagram of test setup



12.4. Test procedure

(6) Configure EUT and assistant system according clause 2.4 and 7.3

(7) The transmitter was set on continuous receive mode with normal modulation.

(8) All the emissions from 9KHz to 4GHz were measured with test spectrum analyser was set as below.

Frequency band	RBW	VBW	Detector mode
Below 1GHz	100KHz	300KHz	Peak
Above 1GHz	100KHz	300KHz	Peak

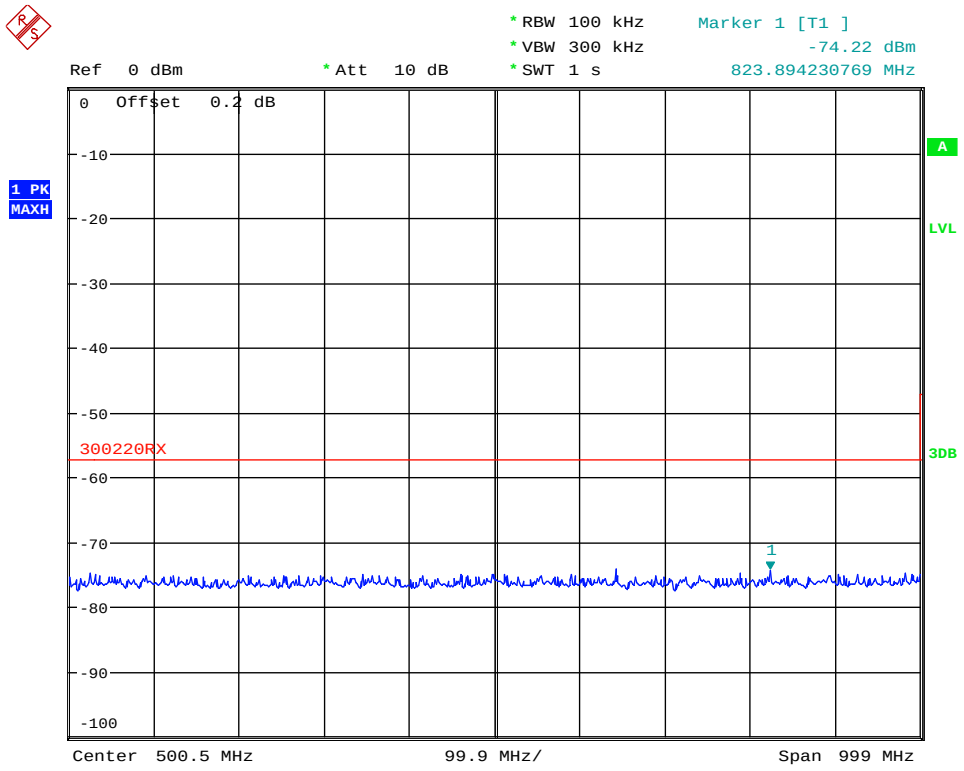
(9) The measured level in step 4 add antenn gain shall comply with limit.

