FCC PART 15 SUBPART C MEASURMENT AND TEST REPORT

For

Shenzhen Yixing Opyoelectronic And Technological Co., Ltd

3F, 2nd Bldg, Sanhe International Industry Center, Baoshan New Village, Longhua New District, Shenzhen City, Guangdong, China

E.U.T.: Wristband Activity&Sleep Tracker

Model Name: WP-808

Brand Name: N/A

FCC ID: 2ABCI11111-A01

Report Number: NTC1311447F

Test Date(s): November 13, 2013 to November 28, 2013

Report Date(s): November 29, 2013

Prepared by

Dongguan NTC Co., Ltd.

Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

Tel: +86-769-22022444 Fax: +86-769-22022799

Prepared By	Approved & Authorized Signer
Rose Hu / Engineer	Sunm Lv / Q.A. Director

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan NTC Co., Ltd.
The test results referenced from this report are relevant only to the sample tested.

Table of Contents

1. GENERAL INFORMATION 4

1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST 4
1.2 RELATED SUBMITTAL(S) / GRANT (S) 5
1.3 TEST METHODOLOGY 5
1.4 EQUIPMENT MODIFICATIONS 5
1.5 SUPPORT DEVICE 5
1.6 TEST FACILITY AND LOCATION 6
1.7 SUMMARY OF TEST RESULTS 6

2. SYSTEM TEST CONFIGURATION 7

2.1 EUT CONFIGURATION 7
2.2 SPECIAL ACCESSORIES 7
2.3 DESCRIPTION OF TEST MODES 7
2.4 EUT EXERCISE 7

3. MAX. CONDUCTED OUTPUT POWER 8

3.1 MEASUREMENT PROCEDURE 8
3.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 8
3.3 MEASUREMENT RESULTS 8

4. 6DB BANDWIDTH 10

4.1 MEASUREMENT PROCEDURE 10
4.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 10
4.3 MEASUREMENT RESULTS 10

5. POWER SPECTRAL DENSITY 13

5.1 MEASUREMENT PROCEDURE 13
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 13
5.3 MEASUREMENT RESULTS 13

6. BAND EDGE AND CONDUCTED SPURIOUS EMISSIONS 16

6.1 REQUIREMENT AND MEASUREMENT PROCEDURE 16
6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 16
6.3 MEASUREMENT RESULTS 16

7. RADIATED SPURIOUS EMISSIONS AND RESTRICTED BANDS 21

7.1 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 21
7.2 MEASUREMENT PROCEDURE 22
7.3 LIMIT 23
7.4 MEASUREMENT RESULTS 24

8. ANTENNA APPLICATION 29

8.1 ANTENNA REQUIREMENT 29

8.2 MEASUREMENT RESULTS 29

9. TEST EQUIPMENT LIST 30

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This device is a Wristband Activity&Sleep Tracker with BT function. It's powered by DC 5V come from external USB port or internal DC 3.7V Li-ion battery. For more details features, please refer to User's Manual.

Manufacturer	:	Shenzhen Yixing Opyoelectronic And Technological Co., Ltd
Address	:	3F, 2nd Bldg, Sanhe International Industry Center, Baoshan New Village, Longhua New District, Shenzhen City, Guangdong, China
Bluetooth Version	:	4.0 (BLE)
RF Operation Frequency:	:	2402-2480MHz
Modulation	:	GFSK
Number of Channel	:	40
Channel space	:	2MHz
Antenna Type	:	Multilayer Chip Antenna
Antenna Gain	:	0.5 dBi (Declaration by manufacturer)
Power Supply	:	DC 3.7V 65mA DC 5V come from USB port (only for charging)
Model name	:	WP-808
Note:	:	N/A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID:2ABCI11111-A01 filing to comply with Section 15.247 of the FCC Part 15(2012), Subpart C Rule.

1.3 Test Methodology

The radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009) and KDB558074(v03). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

None

1.6 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.

Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

Dongguan NTC Co., Ltd.

Building D, Gaosheng Science and Technology Park,
Hongtu Road, Nancheng District, Dongguan City,
Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207 (a)	AC Power Conducted Emission	N/A
§15.247(b)(3)	Max. Conducted Output Power	Compliance
§15.247(a)(2)	6dB Bandwidth	Compliance
§15.247(e)	Power Spectral Density	Compliance
§15.247(d)	Band Edge and Conducted Spurious Emissions	Compliance
§15.247(d),§15.209, §15.205	Radiated Spurious Emissions and Restricted Bands	Compliance
§15.203	Antenna Requirement	Compliance

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

The EUT has been tested under continuous operating condition. Test program used to control the EUT staying in continuous transmitting mode. The Lowest, middle and highest channel were chosen for testing, and modulation type GFSK was tested, but only the worst case data is shown in this report.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Max. Conducted Output Power

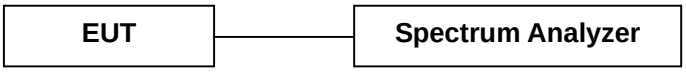
3.1 Measurement Procedure

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

1. Set the RBW = 1MHz.
2. Set the VBW ≥ 3 x RBW
3. Set the span ≥ 1.5 x DTS bandwidth
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges.

3.2 Test SET-UP (Block Diagram of Configuration)



3.3 Measurement Results

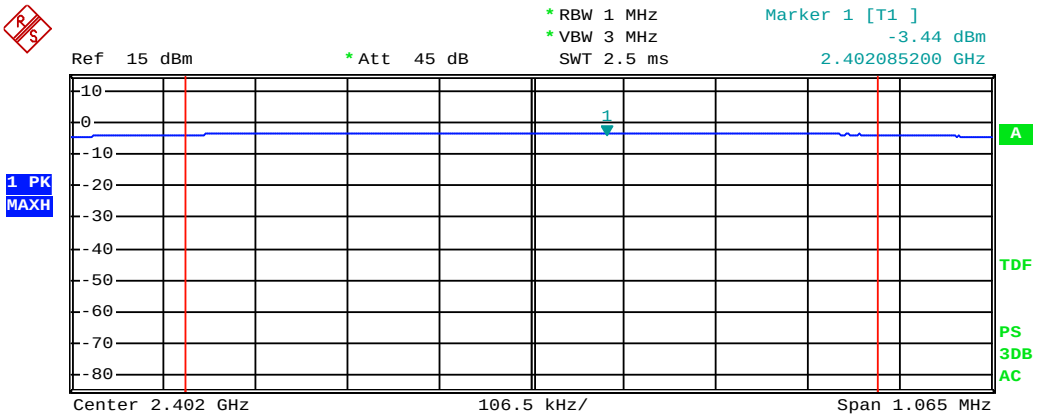
Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	22 ℃	Humidity :	46 %
Test By:	Sance	Test Date :	November 27, 2013
Test Result:	PASS		

