TEST REPORT

FCC ID: 2ABNA-G5, IC: 11648A-G5

Applicant	:	Guangzhou Geoelectron Science & Technology Company Limited
Address	:	No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District, Guangzhou, China

Equipment under Test (EUT):

Name	:	GNSS Receiver
Model	:	G5, GX5

In Accordance with: FCC PART 15, SUBPART C: Section 15.247
RSS-247 ISSUE 1 MAY 2015
ANSI C63.4:2014, ANSI C63.10:2013

Report No	:	T1860371 16
Date of Test	:	March 18- March 28, 2016
Date of Issue	:	March 29, 2016
Test Result	:	PASS

In the configuration tested, the EUT complied with the standards specified above
Authorized Signature

(Mark Zhu)
Manager

Contents

TEST REPORT VERIFICATION

Applicant	:	Guangzhou Geoelectron Science & Technology Company Limited
Manufacturer	:	Guangzhou Geoelectron Science & Technology Company Limited
EUT Description	:	GNSS Receiver
(A) Model No.		: G5, GX5
(B) Trademark		: GINTEC, ACNOVO
(C) Ratings Supply		: DC 3.6V from battery or DC 5.35V from adapter for charging
(D)Test Voltage		: DC 3.6V from battery

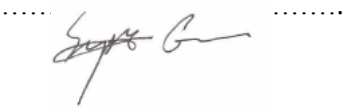
Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C, RSS-247, ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the Part 15C and RSS-247 limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Eric Huang Test Engineer	
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	April 05, 2016	

1. General Information

1.1. Description of Device (EUT)

EUT	:	GNSS Receiver
Model No.	:	G5, GX5
DIFF		Only differ in model number.
Trade mark	:	GINTEC, ACNOVO
Power supply	:	DC 3.6V from battery or DC 5.35V from adapter for charging
Adapter	:	Manufacturer: NIL Model No.: PSAI10R-050Q
Radio Technology	:	BT2.1+EDR
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, π/4 DQPSK, 8-DPSK
Antenna Type	:	Integrated Antenna, max gain 5.46 dBi.
Applicant	:	Guangzhou Geoelectron Science & Technology Company Limited
Address	:	No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District, Guangzhou, China
Manufacturer	:	Guangzhou Geoelectron Science & Technology Company Limited
Address	:	No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District, Guangzhou, China

1.2. Accessories of device (EUT)

Description	:	Adapter
Manufacturer	:	NIL
Model No.	:	PSAI10R-050Q
Input	:	AC 100-240V, 50-60Hz, 0.3A, 22-38VA
Output	:	DC 5.35V, 2.0A

1.3. Test Lab information

Shenzhen Alpha Product Testing Co., Ltd
Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road,
Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

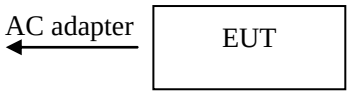
Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.4 :2014&RSS-247 5.4(2) & ANSI C63.10 :2013	PASS
Bandwidth	FCC Part 15: 15.215 ANSI C63.4 :2014&RSS-247 5.1(2) & ANSI C63.10 :2013	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.4 :2014& RSS-247 5.1(2) & ANSI C63.10 :2013	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014&RSS-247 5.1(4) & ANSI C63.10 :2013	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.4 :2014&RSS-247 5.1(4) & ANSI C63.10 :2013	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.4 :2014&RSS-247 Section 5.5& ANSI C63.10 :2013	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.4 :2014&RSS-247 Section 5.5& ANSI C63.10 :2013	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.4 :2014&IC RSS Gen, Section 7.2.4& ANSI C63.10 :2013	PASS
Antenna requirement	FCC Part 15: 15.203 &IC RSS Gen, Section 7.1.4	PASS

2.2. Assistant equipment used for test

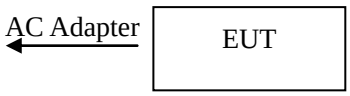
Description : Adapter
Manufacturer : NIL
Model No. : PSAI10R-050Q
Input : AC 100-240V, 50-60Hz, 0.3A, 22-38VA
Output : DC 5.35V, 2.0A

2.3. Block Diagram

1, For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was set to BT test mode before test.



2, For Power Line Conducted Emissions Test: EUT was connected to notebook by 1.5m USB line.



2.4. Test mode

Test methodology: Test had been referenced to the DA 00-705. The test was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
π /4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
8- DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.5. Test Conditions

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

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.71dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.90 dB	Polarize: V
	3.92dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.26 dB	Polarize: H
	4.28 dB	Polarize: V
Uncertainty for conducted RF Power	0.16dB	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal. Due to	Cal Interval
3m Semi-Anechoic	CHENYU	N/A	N/A	2018.01.18	2Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2017.01.16	1Year
Receiver	R&S	ESPI	101873	2017.01.16	1Year
Receiver	R&S	ESCI	101165	2017.01.16	1Year
Bilog Antenna	SCHWARZBECK	VULB 9168	VULB9168-438	2018.01.18	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2017.01.20	2Year
Cable	Resenberger	N/A	No.1	2017.01.16	1Year
Cable	SCHWARZBECK	N/A	No.2	2017.01.16	1Year
Cable	SCHWARZBECK	N/A	No.3	2017.01.16	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2017.01.18	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2017.01.18	1Year
vector Signal Generator	Agilent	N5182A	MY49060042	2016.11.16	1 Year
vector Signal Generator	Agilent	E4438C	US44271917	2016.11.16	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54080020	2016.11.16	1 Year
X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY54110001	2016.11.16	1 Year
Signal Analyzer	Agilent	N9020A	MY48030494	2016.11.16	1 Year

3. Maximum Peak Output power

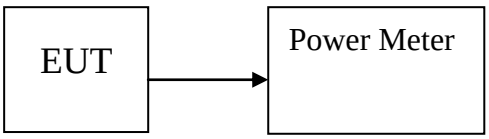
3.1. Limit

Please refer to 15.247 and RSS-247.

3.2. Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3. Test Setup



3.4. Test Result

EUT: GNSS Receiver		M/N: G5			
Test date: 2016-03-25		Test site: RF site		Tested by: Peter	
Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Margin (dB)
GFSK	2402	4.852	3.056	30	25.148
	2441	4.593	2.879	30	25.407
	2480	6.336	4.301	30	23.664
π /4 DQPSK,	2402	1.961	1.571	21	19.039
	2441	2.022	1.593	21	18.978
	2480	3.893	2.451	21	17.107
8- DPSK	2402	1.955	1.569	21	19.045
	2441	2.368	1.725	21	18.632
	2480	3.885	2.446	21	17.115
Conclusion: PASS					

4. Bandwidth

4.1. Limit

Please refer section15.247 and RSS-247.

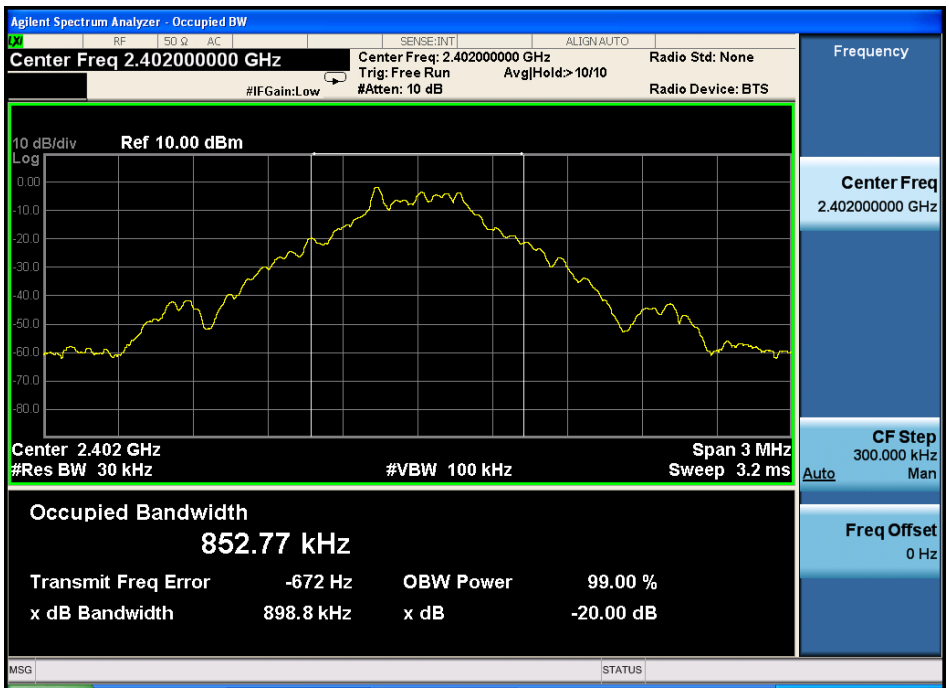
4.2. Test Procedure

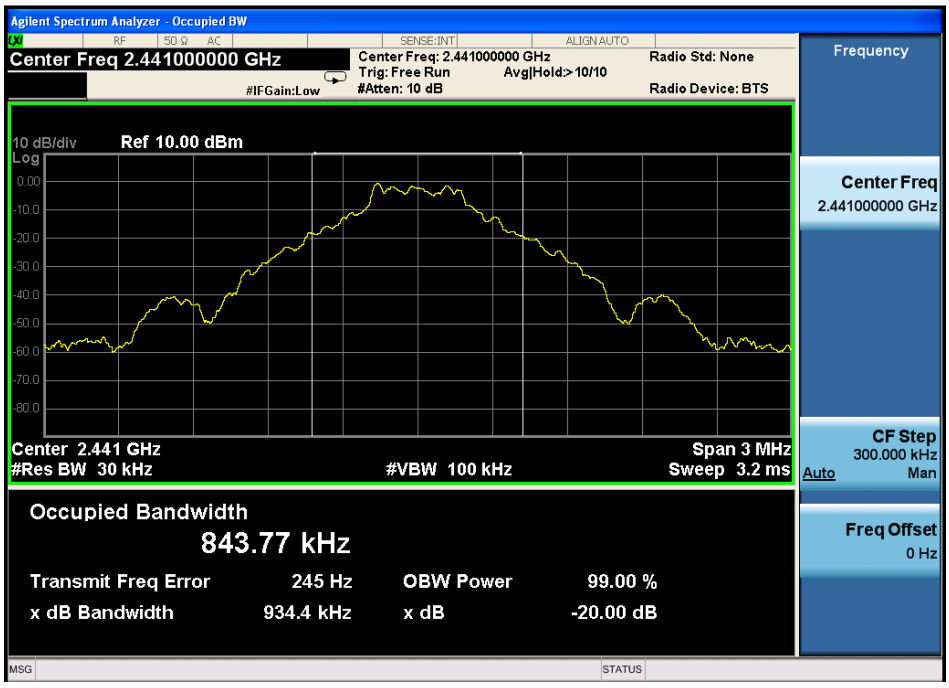
As required by DA 00-705, the transmitter output was coupled to a spectrum analyzer via antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 kHz for RBW and 100 kHz for VBW. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

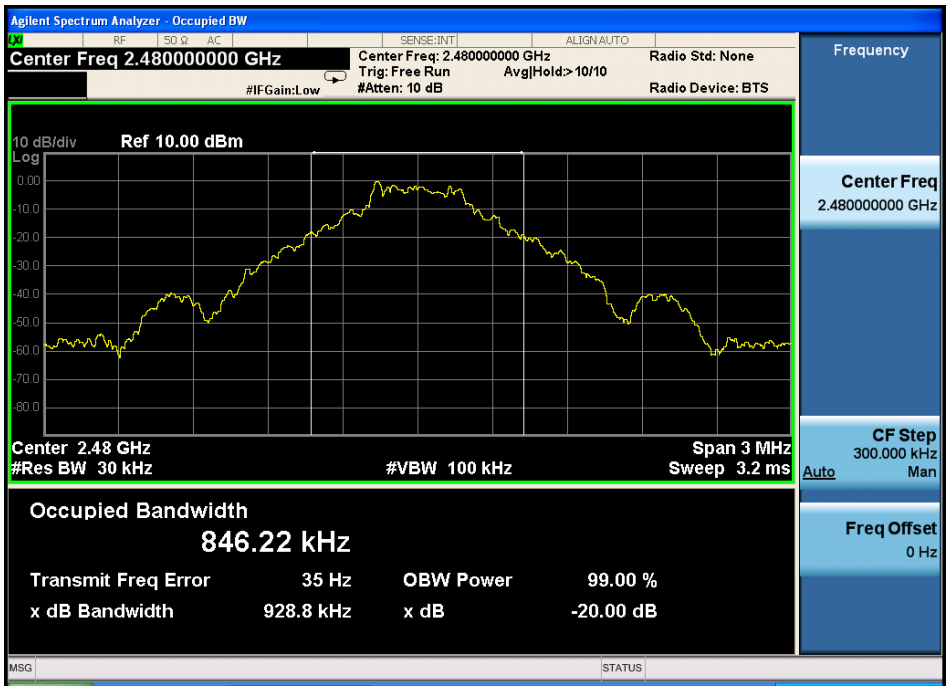
4.3. Test Result

EUT: GNSS Receiver		M/N: G5		
Test date: 2016-03-25		Test site: RF site	Tested by: Peter	
Mode	Freq (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (kHz)	Conclusion
GFSK	2402	898.8	852.77	PASS
	2441	934.4	843.77	PASS
	2480	928.8	846.22	PASS
π /4 DQPSK	2402	1255	1158.8	PASS
	2441	1233	1143.3	PASS
	2480	1255	1160.8	PASS
8- DPSK	2402	1266	1156.6	PASS
	2441	1266	1151.1	PASS
	2480	1255	1159.9	PASS

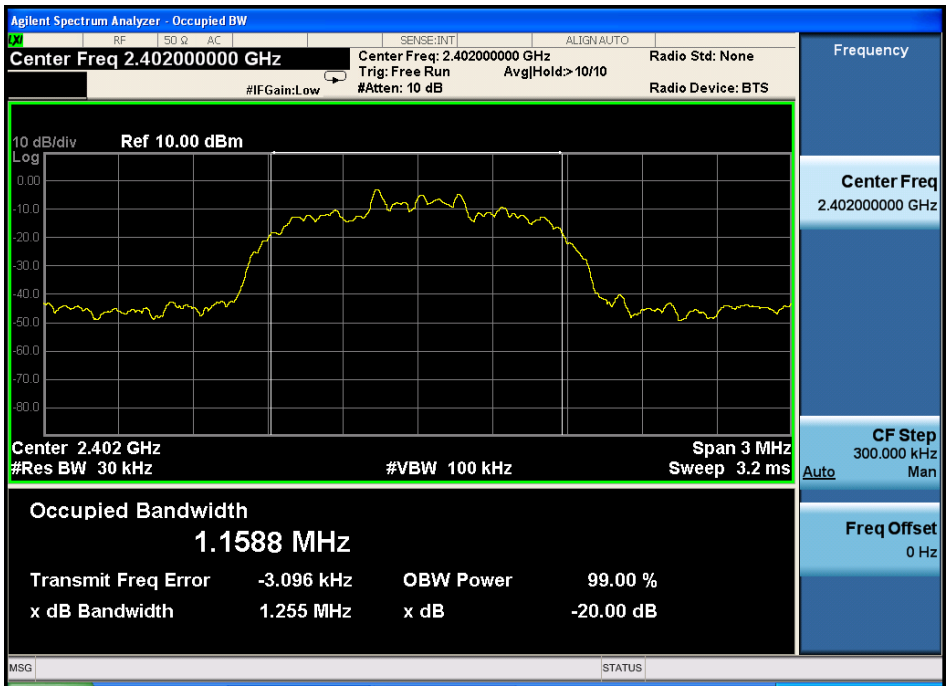
GFSK:

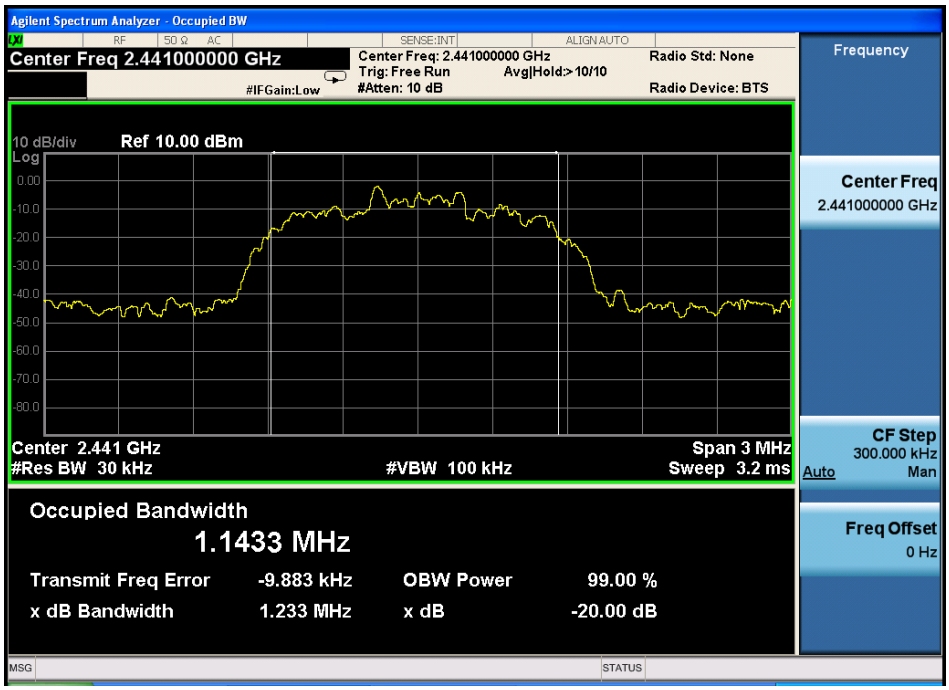

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.402000000 GHz
Center 2.402 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
852.77 kHz
Transmit Freq Error
-672 Hz
OBW Power
99.00 %
x dB Bandwidth
898.8 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

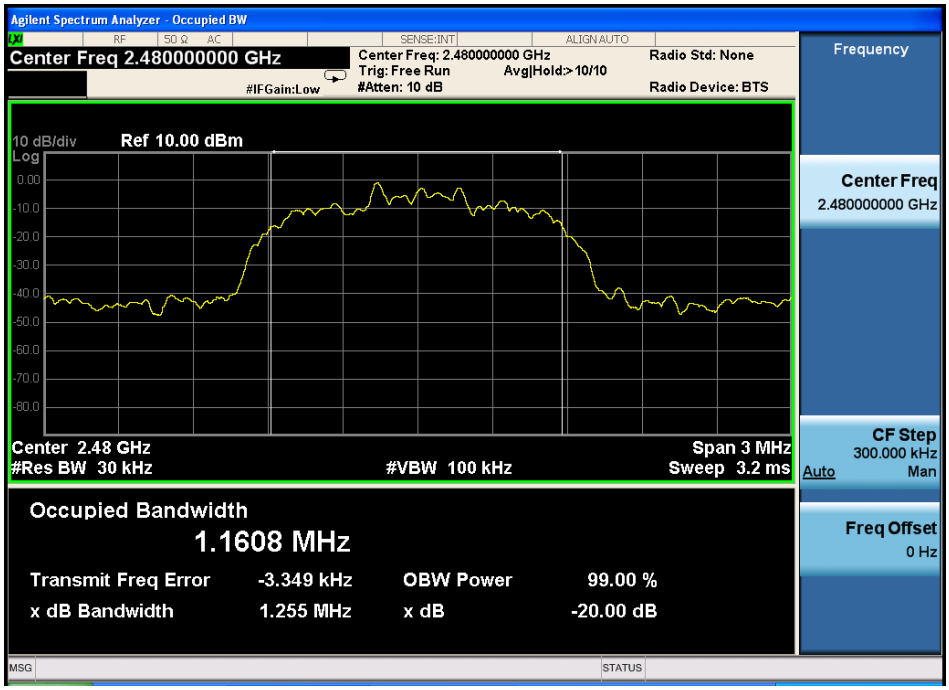

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.441000000 GHz
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
843.77 kHz
Transmit Freq Error
245 Hz
OBW Power
99.00 %
x dB Bandwidth
934.4 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
846.22 kHz
Transmit Freq Error
35 Hz
OBW Power
99.00 %
x dB Bandwidth
928.8 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

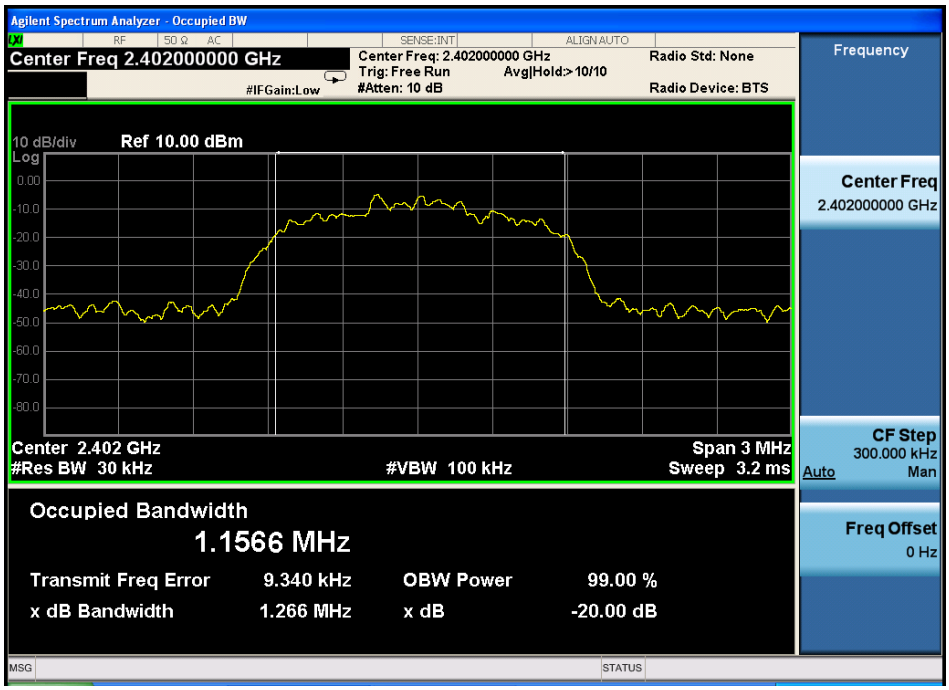
π /4 DQPSK:

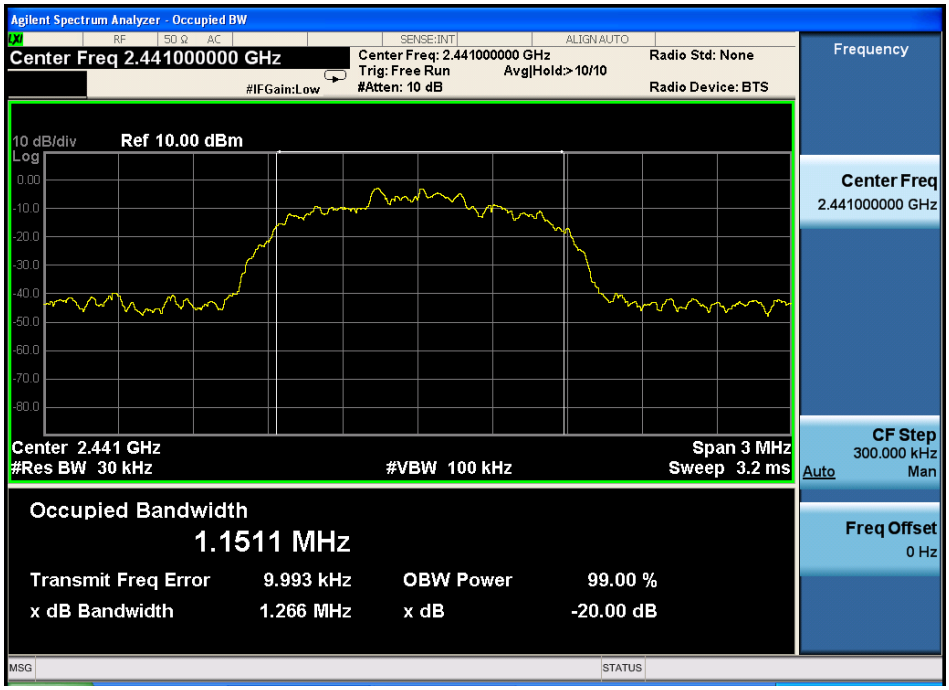

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.402000000 GHz
Center 2.402 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Occupied Bandwidth
1.1588 MHz
Transmit Freq Error
-3.096 kHz
OBW Power
99.00 %
x dB Bandwidth
1.255 MHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

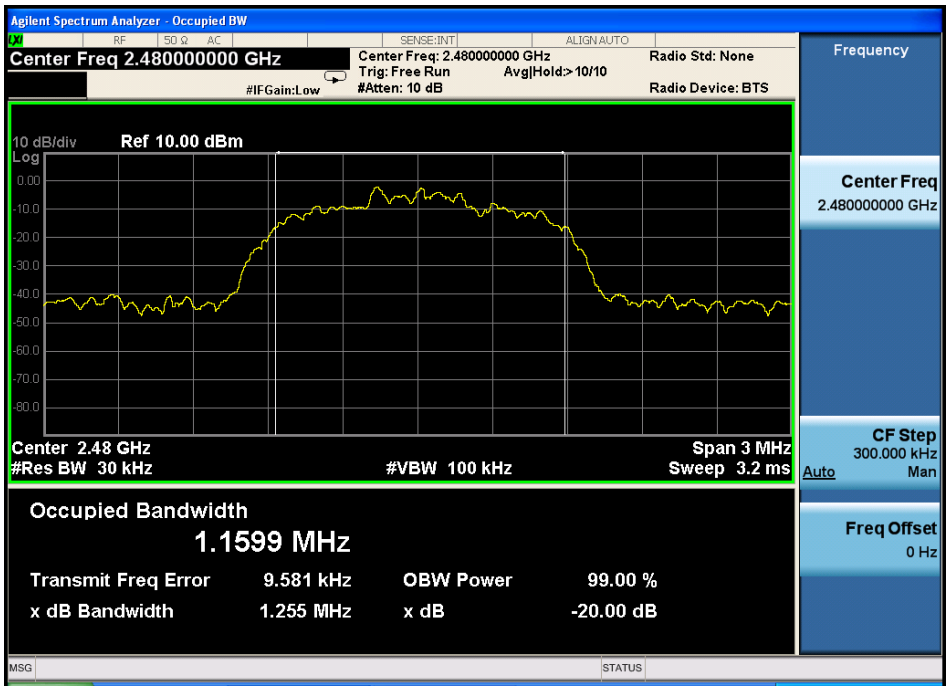

Agilent Spectrum Analyzer - Occupied BW
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
Center Freq 2.441000000 GHz
#IFGain:Low
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1433 MHz
Transmit Freq Error -9.883 kHz
OBW Power 99.00 %
x dB Bandwidth 1.233 MHz
x dB -20.00 dB
Center Freq
2.441000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
Center Freq 2.480000000 GHz
#IFGain:Low
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1608 MHz
Transmit Freq Error -3.349 kHz
OBW Power 99.00 %
x dB Bandwidth 1.255 MHz
x dB -20.00 dB
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

8- DPSK:


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.402 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1566 MHz
Transmit Freq Error 9.340 kHz
OBW Power 99.00 %
x dB Bandwidth 1.266 MHz
x dB -20.00 dB
Frequency
Center Freq
2.402000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.441 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1511 MHz
Transmit Freq Error 9.993 kHz
OBW Power 99.00 %
x dB Bandwidth 1.266 MHz
x dB -20.00 dB
Frequency
Center Freq
2.441000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
Center Freq 2.480000000 GHz
#IFGain:Low
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Log
Ref 10.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
1.1599 MHz
Transmit Freq Error 9.581 kHz
OBW Power 99.00 %
x dB Bandwidth 1.255 MHz
x dB -20.00 dB
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

5. Carrier Frequency Separation

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

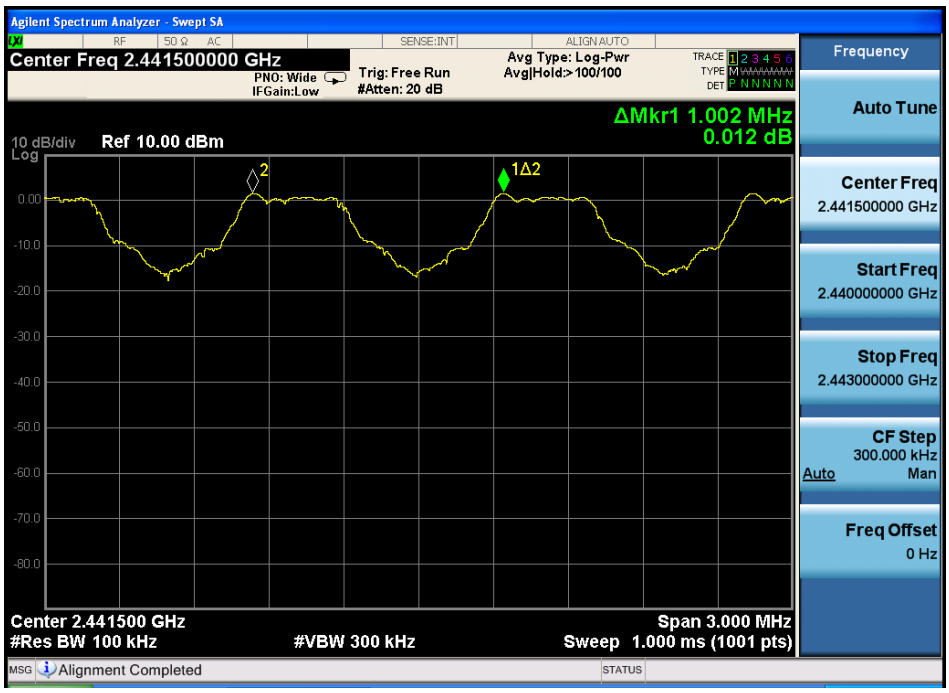
5.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via antenna. The carrier frequency was measured by spectrum analyzer with 30 kHz for RBW and 100 kHz for VBW.

