FCC Part 15 Test Report

Product Name : GSM Mobile Phone

Model Name : X2S

Prepared for:

Global Technology Exchange LLC
Room 1607 – 08, Westin Centre, 26 Hung To Road, Kwun Tong Kowloon, Hong Kong

Prepared by:

Unilab(Shanghai) Co.,Ltd.
FCC 2.948 register number is 714465

Report Number : UL34420130905FCC001-1
Date of Report : Sep. 16, 2013
Date of Test : Sep. 05 –Sep. 14, 2013

Notes:
The test results only relate to these samples which have been tested.
Partly using this report will not be admitted unless been allowed by Unilab.
Unilab is only responsible for the complete report with the reported stamp of Unilab.

Applicant:	Global Technology Exchange LLC Room 1607 – 08, Westin Centre, 26 Hung To Road, Kwun Tong Kowloon, Hong Kong
Manufacturer:	Global Technology Exchange LLC Room 1607 – 08, Westin Centre, 26 Hung To Road, Kwun Tong Kowloon, Hong Kong
Product Name:	GSM Mobile Phone
Brand Name:	LYNXX
Model Name:	X2S
FCC ID:	OA7-X2S
Technical Data:	GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
Date of Receipt:	Sep. 05, 2013
Test Standard:	47 CFR Part 15 Subpart C
Test Result:	PASS
Date of Test	Sep. 05 –Sep. 14, 2013

Prepared by : Andy Wei
(Technical Engineer: Andy Wei)

Reviewed by : Forest Cao
(Senior Engineer: Forest Cao)

Approved by : Eva Wang
(Supervisor: Eva Wang)

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1. GENERAL INFORMATION

1.1 EUT Description

Product	GSM Mobile Phone
Trade Name	LYNXX
Model Number	X2S
Frequency Range	2402MHz -2480MHz
Modulation Type	FHSS
Technical Data:	GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
Antenna Type:	Internal
Channel Spacing:	1MHz
Channel Number	79(CH Low: 2402MHz, CH Mid: 2441MHz, CH High: 2480MHz)
Power Supply	DC 5V by AC/DC adapter 100-240V~50/60Hz DC 3.7V by battery
Temperature Range	-20°C ~ 50°C

Note:

1. Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

1.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15(10-1-09 Edition)	Radio Frequency Devices

1.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.247(a)	Number of Hopping Frequency	PASS	Sep. 10, 2013
2	15.247(b)	Peak Output Power	PASS	Sep. 10, 2013
3	15.247(a)	20dB Bandwidth	PASS	Sep. 10, 2013
4	15.247(a)	Frequency Separation	PASS	Sep. 10, 2013
5	15.247(a)	Dwell Time	PASS	Sep. 10, 2013
6	15.247(d)	Conducted Spurious Emission	PASS	Sep. 10, 2013
7	15.247(d)	Radiated Spurious Emission	PASS	Sep. 13, 2013
8	15.247(d	Band Edge	PASS	Sep. 13, 2013
9	15.207	Power Line Conducted Emission Test	PASS	Sep. 13, 2013

Note:

1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

1.4 ENVIRONMENTAL CONDITIONS

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

- Temperature: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

1.5 Test Facility

Test Site:	Unilab(Shanghai) Co.,Ltd.
Location:	No.1350, Lianxi Road, Beicai, Pudong New District, Shanghai, China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009 and CISPR 16 requirements. The FCC Registration Number is **714465.** The **CNAS** Registration Number is **CNAS L3573.**
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

1.6 General Test Procedures

EUT Function and Test Mode

The EUT has been tested under normal operating (TX) and standby (RX) condition.
Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2009,Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2009.

1.7 FCC Part 15.205 Restricted Bands of Operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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	2655 - 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])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

1.8 Test Equipment List

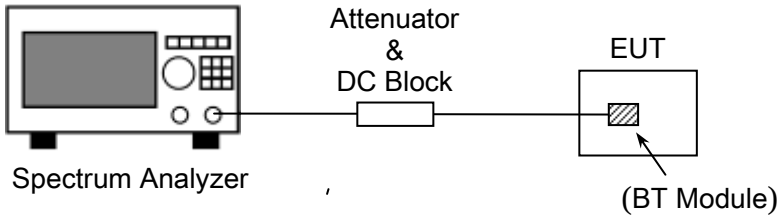
Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	Agilent	N9038A	MY51210142	2013/09/28
Wireless Connectivity Test Set	Agilent	N4010A	MY49080305	2013/09/28
Loop Antenna	Schwarzbeck	FMZB1519	1519-020	2014/03/27
LISN	R&S	ENV216	100069	2014/08/28
3m Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	CT-0000336	2013/11/27
Microwave Preamplifier	EM Electronics	EM30180	3008A02425	2014/03/01
Power Splitter	Agilent	11667C/ 52401	MY53806148	2014/03/01
Cold-heat climate test chamber	Weiss-Voetsch Environmental Testing Instrunments (Taicang) Co., Ltd.	C, 180, -40	54686002620010	2013/12/4
DC Power Supply	Agilent	6612C	MY43002989	2014/03/04
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2014/07/19
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2014/07/19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2014/07/19
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2014/07/19

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and has been calibrated by accredited calibration laboratories.

2. NUMBER OF HOPPING FREQUENCY

2.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



2.2 Definition

According to FCC section 15.247(a),(1)(iii), A frequency hopping system in the 2400–2483.5 MHz band shall use at least 15 channels.