Frequency MHz	Data Rate Mbps	PK Output Power dBm	Limit dBm
Low Channel: 2402	1	-5.23	30
Middle Channel: 2440	1	-4.28	30
High Channel: 2480	1	-3.81	30

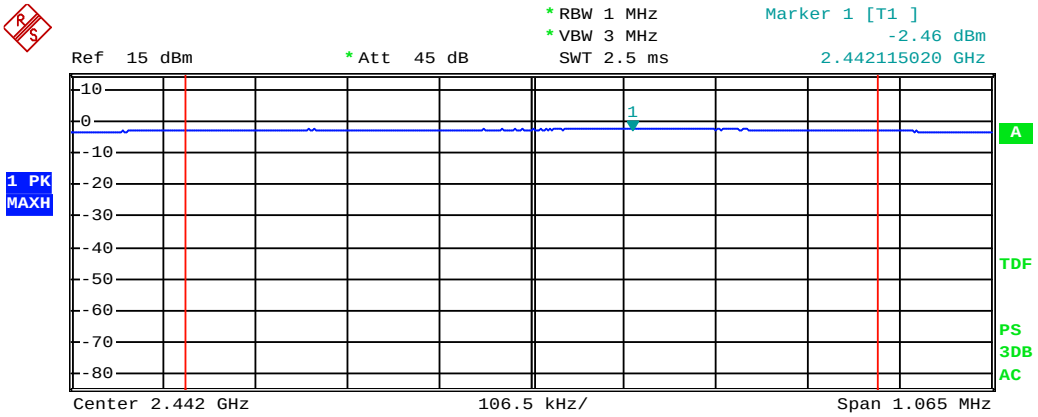
Maximum Peak Conducted Output Power

Low Channel



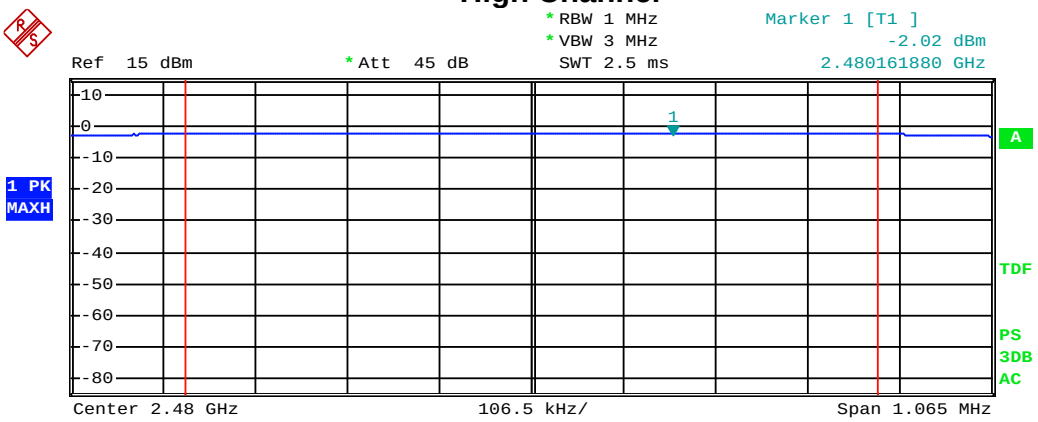
Tx Channel
Bandwidth 800 kHz Power -5.23 dBm

Middle Channel



Tx Channel
Bandwidth 800 kHz Power -4.28 dBm

High Channel



Tx Channel
Bandwidth 800 kHz Power -3.81 dBm

4. 6dB Bandwidth

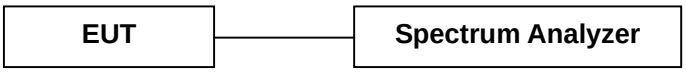
4.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

1. Set the RBW = 100KHz.
2. Set the VBW ≥ 3 x RBW
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.2 Test SET-UP (Block Diagram of Configuration)



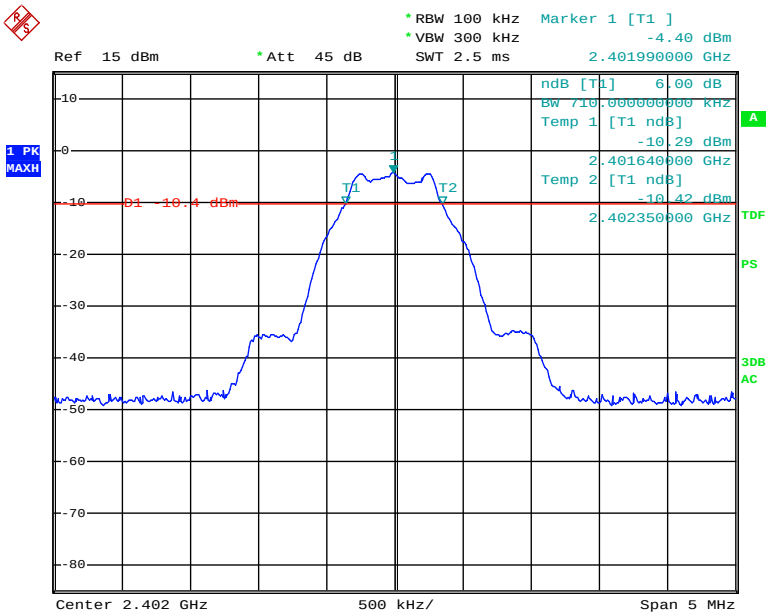
4.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	22 ℃	Humidity :	46 %
Test By:	Sance	Test Date :	November 27, 2013
Test Result:	PASS		

