FCC PART 15 SUBPART C MEASURMENT AND TEST REPORT

For

JETOP INDUSTRIAL LIMITED.

Unit 11, 2/F., Sing Win Factory Building, 15-17 Shing Yip Street, Kwun Tong, Kowloon, Hong Kong

E.U.T.: Bluetooth Tower Speaker

Model Name: ITB124B, JT124L, ITB125B

Brand Name: iLIVE, , GPX, JT

FCC ID: RYD-ITB124B

Report Number: NTC1406742F

Test Date(s): June 14, 2014 to July 21, 2014

Report Date(s): July 21, 2014

Prepared by

Dongguan Nore Testing Center Co., Ltd.

Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District,Dongguan City, Guangdong, 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 Nore Testing Center 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 5
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. CONDUCTED EMISSIONS TEST 8

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

4. RADIATED EMISSION TEST 11

4.1 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 11
4.2 MEASUREMENT PROCEDURE 12
4.3 LIMIT 12
4.4 MEASUREMENT RESULTS 14

5. CHANNEL SEPARATION TEST 18

5.1 MEASUREMENT PROCEDURE 18
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 18
5.3 MEASUREMENT RESULTS 18

6. 20DB BANDWIDTH 21

6.1 MEASUREMENT PROCEDURE 21
6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 21
6.3 MEASUREMENT RESULTS 21

7. HOPPING CHANNEL NUMBER 22

7.1 MEASUREMENT PROCEDURE 24
7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 24
7.3 MEASUREMENT RESULTS 24

8. TIME OF OCCUPANCY (DWELL TIME) 26

8.1 MEASUREMENT PROCEDURE 26
8.2 MEASUREMENT RESULTS 26

9. MAXIMUM PEAK OUTPUT POWER 26

9.1 MEASUREMENT PROCEDURE 29
9.2 MEASUREMENT RESULTS 29

10. BAND EDGE 29

10.1 MEASUREMENT PROCEDURE 32
10.2 LIMIT 32
10.3 MEASUREMENT RESULTS 33

11. ANTENNA APPLICATION 34

11.1 ANTENNA REQUIREMENT 36
11.2 MEASUREMENT RESULTS 36

12. CONDUCTED SPURIOUS EMISSIONS 37

12.1 MEASUREMENT PROCEDURE 37
12.2. MEASUREMENT RESULTS 37

13. TEST EQUIPMENT LIST 41

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This device is a BT speaker with FM, Line IN, AUX IN and BT functions. It's powered by DC 9V come from Adapter. For more details features, please refer to User's Manual.

Manufacturer	:	JETOP INDUSTRIAL LIMITED.
Address	:	Unit 11, 2/F., Sing Win Factory Building, 15-17 Shing Yip Street, Kwun Tong, Kowloon, Hong Kong
Frequency:	:	2402-2480MHz
Modulation	:	GFSK
Number of Channel	:	79
Channel space	:	1MHz
Bluetooth Version	:	2.1
Max RF Output Power	:	-5.46dBm (0.28mW)
Antenna Type	:	PCB
Antenna Gain	:	0dBi (declaration by manufacturer)
Power Supply	:	DC 9V come from Adapter Adapter M/N: DP15-0902000dU Input: AC 100-240V 50/60Hz 0.4A Max Output: DC 9V 1.8A
Model name	:	ITB124B, JT124L, ITB125B
Note:	:	All models have the same circuit schematic, construction and critical components except model number and trade mark.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: RYD-ITB124B filing to comply with Section 15.247 of the FCC Part 15 (2013), Subpart C Rule.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009) and DA 00-705. 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.

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 Nore Testing Center Co., Ltd.
Building D, Gaosheng Science and Technology Park, Hongtu Road,
Nancheng District,Dongguan City, Guangdong, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.247(a)(1)	Channel Separation test	Compliant
§15.247(a)(1)	20dB Bandwidth	Compliant
§15.247(a)(1)(iii)	Hopping Channel Number	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(b)	Max Peak output Power test	Compliant
§15.247(d)	Band edge test	Compliant
§15.207 (a)	AC Power Conducted Emission	Compliant
§15.247(d),§15.209, §15.205	Radiated Emission	Compliant
§15.203	Antenna Requirement	Compliant
§15.247(d)	Conducted Spurious Emission	Compliant

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

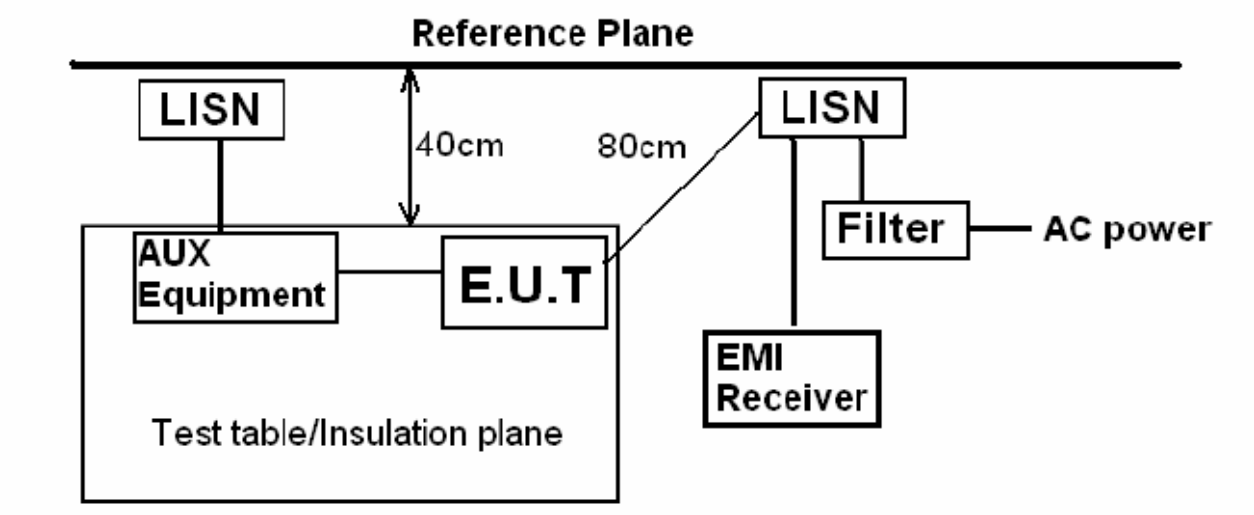
The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and normal mode is programmed. The Lowest, middle and highest channel were chosen for testing, and all packets DH1, DH3 and DH5 mode in all modulation type GFSK were tested.

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. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: BT Mode

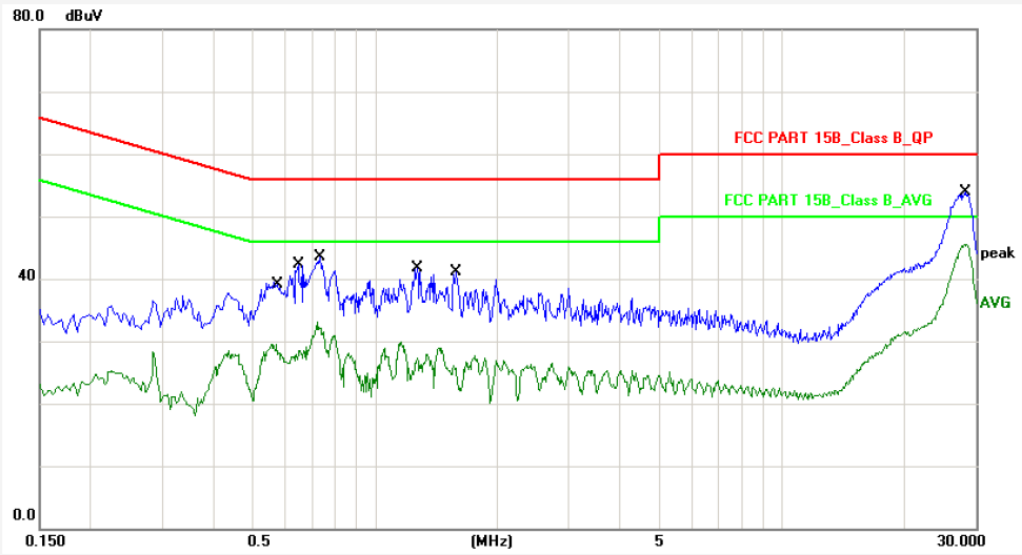
3.3 Measurement Results

Please refer to following plots.

Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: Http://www.ntc-c.com

Site: Conduction

Test Time: 2014-6-16 10:01:25



Report No.: ITB124B
Test Standard: FCC PART 15B_Class B_QP
Test item: Conducted Emission
Phase: L1
Applicant: Je Top
Temp.( )/Hum.(%): 26(C) / 60 %
Product: Bluetooth Tower Speaker
Power Rating: AC 120V/60Hz
Model No.: ITB124B
Test Engineer: Jason

Test Mode: BT Mode
Remark:

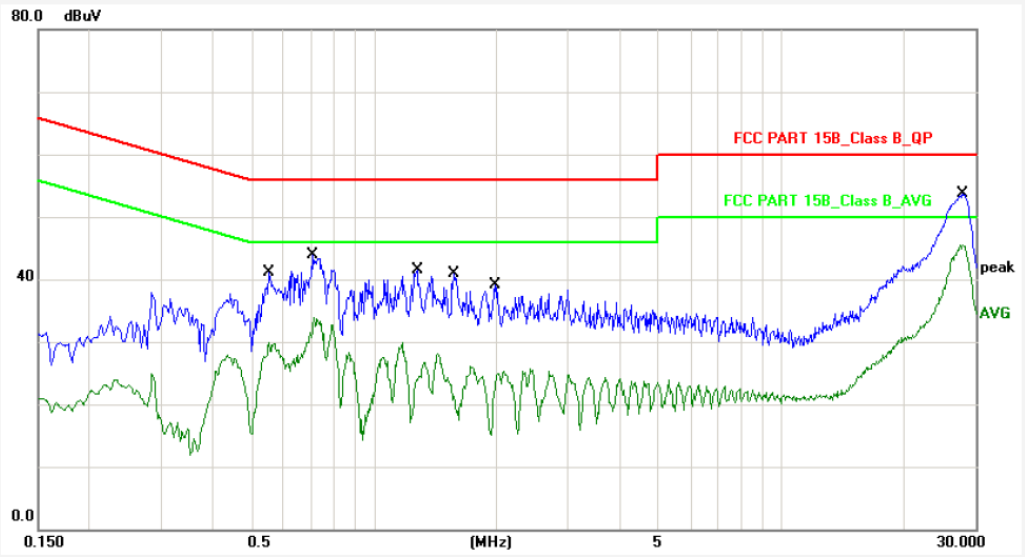
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5740	10.80	24.90	35.70	56.00	-20.30	QP	P	
2	0.5740	10.80	17.50	28.30	46.00	-17.70	AVG	P	
3	0.6500	10.80	24.50	35.30	56.00	-20.70	QP	P	
4	0.6500	10.80	16.80	27.60	46.00	-18.40	AVG	P	
5	0.7340	10.80	28.60	39.40	56.00	-16.60	QP	P	
6	0.7340	10.80	21.20	32.00	46.00	-14.00	AVG	P	
7	1.2740	10.80	24.60	35.40	56.00	-20.60	QP	P	
8	1.2740	10.80	16.53	27.33	46.00	-18.67	AVG	P	
9	1.5780	10.80	24.50	35.30	56.00	-20.70	QP	P	
10	1.5780	10.80	14.10	24.90	46.00	-21.10	AVG	P	
11	28.2380	10.80	39.60	50.40	60.00	-9.60	QP	P	
12	28.2380	10.80	33.10	43.90	50.00	-6.10	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: Http://www.ntc-c.com

Site: Conduction

Test Time: 2014-6-16 10:06:57



Report No.: ITB124B
Test Standard: FCC PART 15B_Class B_QP
Test item: Conducted Emission
Phase: N
Applicant: Je Top
Temp.( )/Hum.(%): 26(C) / 60 %
Product: Bluetooth Tower Speaker
Power Rating: AC 120V/60Hz
Model No.: ITB124B
Test Engineer: Jason

Test Mode: BT Mode
Remark:

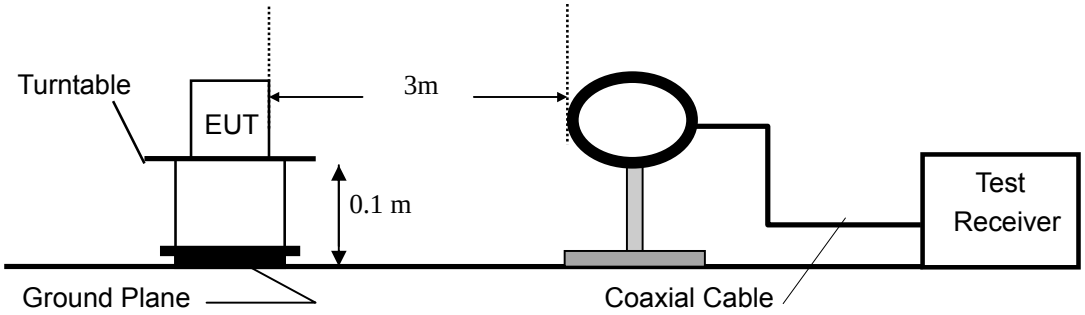
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5540	10.80	25.10	35.90	56.00	-20.10	QP	P	
2	0.5540	10.80	18.40	29.20	46.00	-16.80	AVG	P	
3	0.7060	10.80	32.10	42.90	56.00	-13.10	QP	P	
4	0.7060	10.80	22.00	32.80	46.00	-13.20	AVG	P	
5	1.2780	10.80	24.20	35.00	56.00	-21.00	QP	P	
6	1.2780	10.80	12.50	23.30	46.00	-22.70	AVG	P	
7	1.5740	10.80	23.20	34.00	56.00	-22.00	QP	P	
8	1.5740	10.80	9.00	19.80	46.00	-26.20	AVG	P	
9	1.9820	10.80	21.00	31.80	56.00	-24.20	QP	P	
10	1.9820	10.80	11.10	21.90	46.00	-24.10	AVG	P	
11	28.1180	10.80	40.30	51.10	60.00	-8.90	QP	P	
12	28.1180	10.80	33.00	43.80	50.00	-6.20	AVG	P	

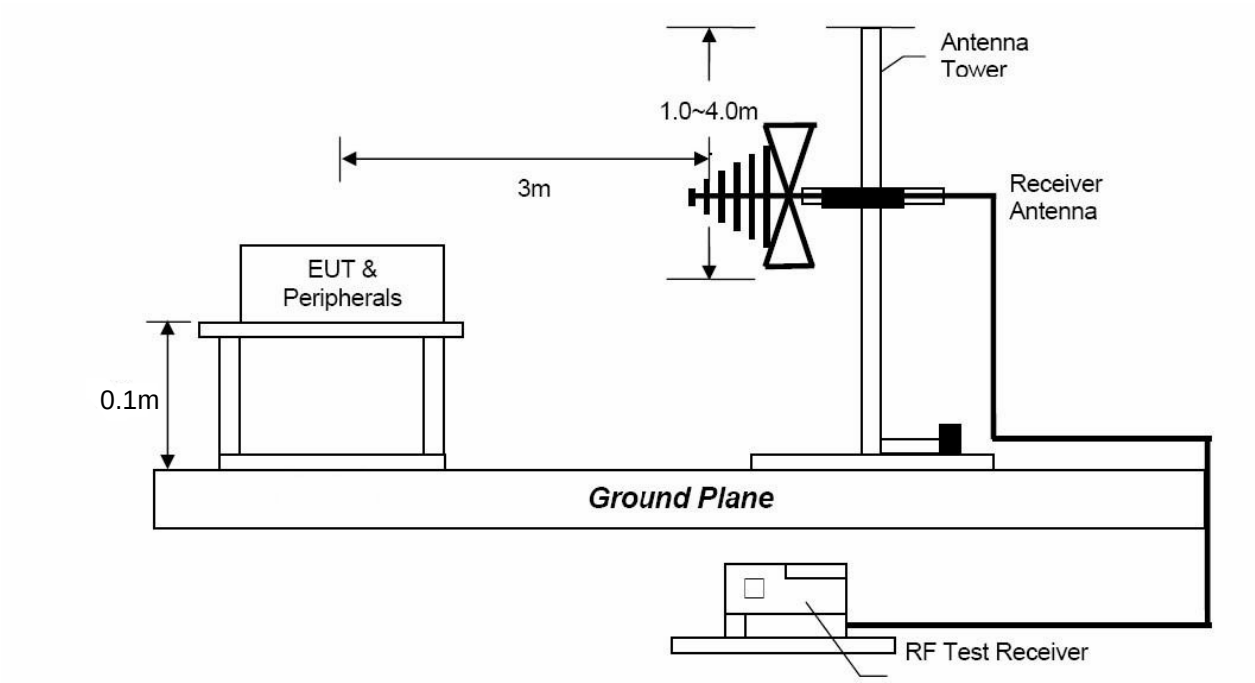
Note: Level=Reading+Factor.
Margin=Limit-Level.