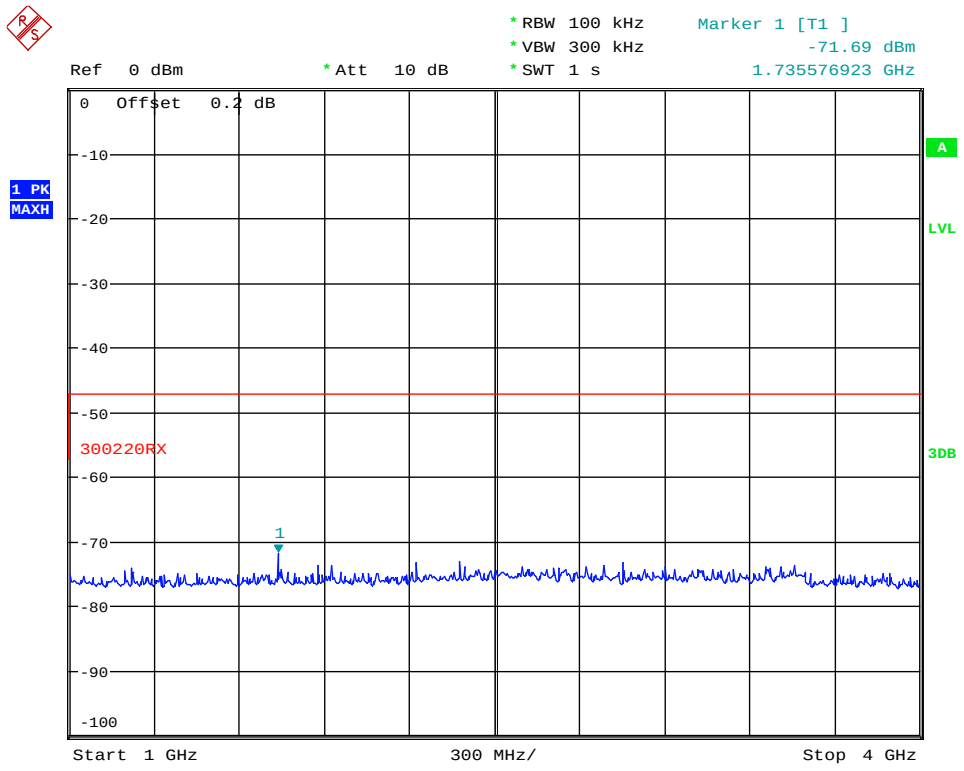
12.5. Test result

Test Mode：Rx Mode					
Frequency (MHz)	Result (dBm)	Antenna Gain (dB)	Unwanted emissions (dB)	Limit (dBm)	Margin (dB)
823.894	-74.22	2	-72.22	-57	15.22
1735.5	-71.69	2	-69.69	-47	22.69
Conclusion: PASS					
Test date: Oct.22,2014			Test engineer: Leo Liu		

12.6. Original Test Data

Rx Mode:





13. Receiver spurious emissions (Radiated)

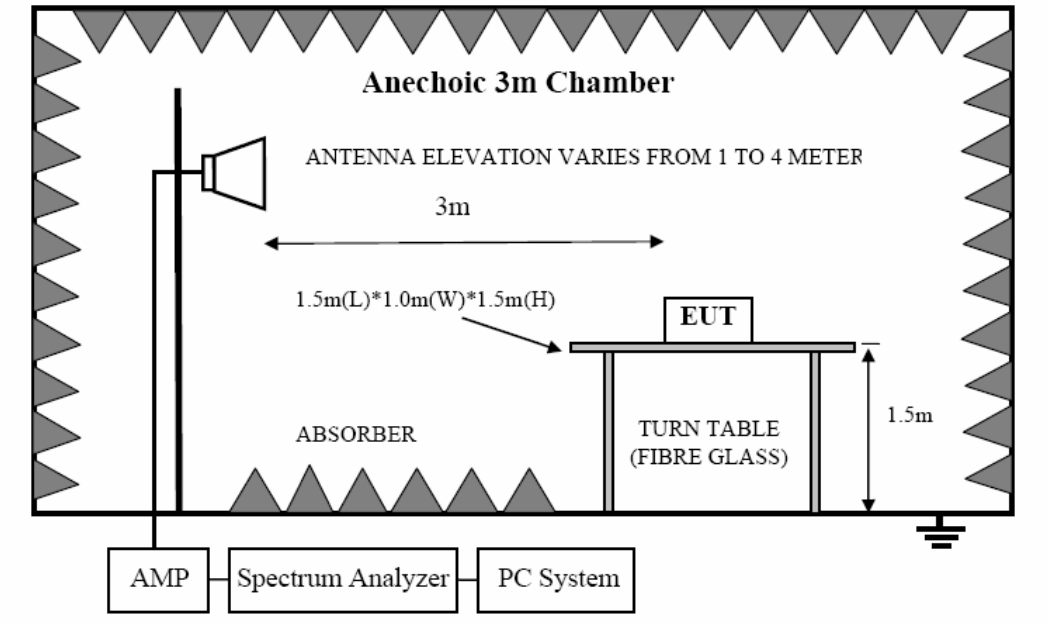
13.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU26	1166.1660.26	2013/11/13	1Y
2	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2013/11/16	1Y
3	Double Ridged Horn Antenna	R&S	HF907	100276	2013/11/16	1Y
4	Pre-Amplifier	R&S	SCU-01	10049	2013/11/13	1Y
5	Pre-amplifier	A.H.	PAM0-0118	360	2013/11/13	1Y
6	RF Cable	R&S	R01	10403	2013/11/13	1Y
7	RF Cable	R&S	R02	10512	2013/11/13	1Y
8	RF Cable	R&S	R01	10454	2013/11/13	1Y
9	RF Cable	R&S	R02	10343	2013/11/13	1Y