Frequency MHz	Data Rate Mbps	6dB Bandwidth KHz	Limit
Low Channel: 2402	1	710	>500KHz
Middle Channel: 2440	1	710	>500KHz
High Channel: 2480	1	710	>500KHz

Low Channel



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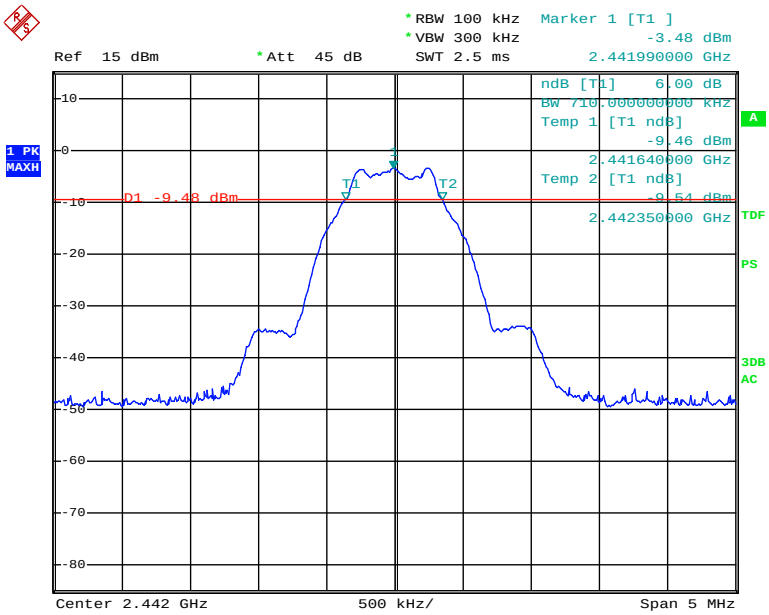
Middle Channel



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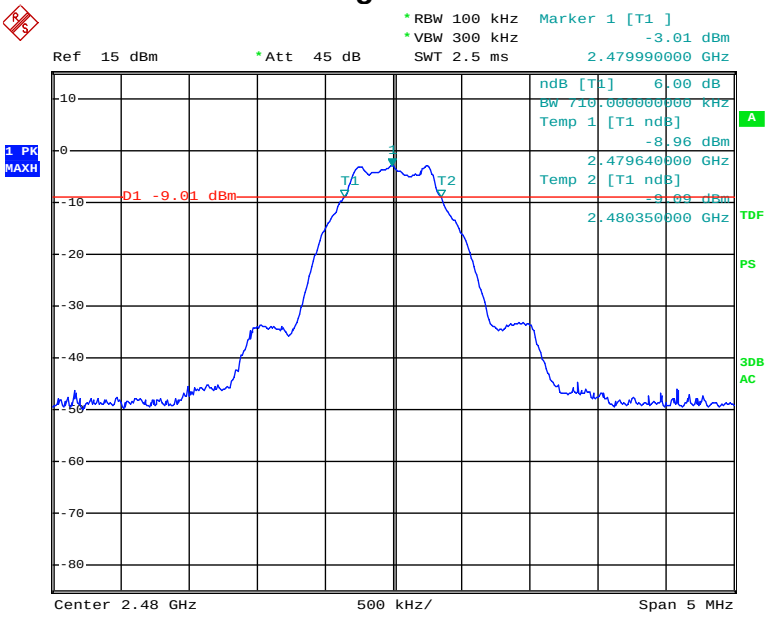
High Channel



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5. Power Spectral Density

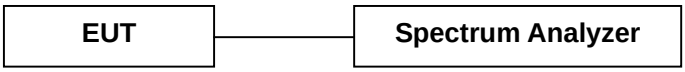
5.1 Measurement Procedure

DTS 6dB Channel Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set as below according to FCC KDB558074(v03):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz≤RBW≤100KHz
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.2 Test SET-UP (Block Diagram of Configuration)



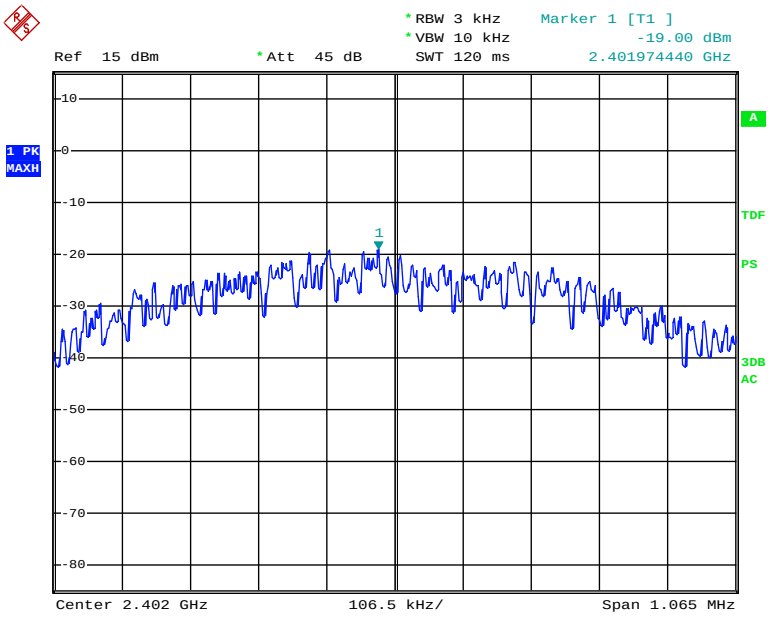
5.3 Measurement Results

Please refer to following table and plots.

