

FCC CERTIFICATION TEST REPORT

FOR

Applicant : VSO TECHNOLOGY (DONG GUAN) CO.,LTD
Address : No.58 Long Tou Road,Long Jian Tian,Huang Jiang,Dong Guan,Guang Dong,China
Equipment under Test : Wireless receiver
Model No. : JRB13
FCC ID : YLD-MX168S
Manufacturer : VSO TECHNOLOGY (DONG GUAN) CO.,LTD
Address : No.58 Long Tou Road,Long Jian Tian,Huang Jiang,Dong Guan,Guang Dong,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

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TEST REPORT DECLARE

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Address : No.58 Long Tou Road,Long Jian Tian,Huang Jiang,Dong Guan,Guang
 Dong,China

Test Standard Used: FCC Rules and Regulations Part 15 Subpart C: 2012

Test procedure used: ANSI C63.10:2009; ANSI C63.4:2009

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 provided for test compliance with the requirement of the above FCC standards.

Report No:	DDT-RE140546		
Date of Test:	2014/07/14-2014/07/17	Date of Report:	2014/07/17

Prepared By:



Leo Liu/Engineer

Approved By:



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

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission Test	FCC Part 15C: 15.207 ANSI C63.10 :2009 ANSI C63.4:2009	PASS
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10 :2009 ANSI C63.4:2009	PASS
Band Edge Compliance Test	FCC Part 15: 15.249 ANSI C63.10 :2009 ANSI C63.4:2009	PASS
20dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10 :2009	PASS
N/A is an abbreviation for Not Applicable.		

2. General test information

2.1. Description of EUT

EUT* Name	:	Wireless receiver
Model Number	:	JRB13
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 5V from notebook
FCC ID	:	YLD-MX168S
FCC Operation frequency	:	2402MHz -2480MHz
Modulation	:	GFSK
Antenna Type	:	“F” Shape integral PCB Antenna, Gain: 0dBi
Date of Receipt	:	2014/07/10
Sample Type	:	Series production

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

2.2. Accessories of EUT

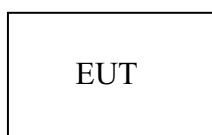
Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
Notebook	DELL	LATITUDE / D610	AC ADAPTER MODEL NO.: LA65NS0-00

2.4. Block diagram of EUT configuration for test

TX Mode:



Note: For Tx Mode, A special test firmware was installed in the notebook and which can exercise the EUT work in continues RF test mode at specified test channel as below:

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
Tx Mode	Low	2402
	Middle	2440
	High	2480

2.5. Test environment conditions

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

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

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

FCC Registration Number: 270092

2.7. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.40dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	2.78 dB (Polarize: V)
	3.20 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	2.08dB(Polarize: V)
	2.56dB (Polarize: H)
Uncertainty for radio frequency	1×10-9
Uncertainty for conducted RF Power	0.65dB

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

3. 20dB Bandwidth

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	1Y

3.2. Block diagram of test setup



3.3. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.4. Test Procedure

- (1) The EUT's RF signal was coupled to spectrum analyzer by a antenna connected to spectrum analyzer.
- (2) Configure EUT work in Tx mode as stated in clause 2.4.
- (3) The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

EUT: Wireless receiver M/N: JRB13					
Mode	Freq (MHz)	Result (MHz)	Limit (MHz)	Margin (MHz)	Conclusion
Tx Mode	2402	1.855	/	/	PASS
	2440	1.870	/	/	PASS
	2480	1.955	/	/	PASS
Test Date : 2014/07/16			Test Engineer : Damon Hu		

Ref -20 dBm * Att 0 dB * RBW 100 kHz * VBW 300 kHz SWT 5 ms Marker 1 [T1] -23.66 dBm 2.401830000 GHz

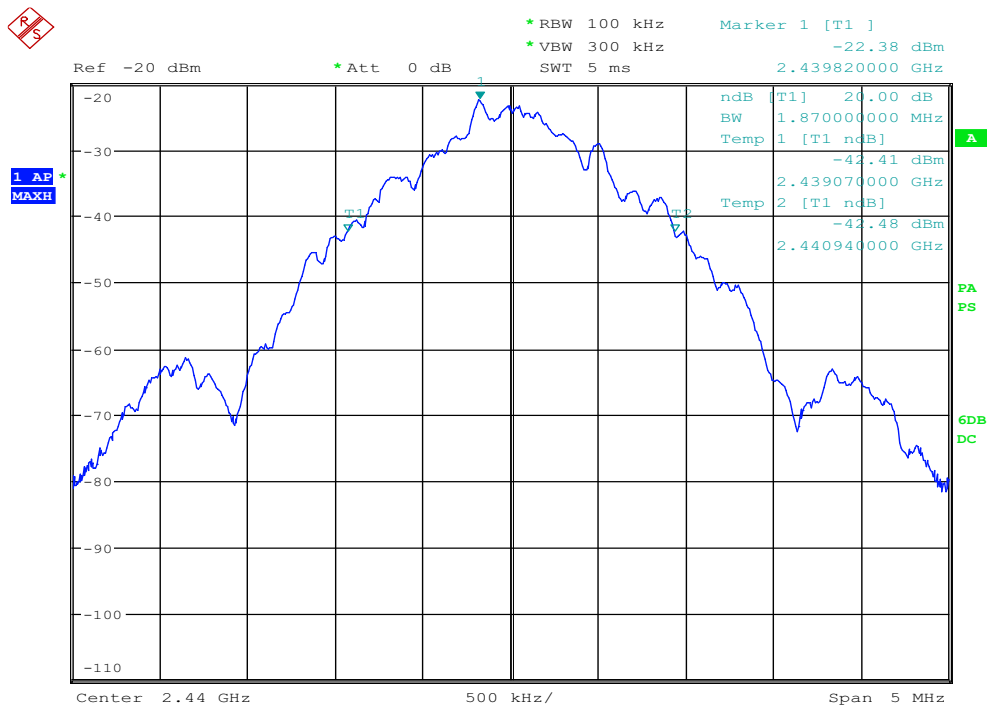
1 AP MAXH

ndB [T1] 20.00 dB
BW 1.855000000 MHz
Temp 1 [T1 ndB] -43.55 dBm 2.401075000 GHz
Temp 2 [T1 ndB] -43.61 dBm 2.402930000 GHz