13.2. Limits

State	Other frequencies ≤1 000 MHz	Frequencies > 1 000 MHz
Receive	2 nW /-57dBm	20 nW /-47dBm

13.3. Block diagram of test setup



13.4. Test procedure

(7) EUT was placed on a non-metallic table, 1.5m above the ground plane inside a semi-anechoic chamber.

(8) Setup EUT and assistant system according clause 2.4 and 8.3.

(9) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
30MHz-1GHz	Trilog Broadband Antenna
1GHz-4GHz	Double Ridged Horn Antenna

(10) Set EUT work in receive mode.

(11) All the emissions from 30MHz to 4GHz at 3m distance was measured and recorded with receive antenna in both vertical and horizontal and varied from 1 m to 4 m. in height above the reference ground plane, and rotating the turntable obtain the maximum signal strength., the test spectrum analyser was set as below

Frequency band	RBW	VBW	Detector mode
30MHz-1GHz	100KHz	300KHz	Peak
1GHz-12.75GHz	1MHz	3MHz	Peak

Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

(12) A correction values from a verified site calibration was used to calculate the spurious emissions of EUT.

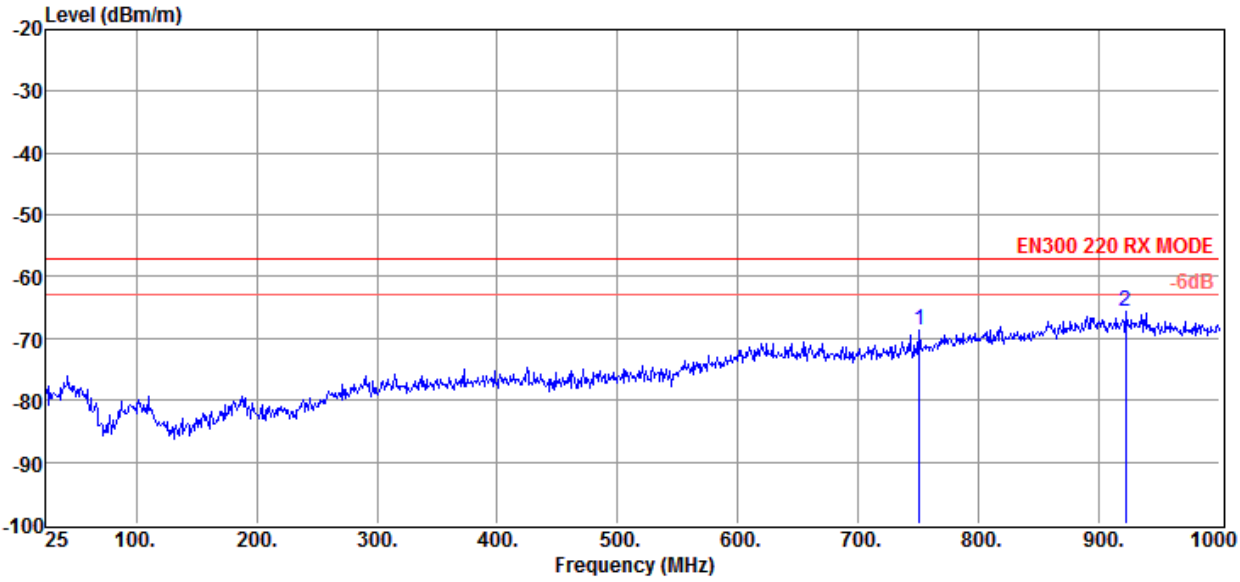
13.5. Test result

PASS, See below test data

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-23	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Rx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: VULB 9163 2014-05/3m/HORIZONTAL
Memo	:		