Modulation:	GFSK		
Temperature :	22 ℃	Humidity :	46 %
Test By:	Sance	Test Date :	November 27, 2013
Test Result:	PASS		

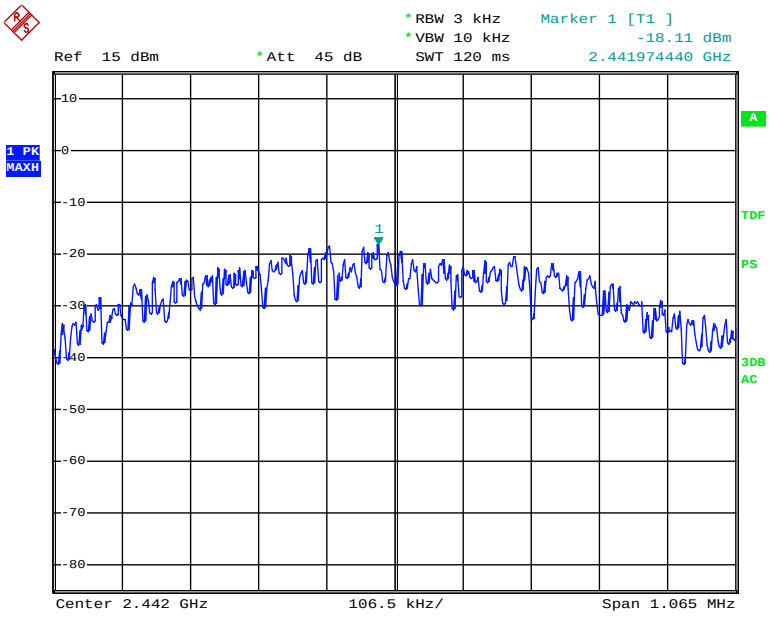
Frequency MHz	Data Rate Mbps	PSD dBm	Limit dBm
Low Channel: 2402	1	-19.00	8
Middle Channel: 2440	1	-18.11	8
High Channel: 2480	1	-17.59	8

Low Channel



Date: 27.NOV.2013 13:27:09

Middle Channel



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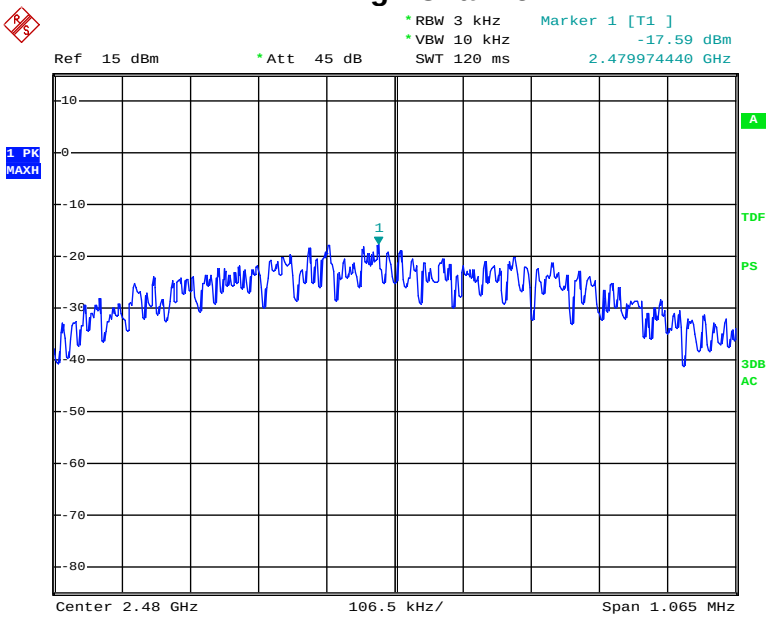
High Channel



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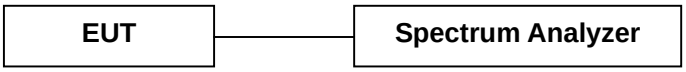
6. Band Edge and Conducted Spurious Emissions

6.1 Requirement and Measurement Procedure

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer was set according to FCC KDB558074(v03) clause 11.3.

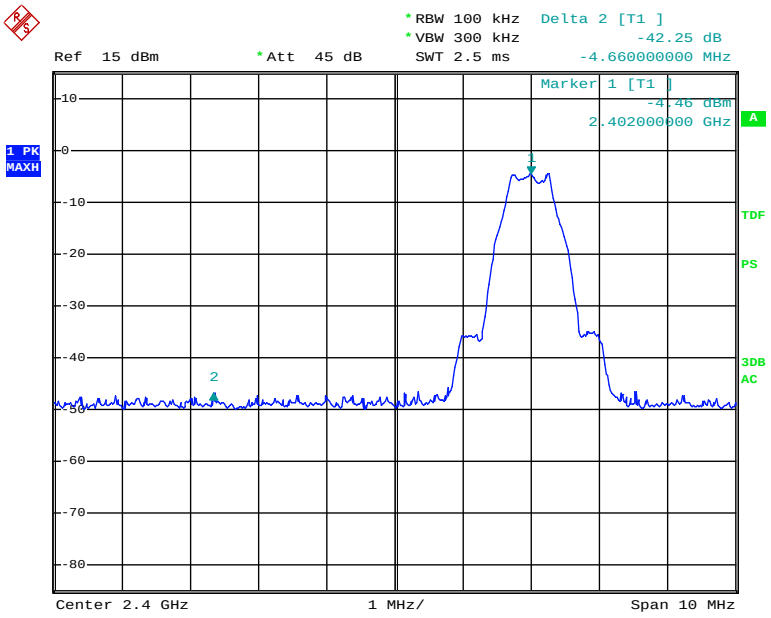
6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Results

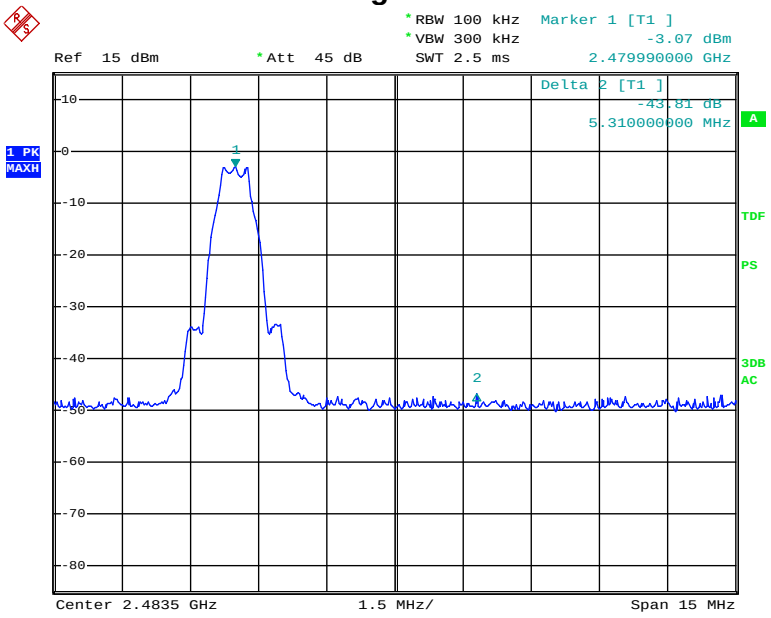
The test plots showed all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB below the highest level of the desired power in the passband. Please refer to below plots.