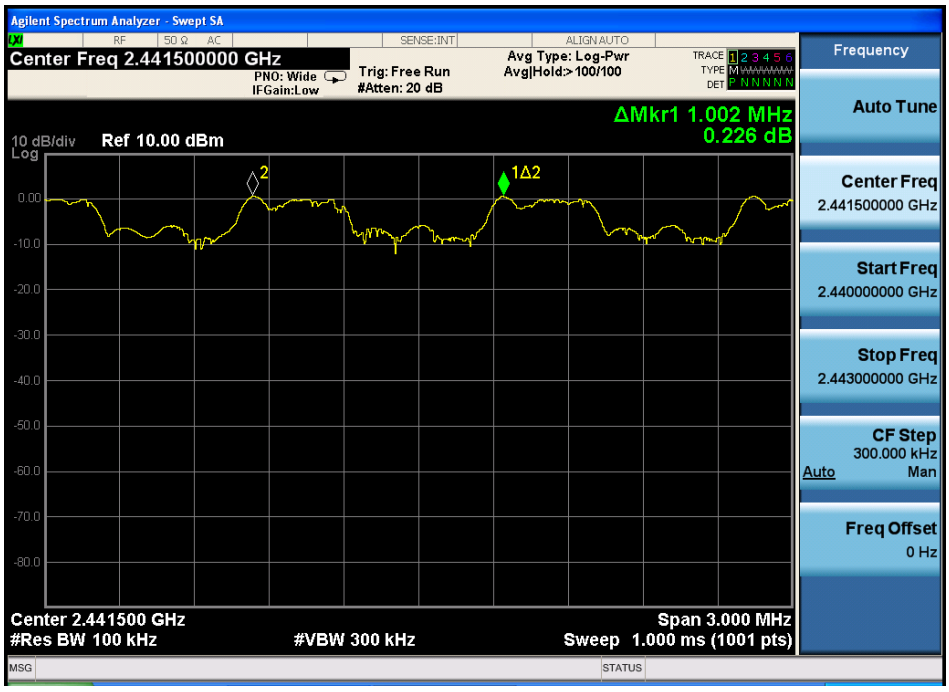
5.3. Test Result

EUT: GNSS Receiver M/N: G5				
Test date: 2016-03-25		Test site: RF site	Tested by: Peter	
Mode/Channel	Channel separation (KHz)	20dB Bandwidth (KHz)	Limit (KHz) 2/3 20dB bandwidth	Conclusion
GFSK	1002	934.400	622.933	PASS
π /4 DQPSK	1002	1233.000	822.000	PASS
8- DPSK	1002	1266.000	844.000	PASS

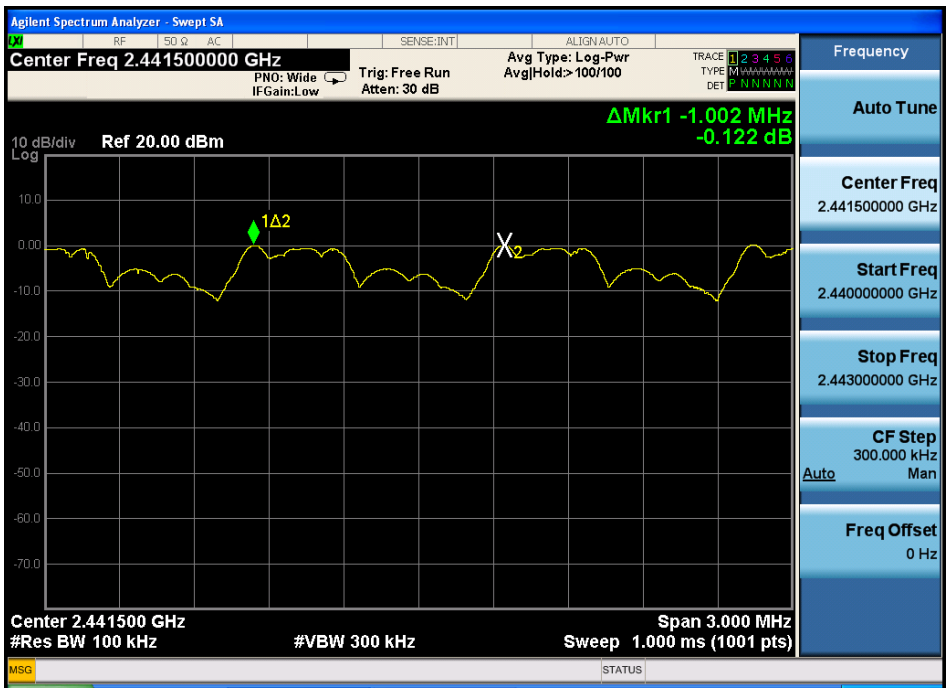
GFSK



π /4 DQPSK



8- DPSK:


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
ΔMkr1 -1.002 MHz
-0.122 dB
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1Δ2
Center 2.441500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3.000 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440000000 GHz
Stop Freq
2.443000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

6. Number of Hopping Channel

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

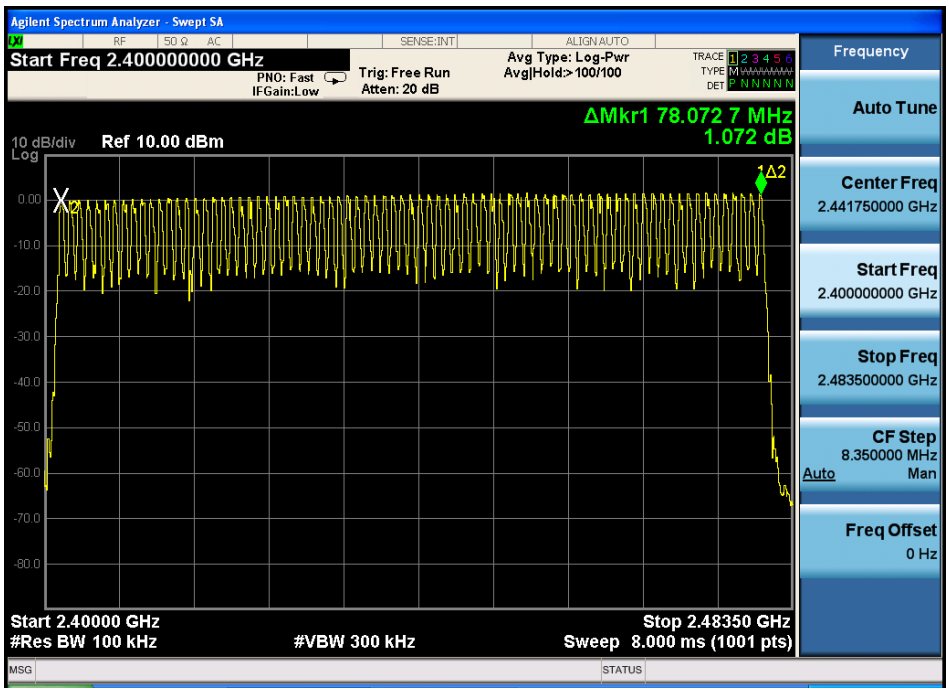
6.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via antenna. The number of hopping channel was measured by spectrum analyzer with 300 kHz for RBW and 1MHz for VBW.

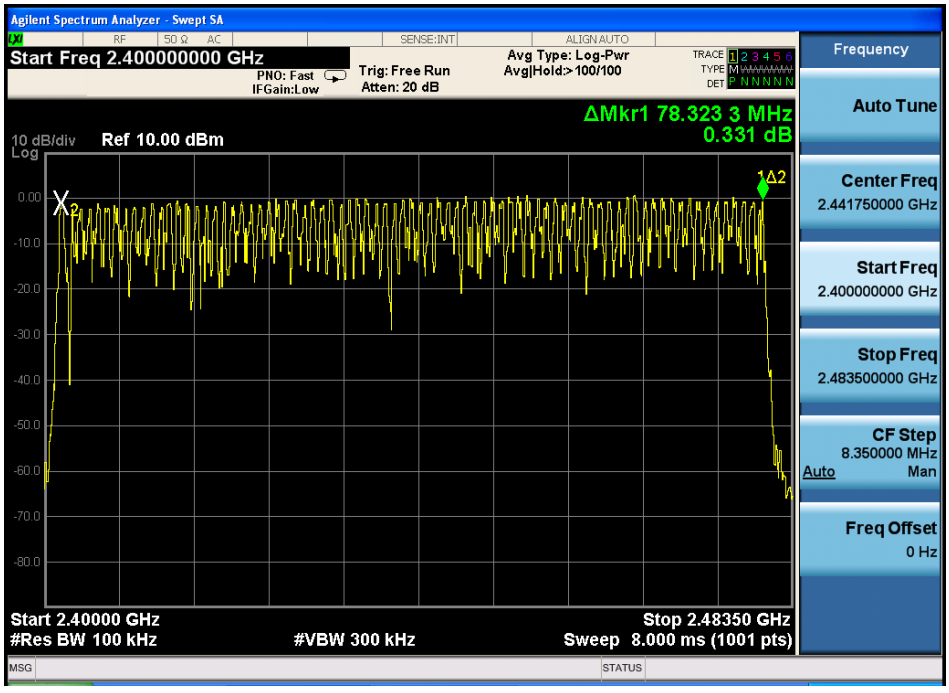
6.3. Test Result

EUT: GNSS Receiver M/N: G5			
Test date: 2016-03-25	Test site: RF site	Tested by: Peter	
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
π /4 DQPSK	79	>15	PASS
8- DPSK	79	>15	PASS

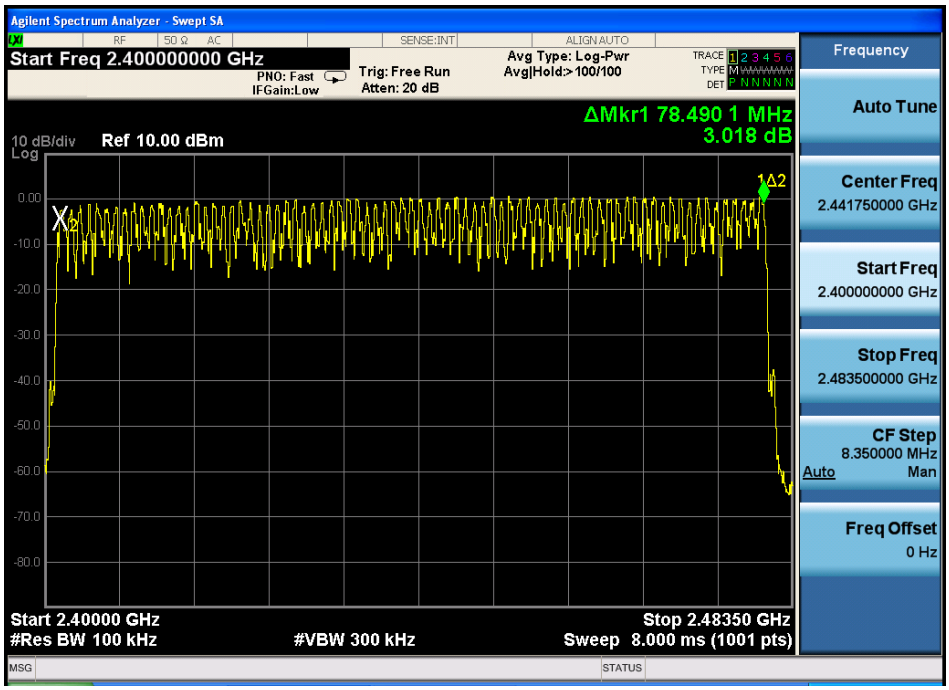
GFSK



π /4 DQPSK



8- DPSK:


Agilent Spectrum Analyzer - Swept SA
Start Freq 2.400000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
ΔMkr1 78.490 1 MHz
3.018 dB
10 dB/div
Log
Ref 10.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

7. Dwell Time

7.1. Test limit

Please refer section15.247 and RSS-247.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW=VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured was complete.

7.3. Test Results

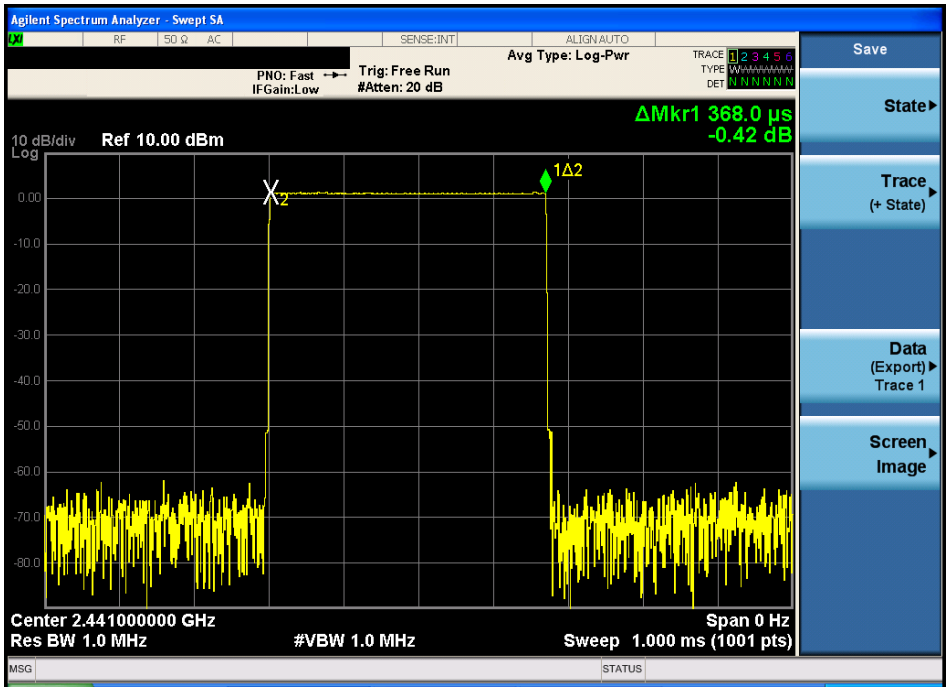
PASS.