Data: 5



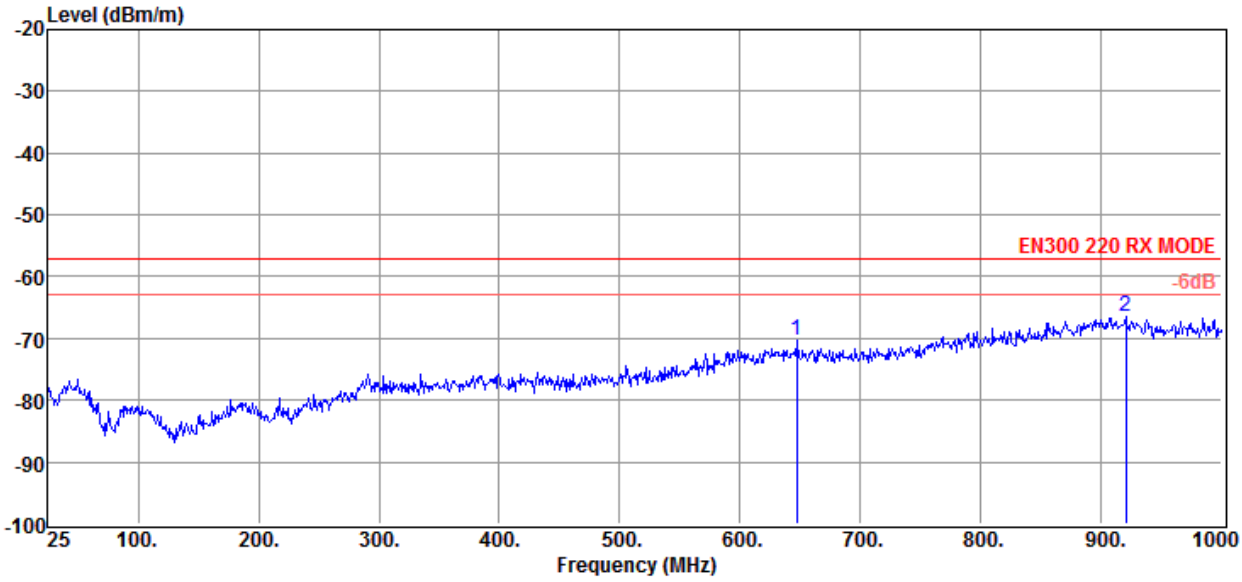
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	750.40	-101.68	19.50	0.00	4.55	9.02	-68.61	-57.00	-11.61	EIRP
2	922.00	-102.26	21.94	0.00	4.98	9.73	-65.61	-57.00	-8.61	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-23	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Rx Mode
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: VULB 9163 2014-05/3m/HORIZONTAL
Memo	:		