Band Edge
Low Channel



Date: 27.NOV.2013 13:30:09

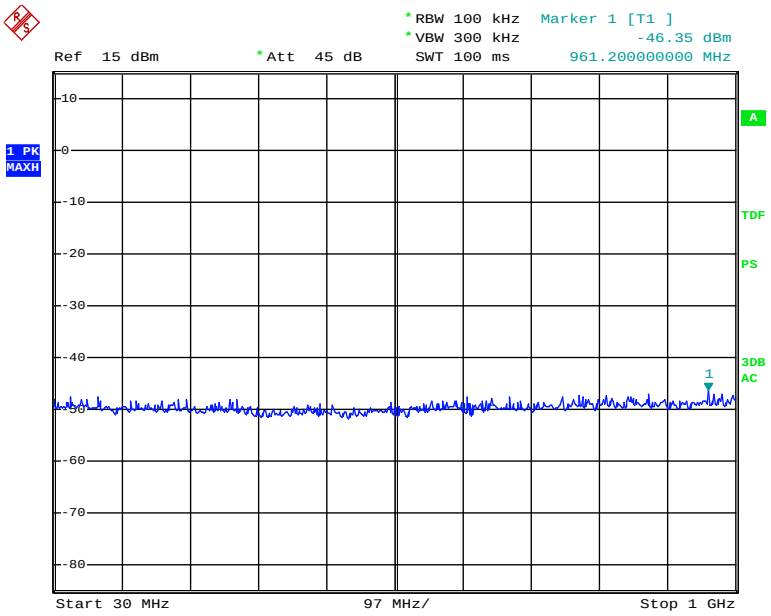
High Channel



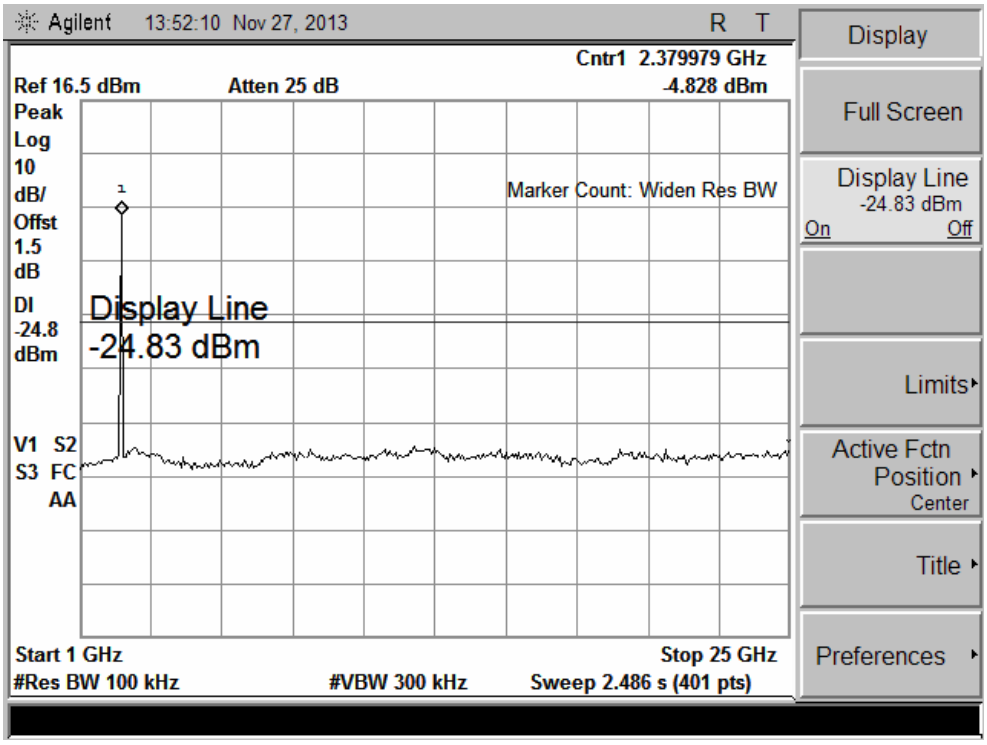
Date: 27.NOV.2013 13:31:17

Conducted Spurious Emissions

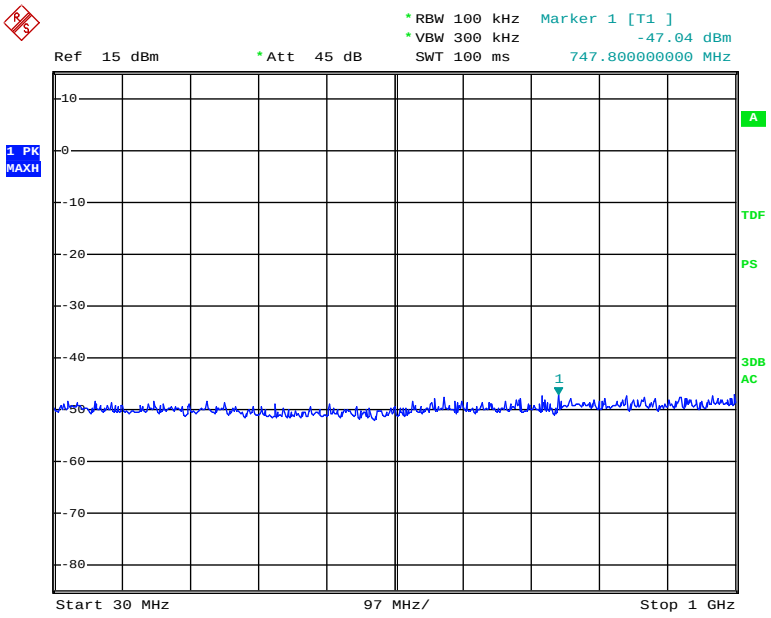