4. Radiated Emission Test

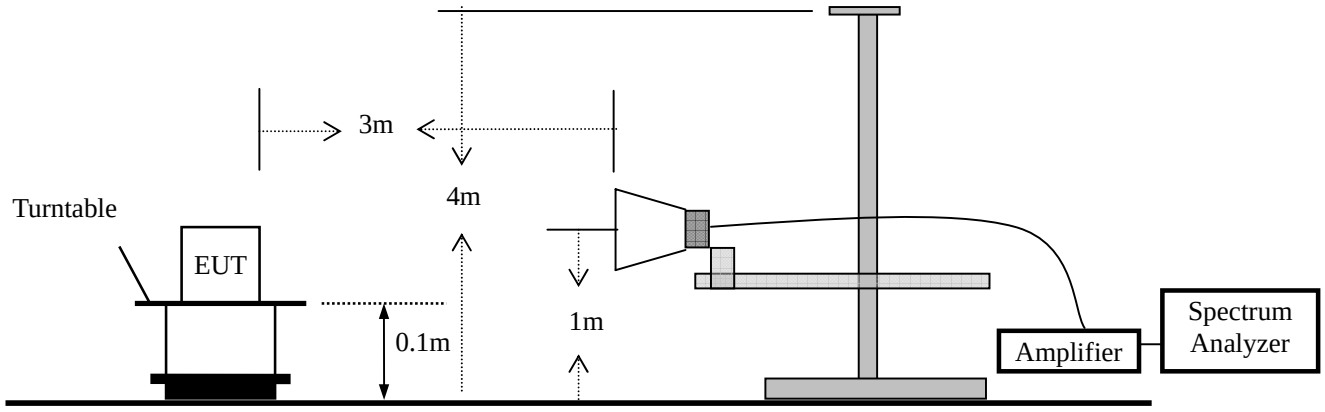
4.1 Test SET-UP (Block Diagram of Configuration)

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





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



4.2 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.1 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.

e. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.
   1. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300KHz for Quasi-peak detection at frequency below 1GHz.
   2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
   3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for average detection(AV) at below at frequency above 1GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

4.3 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.

4.4 Measurement Results

Operation Mode:	TX		
Frequency Range:	9KHz~1GHz	Temperature :	23 ℃
Test Result:	PASS	Humidity :	52 %
Measured Distance:	3m	Test By:	Sance
Test Date :	July 02, 2014		

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
31.7552	V	35.00	40.00	-5.00	QP
63.9500	V	28.70	40.00	-11.30	QP
92.0800	V	28.88	43.50	-14.62	QP

121.1800	H	20.05	43.50	-23.45	QP
143.4900	H	24.82	43.50	-18.68	QP
163.8600	H	19.00	43.50	-24.50	QP

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

Note:
(1) Emission Level= Reading Level + Factor
(2) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(3) Measurement uncertainty : ±3.4dB
(4) Loop antenna used for the emission below 30MHz.
(5) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.

Modulation:	GFSK (Low Frequency: 2402MHz)		
Operation Mode:	TX Mode (Low)	Test Date :	July 02, 2014
Frequency Range:	1-25GHz	Temperature :	23 ℃
Test Result:	PASS	Humidity :	52 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		Peak	AV	Peak	AV	Peak	AV
4804	V	52.37	43.88	74.00	54.00	-21.63	-10.12
7206	V	58.27	46.13	74.00	54.00	-15.73	-7.87

4804	H	53.62	44.72	74.00	54.00	-20.38	-9.28
7206	H	59.56	46.08	74.00	54.00	-14.44	-7.92

Note:
(1) All Readings are Peak Value and AV.
(2) Emission Le vel= Reading Level + Factor
(3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(4) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
(5) Measurement uncertainty : ±3.7dB.
(6) Horn antenna used for the emission over 1000MHz.

Modulation:	GFSK (Mid Frequency: 2441MHz)		
Operation Mode:	TX Mode (Mid)	Test Date :	July 02, 2014
Frequency Range:	1-25GHz	Temperature :	23 ℃
Test Result:	PASS	Humidity :	52 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		Peak	AV	Peak	AV	Peak	AV
4882	V	52.38	42.94	74.00	54.00	-21.62	-11.06
7323	V	58.41	48.61	74.00	54.00	-15.59	-5.39

4882	H	52.65	44.51	74.00	54.00	-21.35	-9.49
7323	H	58.91	46.27	74.00	54.00	-15.09	-7.73

Note:
(1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level + Factor
(3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(4) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
(5) Measurement uncertainty : ±3.7dB.
(6) Horn antenna used for the emission over 1000MHz.

Modulation:	GFSK (High Frequency: 2480MHz)		
Operation Mode:	TX Mode (High)	Test Date :	July 02, 2014
Frequency Range:	1-25GHz	Temperature :	23 ℃
Test Result:	PASS	Humidity :	52 %
Measured Distance:	3m	Test By:	Sance

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		Peak	AV	Peak	AV	Peak	AV
4960	V	52.08	41.78	74.00	54.00	-21.92	-12.22
7440	V	58.90	46.53	74.00	54.00	-15.10	-7.47

4960	H	52.96	44.90	74.00	54.00	-21.04	-9.10
7440	H	58.60	46.57	74.00	54.00	-15.40	-7.43

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level + Factor
(3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(4) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
(5) Measurement uncertainty : ±3.7dB.
(6) Horn antenna used for the emission over 1000MHz.

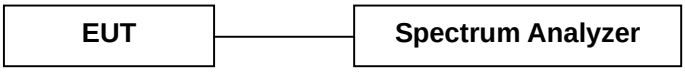
5. Channel Separation test

5.1 Measurement Procedure

Minimum Hopping Channel Carrier Frequency Separation, FCC Rule 15.247(a)(1):

Connect EUT antenna terminal to the spectrum analyzer with a low loss cable, and using the MARKER and Max-Hold function to record the separation of two adjacent channels.

5.2 Test SET-UP (Block Diagram of Configuration)

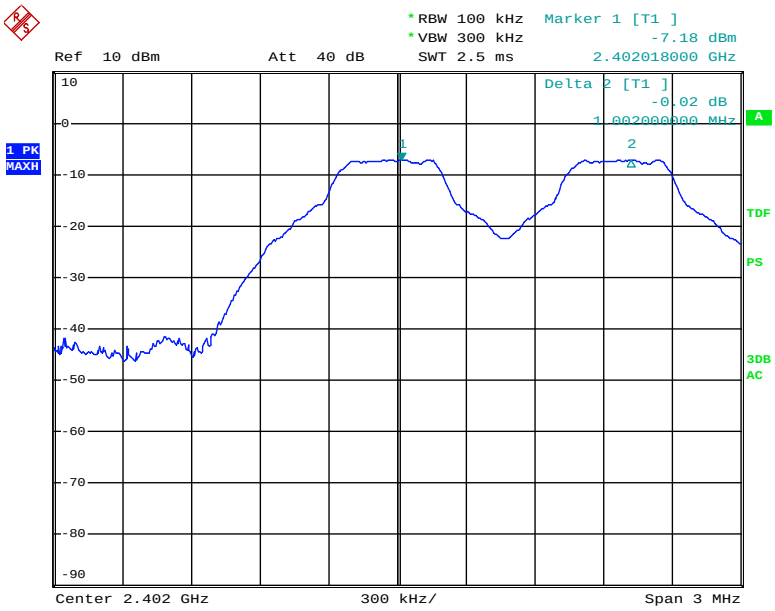


5.3 Measurement Results

Modulation:	GFSK		
RBW:	100KHz	VBW:	300KHz
Packet:	DH5	Spectrum Detector:	PK
Test By:	Sance	Test Date :	Jul. 20, 2014
Temperature :	24 ℃	Humidity :	50 %
Test Result:	PASS		