Detailed information please see the following page.

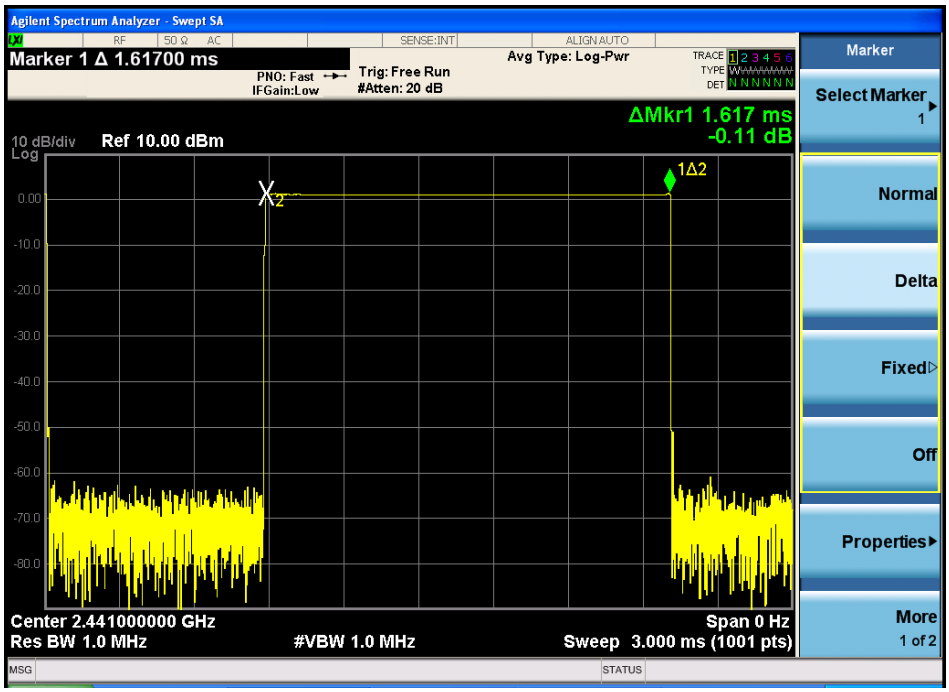
EUT: GNSS Receiver M/N: G5						
Test date: 2016-03-25		Test site: RF site		Tested by: Peter		
Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
GFSK	DH1	2441	0.368	0.236	<0.4	PASS
	DH3	2441	1.617	0.345	<0.4	PASS
	DH5	2441	2.856	0.366	<0.4	PASS
π /4 DQPSK	DH1	2441	0.375	0.240	<0.4	PASS
	DH3	2441	1.614	0.344	<0.4	PASS
	DH5	2441	2.855	0.365	<0.4	PASS
8- DPSK	DH1	2441	0.374	0.239	<0.4	PASS
	DH3	2441	1.617	0.345	<0.4	PASS
	DH5	2441	2.868	0.367	<0.4	PASS
Note: 1 A period time = 0.4 (s) * 79 = 31.6(s) 2 DH1 time slot = Pulse Duration * (1600/(1*79)) * A period time DH3 time slot = Pulse Duration * (1600/(3*79)) * A period time DH5 time slot = Pulse Duration * (1600/(5*79)) * A period time						

GFSK

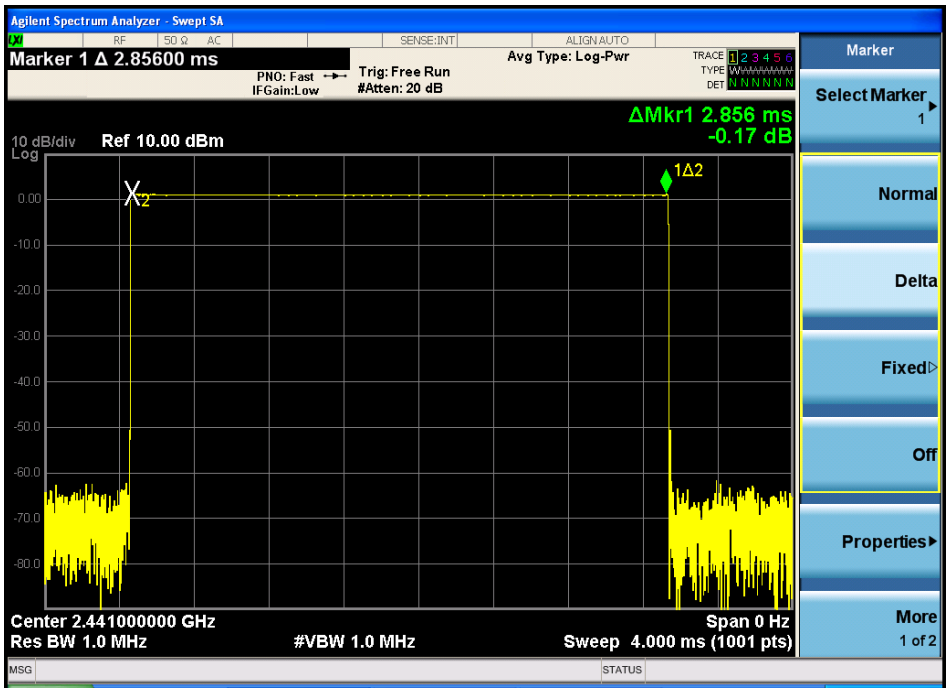
DH1:


Agilent Spectrum Analyzer - Swept SA
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
ΔMkr1 368.0 µs
-0.42 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
Save
State
Trace
(+ State)
Data
(Export)
Trace 1
Screen
Image

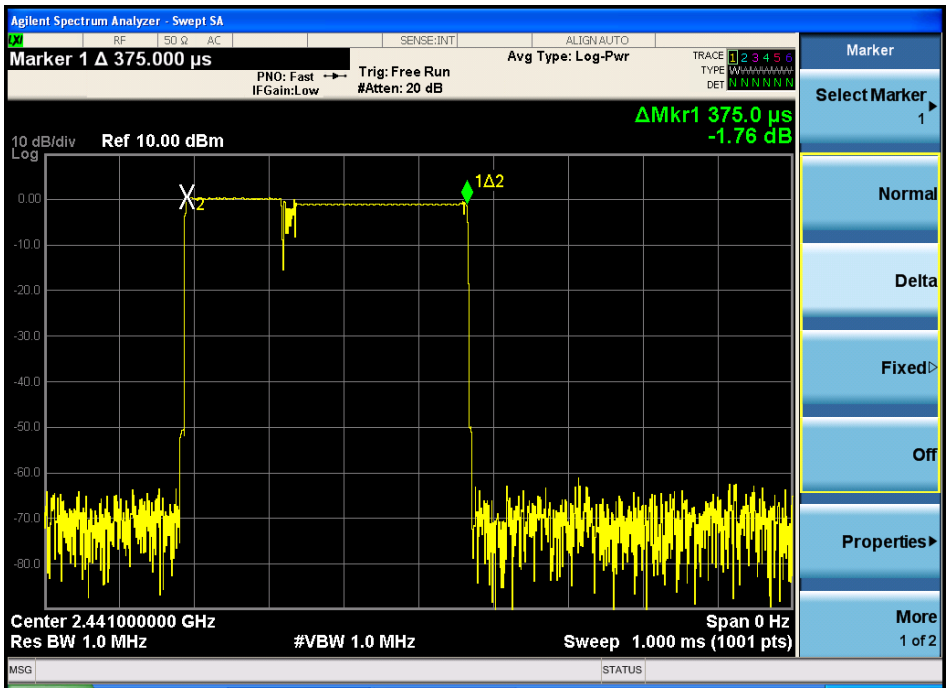
DH3:


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.61700 ms
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
ΔMkr1 1.617 ms
-0.11 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

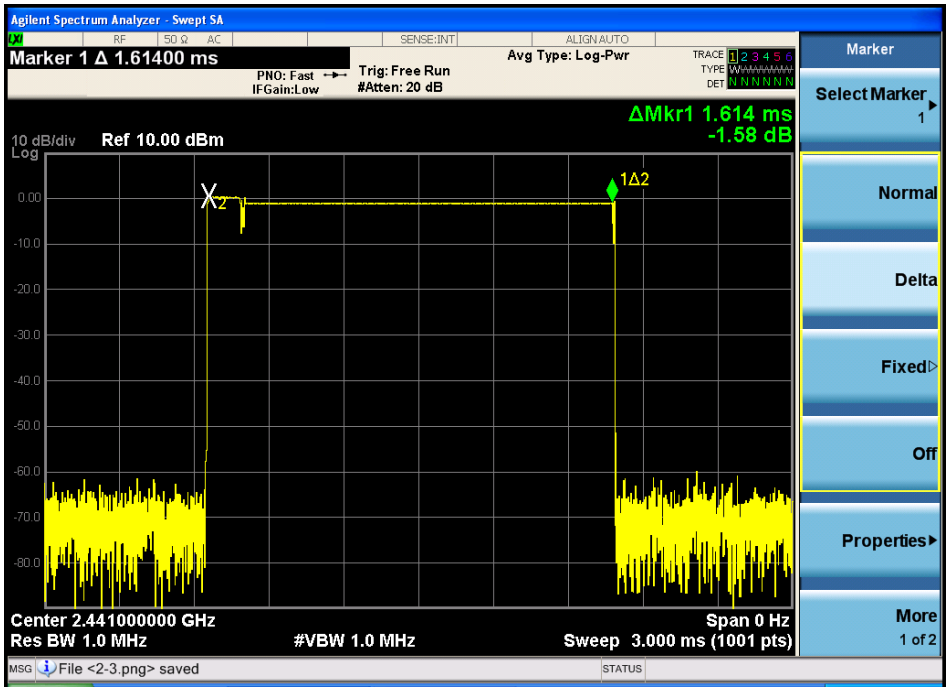
DH5



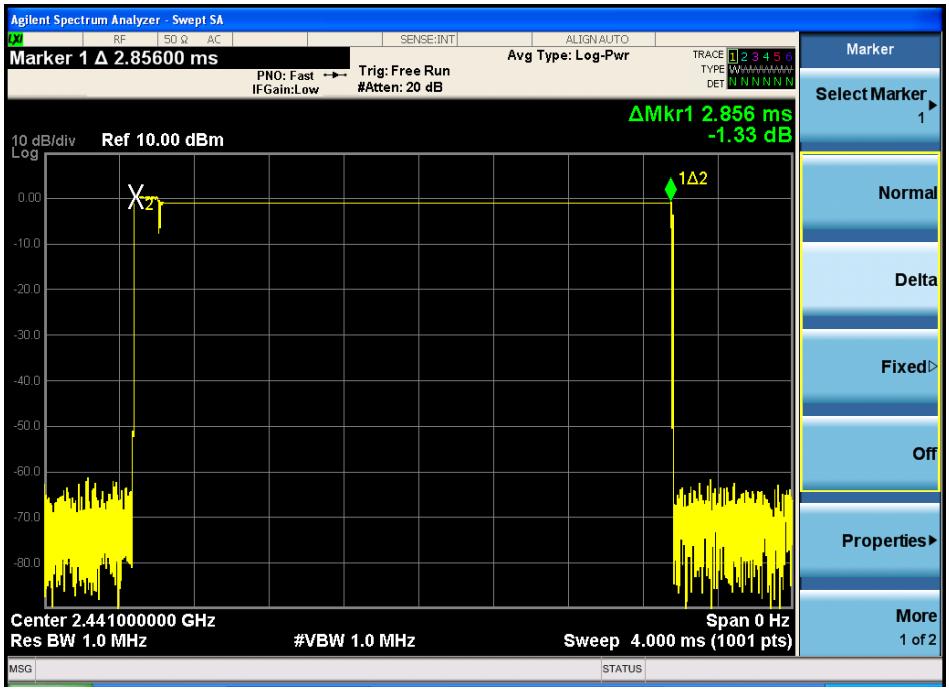
π /4 DQPSK
DH1



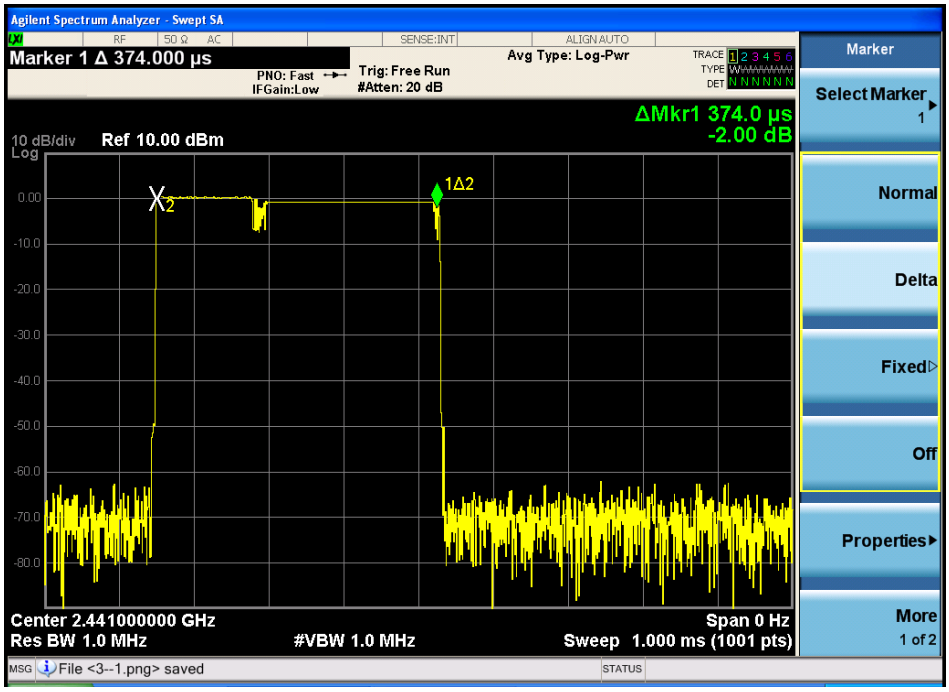
DH3

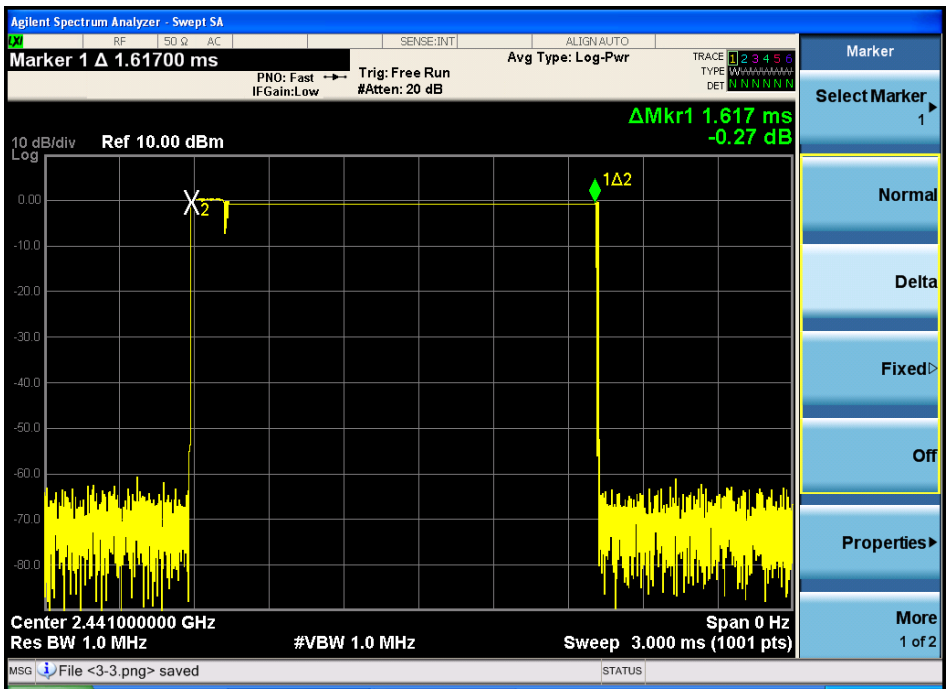

Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.61400 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 1.614 ms
-1.58 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (1001 pts)
File <2-3.png> saved
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