Low Channel



Date: 27.NOV.2013 13:31:49



Middle Channel



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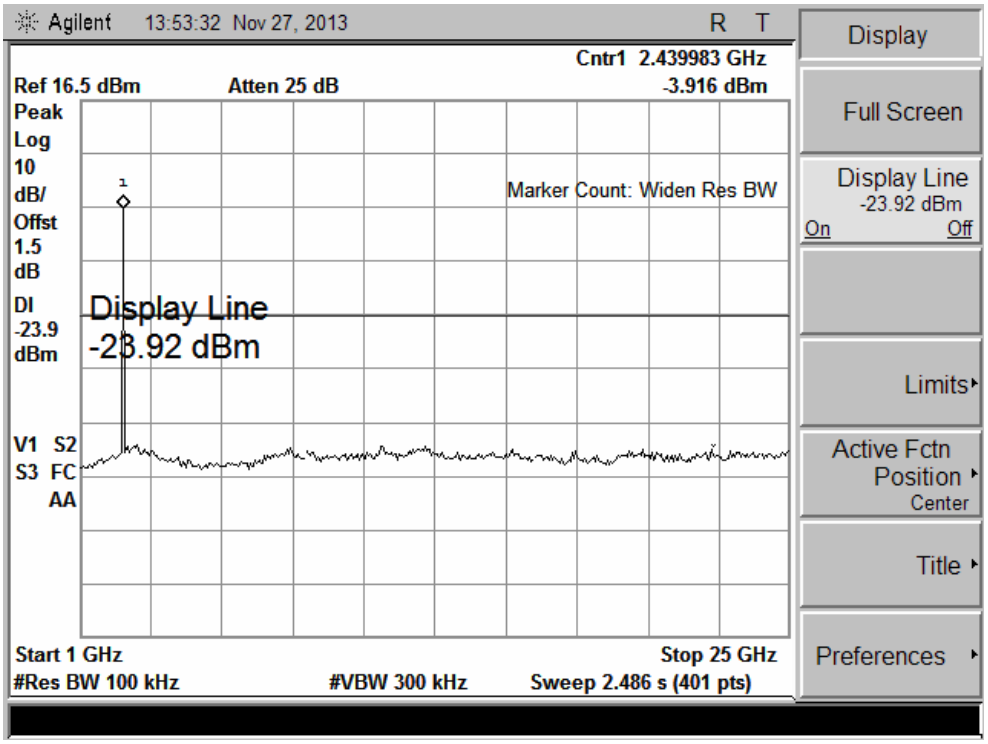
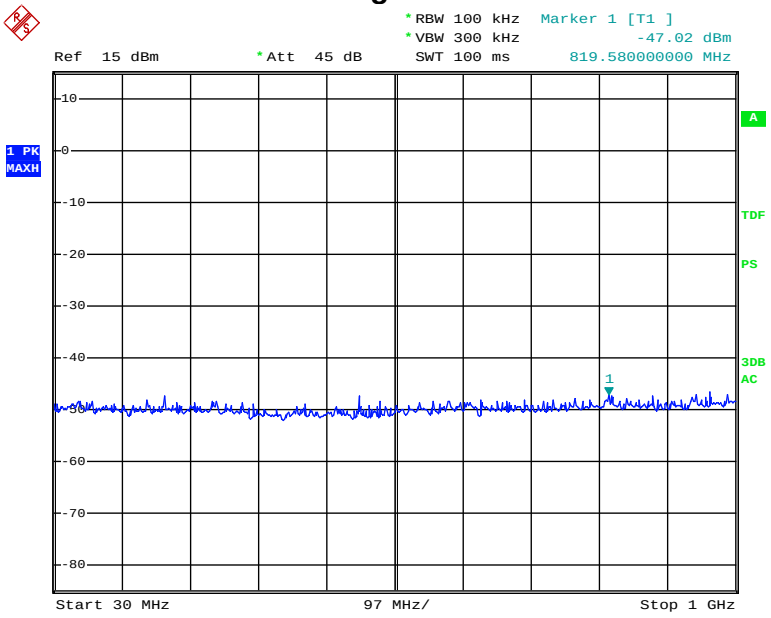
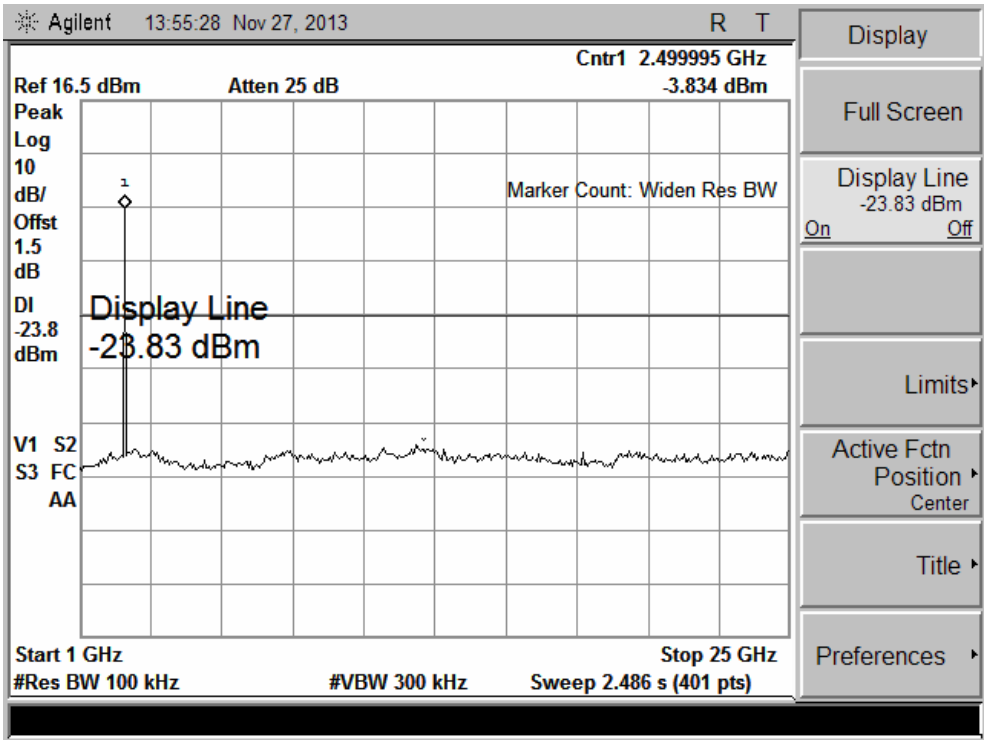