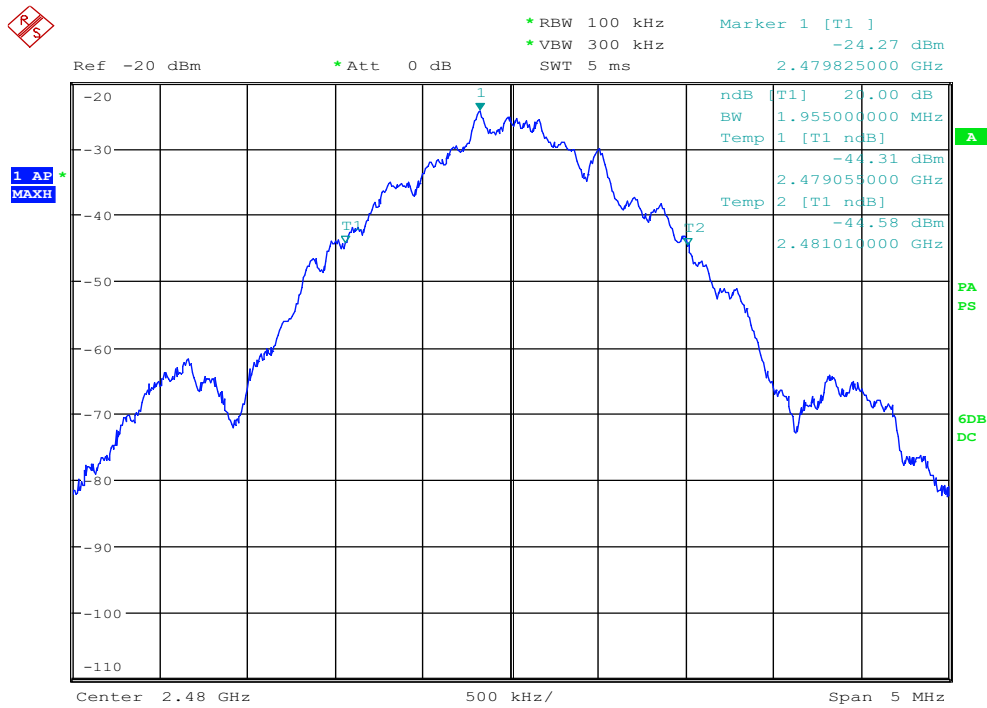
PA PS 6DB DC

Center 2.402 GHz Span 5 MHz

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Date: 16.JUL.2014 09:11:08



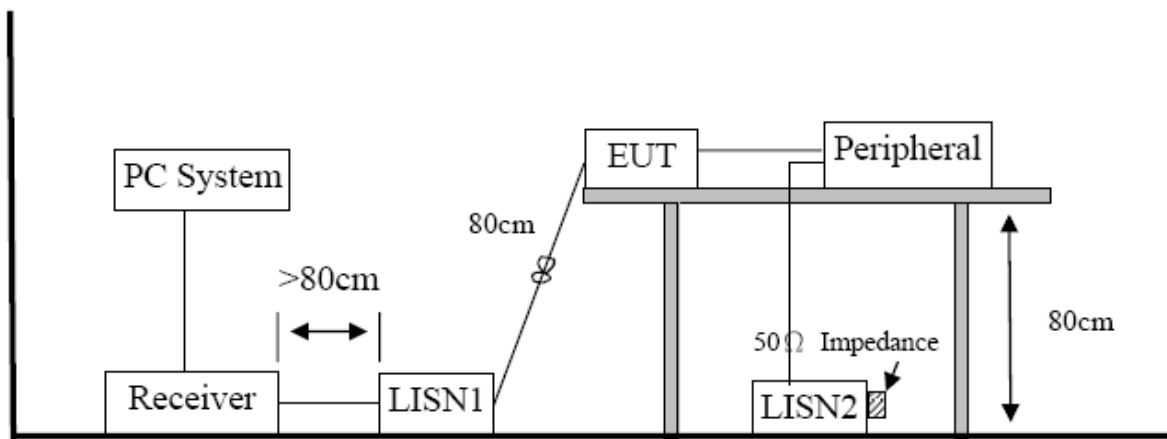
Date: 16.JUL.2014 09:13:17

4. Power Line Conducted Emission

4.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESU8	100316	2013/11/13	1 Year
2	LISN 1	R&S	ENV216	101109	2013/11/13	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2013/11/13	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101242	2013/11/13	1 Year
5	Cable	HUBSER	RG214/U	534971	2013/11/13	1 Year

4.2. Block diagram of test setup



4.3. Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

4.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 4.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

4.5. Test Result

PASS. (See below detailed test result)

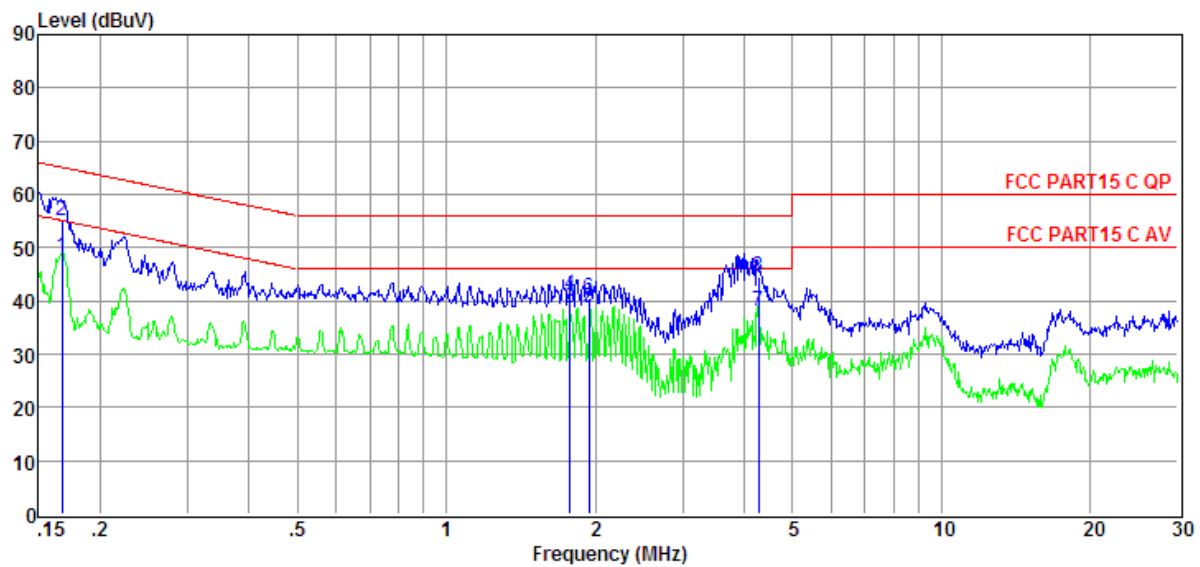
Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “----” means average detection; “----” mans peak detection

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2014 report data\QD140322\CE.EM6**
Test Date : 2014-07-17 **Tested By** : Damon
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : TX Mid Channel 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **LISN** : 2013 ENV216/LINE
Memo :

Data : 2



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.17	28.80	9.61	0.01	9.84	48.26	55.08	-6.82	Average	LINE
2	0.17	35.67	9.61	0.01	9.84	55.13	65.08	-9.95	QP	LINE
3	1.78	18.96	9.63	0.06	9.86	38.51	46.00	-7.49	Average	LINE
4	1.78	21.70	9.63	0.06	9.86	41.25	56.00	-14.75	QP	LINE
5	1.94	19.14	9.63	0.07	9.86	38.70	46.00	-7.30	Average	LINE
6	1.94	20.94	9.63	0.07	9.86	40.50	56.00	-15.50	QP	LINE
7	4.27	18.30	9.67	0.10	9.87	37.94	46.00	-8.06	Average	LINE
8	4.27	24.92	9.67	0.10	9.87	44.56	56.00	-11.44	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

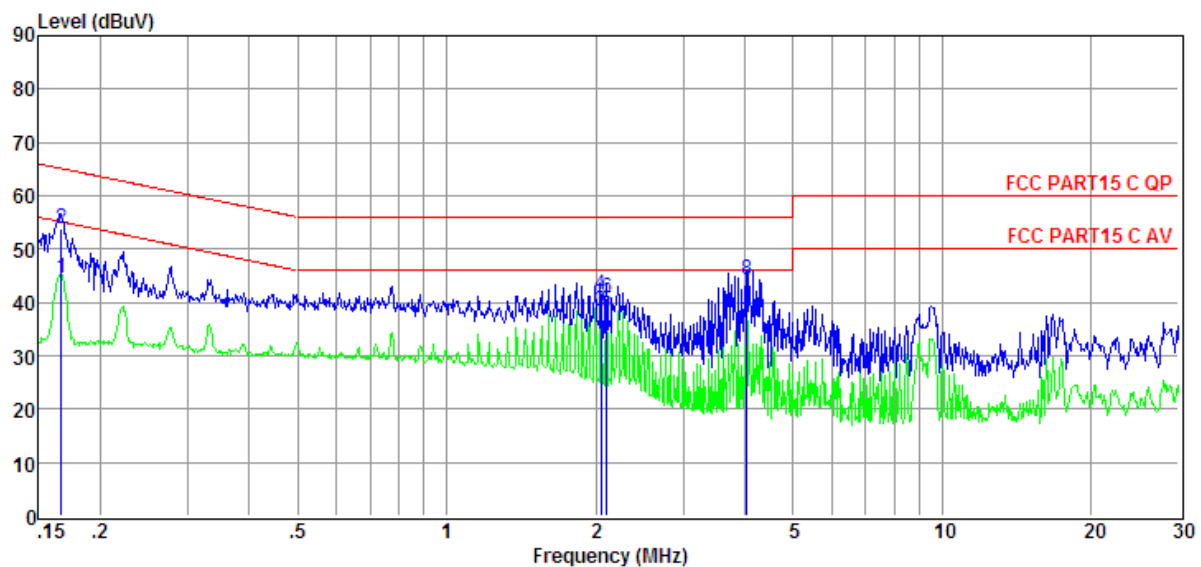
2. If QP Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200Hz (9kHz—150kHz) , 9kHz (150kHz—30MHz), Step size: 4kHz, Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2014 report data\QD140322\CE.EM6**
Test Date : 2014-07-17 **Tested By** : Damon
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : TX Mid Channel 2440MHz
Condition : Temp:24.5'C,Humi:55%,
Press:100.1kPa **LISN** : 2013 ENV216/NEUTRAL
Memo :

Data : 4



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.17	25.17	9.60	0.01	9.84	44.62	55.12	-10.50	Average	NEUTRAL
2	0.17	34.22	9.60	0.01	9.84	53.67	65.12	-11.45	QP	NEUTRAL
3	2.05	18.79	9.61	0.07	9.86	38.33	46.00	-7.67	Average	NEUTRAL
4	2.05	22.05	9.61	0.07	9.86	41.59	56.00	-14.41	QP	NEUTRAL
5	2.11	18.79	9.61	0.07	9.86	38.33	46.00	-7.67	Average	NEUTRAL
6	2.11	21.24	9.61	0.07	9.86	40.78	56.00	-15.22	QP	NEUTRAL
7	4.04	16.54	9.62	0.10	9.87	36.13	46.00	-9.87	Average	NEUTRAL
8	4.04	24.64	9.62	0.10	9.87	44.23	56.00	-11.77	QP	NEUTRAL

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

2. If QP Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200Hz (9kHz—150kHz) , 9kHz (150kHz—30MHz), Step size:4kHz, Scan time: auto.