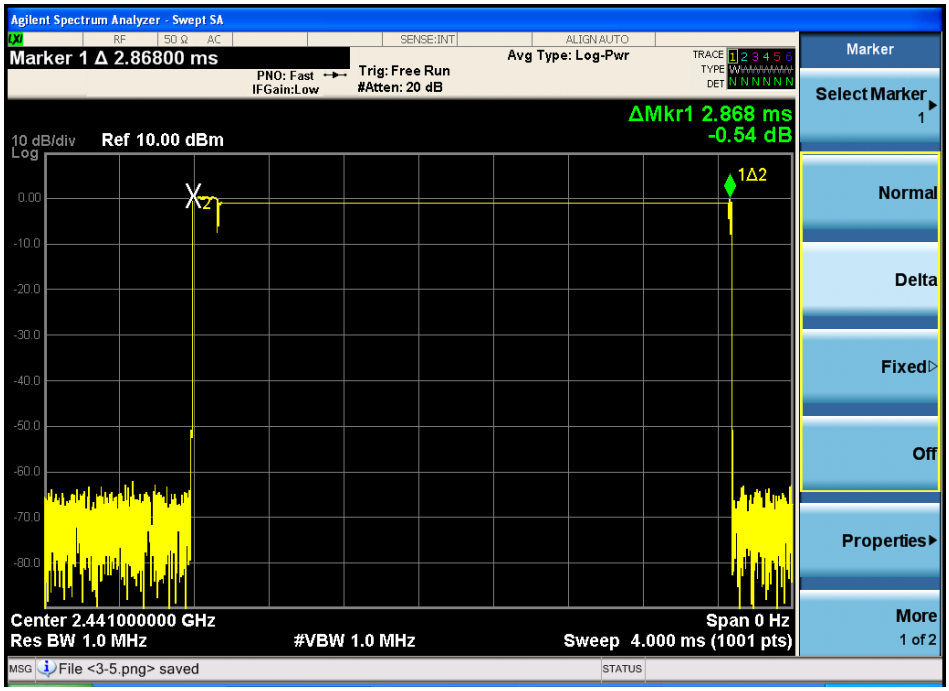
DH5


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 2.85600 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 2.856 ms
-1.33 dB
10 dB/div
Log
Ref 10.00 dBm
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 4.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

8- DPSK:


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 374.000 µs
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 374.0 µs
-2.00 dB
10 dB/div
Log
Ref 10.00 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
File <3--1.png> saved


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.61700 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
ΔMkr1 1.617 ms
-0.27 dB
10 dB/div
Log
Ref 10.00 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
File <3-3.png> saved


Agilent Spectrum Analyzer - Swept SA
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
Marker 1 Δ 2.86800 ms
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWW
DET N N N N N
ΔMkr1 2.868 ms
-0.54 dB
10 dB/div
Log
Ref 10.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 4.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
File <3-5.png> saved
STATUS

8. Radiated emissions

8.1. Limit

All the emissions appearing within FCC Part 15 and RSS-Gen restricted frequency bands shall not exceed the limits shown in FCC Part 15 and RSS-Gen, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with FCC Part 15 and RSS-Gen limits.

Restricted bands:

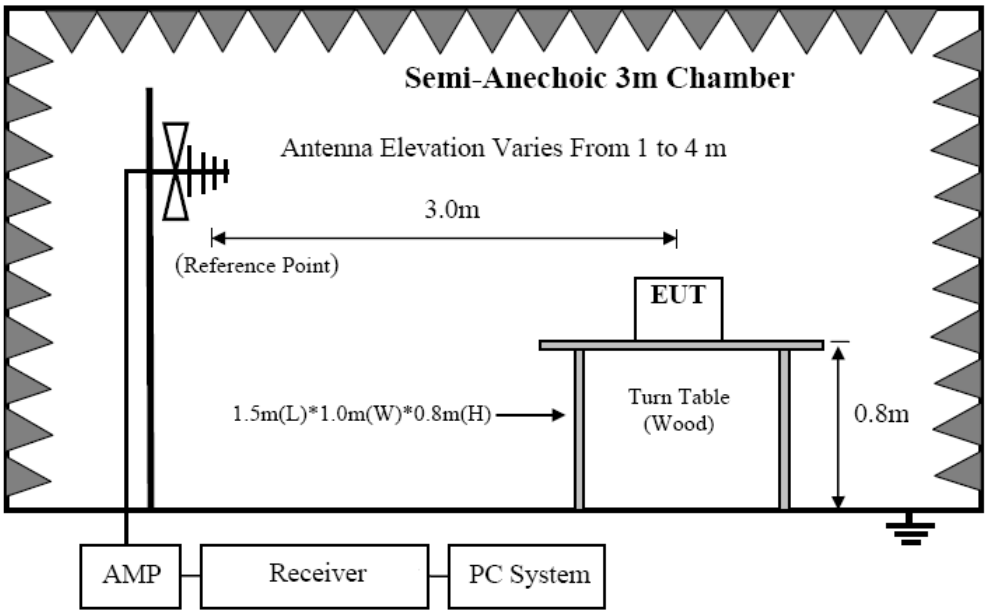
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

Limits:

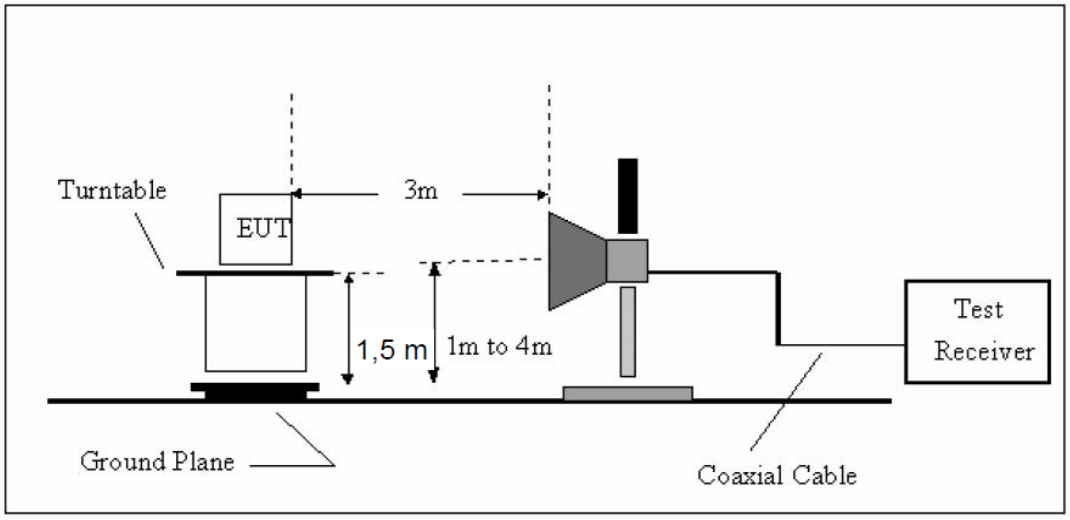
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

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



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



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

8.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1GHz testing, and 150cm for above 1GHz testing.
(2) Setup EUT and simulator as shown in section 1.4 and 6.1
(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) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produce highest emissions
(4) Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated
(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 2013 on Radiated Emission test.
(6) 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.

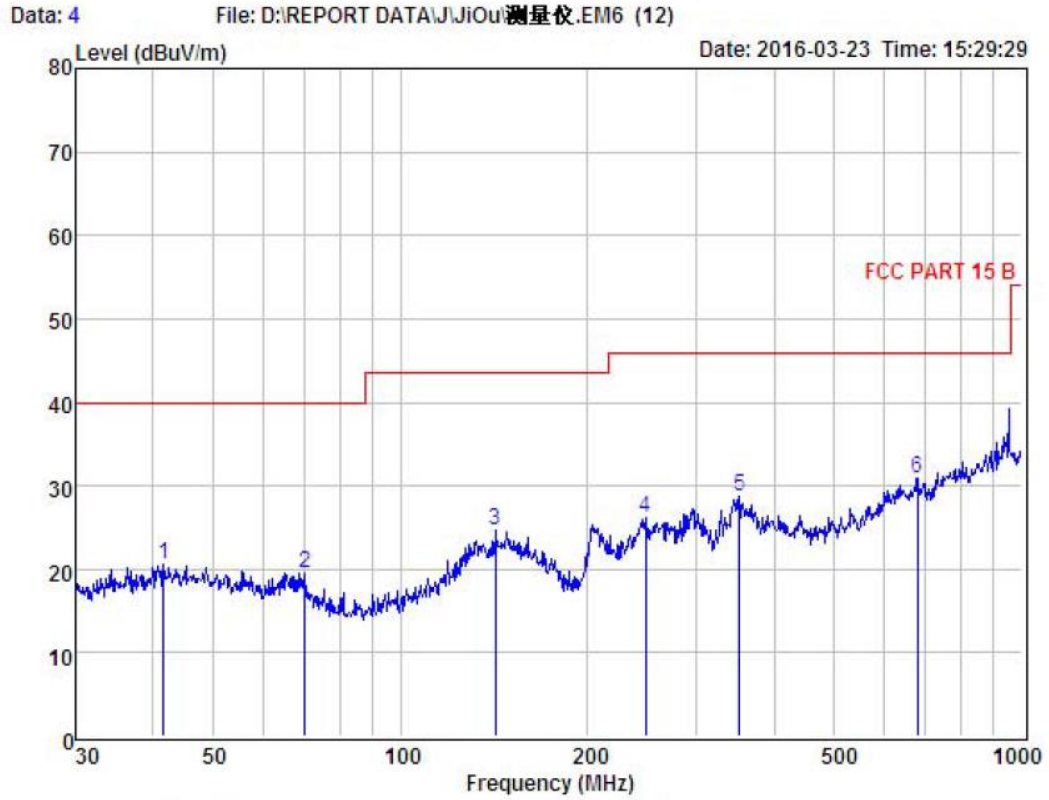
8.4. Test Result

We have scanned the 10th harmonic from 9 kHz to the EUT.
Detailed information please see the following page.

From 9 kHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

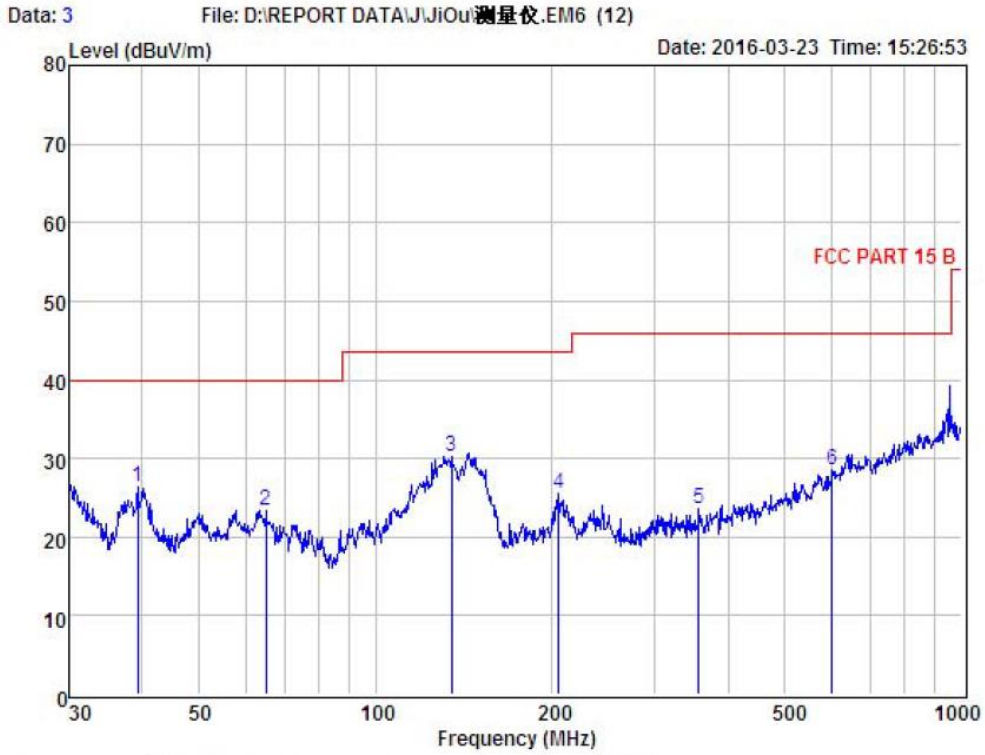
From 30MHz to 1000MHz: Conclusion: PASS



Condition : FCC PART 15 B 3m POL: HORIZONTAL
EUT :
Model No : S5
Test Mode :
Power : AC 120V/60Hz
Test Engineer :
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	41.57	37.29	13.93	30.85	0.19	20.56	40.00	-19.44	Peak
2	70.09	38.55	10.82	30.15	0.24	19.46	40.00	-20.54	Peak
3	142.32	40.18	13.64	29.35	0.29	24.76	43.50	-18.74	Peak
4	248.55	42.33	11.55	28.24	0.44	26.08	46.00	-19.92	Peak
5	351.71	41.93	13.87	27.80	0.66	28.66	46.00	-17.34	Peak
6	679.96	35.64	19.44	25.80	1.70	30.98	46.00	-15.02	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