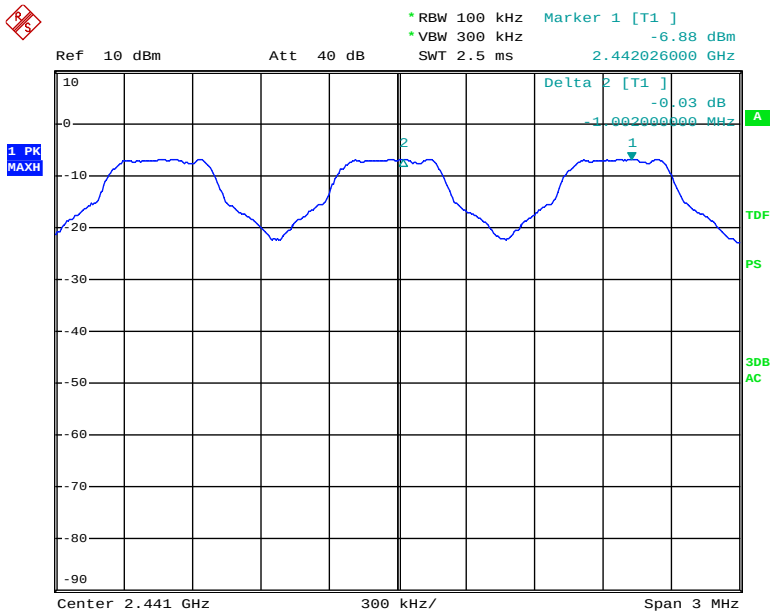
Channel number	Channel frequency (MHz)	Separation Read Value (KHz)	Separation Limit (KHz)
Lowest	2402	1002	>996
Middle	2441	1002	>990
Highest	2480	1002	>668

Lowest Channel



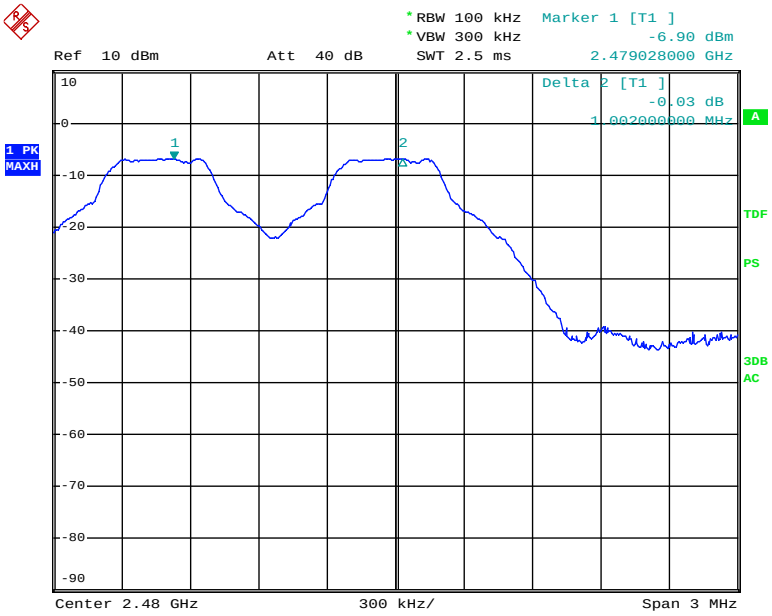
Date: 20.JUL.2014 15:25:51

Middle Channel



Date: 20.JUL.2014 15:28:40

Highest Channel



Date: 20.JUL.2014 15:29:51

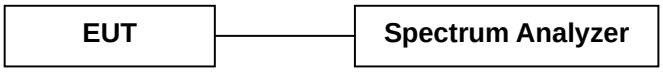
6. 20dB Bandwidth

6.1 Measurement Procedure

Maximum 20dB RF Bandwidth, FCC Rule 15.247(a)(1):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

6.2 Test SET-UP (Block Diagram of Configuration)



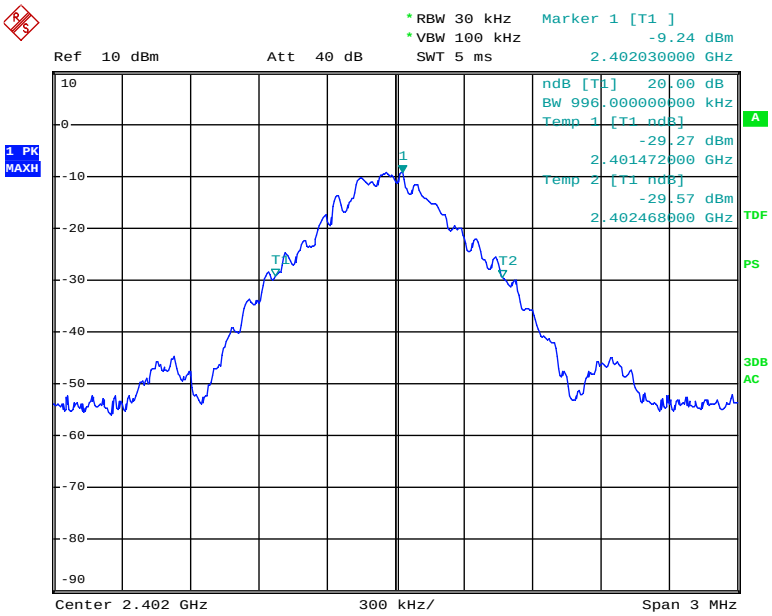
6.3 Measurement Results

Refer to attached data chart.

Modulation:	GFSK		
RBW:	30KHz	VBW:	100KHz
Packet:	DH5	Spectrum Detector:	PK
Test By:	Sance	Test Date :	Jul. 20, 2014
Temperature :	24 ℃	Humidity :	50 %
Test Result:	PASS		

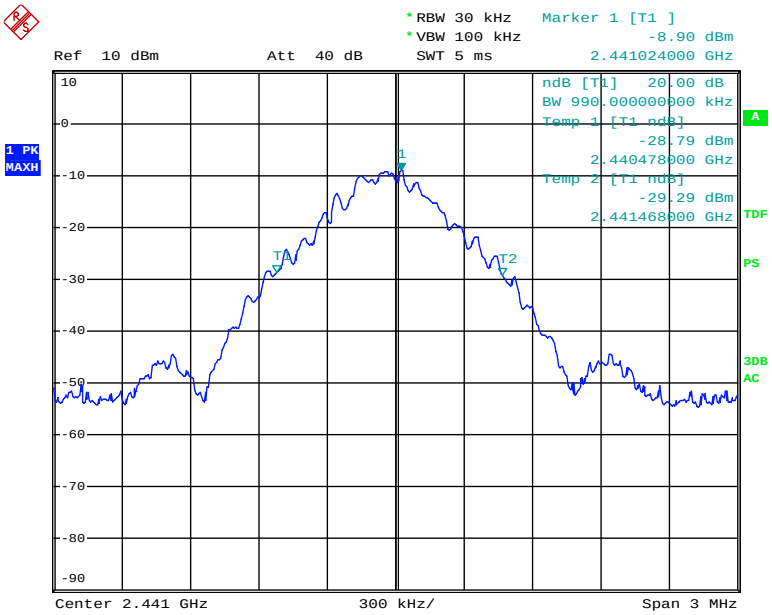
Channel frequency (MHz)	20dB Down BW(kHz)
2402	996
2441	990
2480	1002

Lowest Channel



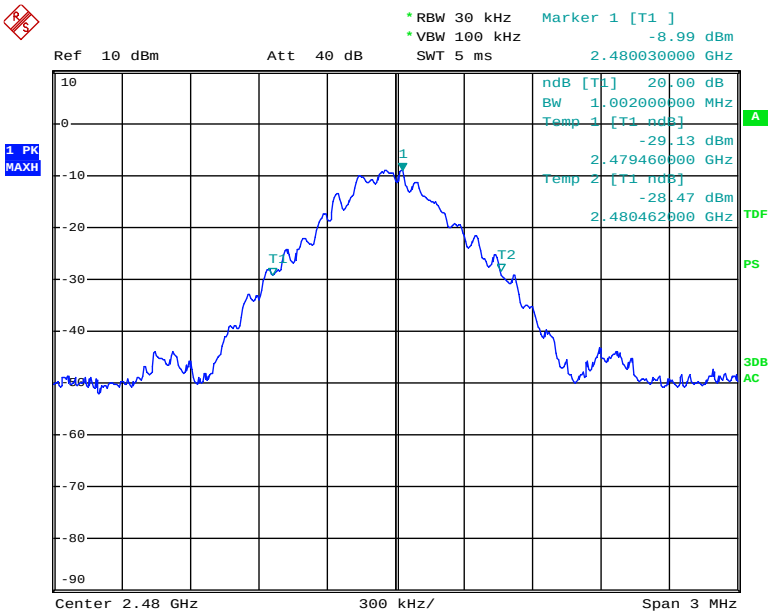
Date: 20.JUL.2014 15:24:31

Middle Channel



Date: 20.JUL.2014 15:24:48

Highest Channel



Date: 20.JUL.2014 15:25:03

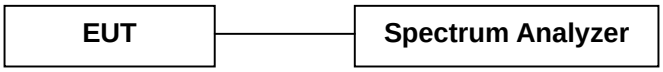
7. Hopping Channel Number

7.1 Measurement Procedure

Minimum Number of Hopping Frequencies, FCC Rule 15.247(a)(1)(iii):

Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum, and the spectrum analyzer set to MAX HOLD readings were taken for 3-5 minutes. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