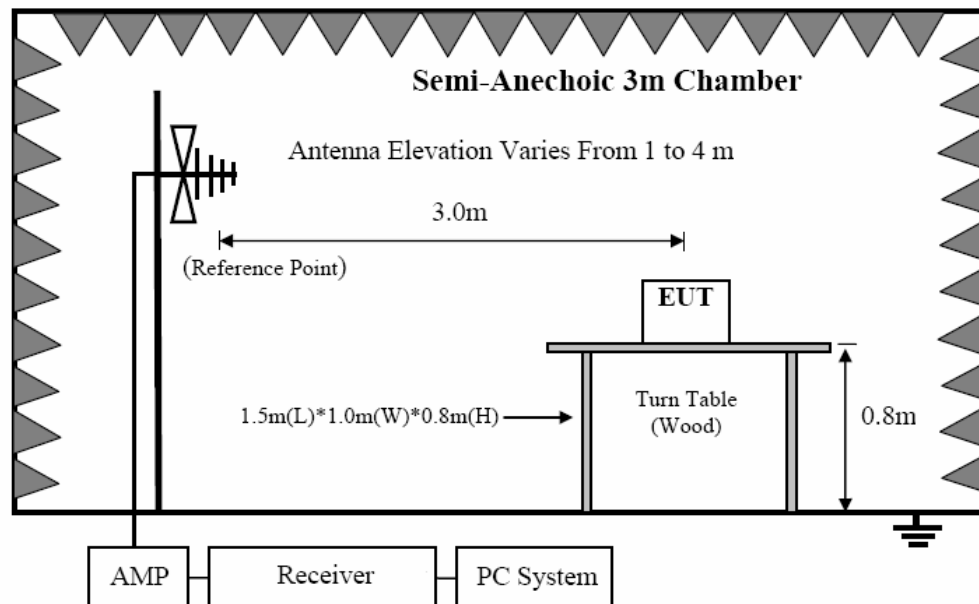
5. Radiated emission

5.1. Test equipment

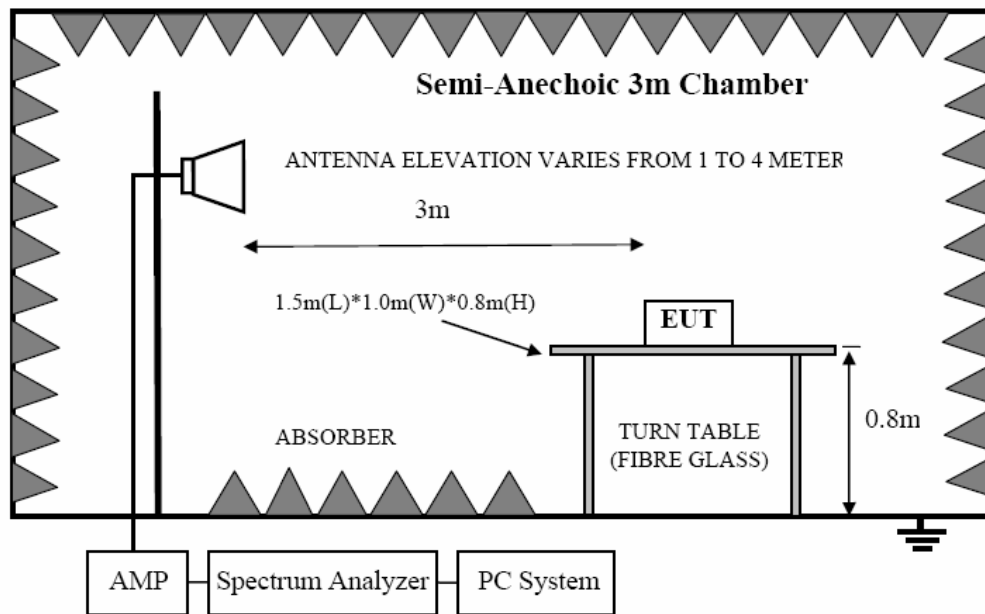
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2013/11/13	1Y
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1Y
3	Loop antenna	TESEQ	HLA6120	20129	2013/11/16	1Y
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2013/11/16	1Y
5	Double Ridged Horn Antenna	R&S	HF907	100276	2013/11/16	1Y
6	Horn Antenna	EMCO	3116	00060095	2013/11/16	1Y
7	Pre-Amplifier	R&S	SCU-01	10049	2013/11/13	1Y
8	Pre-amplifier	A.H.	PAM0-0118	360	2013/11/13	1Y
9	Pre-amplifier	A.H.	PAM-1840VH	562	2013/11/13	1Y
10	RF Cable	R&S	R01	10403	2013/11/13	1Y
11	RF Cable	R&S	R02	10512	2013/11/13	1Y

5.2. Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



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

5.3. Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	
Field Strength of Fundamental emission for 2.4GHz-2.4835GHz	3	94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) 114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)	
Field Strength of Harmonics	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
- (4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

5.4. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 5.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Change power supply range from 85% to 115% of the rated supply voltage
 - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure. Peak detector is used for both PK and AV test.
- (8) For emissions below 1GHz, according explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1GHz, the final test was only performed with EUT working in Tx 2440MHz mode.

5.5. Test result

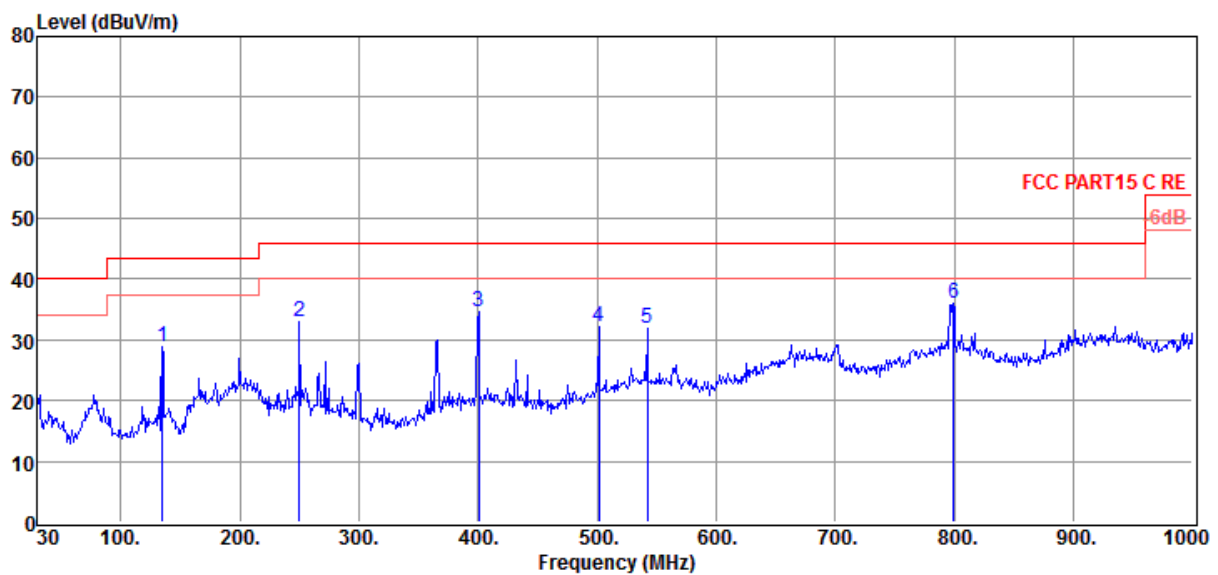
PASS. (See below detailed test result)

All the emissions except fundamental emission from 9 KHz to 25GHz were comply with 15.209 limit.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-14 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 VULB9163/3m/HORIZONTAL
Memo :

Data: 19



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	134.76	19.08	8.15	1.65	28.88	43.50	-14.62	QP	HORIZONTAL
2	250.19	18.73	11.80	2.43	32.96	46.00	-13.04	QP	HORIZONTAL
3	400.54	16.21	15.27	3.23	34.71	46.00	-11.29	QP	HORIZONTAL
4	501.42	12.58	16.01	3.67	32.26	46.00	-13.74	QP	HORIZONTAL
5	542.16	10.74	17.47	3.77	31.98	46.00	-14.02	QP	HORIZONTAL
6	799.21	9.81	21.54	4.69	36.04	46.00	-9.96	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

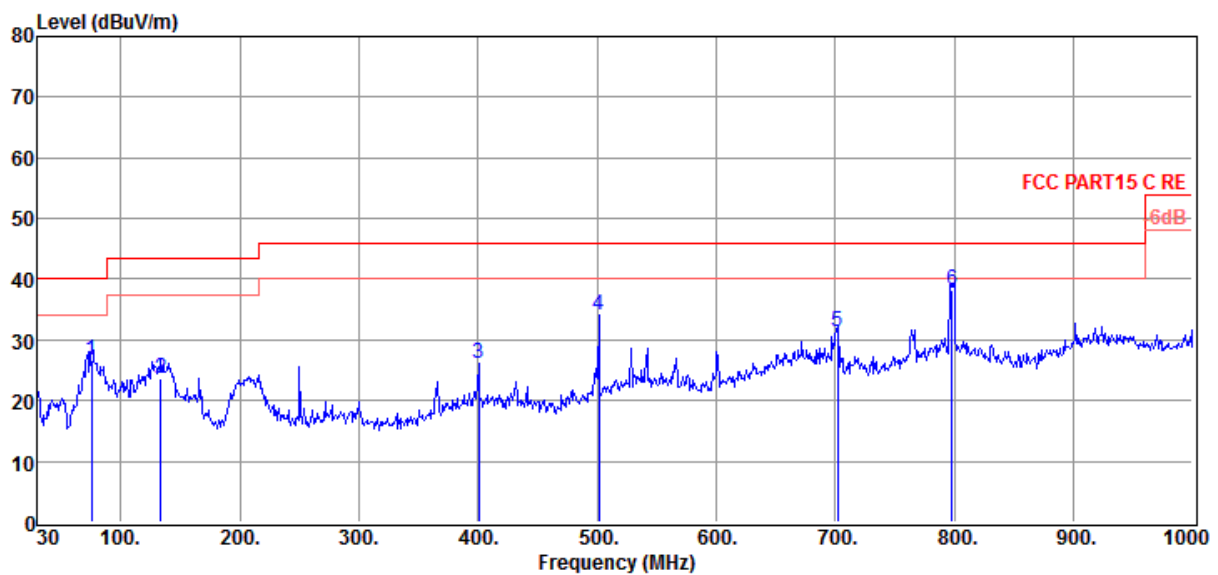
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-14 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 VULB9163/3m/VERTICAL
Memo :