Condition : FCC PART 15 B 3m POL: VERTICAL
EUT :
Model No : S5
Test Mode :
Power : AC 120V/60Hz
Test Engineer :
Remark :
Temp : 24.2℃
Hum : 54%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	39.30	42.94	14.07	30.84	0.17	26.34	40.00	-13.66	Peak
2	65.11	42.01	11.59	30.52	0.25	23.33	40.00	-16.67	Peak
3	135.03	46.17	13.08	29.41	0.46	30.30	43.50	-13.20	Peak
4	205.68	43.95	10.00	28.73	0.39	25.61	43.50	-17.89	Peak
5	356.68	36.60	13.95	27.72	0.66	23.49	46.00	-22.51	Peak
6	601.43	34.93	18.36	25.89	1.07	28.47	46.00	-17.53	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	42.67	33.95	10.18	34.26	52.54	74	21.46	PK
2	4804	32.03	33.95	10.18	34.26	41.90	54	12.1	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.69	33.95	10.18	34.26	52.56	74	21.44	PK
2	4804	31.47	33.95	10.18	34.26	41.34	54	12.66	AV
3	7206	/							
4	9608	/							
5	12010	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.09	33.93	10.2	34.29	52.93	74	21.07	PK
2	4882	32.29	33.93	10.2	34.29	42.13	54	11.87	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	42.92	33.93	10.2	34.29	52.76	74	21.24	PK
2	4882	31.7	33.93	10.2	34.29	41.54	54	12.46	AV
3	7323	/							
4	9764	/							
5	12205	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: GFSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.37	33.98	10.22	34.25	53.32	74	20.68	PK
2	4960	31.76	33.98	10.22	34.25	41.71	54	12.29	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.31	33.98	10.22	34.25	53.26	74	20.74	PK
2	4960	32.18	33.98	10.22	34.25	42.13	54	11.87	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: π/4 DQPSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	42.98	33.95	10.18	34.26	52.85	74	21.15	PK
2	4804	36.08	33.95	10.18	34.26	45.95	54	8.05	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.86	33.95	10.18	34.26	52.73	74	21.27	PK
2	4804	32.75	33.95	10.18	34.26	42.62	54	11.38	AV
3	7206	/							
4	9608	/							
5	12010	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: π/4 DQPSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	43.01	33.93	10.2	34.29	52.85	74	21.15	PK
2	4882	32.68	33.93	10.2	34.29	42.52	54	11.48	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	42.98	33.93	10.2	34.29	52.82	74	21.18	PK
2	4882	32.47	33.93	10.2	34.29	42.31	54	11.69	AV
3	7323	/							
4	9764	/							
5	12205	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: GNSS Receiver M/N: G5									
Power: DC 3.6V from battery									
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter									
Test mode: π/4 DQPSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	43.06	33.98	10.22	34.25	53.01	74	20.99	PK
2	4960	32.85	33.98	10.22	34.25	42.8	54	11.2	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.38	33.98	10.22	34.25	53.33	74	20.67	PK
2	4960	32.95	33.98	10.22	34.25	42.9	54	11.1	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

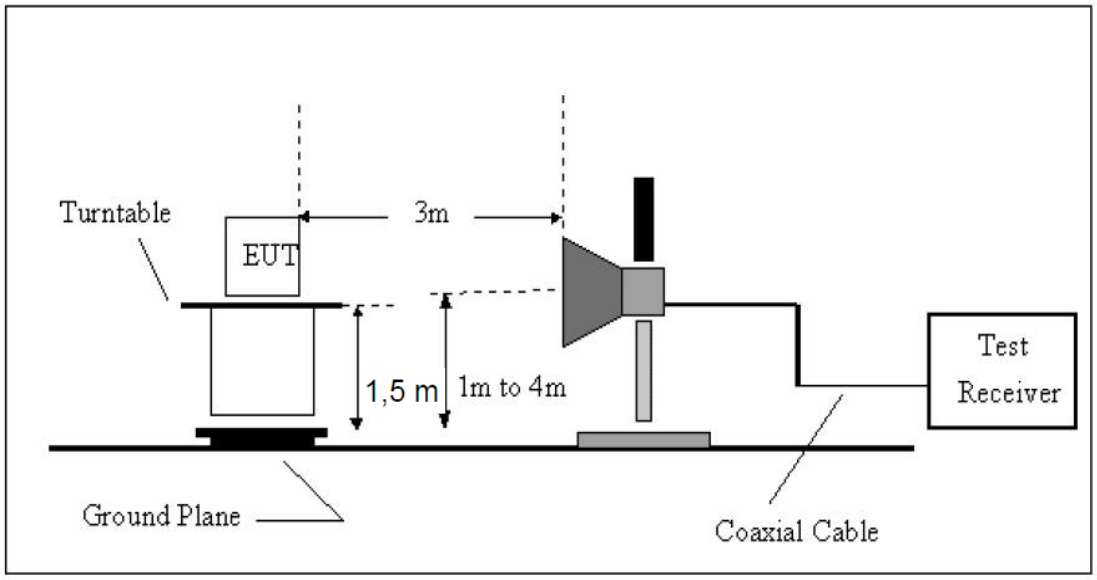
1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth earphone M/N: MDS-800X									
Power: DC 5.0V From notebook									
Test date: 2015-01-07 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH1 2402MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804	42.99	33.95	10.18	34.26	52.86	74	21.14	PK
2	4804	32.38	33.95	10.18	34.26	42.25	54	11.75	AV
3	7206	/							
4	9608	/							
5	12010	/							
Antenna Polarity: Horizontal									
1	4804	42.67	33.95	10.18	34.26	52.54	74	21.46	PK
2	4804	32.04	33.95	10.18	34.26	41.91	54	12.09	AV
3	7206	/							
4	9608	/							
5	12010	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth earphone M/N: MDS-800X									
Power: DC 5.0V From notebook									
Test date: 2015-01-07 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH40 2441MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882	42.8	33.93	10.2	34.29	52.64	74	21.36	PK
2	4882	32.47	33.93	10.2	34.29	42.31	54	11.69	AV
3	7323	/							
4	9764	/							
5	12205	/							
Antenna Polarity: Horizontal									
1	4882	42.86	33.93	10.2	34.29	52.7	74	21.3	PK
2	4882	32.59	33.93	10.2	34.29	42.43	54	11.57	AV
3	7323	/							
4	9764	/							
5	12205	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

1GHz—25GHz Radiated emission Test result									
EUT: Bluetooth earphone M/N: MDS-800X									
Power: DC 5.0V From notebook									
Test date: 2015-01-07 Test site: 3m Chamber Tested by: Peter									
Test mode: 8- DQPSK Tx CH79 2480MHz									
Antenna polarity: Vertical									
No	Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960	42.78	33.98	10.22	34.25	52.73	74	21.27	PK
2	4960	33.78	33.98	10.22	34.25	43.73	54	10.27	AV
3	7440	/							
4	9920	/							
5	12400	/							
Antenna Polarity: Horizontal									
1	4960	43.1	33.98	10.22	34.25	53.05	74	20.95	PK
2	4960	32.47	33.98	10.22	34.25	42.42	54	11.58	AV
3	7440	/							
4	9920	/							
5	12400	/							
Note: 1, Measuring frequency from 1GHz to 25GHz 2, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

9. Band Edge Compliance

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in FCC Part 15 and RSS-Gen, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with FCC Part 15 and RSS-Gen limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested, only worse case is reported.

9.4. Test Result

PASS. (See below detailed test data)

GFSK (CH Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	44.68	27.62	3.92	34.97	41.25	74	32.75	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	44.17	27.62	3.92	34.97	40.74	74	33.26	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (CH High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	44.01	27.89	4	34.97	40.93	74	33.07	**PK**
2483.5	--	27.89	4	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	44.2	27.89	4	34.97	41.12	74	32.88	**PK**
2483.5	--	27.89	4	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (Hopping Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.01	27.62	3.92	34.97	39.58	74	34.42	**PK**
2390		27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.96	27.62	3.92	34.97	40.53	74	33.47	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK (Hopping High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.48	27.89	4	34.97	40.4	74	33.6	**PK**
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.7	27.89	4	34.97	40.62	74	33.38	**PK**
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π /4 DQPSK (CH Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.78	27.62	3.92	34.97	40.35	74	33.65	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	44.1	27.62	3.92	34.97	40.67	74	33.33	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π /4 DQPSK (CH High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.7	27.89	4	34.97	40.62	74	33.38	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.63	27.89	4	34.97	40.55	74	33.45	PK
2483.5	--	--	--	--	--	54	--	AV
Note: 1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK 2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK 3, Result = Read level + Antenna factor + cable loss-Amp factor 4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.								

π /4 DQPSK (Hopping Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode:								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.78	27.62	3.92	34.97	40.35	74	33.65	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	43.74	27.62	3.92	34.97	40.31	74	33.69	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

π /4 DQPSK (Hopping High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.03	27.89	4	34.97	39.95	74	34.05	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	44.28	27.89	4	34.97	41.2	74	32.8	PK
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (CH Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH Low 2402MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.96	27.62	3.92	34.97	40.53	74	33.47	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	44.17	27.62	3.92	34.97	40.74	74	33.26	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (CH High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx CH High 2480MHz								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.01	27.89	4	34.97	39.93	74	34.07	**PK**
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	44.36	27.89	4	34.97	41.28	74	32.72	**PK**
2483.5	--	--	--	--	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

8- DPSK (Hopping Low)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2390	43.68	27.62	3.92	34.97	40.25	74	33.75	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV
Antenna Polarity: Horizontal								
2390	44.21	27.62	3.92	34.97	40.78	74	33.22	**PK**
2390	--	27.62	3.92	34.97	--	54	--	AV

Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

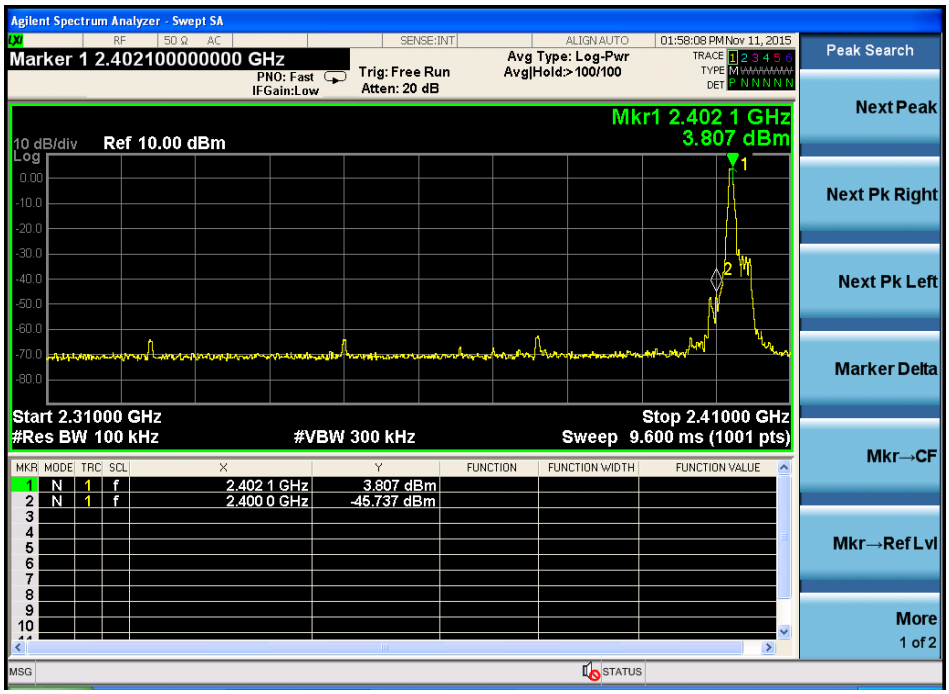
8- DPSK (Hopping High)

Band Edge Test result								
EUT: GNSS Receiver M/N: G5								
Power: DC 3.6V from battery								
Test date: 2016-03-25 Test site: 3m Chamber Tested by: Peter								
Test mode: Tx								
Antenna polarity: Vertical								
Freq (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2483.5	43.1	27.89	4	34.97	40.02	74	33.98	PK
2483.5	--	--	--	--	--	54	--	AV
Antenna Polarity: Horizontal								
2483.5	43.81	27.89	4	34.97	40.73	74	33.27	PK
2483.5	--	--	--	--	--	54	--	AV

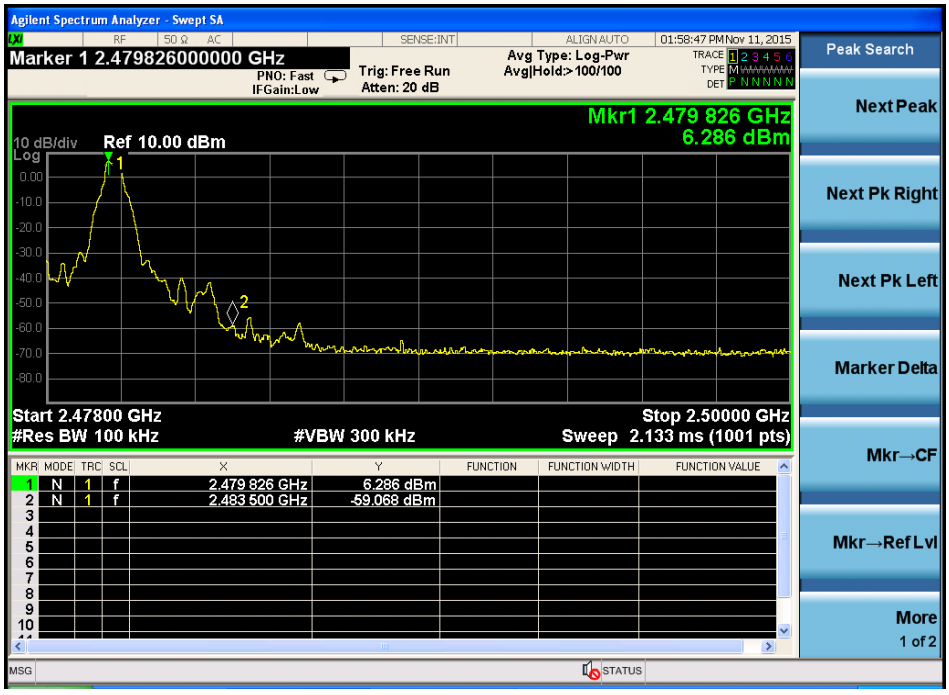
Note:
1, Spectrum Set for PK measure: RBW=1MHz, VBW=1MHz, Sweep time=Auto, Detector: PK
2, Spectrum Set for AV measure: RBW=1MHz, VBW=10Hz, Sweep time=Auto, Detector: PK
3, Result = Read level + Antenna factor + cable loss-Amp factor
4, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