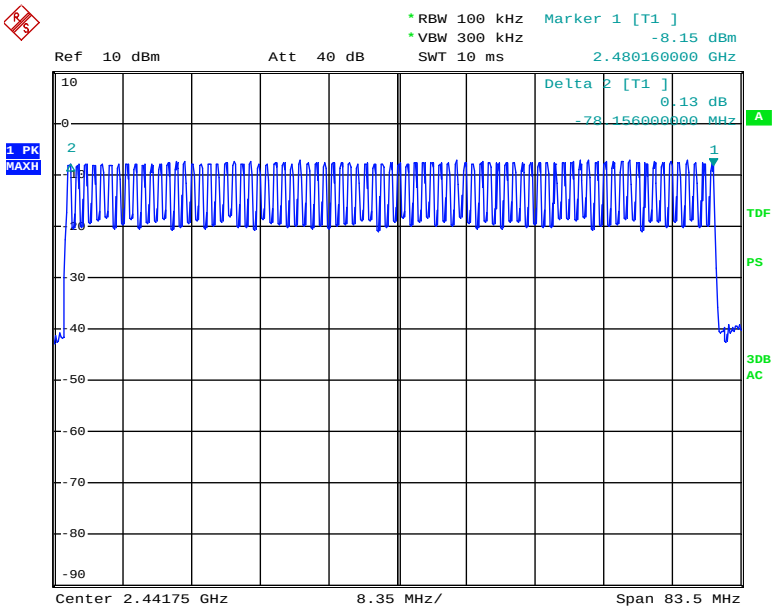
7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Results

Modulation	GFSK		
RBW:	100KHz	VBW:	300KHz
Packet:	DH5	Spectrum Detector:	PK
Test By:	Sance	Test Date :	Jul. 20, 2014
Temperature :	24 ℃	Humidity :	50 %
Test Result:	PASS		

Hopping Channel Frequency Range	Number of Hopping Channels	Limit
2402-2480	79	≥15



Date: 20.JUL.2014 15:44:09

8. Time of Occupancy (Dwell Time)

8.1 Measurement Procedure

Average Channel Occupancy Time, FCC Ref:15.247(a)(1)(iii):

Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
The spectrum analyzer center frequency was set to one of the known hopping channels. The Sweep was set to 10 ms, the SPAN was set to Zero SPAN. The time duration of the transmissions so captured was measured with the Marker Delta function

8.2 Measurement Results

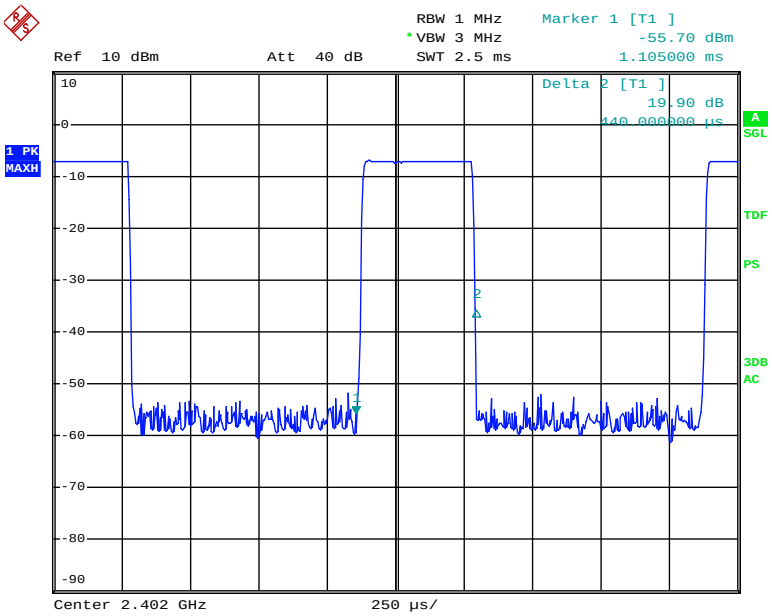
The maximum number of hopping channels in 31.6s (0.4s/Channel x 79 Channel)

Refer to attached data chart.

Modulation :	GFSK		
RBW :	1MHz	VBW :	3MHz
Spectrum Detector:	PK	Test By:	Sance
Test Date :	Jul. 20, 2014	Temperature :	24 ℃
Test Result:	PASS	Humidity :	50 %

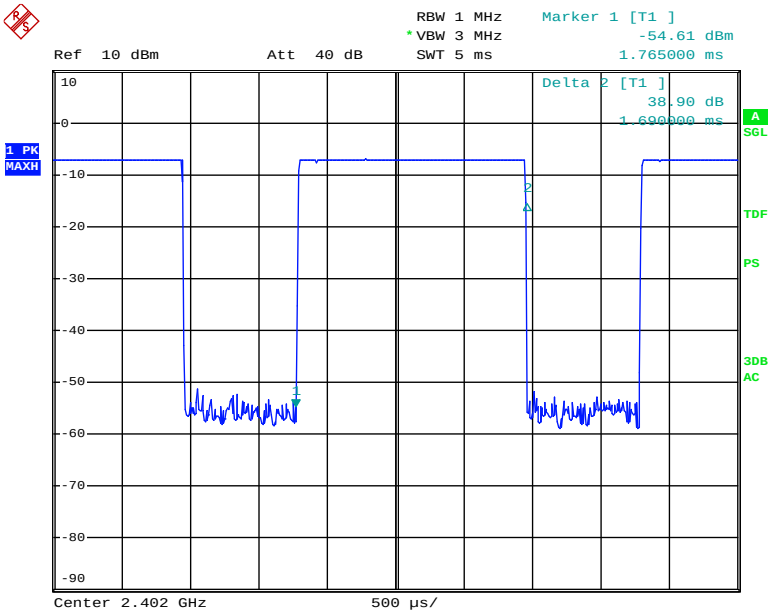
Packet	Frequency (MHz)	Result (msec)	Limit (msec)
DH1	2402	0.440(ms)*(1600/(2*79))*31.6=140.8	400
DH3	2402	1.690(ms)*(1600/(4*79))*31.6=270.4	400
DH5	2402	2.950(ms)*(1600/(6*79))*31.6=314.7	400

GFSK DH1



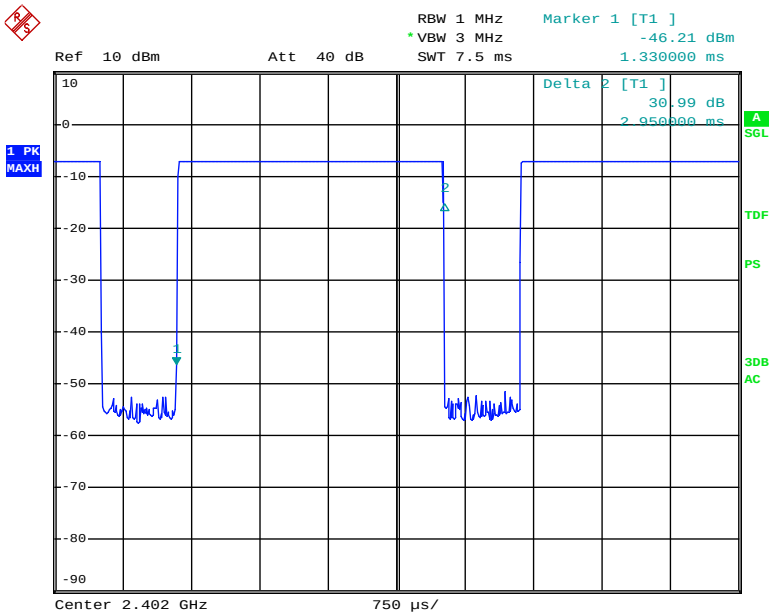
Date: 20.JUL.2014 15:44:56

GFSK DH3



Date: 20.JUL.2014 15:45:21

GFSK DH5



Date: 20.JUL.2014 15:45:43

9. MAXIMUM PEAK OUTPUT POWER

9.1 Measurement Procedure

Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(1):

Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum. The analyzer was set for RBW > 20dB bandwidth and power was read directly in dBm. Cable loss was considered during this measurement.