Data: 6



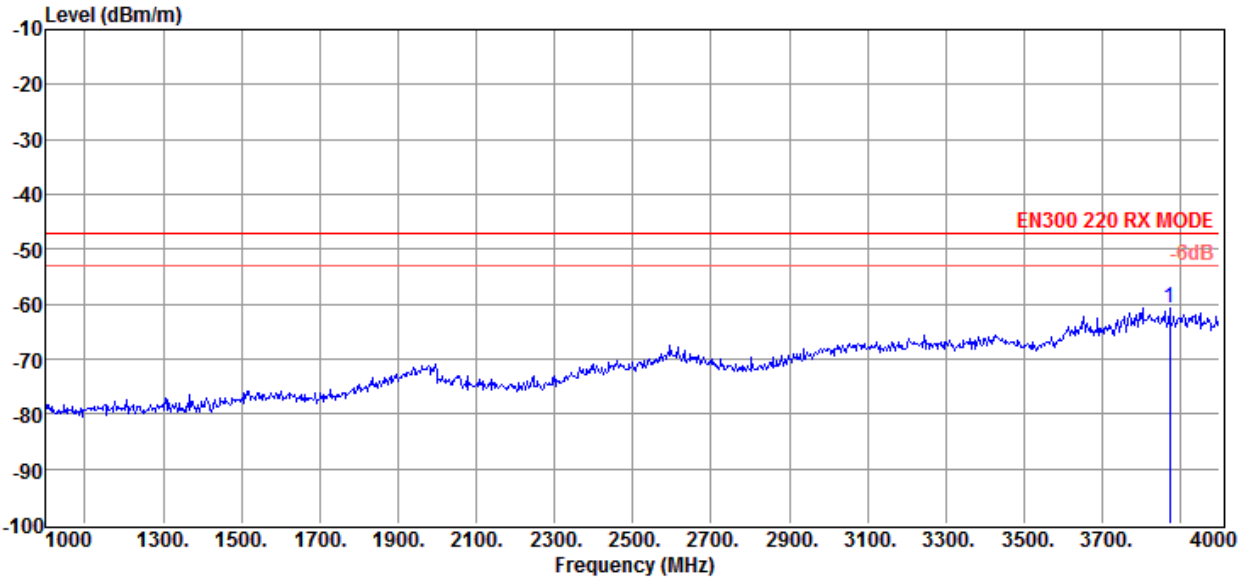
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	647.05	-102.83	18.36	0.00	4.16	10.01	-70.30	-57.00	-13.30	EIRP
2	920.05	-103.05	21.96	0.00	4.97	9.73	-66.39	-57.00	-9.39	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-23	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Rx
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: HF907 SN100276/3m/HORIZONTAL
Memo	:		

Data: 7



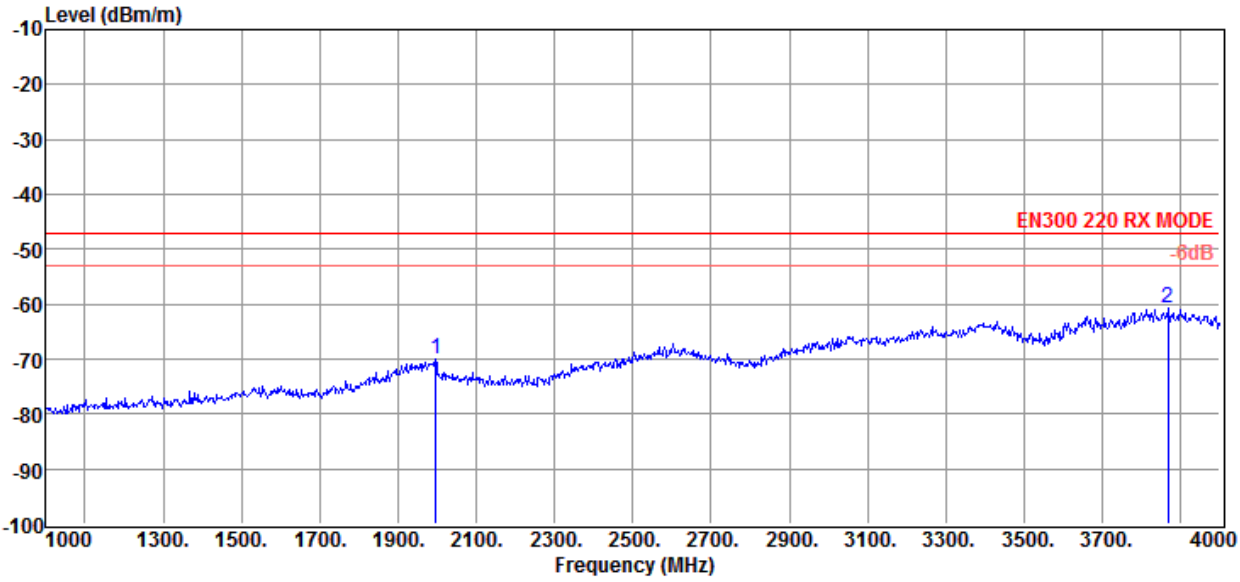
Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	3871.00	-70.95	32.99	40.31	8.80	8.64	-60.83	-47.00	-13.83	EIRP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Spurious Emission Test Result