GFSK

CH LOW:

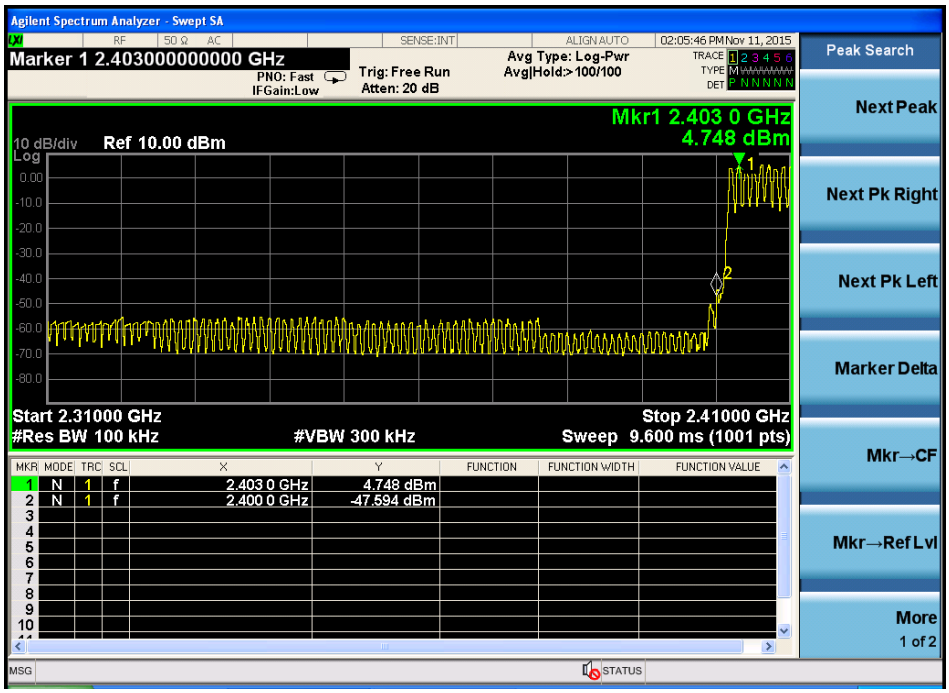


CH High:

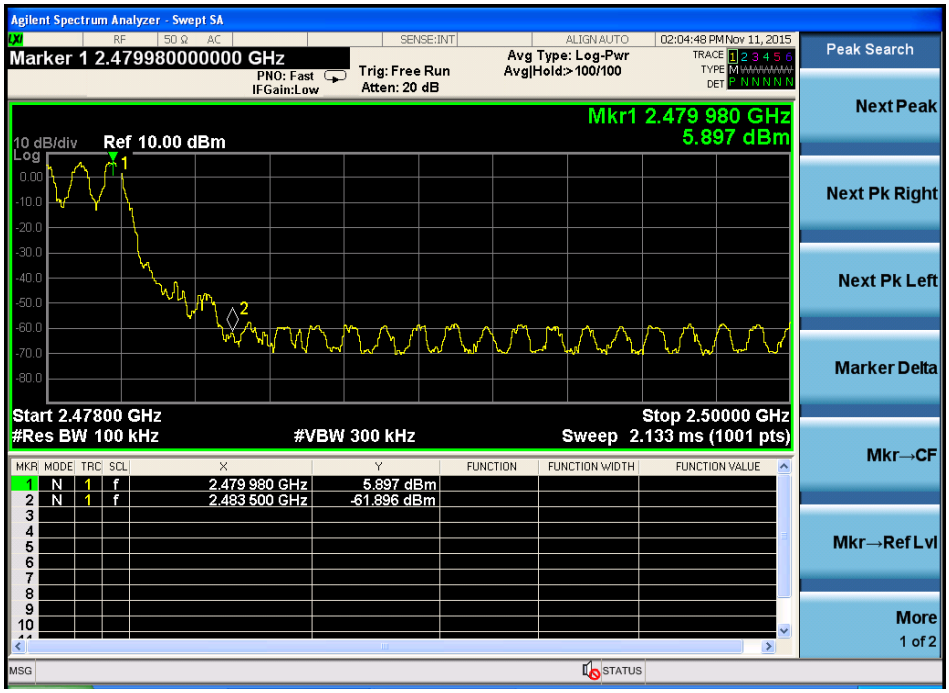


Hopping

Low

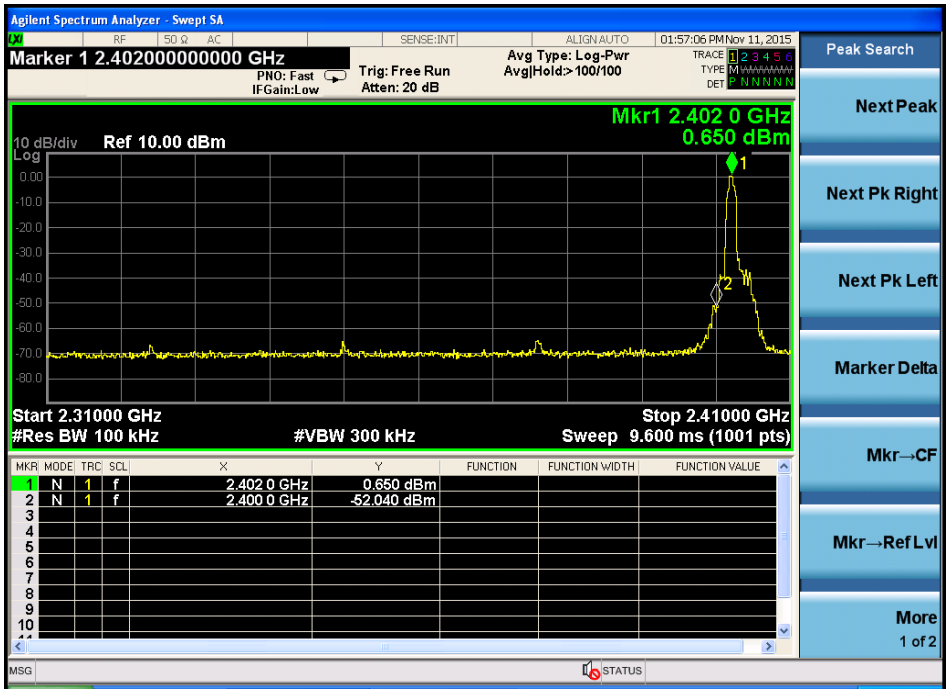


High



π /4 DQPSK

Low



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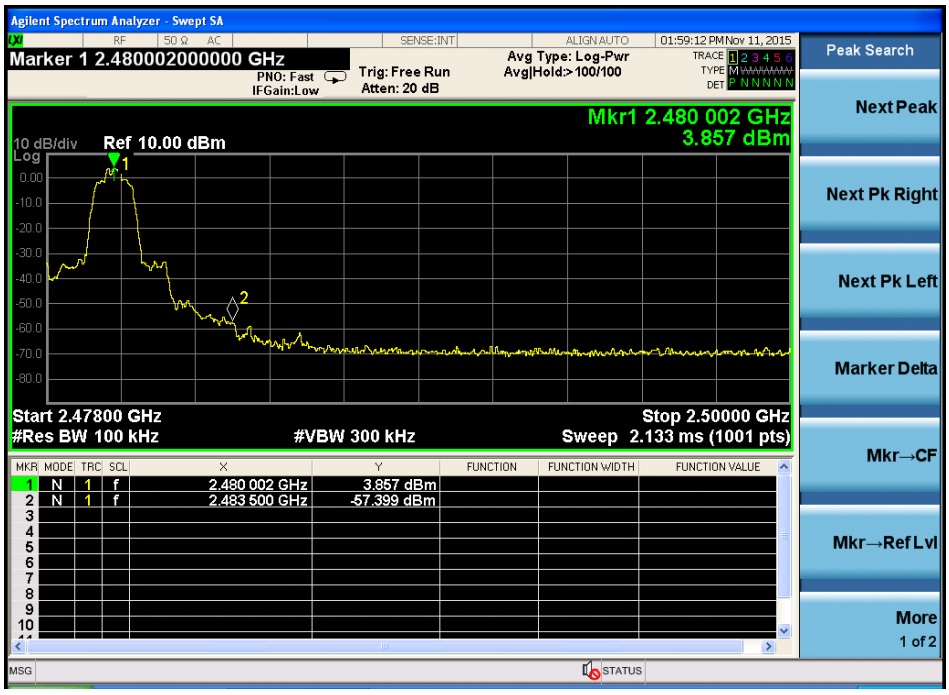
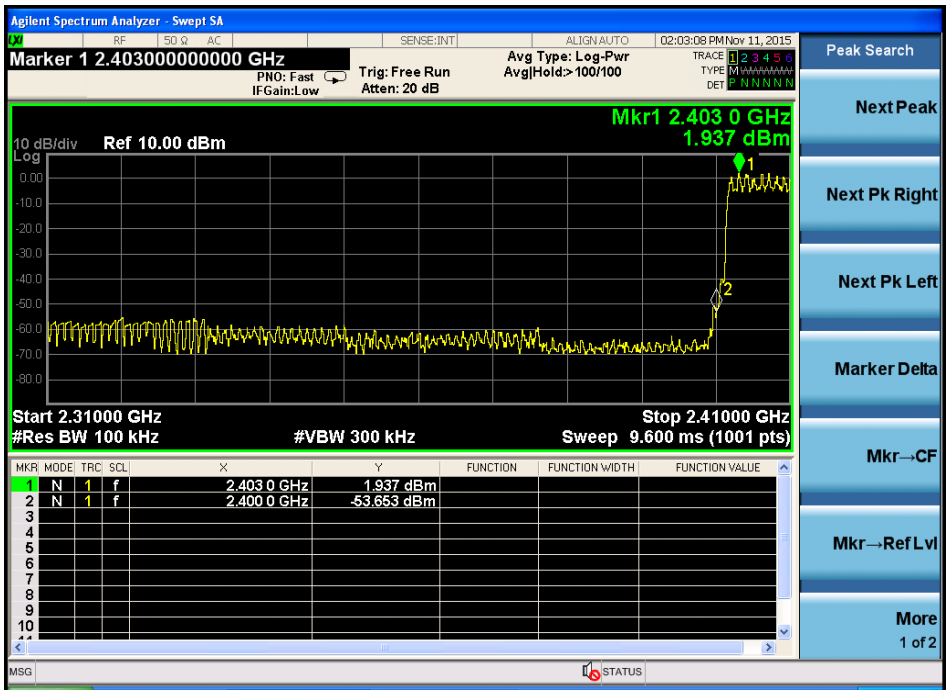


Hopping

Low



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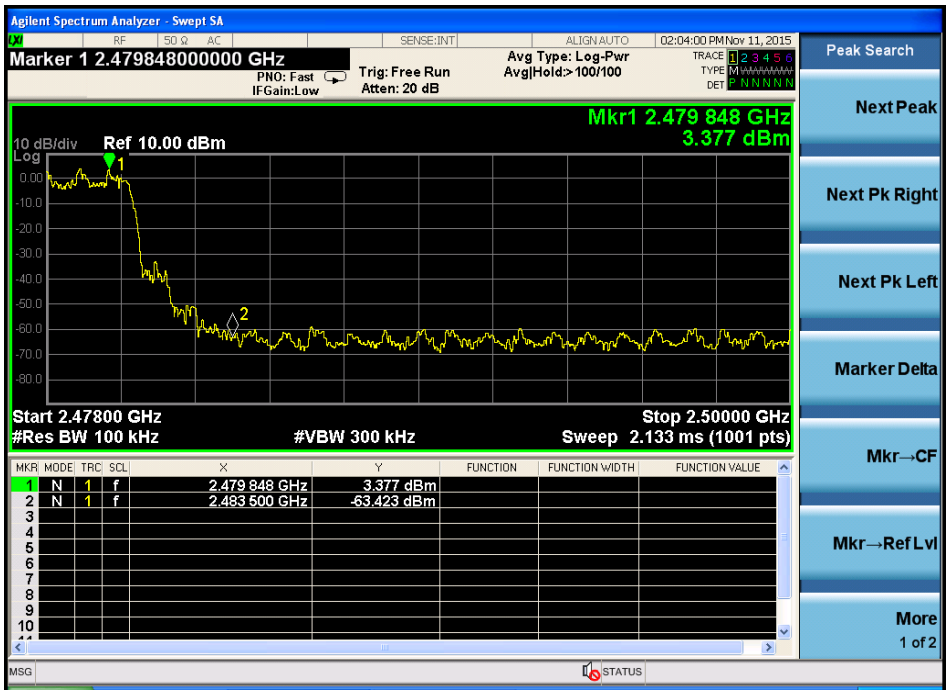
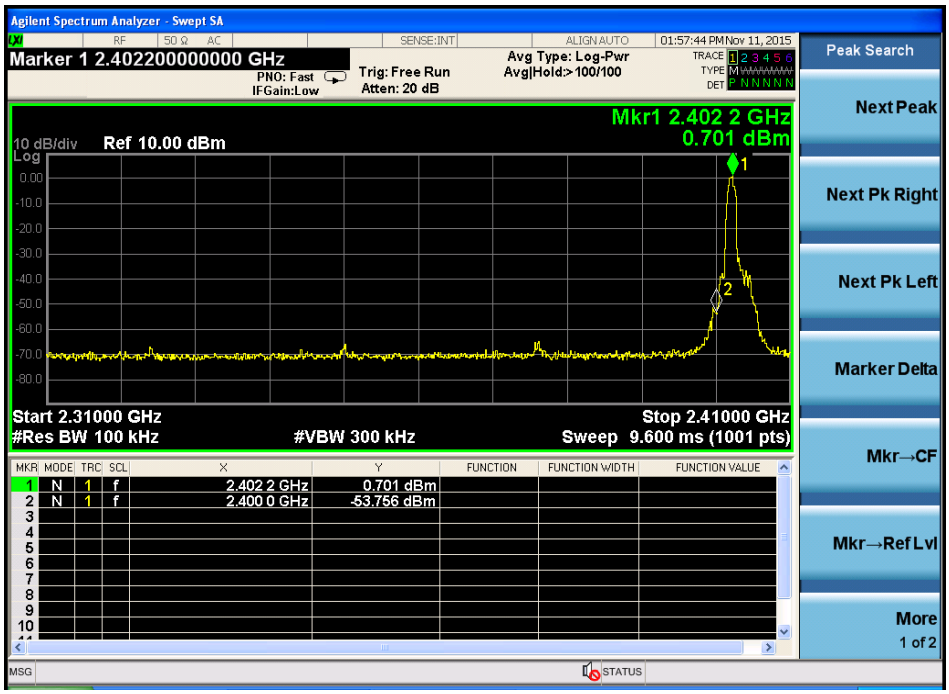