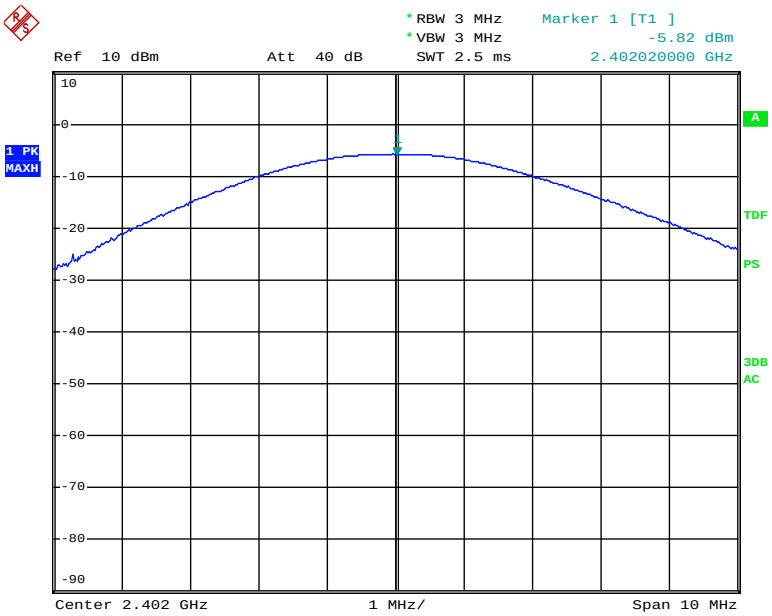
9.2 Measurement Results

Refer to attached data chart.

Modulation :	GFSK		
RBW :	3MHz	VBW :	3MHz
Spectrum Detector:	PK	Test Date :	Jul. 20, 2014
Test By:	Sance	Temperature :	24 ℃
Test Result:	PASS	Humidity :	50 %

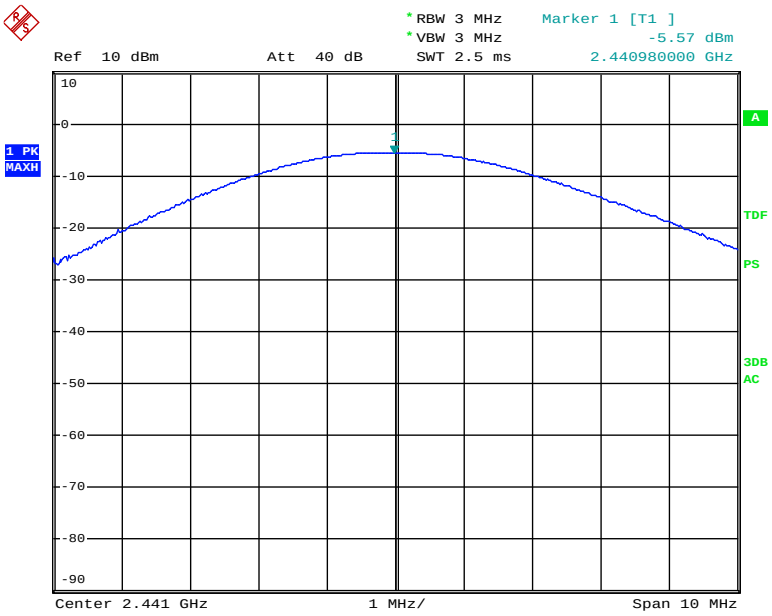
Channel Frequency (MHz)	Cable Loss dB	Peak Power output(mW)	Peak Power output(dBm)	Peak Power Limit(dBm)	Pass/Fail
2402.00	1.5	0.26	-5.82	21	PASS
2441.00	1.5	0.28	-5.57	21	PASS
2480.00	1.5	0.28	-5.46	21	PASS

Lowest Channel



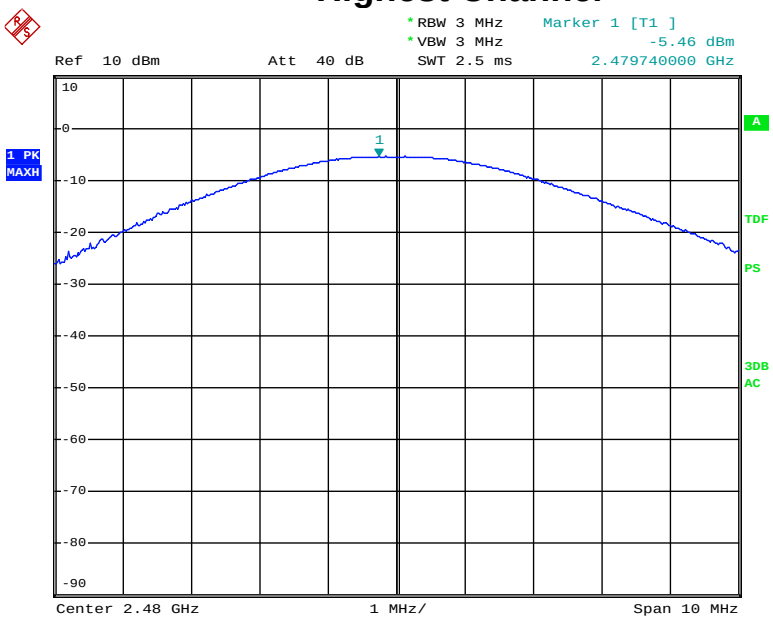
Date: 20.JUL.2014 15:33:36

Middle Channel



Date: 20.JUL.2014 15:33:47

Highest Channel



Date: 20.JUL.2014 15:33:58

10. Band Edge

10.1 Measurement Procedure

Out of Band Conducted Emissions, FCC Rule 15.247(d):

The transmitter output is connected to spectrum analyzer. The resolution bandwidth is set to100KHz, and the video bandwidth set to 300KHz.

A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

1. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300KHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for average detection(AV) at below at frequency above 1GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

10.2 Limit

15.247(d)In any 100KHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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.

10.3 Measurement Results

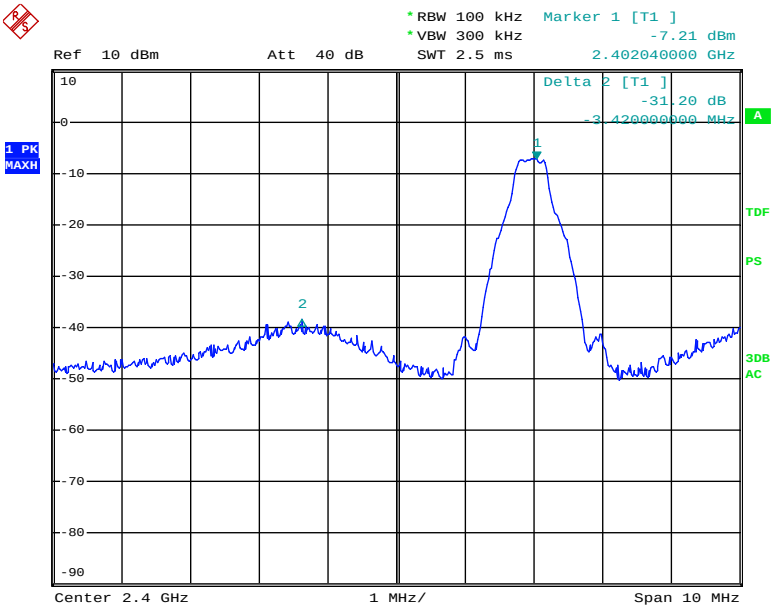
Please see below test table and plots.
For Radiated Emission

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		Peak	AV	Peak	AV	Peak	AV
2398.850	H	37.18	26.12	74.00	54.00	-36.82	-27.88
2398.520	V	37.87	27.66	74.00	54.00	-36.13	-26.34
2485.760	H	36.57	24.96	74.00	54.00	-37.43	-29.04
2484.760	V	39.65	28.70	74.00	54.00	-34.35	-25.30

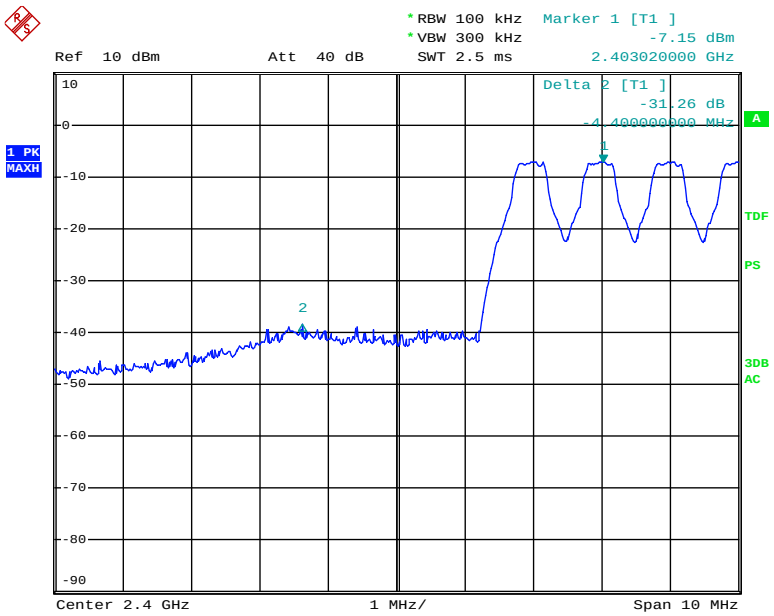
Note: (1) Emission Level= Reading Level + Factor
(2) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(3) Horn antenna used for the emission over 1000MHz.