Data: 20



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	75.59	17.19	8.20	1.30	26.69	40.00	-13.31	QP	VERTICAL
2	133.79	13.52	8.38	1.64	23.54	43.50	-19.96	QP	VERTICAL
3	400.54	7.65	15.27	3.23	26.15	46.00	-19.85	QP	VERTICAL
4	501.42	14.44	16.01	3.67	34.12	46.00	-11.88	QP	VERTICAL
5	702.21	7.64	19.20	4.41	31.25	46.00	-14.75	QP	VERTICAL
6	798.24	12.02	21.54	4.69	38.25	46.00	-7.75	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

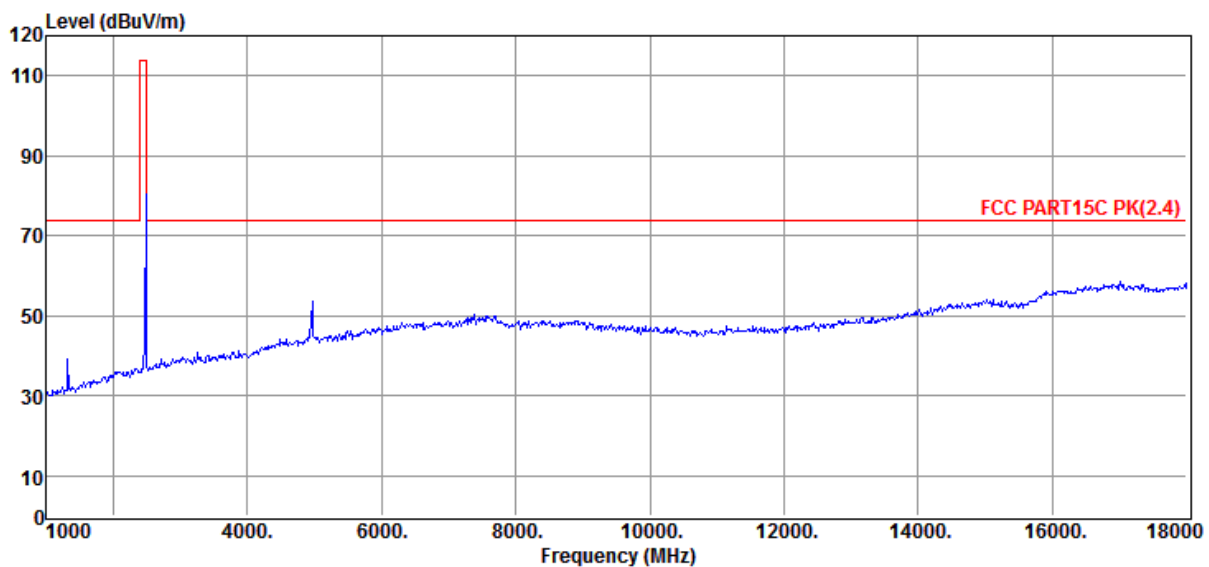
2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 21



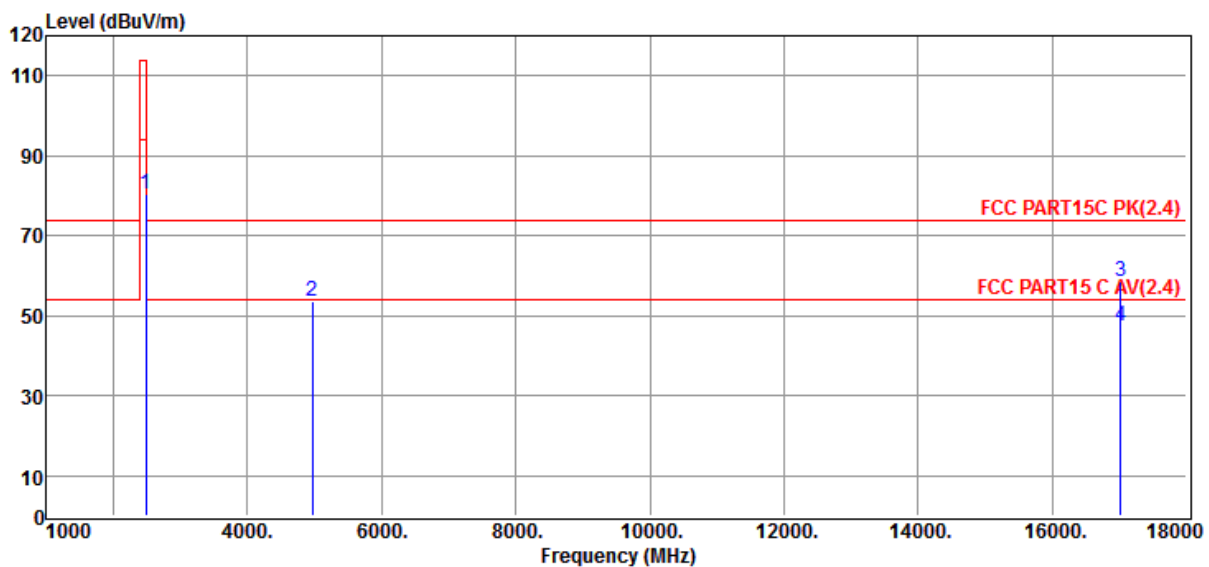
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4. For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 22



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2480.00	85.33	30.25	43.50	8.50	80.58	114.00	-33.42	Peak	HORIZONTAL
2	4960.00	50.05	35.64	44.01	12.02	53.70	74.00	-20.30	Peak	HORIZONTAL
3	17014.00	30.78	43.57	41.30	25.60	58.65	74.00	-15.35	Peak	HORIZONTAL
4	17014.00	19.46	43.57	41.30	25.60	47.33	54.00	-6.67	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

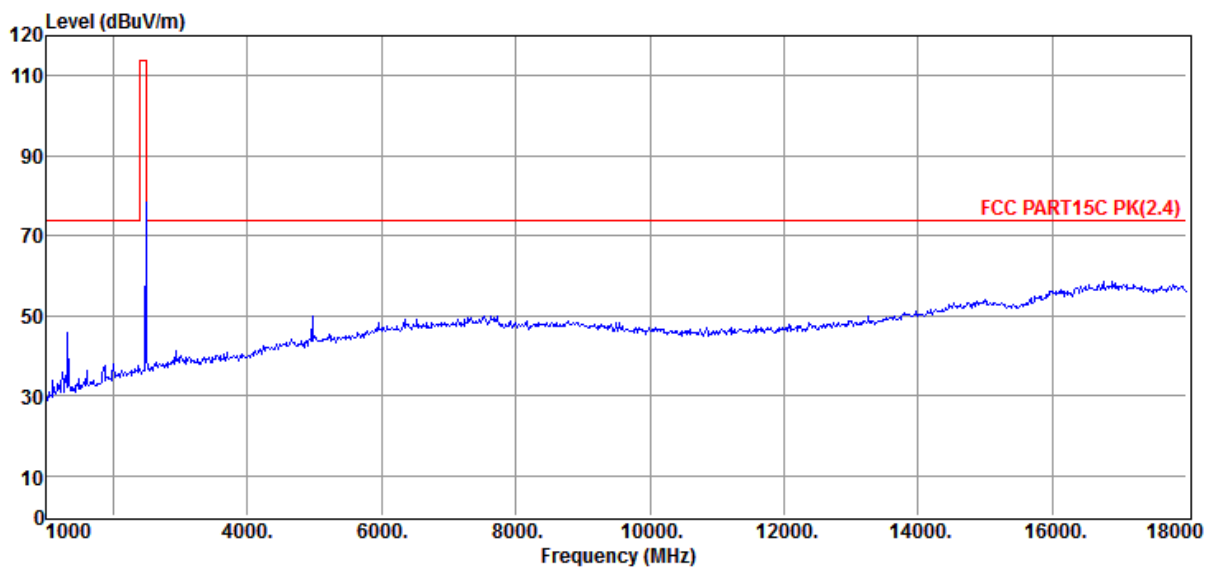
3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