Test Site	: DDT 3m Chamber	E:\2014 Report Data\QD140391\QD140391.EM6	
Test Date	: 2014-10-23	**Tested By**	: Jerry
EUT	: Wireless RF module	**Model Number**	: RF69CW-433S2
Power Supply	: DC 4.5V	**Test Mode**	: Rx
Condition	: Temp:24.5'C,Humi:55%,Press:100.1kPa	**Antenna/Distance**	: HF907 SN100276/3m/VERTICAL
Memo	:		

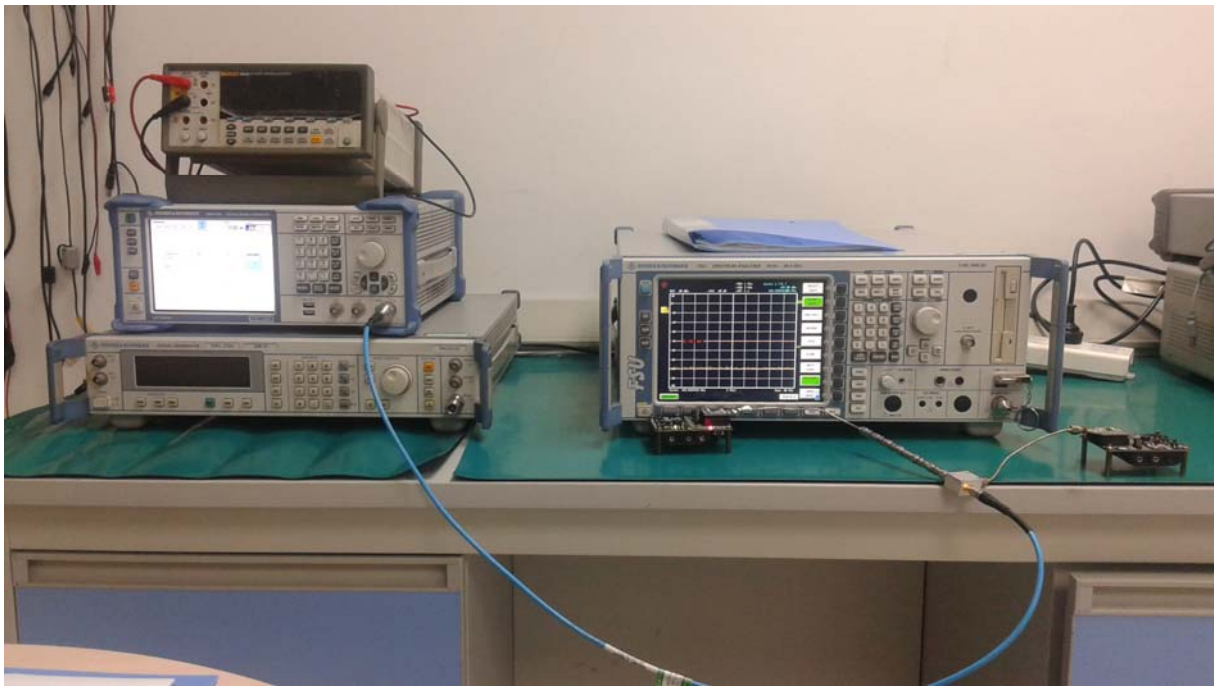
Data: 8

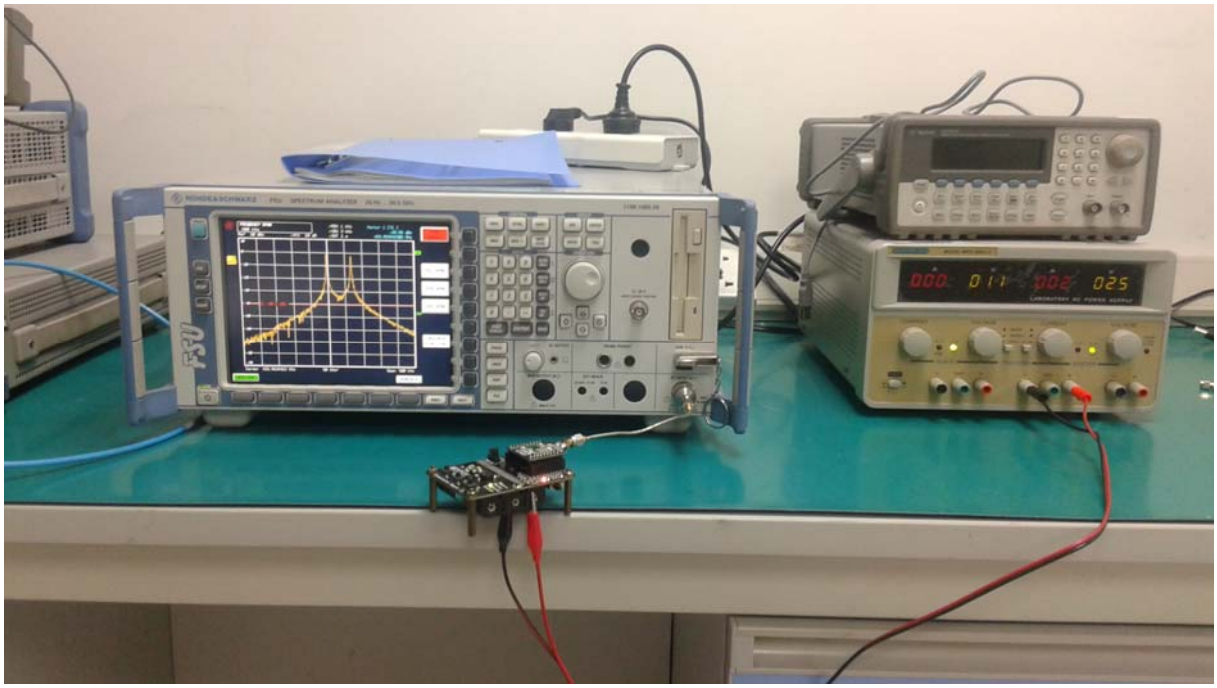


Item (Mark)	Freq (MHz)	Read Level (dBm)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Site