For RF Conducted

Lowest Channel

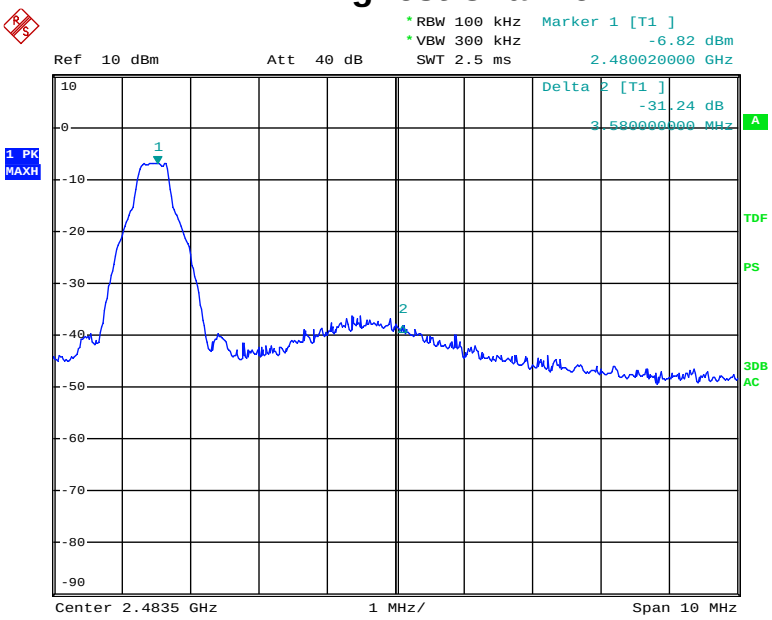


Date: 20.JUL.2014 15:36:56

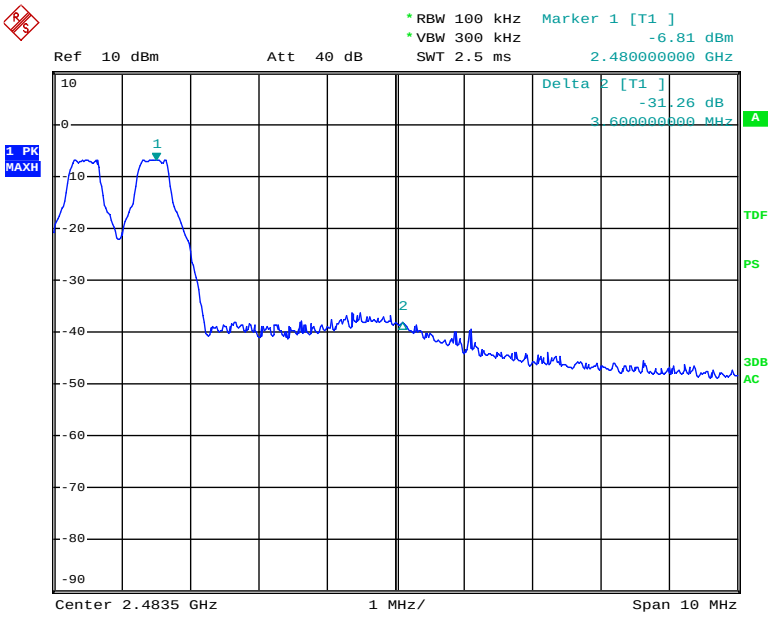


Date: 20.JUL.2014 15:37:42

Highest Channel



Date: 20.JUL.2014 15:38:14



Date: 20.JUL.2014 15:38:38

11. Antenna Application

11.1 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.

11.2 Measurement Results

The antenna is integrated on the main PCB and no consideration of replacement, and the best case gain of the antenna is 0dBi. So, the antenna is consider meet the requirement.

12. Conducted Spurious Emissions

12.1 Measurement Procedure

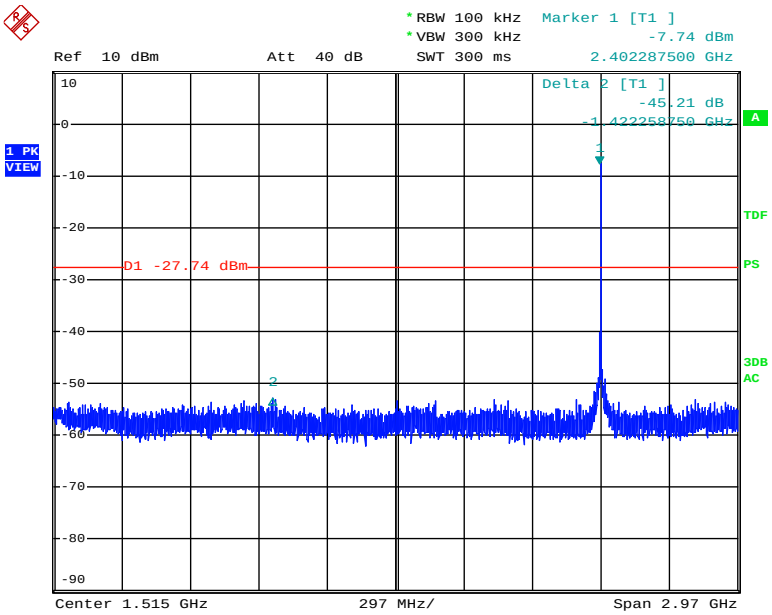
Out of Band Conducted Spurious Emissions, FCC Rule 15.247(d):

The transmitter output is connected to spectrum analyzer. All spurious emission and up tp 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.

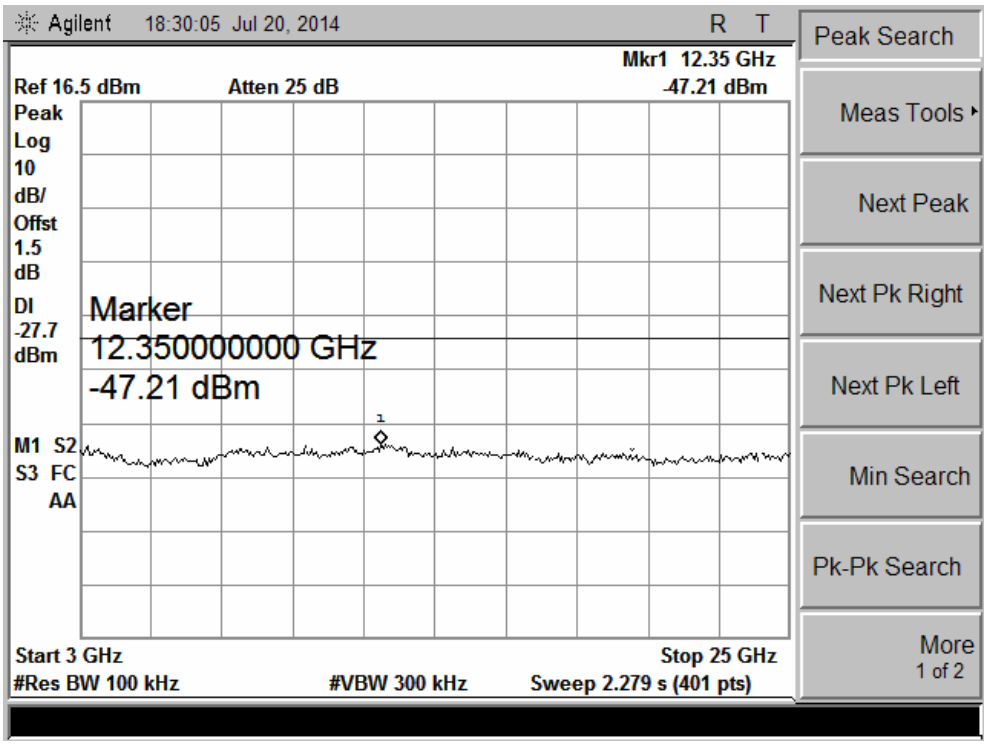
12.2. Measurement Results

Please refer to following plots.