High Channel



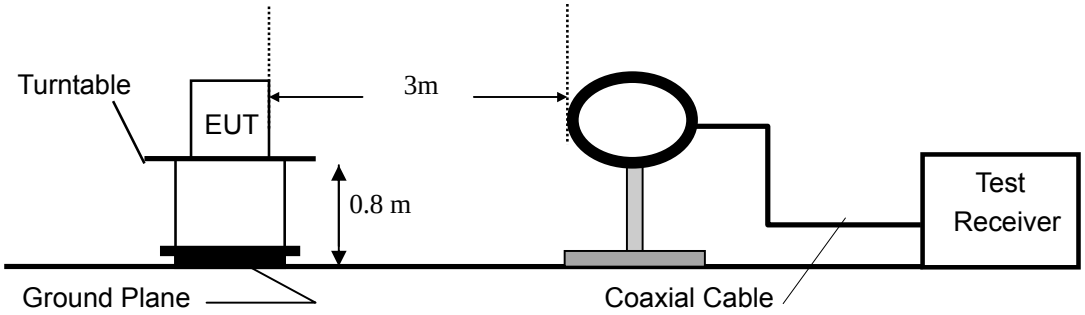
Date: 27.NOV.2013 13:32:14

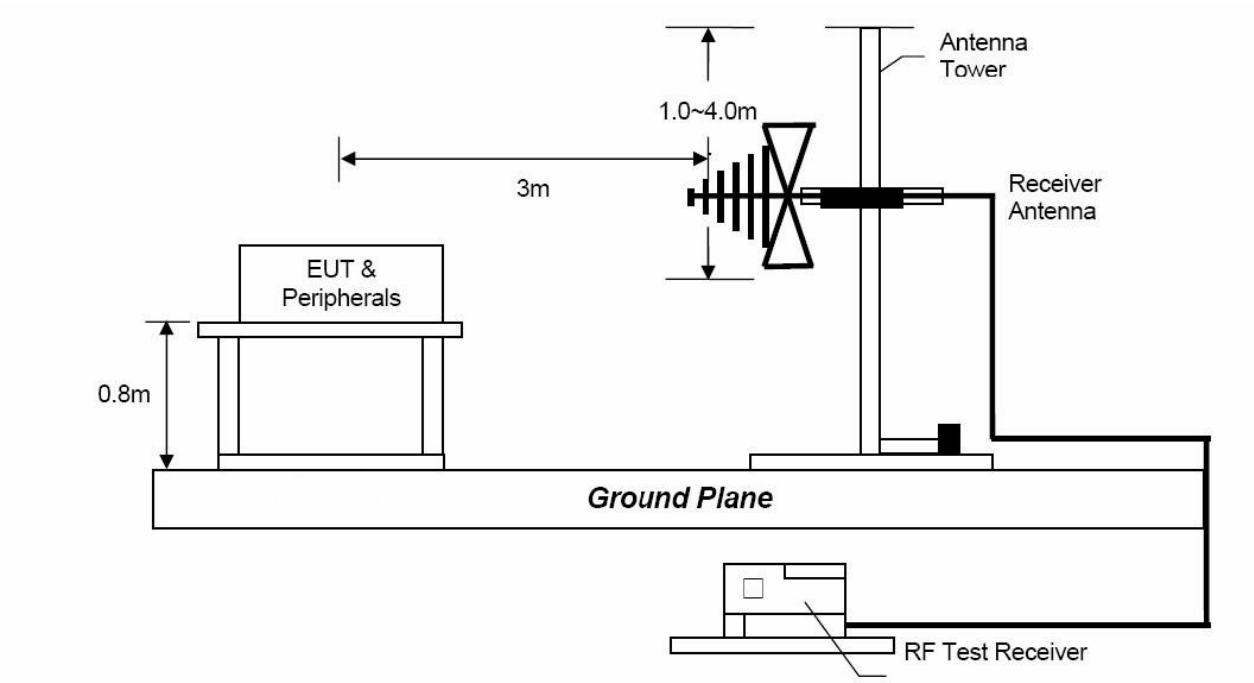


7. Radiated Spurious Emissions and Restricted Bands

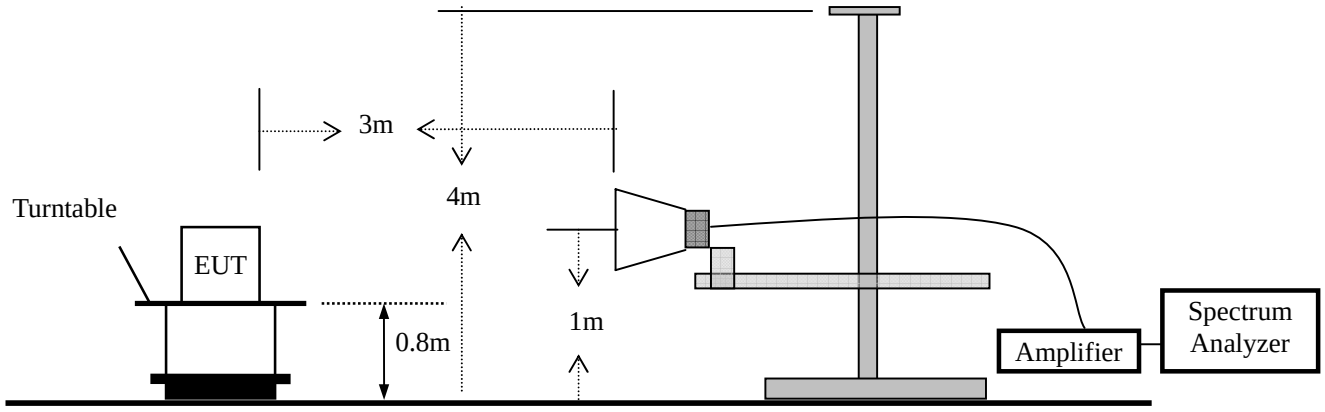
7.1 Test SET-UP (Block Diagram of Configuration)