4. For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 23



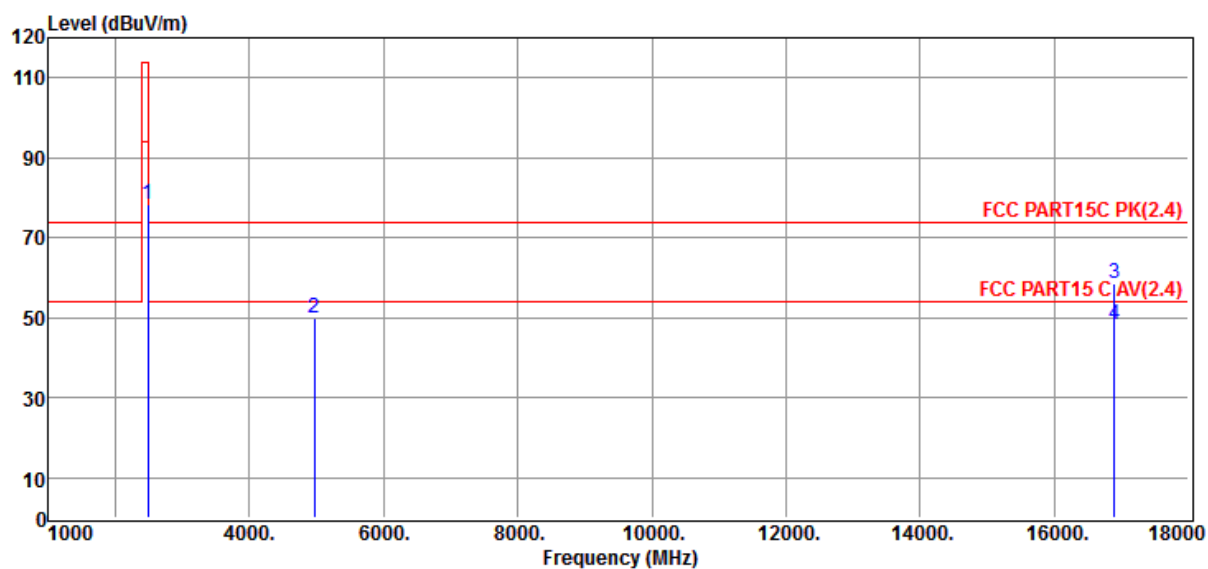
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4. For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 24



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2480.00	83.14	30.25	43.50	8.50	78.39	114.00	-35.61	Peak	VERTICAL
2	4960.00	46.07	35.64	44.01	12.02	49.72	74.00	-24.28	Peak	VERTICAL
3	16895.00	30.79	43.62	41.28	25.60	58.73	74.00	-15.27	Peak	VERTICAL
4	16895.00	20.37	43.62	41.28	25.60	48.31	54.00	-5.69	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

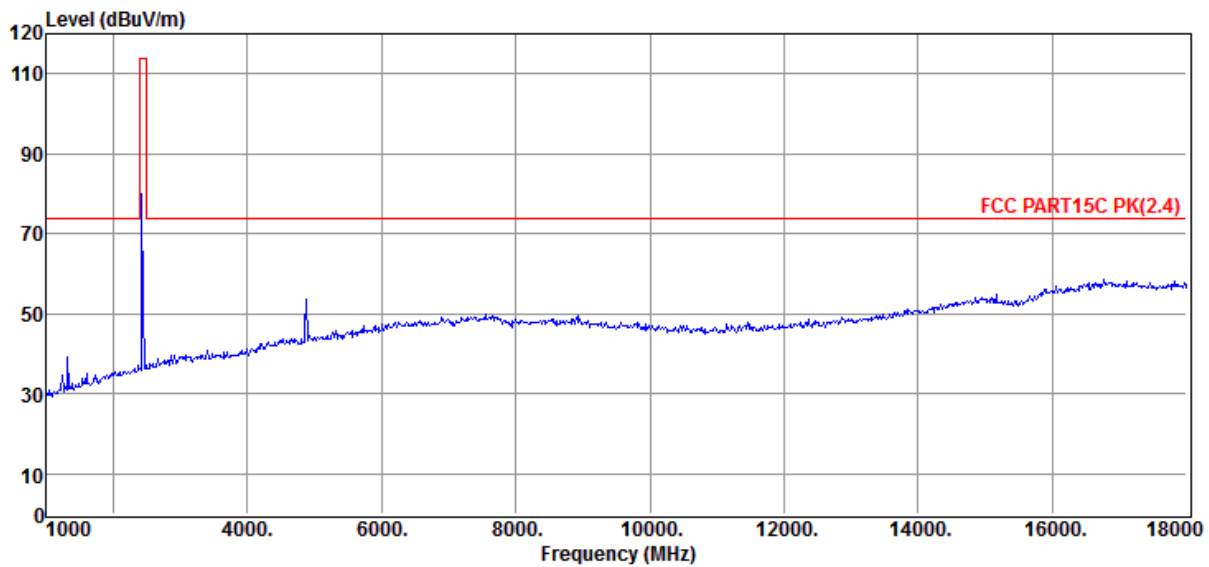
3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

4. For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 27



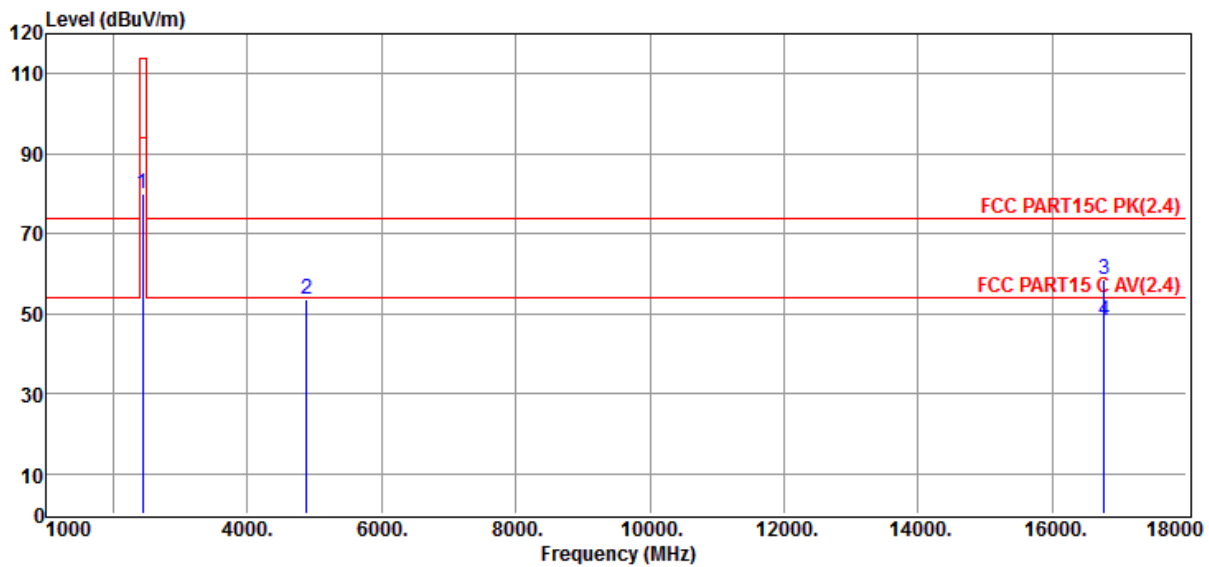
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4: For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 28



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2440.00	85.04	30.14	43.49	8.40	80.09	114.00	-33.91	Peak	HORIZONTAL
2	4880.00	49.97	35.51	44.03	12.04	53.49	74.00	-20.51	Peak	HORIZONTAL
3	16776.00	31.03	43.64	41.25	25.00	58.42	74.00	-15.58	Peak	HORIZONTAL
4	16776.00	20.85	43.64	41.25	25.00	48.24	54.00	-5.76	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

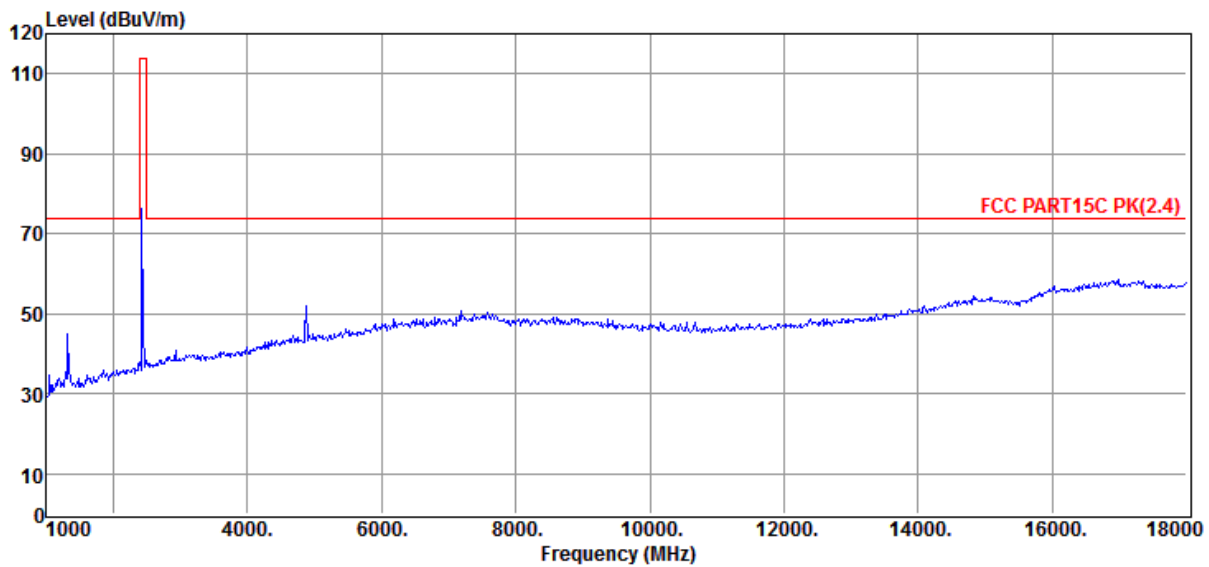
3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