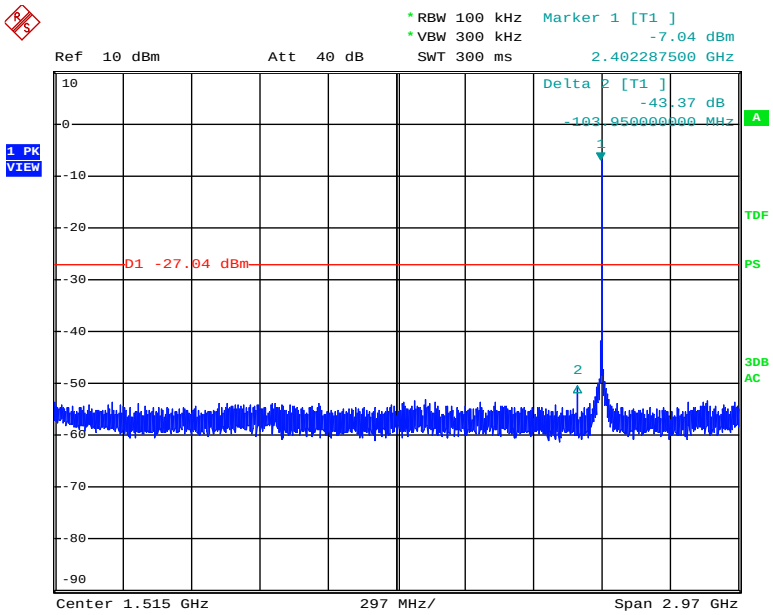
Lowest Channel



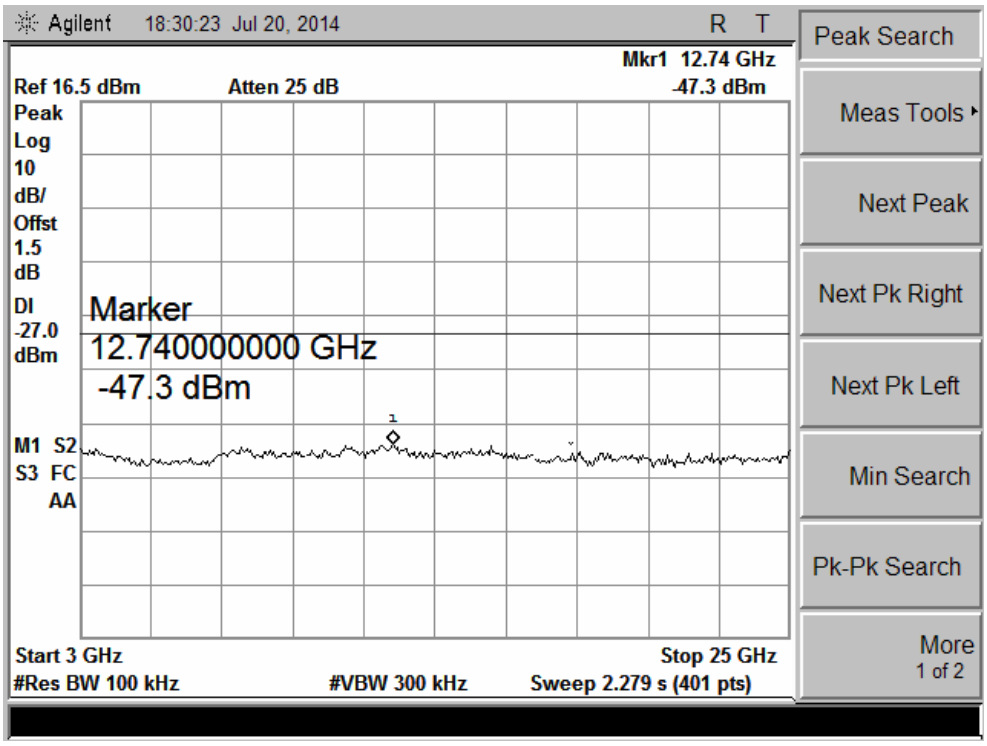
Date: 20.JUL.2014 15:31:45



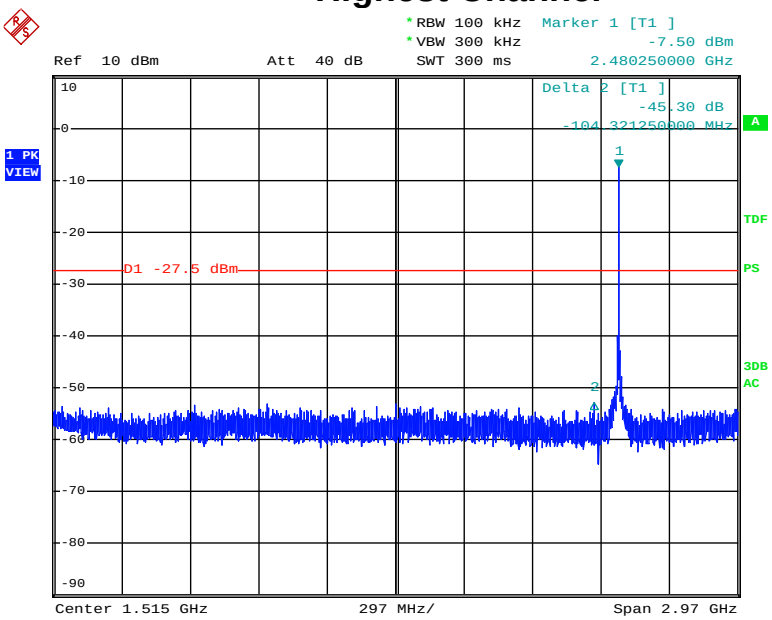
Middle Channel



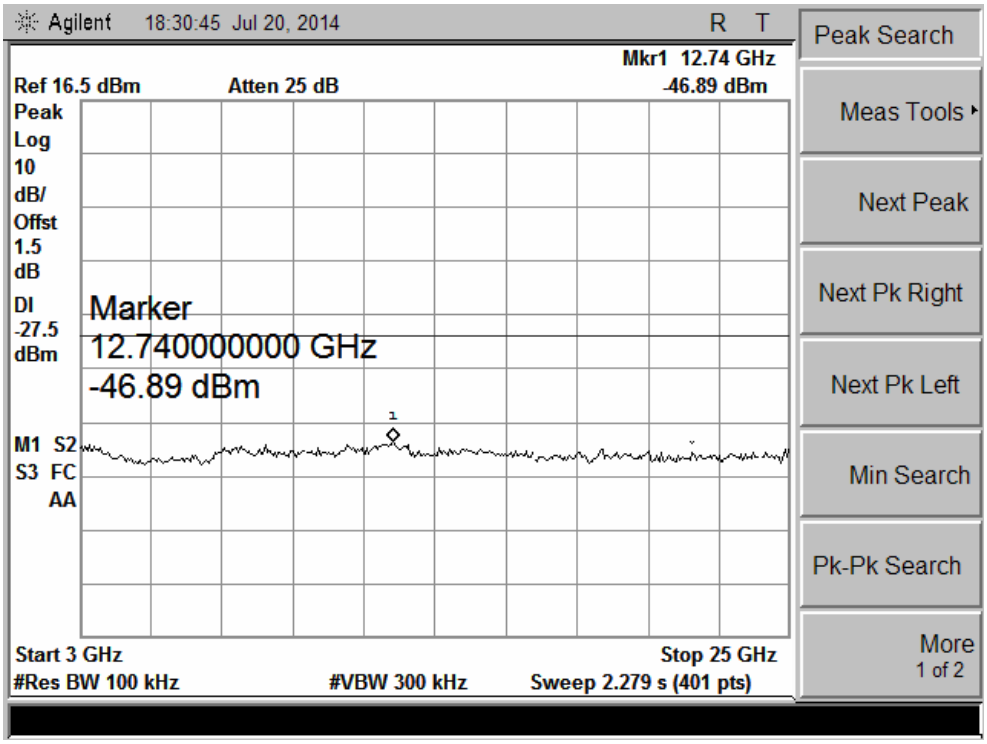
Date: 20.JUL.2014 15:32:17



Highest Channel



Date: 20.JUL.2014 15:32:51



13. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Nov. 25, 2013	Nov. 24, 2014
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Nov. 28, 2013	Nov. 27, 2014
Positioning Controller	UC	UC 3000	N/A	0~360°, 1-4m	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	32A	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	200A	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	200A	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Nov. 09, 2013	Nov. 08, 2014
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Nov. 09, 2013	Nov. 08, 2014
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Nov. 09, 2013	Nov. 08, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	15GHz~26.5GHz	Oct.24, 2013	Oct.23, 2014
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Nov. 07, 2013	Nov. 06, 2014
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Oct.11, 2013	Oct.10, 2014
Spectrum Analyzer	Agilent	E4408B	MY414407D	9KHz~26.5GHz	Nov. 05, 2013	Nov. 04, 2014
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Nov. 05, 2013	Nov. 04, 2014
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Nov. 09, 2013	Nov. 08, 2014

---End of report---