8- DPSK:

Low



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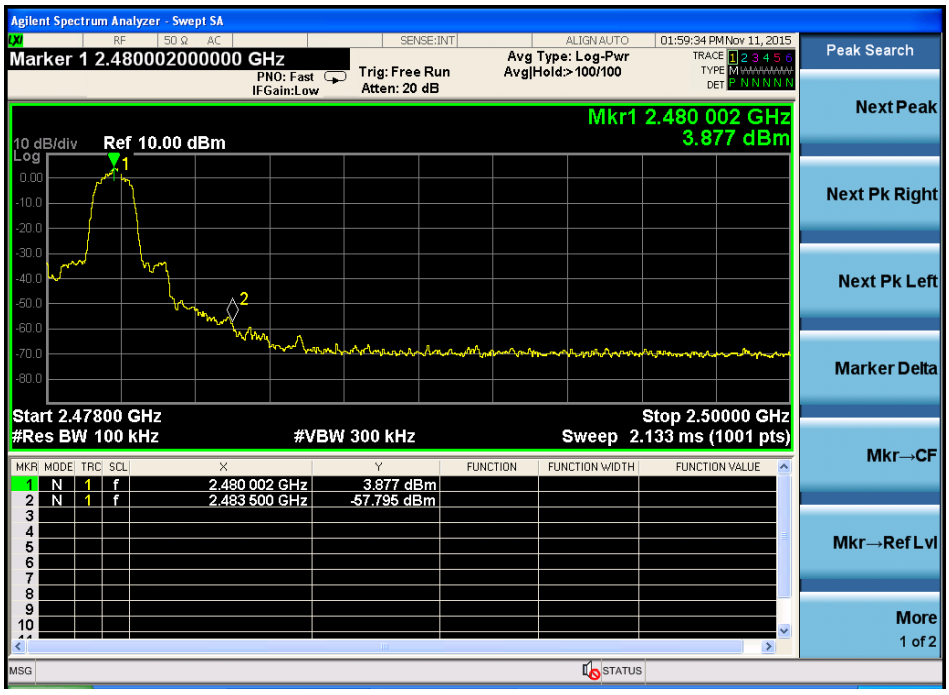
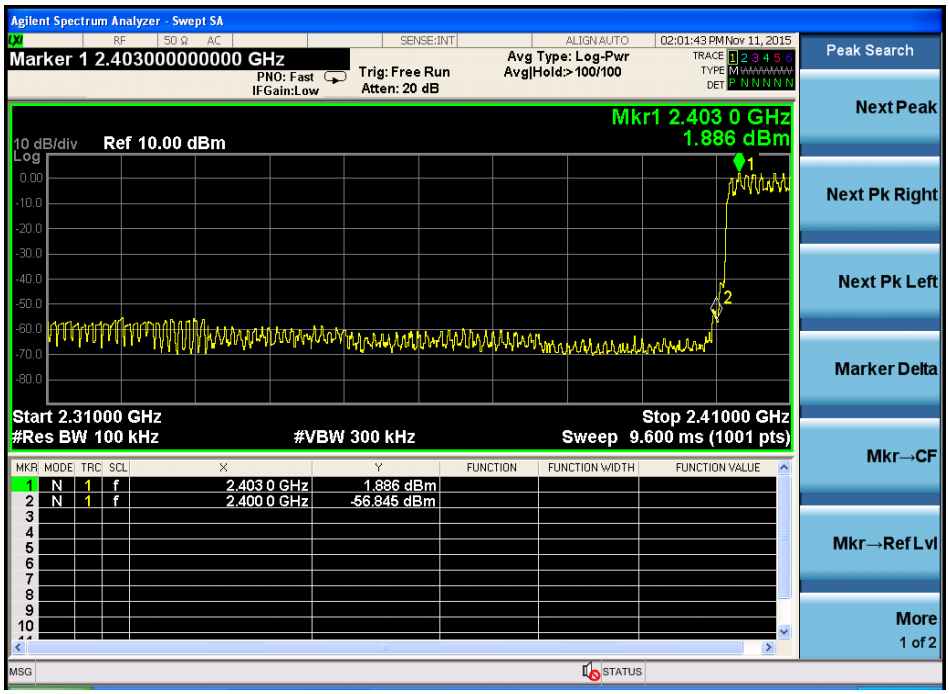


Hopping

Low



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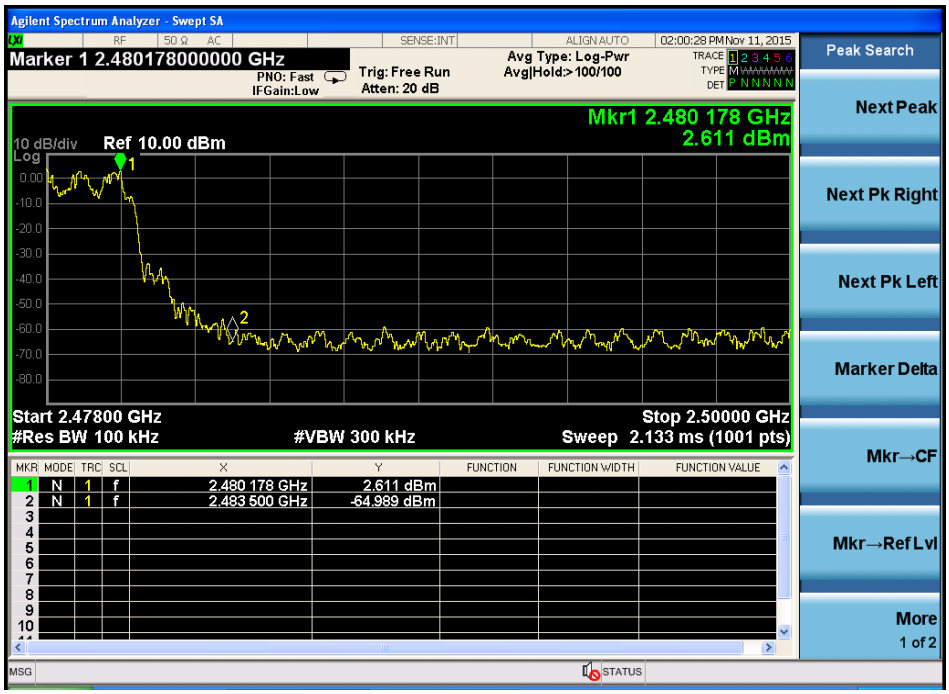
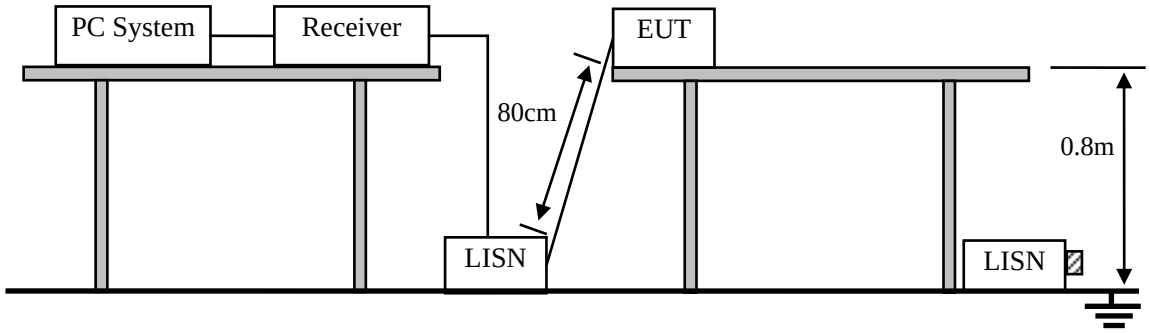


10. Power Line Conducted Emissions

10.1. Block Diagram of Test Setup



:50Ω Terminator

10.2. Limit

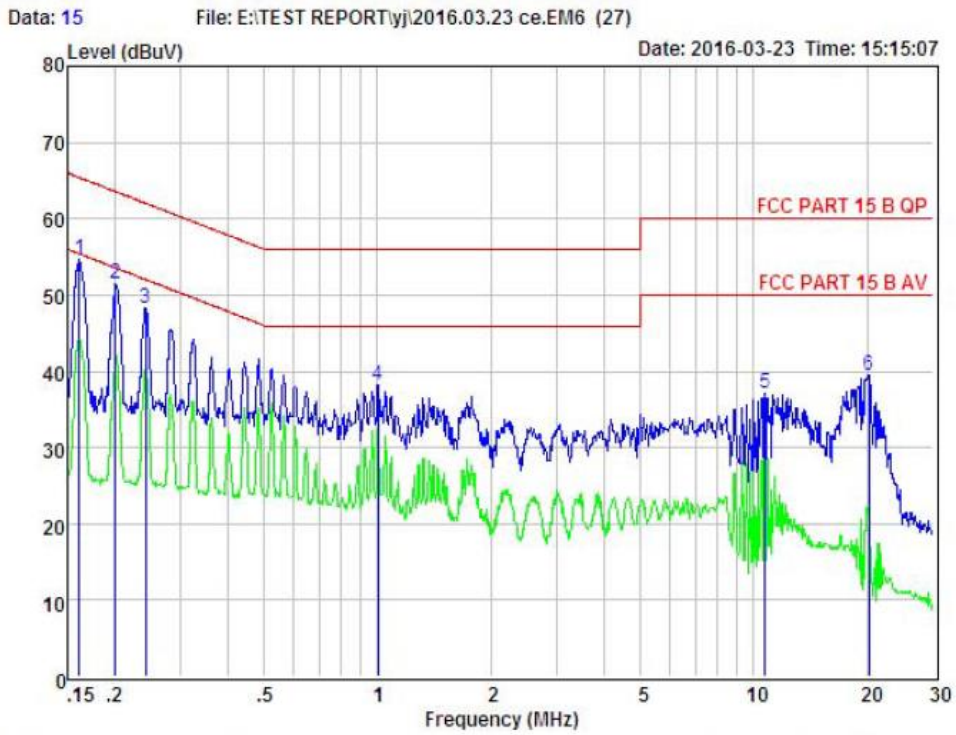
Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. 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 2013 on conducted Emission test.
(4) The bandwidth of test receiver is set at 10 kHz.
(5) The frequency range from 150 kHz to 30 MHz is checked.

10.4.Test Result

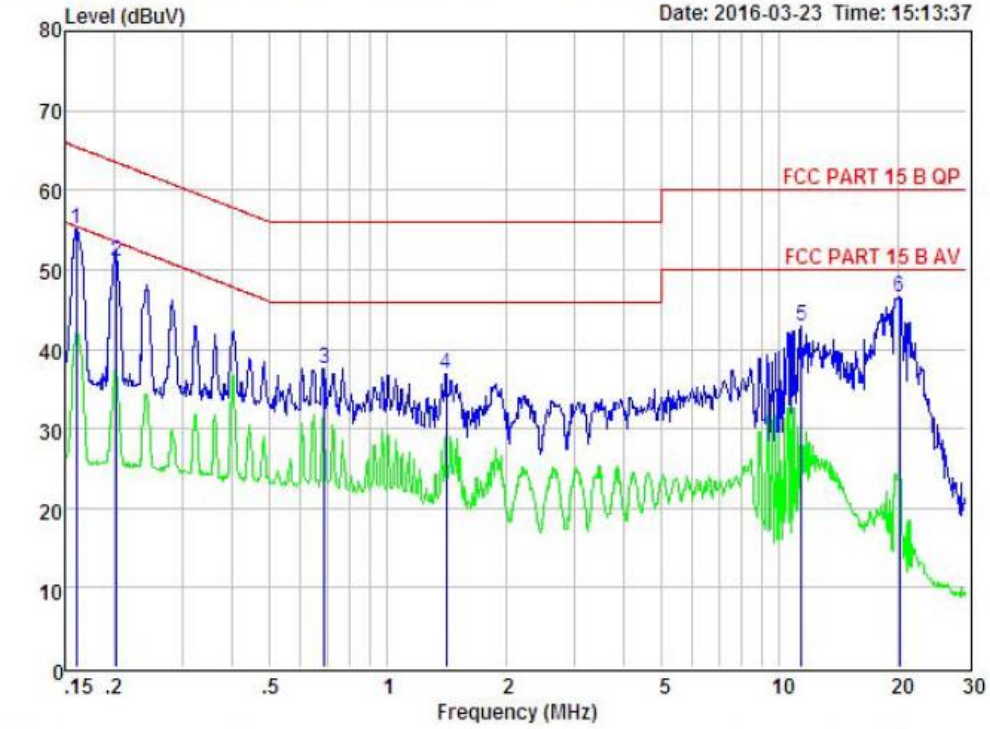


Condition : FCC PART 15 B QP POL: LINE Temp: 25.7 ℃ Hum: 51 %
EUT :
Model No : S5
Test Mode :
Power : DC 5V from adapter with AC 120V/60Hz
Test Engineer :
Remark :

Item	Freq	Read Level	LISN Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.162	44.93	0.03	-9.52	0.10	54.58	65.38	-10.80	Peak
2	0.201	41.90	0.03	-9.52	0.10	51.55	63.58	-12.03	Peak
3	0.242	38.69	0.03	-9.52	0.10	48.34	62.04	-13.70	Peak
4	1.005	28.43	0.04	-9.63	0.10	38.20	56.00	-17.80	Peak
5	10.733	26.74	0.22	-9.92	0.22	37.10	60.00	-22.90	Peak
6	20.270	29.05	0.32	-9.80	0.36	39.53	60.00	-20.47	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

Data: 13 File: E:\TEST REPORT\yj\2016.03.23 ce.EM6 (27)



Condition : FCC PART 15 B QP POL: NEUTRAL Temp: 25.7 ℃ Hum: 51 %
EUT :
Model No : S5
Test Mode :
Power : DC 5V from adapter with AC 120V/60Hz
Test Engineer :
Remark :

Item	Freq	Read Level	LISN Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
1	0.161	45.39	0.03	-9.52	0.10	55.04	65.43	-10.39	Peak
2	0.203	41.40	0.03	-9.52	0.10	51.05	63.49	-12.44	Peak
3	0.690	27.90	0.04	-9.59	0.10	37.63	56.00	-18.37	Peak
4	1.411	26.98	0.05	-9.66	0.10	36.79	56.00	-19.21	Peak
5	11.377	32.56	0.24	-9.91	0.22	42.93	60.00	-17.07	Peak
6	20.270	36.12	0.32	-9.80	0.36	46.60	60.00	-13.40	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

11. Antenna Requirements

11.1. Limit

For intentional device, according to FCC Part 15 and RSS-Gen, 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. And according to FCC Part 15 and RSS-Gen, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2. Result

The antennas used for this product are integral antenna for Bluetooth, 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 5.46 dBi.

---------END OF THE REPORT-------