Loss Factor dB	Result Level (dBm	Limit Line (dBm)	Over Limit (dB)	Type
1	1996.00	-75.23	28.50	41.30	6.17	11.76	-70.10	-47.00	-23.10	EIRP
2	3868.00	-71.13	33.01	40.31	8.80	8.80	-60.83	-47.00	-13.83	EIRP

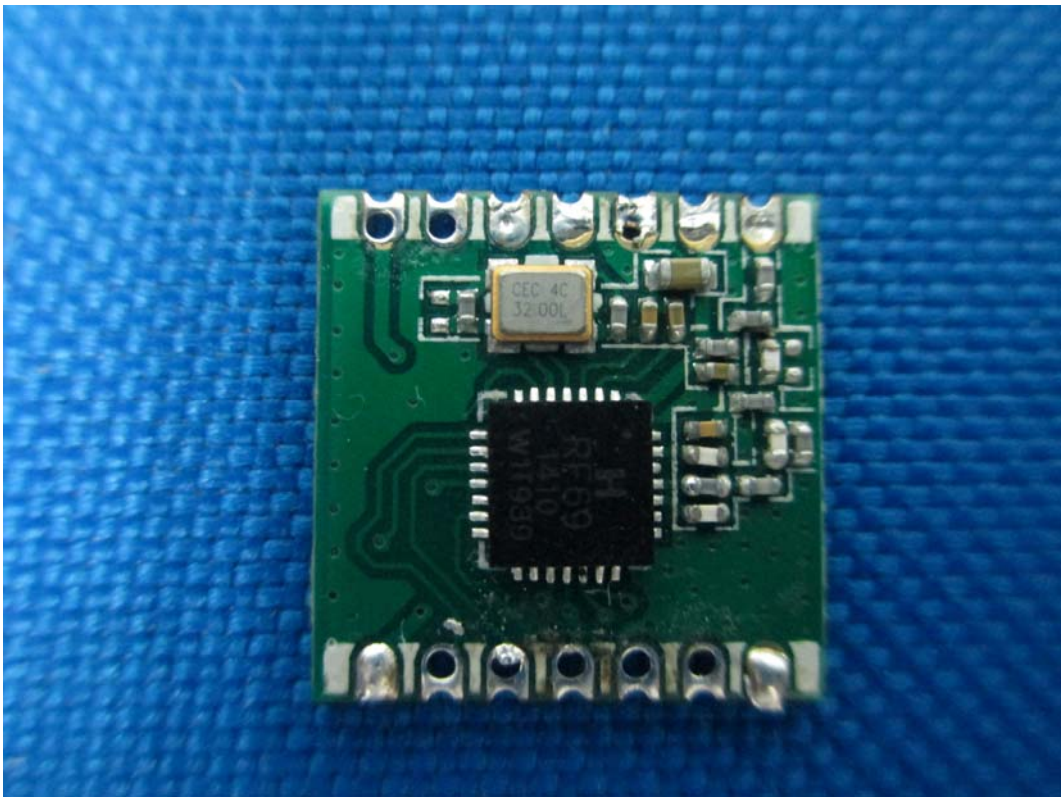
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor + Site Loss Factor.
2. Below 1 GHz test setup: RBW: 100 kHz, VBW: 300 kHz, Sweep time: auto.
3. Above 1 GHz test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