4. For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : D DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 29



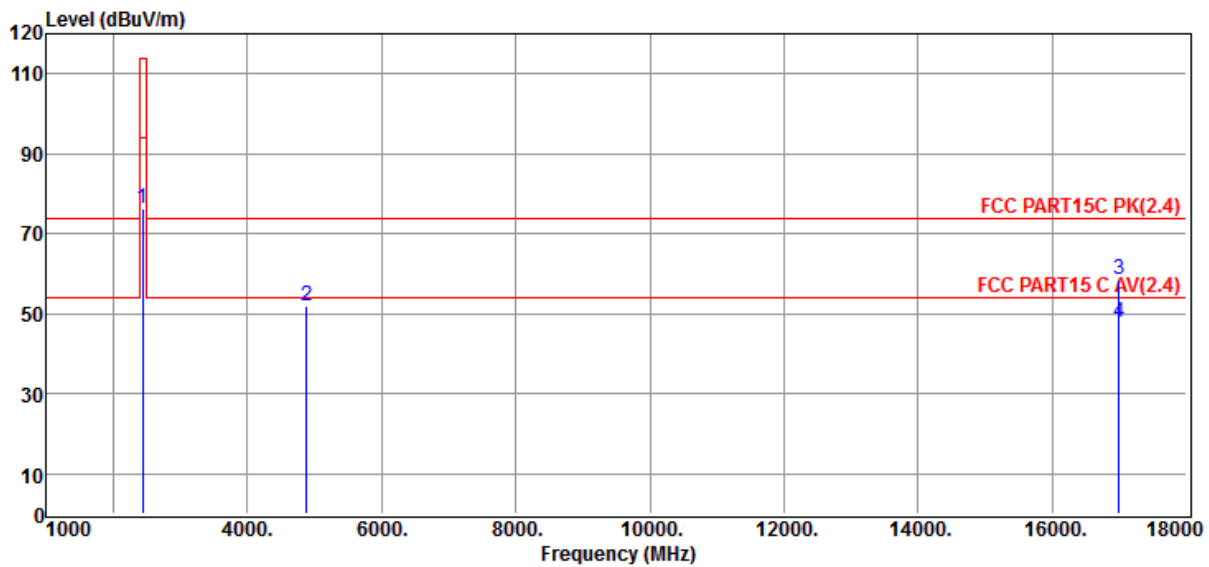
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4: For fundamental frequency RBW 3MHz VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Mid 2440MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 30



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2440.00	81.44	30.14	43.49	8.40	76.49	114.00	-37.51	Peak	VERTICAL
2	4880.00	48.47	35.51	44.03	12.04	51.99	74.00	-22.01	Peak	VERTICAL
3	16997.00	30.47	43.60	41.30	25.60	58.37	74.00	-15.63	Peak	VERTICAL
4	16997.00	19.75	43.60	41.30	25.60	47.65	54.00	-6.35	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

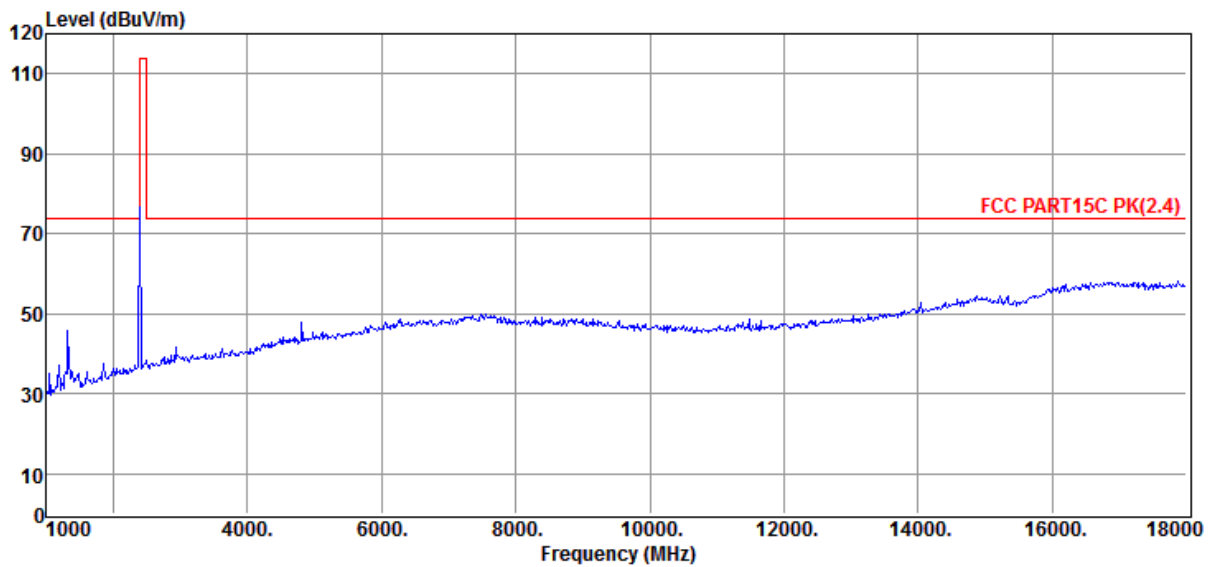
3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

4. For fundamental frequency RBW 3MHz, VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 31



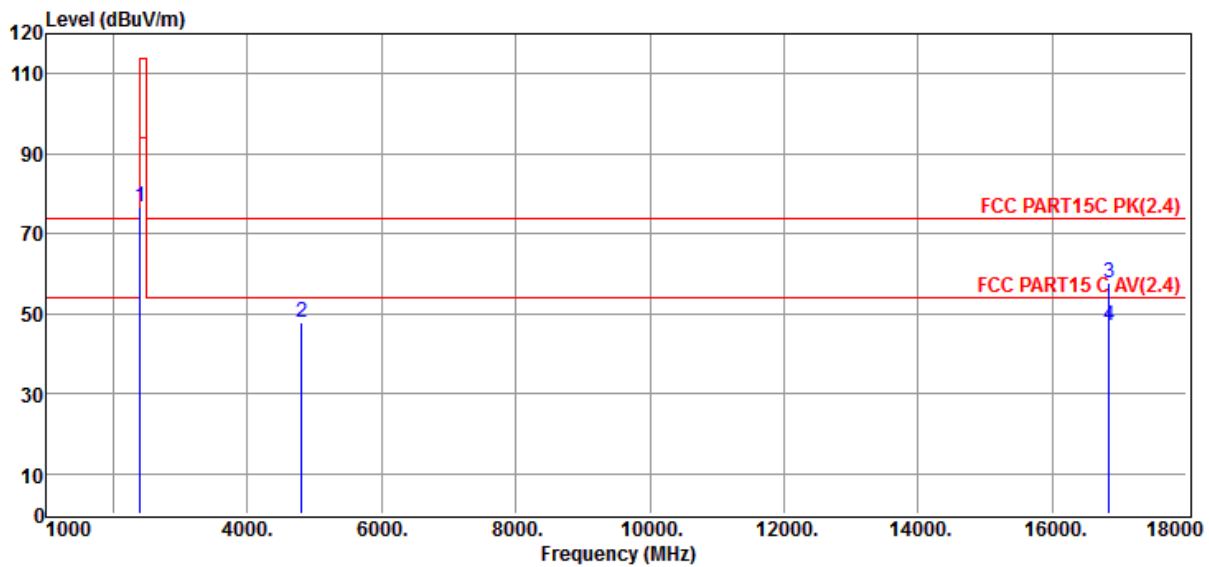
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4. For fundamental frequency RBW 3MHz, VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 32



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2402.00	81.68	29.99	43.49	8.35	76.53	114.00	-37.47	Peak	VERTICAL
2	4808.00	44.56	35.40	44.06	12.07	47.97	74.00	-26.03	Peak	VERTICAL
3	16844.00	29.93	43.63	41.27	25.60	57.89	74.00	-16.11	Peak	VERTICAL
4	16844.00	19.25	43.63	41.27	25.60	47.21	54.00	-6.79	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

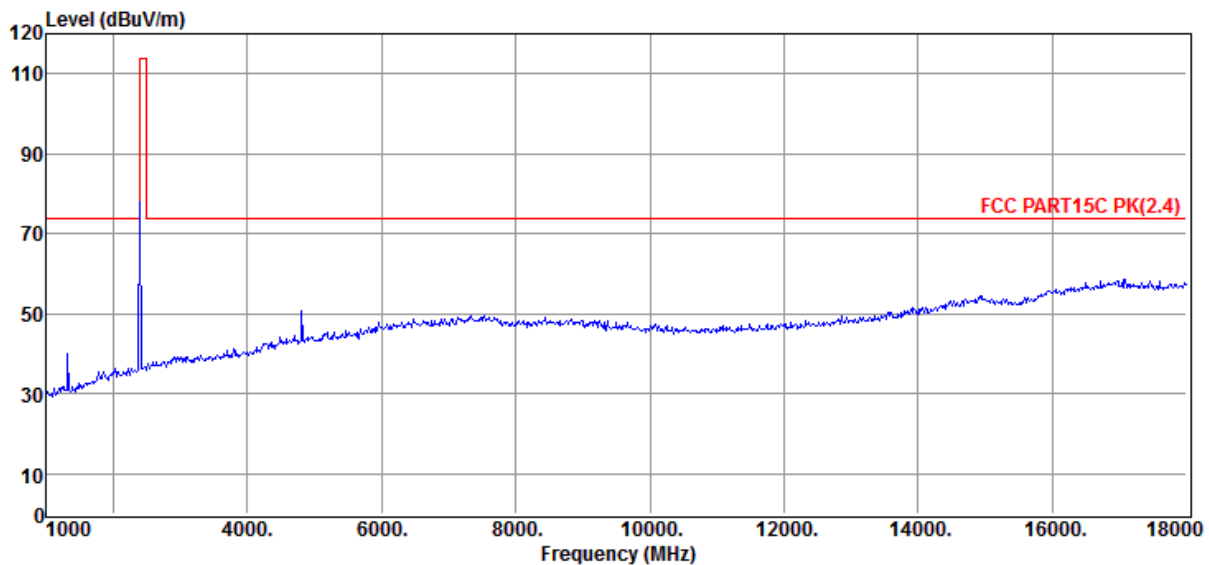
3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