7.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz





7.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



7.2 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

7.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209) μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

(5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

7.4 Measurement Results

Operation Mode:	TX		
Frequency Range:	9KHz~1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	46 %
Measured Distance:	3m	Test By:	Sance
Test Date :	November 27, 2013		

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
87.2300	V	22.10	40.00	-17.90	QP
96.9300	V	23.50	43.50	-20.00	QP
123.1200	V	24.10	43.50	-19.40	QP
159.0100	V	24.60	43.50	-18.90	QP
239.5200	V	26.40	46.00	-19.60	QP
267.6500	V	23.40	46.00	-22.60	QP
51.3400	H	16.50	40.00	-23.50	QP
103.7300	H	12.40	43.50	-31.10	QP
135.7300	H	13.50	43.50	-30.00	QP
232.7300	H	13.20	46.00	-32.80	QP
282.2000	H	14.80	46.00	-31.20	QP
379.2000	H	18.50	46.00	-27.50	QP

Other emissions are lower than 10dB below the allowable limit.

Note: (1) Quasi-Peak detector is used except for others stated.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : ±3.7dB.

Modulation:	GFSK (Low Frequency: 2402MHz)		
Operation Mode:	TX Mode (Low)	Test Date :	November 27, 2013
Frequency Range:	1-25GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	46 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4804	H	55.23	43.52	74.00	54.00	-18.77	-10.48
7206	H	57.59	44.15	74.00	54.00	-16.41	-9.85
9608	H	53.38	40.14	74.00	54.00	-20.62	-13.86
12010	H	54.51	41.92	74.00	54.00	-19.49	-12.08
4804	V	53.75	40.87	74.00	54.00	-20.25	-13.13
7206	V	56.52	42.25	74.00	54.00	-17.48	-11.75
9608	V	53.71	41.64	74.00	54.00	-20.29	-12.36
12010	V	54.48	41.78	74.00	54.00	-19.52	-12.22

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : ±3.7dB

Modulation:	GFSK (Mid Frequency: 2440MHz)		
Operation Mode:	TX Mode (Mid)	Test Date :	November 27, 2013
Frequency Range:	1-25GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	46 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4880	V	57.49	45.18	74.00	54.00	-16.51	-8.82
7320	V	56.21	43.95	74.00	54.00	-17.79	-10.05
9760	V	53.29	40.68	74.00	54.00	-20.71	-13.32
12200	V	54.17	41.37	74.00	54.00	-19.83	-12.63
4880	H	54.25	42.31	74.00	54.00	-19.75	-11.69
7320	H	55.76	41.79	74.00	54.00	-18.24	-12.21
9760	H	53.84	40.94	74.00	54.00	-20.16	-13.06
12200	H	54.12	41.03	74.00	54.00	-19.88	-12.97

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : ±3.7dB

Modulation:	GFSK (High Frequency: 2480MHz)		
Operation Mode:	TX Mode (High)	Test Date :	November 27, 2013
Frequency Range:	1-25GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	46 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4960	V	58.95	46.18	74.00	54.00	-15.05	-7.82
7440	V	55.93	42.12	74.00	54.00	-18.07	-11.88
9920	V	54.02	40.61	74.00	54.00	-19.98	-13.39
12400	V	54.88	40.70	74.00	54.00	-19.12	-13.30
4960	H	55.33	42.09	74.00	54.00	-18.67	-11.91
7440	H	54.61	41.94	74.00	54.00	-19.39	-12.06
9920	H	53.45	40.13	74.00	54.00	-20.55	-13.87
12400	H	54.28	41.17	74.00	54.00	-19.72	-12.83

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : ±3.7dB

Spurious Emission in restricted band:

Operation Mode:	TX	Test Date :	November 27, 2013
Frequency Range:	Above 1GHz	Temperature :	22 ℃
Test Result:	PASS	Humidity :	46 %
Measured Distance:	3m	Test By:	Sance

Frequency (MHz)	Polarity	Level		Limited		Margin		Result
		PK	AV	PK	AV	PK	AV	
GFSK								
2396.810	H	42.25	30.12	74.00	54.00	-31.75	-23.88	PASS
2397.320	V	40.53	30.15	74.00	54.00	-33.47	-23.85	PASS
2487.370	H	41.37	29.35	74.00	54.00	-32.63	-24.65	PASS
2487.100	V	40.53	29.40	74.00	54.00	-33.47	-24.60	PASS

Other harmonics emissions are lower than 10dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Measurement uncertainty : ±3.7dB

8. Antenna Application

8.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

8.2 Measurement Results

The antenna is integrated on the main PCB and no consideration of replacement, and the best case gain of the antenna is 0.5dBi. So, the antenna is considered meet the requirement.

9. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	Nov. 25, 2013	Nov. 24, 2014
Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 05, 2013	Nov. 04, 2014
Positioning Controller	UC	UC 3000	N/A	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	Nov. 09, 2013	Nov. 08, 2014
Cable	Huber+Suhner	CIL02	N/A	Nov. 09, 2013	Nov. 08, 2014
Power Amplifier	HP	HP 8447D	1145A00203	Nov. 09, 2013	Nov. 08, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct. 24, 2013	Oct. 23, 2014
Horn Antenna	Com-Power	AH-118	071078	Nov. 07, 2013	Nov. 06, 2014
Loop antenna	Daze	ZA30900A	0708	Oct.16, 2013	Oct.15, 2014
Spectrum Analyzer	Agilent	E4408B	MY41440717	Nov. 05, 2013	Nov. 04, 2014
Pre-Amplifier	Agilent	8449B	3008A02964	Nov. 05, 2013	Nov. 04, 2014