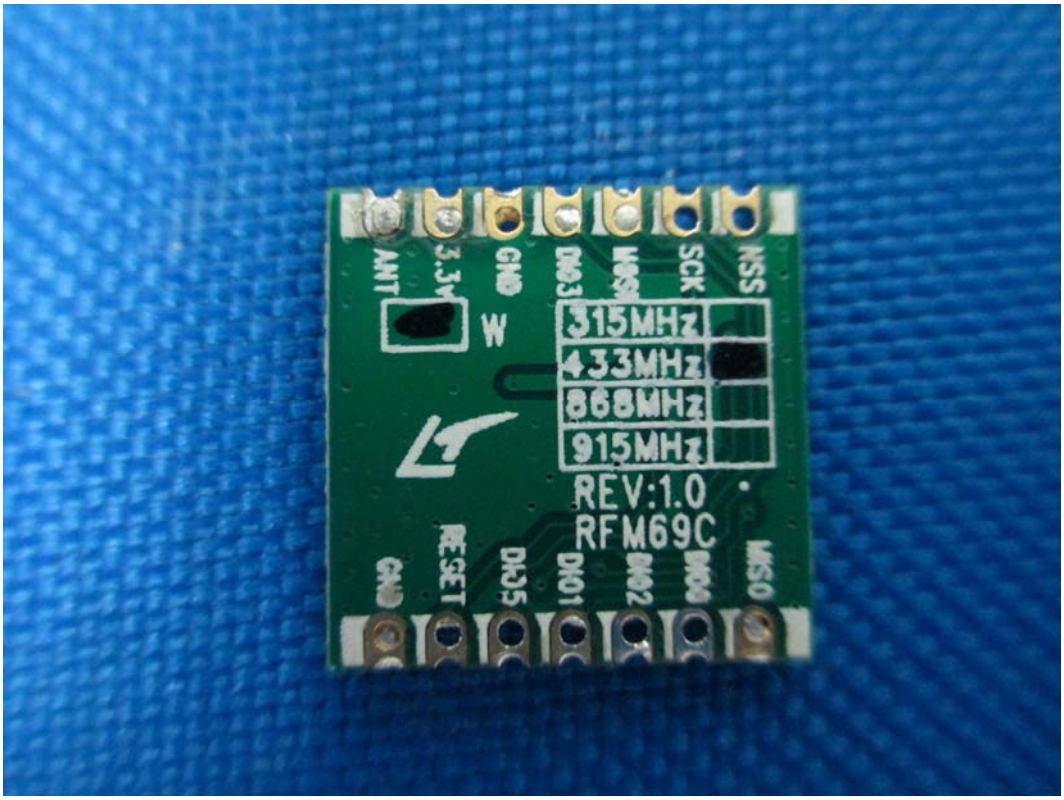
14. Test setup photograph





15. Photos of the EUT





END OF REPORT