4. For fundamental frequency RBW 3MHz, VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 33



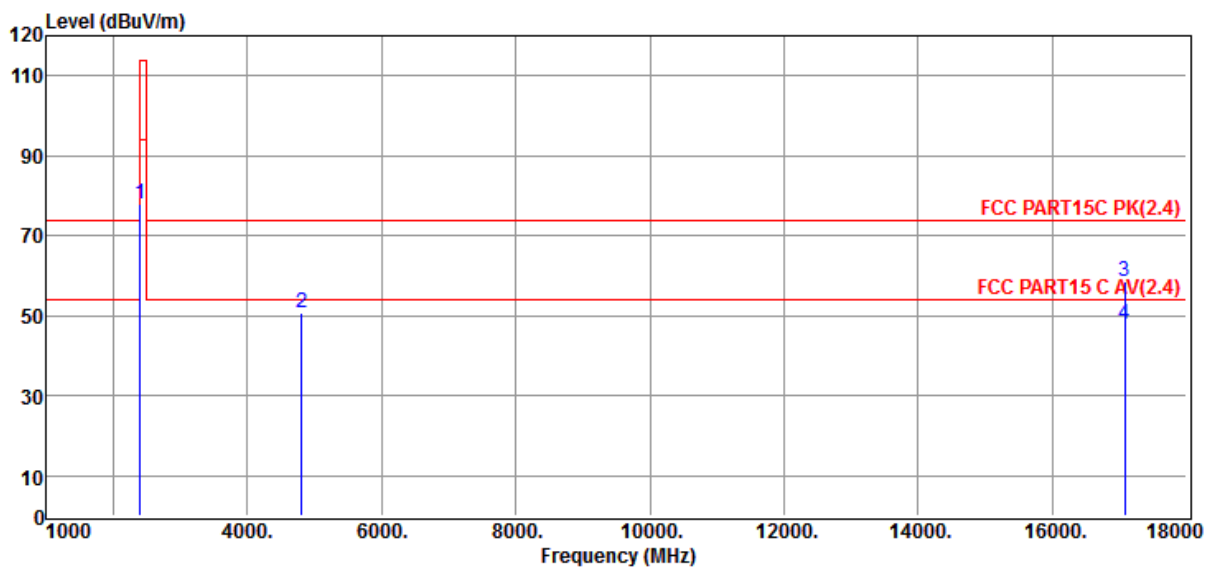
Item	Freq	Read Level	Antenna Factor	PRM Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector	Polarization
(Mark)	(MHz)	(dBμV)	(dB/m)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)		

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
 2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.
 4. For fundamental frequency RBW 3MHz, VBW 10MHz, Peak detector.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 34



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2402.00	82.97	29.99	43.49	8.35	77.82	114.00	-36.18	Peak	HORIZONTAL
2	4804.00	47.49	35.40	44.06	12.07	50.90	74.00	-23.10	Peak	HORIZONTAL
3	17082.00	30.81	43.47	41.23	25.47	58.52	74.00	-15.48	Peak	HORIZONTAL
4	17082.00	20.11	43.47	41.23	25.47	47.82	54.00	-6.18	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

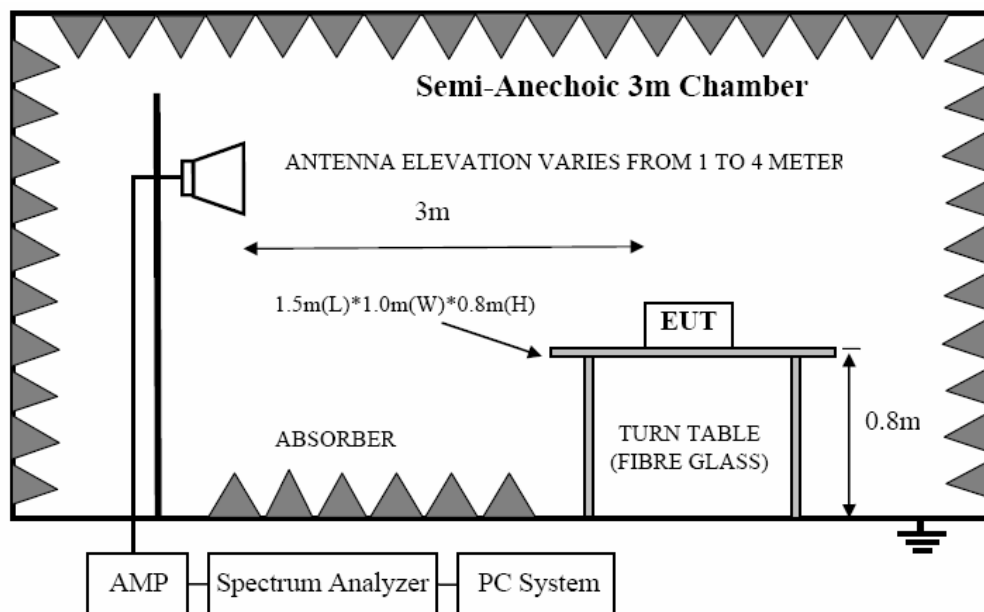
4. For fundamental frequency RBW 3MHz, VBW 10MHz, Peak detector.

6. Band Edge Compliance

6.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2013/11/13	1Y
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2013/11/13	1Y
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2013/11/16	1Y
4	Double Ridged Horn Antenna	R&S	HF907	100276	2013/11/16	1Y
5	Pre-Amplifier	R&S	SCU-01	10049	2013/11/13	1Y
6	Pre-amplifier	A.H.	PAM0-0118	360	2013/11/13	1Y
7	RF Cable	R&S	R01	10403	2013/11/13	1Y
8	RF Cable	R&S	R02	10512	2013/11/13	1Y

6.2. Block diagram of test setup



6.3. Limit

All emissions outside frequency band 2400MHz to 2483.5MHz should be comply with 15.209 limits.

6.4. Test Procedure

All band have been tested , only worse case is reported

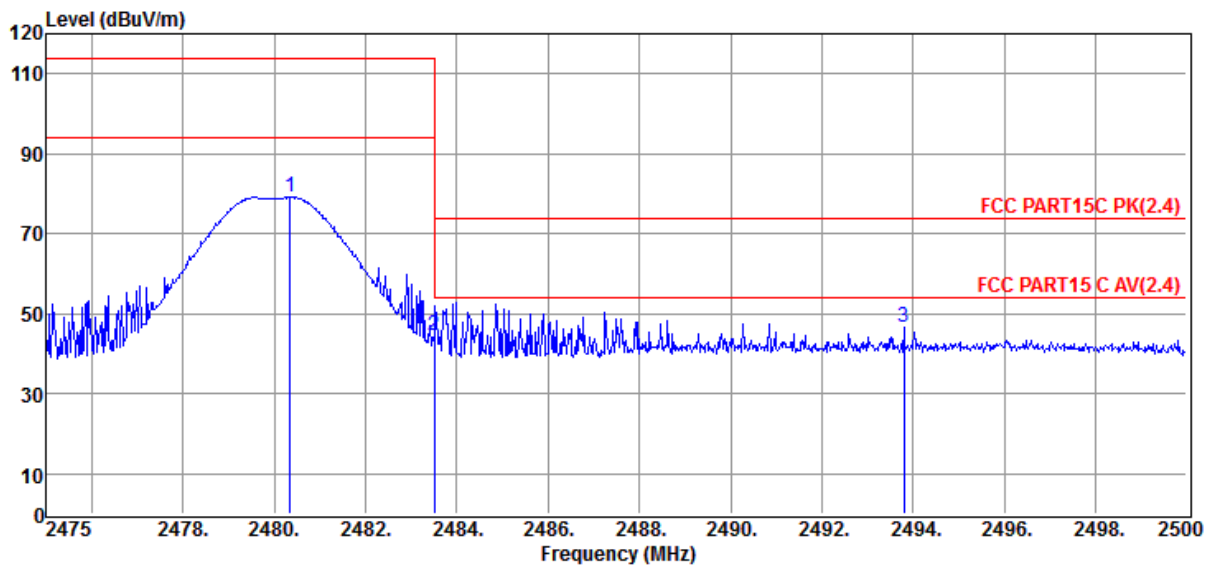
6.5. Test result

PASS. (See below detailed test result)

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 25



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2480.35	84.07	30.25	43.50	8.50	79.32	114.00	-34.68	Peak	VERTICAL
2	2483.50	49.44	30.25	43.50	8.50	44.69	74.00	-29.31	Peak	VERTICAL
3	2493.80	51.41	30.30	43.50	8.50	46.71	74.00	-27.29	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

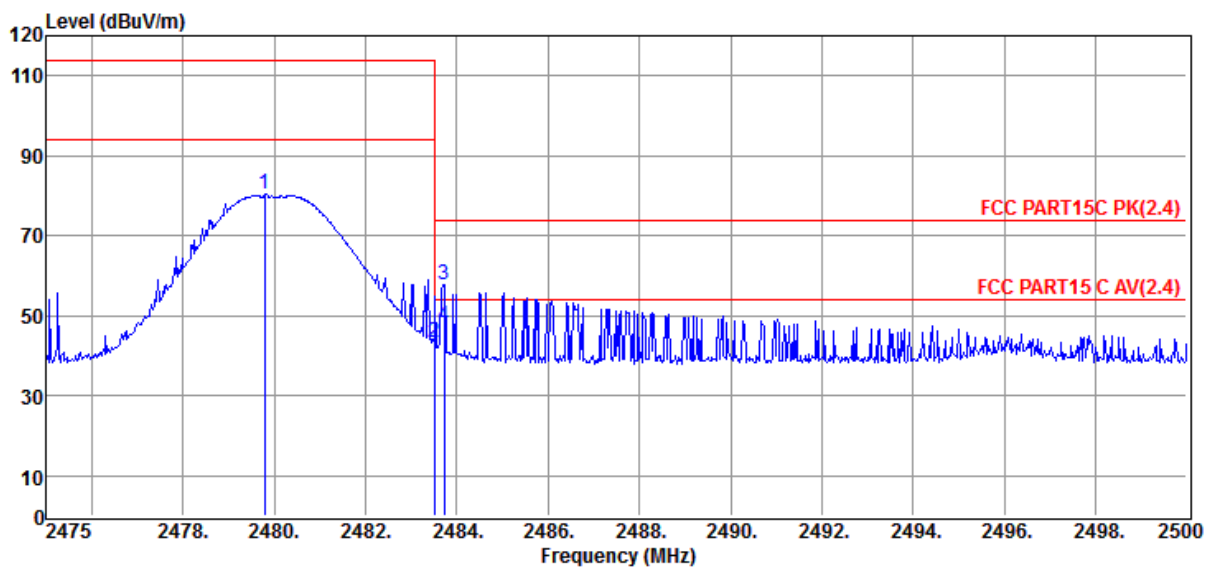
2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2014 Report Data\QD140322\QD140322.EM6**
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch High 2480MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 26



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2479.78	85.06	30.25	43.50	8.50	80.31	114.00	-33.69	Peak	HORIZONTAL
2	2483.50	48.02	30.25	43.50	8.50	43.27	74.00	-30.73	Peak	HORIZONTAL
3	2483.73	62.65	30.25	43.50	8.50	57.90	74.00	-16.10	Peak	HORIZONTAL
4	2483.73	52.20	30.25	43.50	8.50	47.45	54.00	-6.55	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

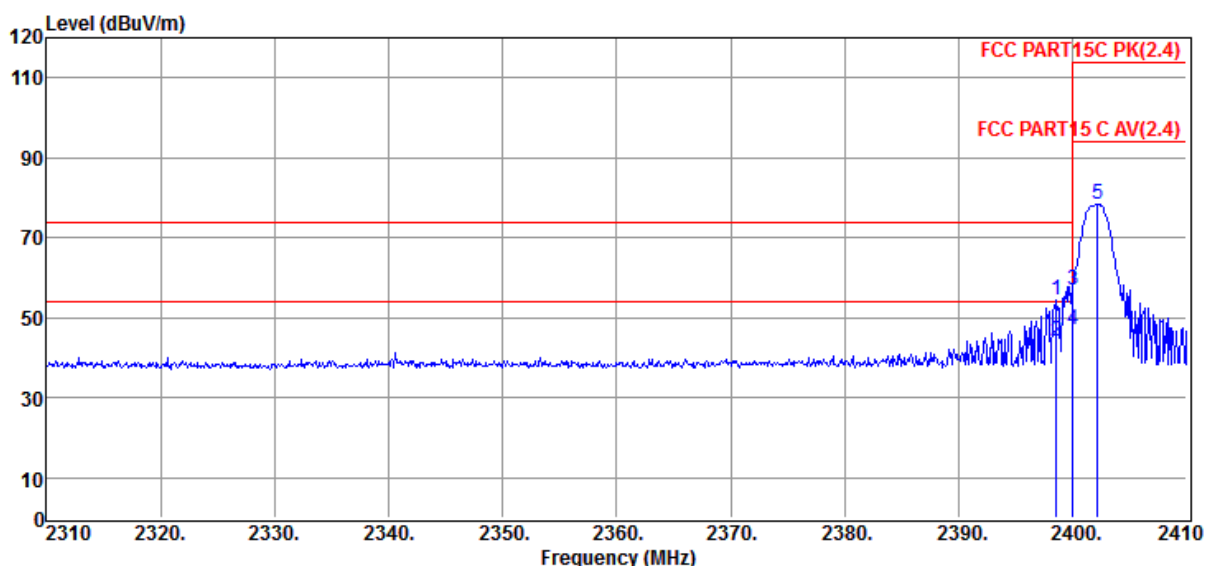
2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/HORIZONTAL
Memo :

Data: 35



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2398.60	59.50	29.99	43.48	8.35	54.36	74.00	-19.64	Peak	HORIZONTAL
2	2398.60	49.43	29.99	43.48	8.35	44.29	54.00	-9.71	Average	HORIZONTAL
3	2400.00	62.14	29.99	43.49	8.35	56.99	74.00	-17.01	Peak	HORIZONTAL
4	2400.00	52.08	29.99	43.49	8.35	46.93	54.00	-7.07	Average	HORIZONTAL
5	2402.20	83.69	29.99	43.49	8.35	78.54	114.00	-35.46	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

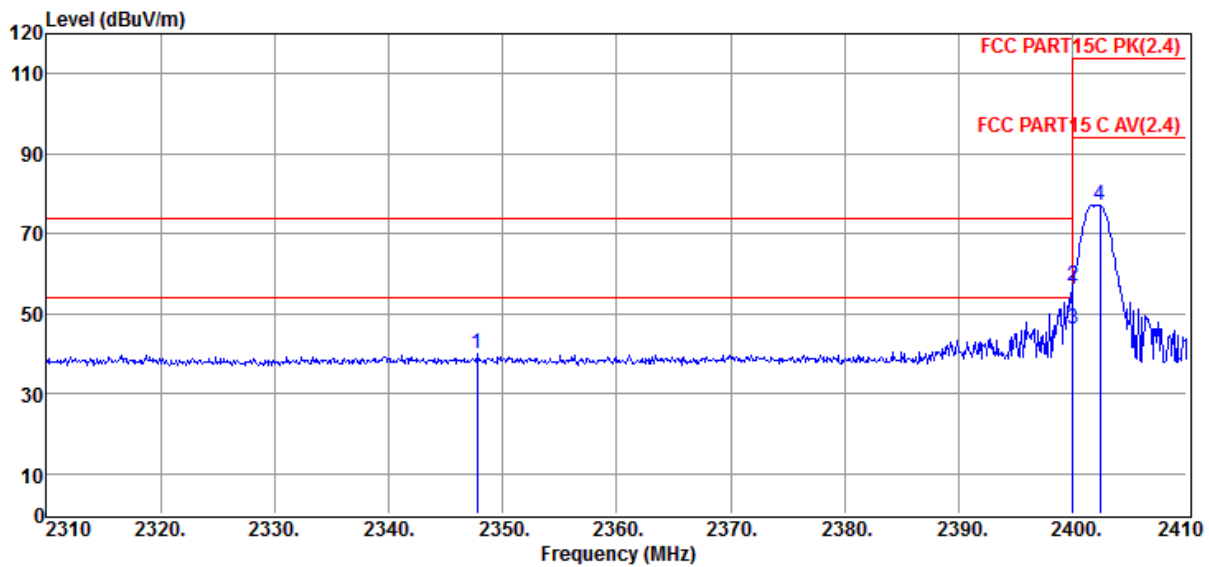
2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2014 Report Data\QD140322\QD140322.EM6
Test Date : 2014-07-15 **Tested By** : Leo
EUT : Wireless Receiver **Model Number** : JRB13
Power Supply : DC 5V from notebook **Test Mode** : Tx Ch Low 2402MHz
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2013 HF907/3m/VERTICAL
Memo :

Data: 36



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	2347.80	45.38	29.83	43.47	8.25	39.99	74.00	-34.01	Peak	VERTICAL
2	2400.00	61.95	29.99	43.49	8.35	56.80	74.00	-17.20	Peak	VERTICAL
3	2400.00	51.49	29.99	43.49	8.35	46.34	54.00	-7.66	Average	VERTICAL
4	2402.40	82.24	29.99	43.49	8.35	77.09	114.00	-36.91	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result comply with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1MHz, VBW: 3MHz, Sweep time: auto.

7. Antenna Requirements

7.1. Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

7.2. Result

The antennas used for this product are integral PCB Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.