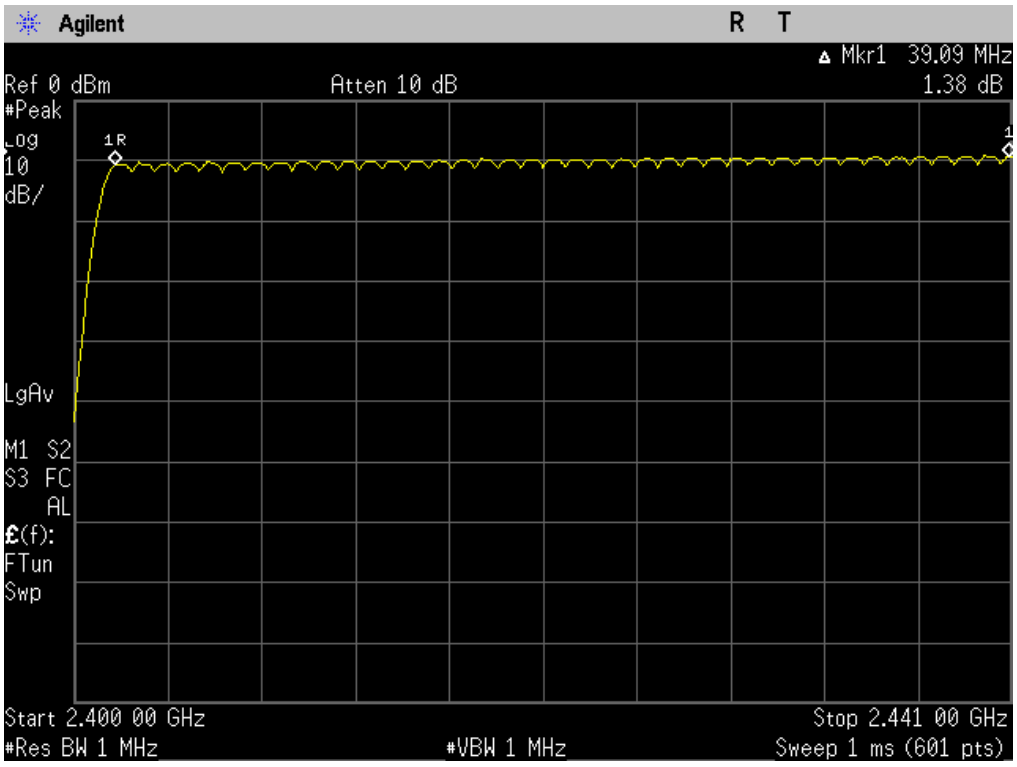
2.3 Test Result

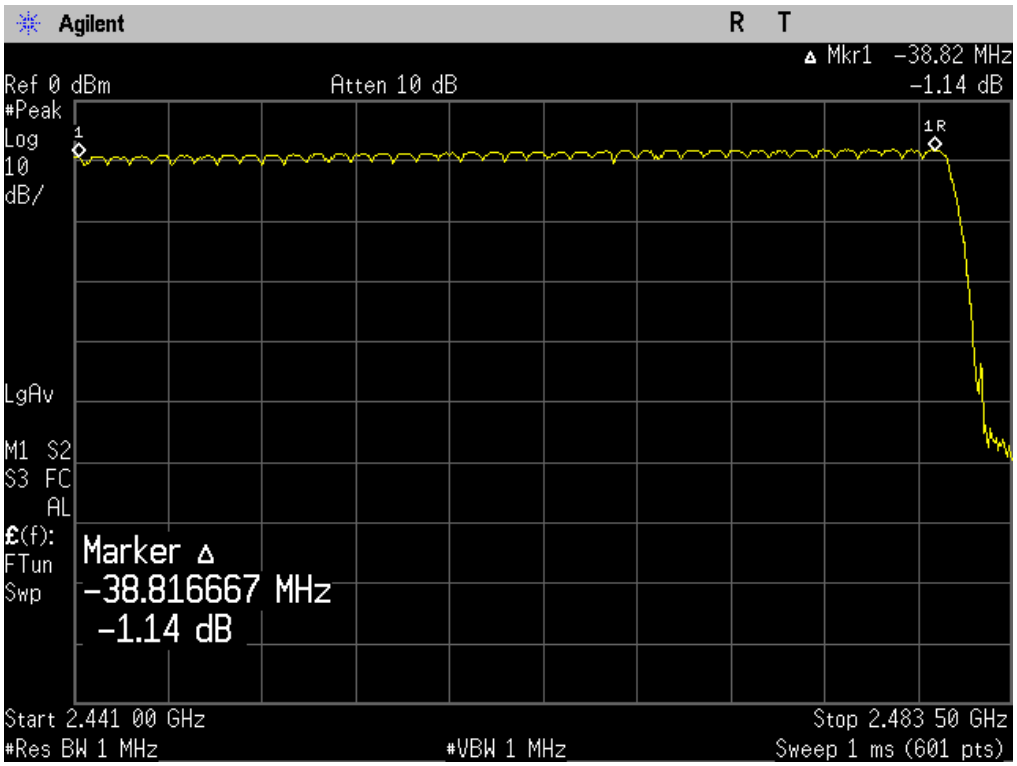
A. Test Verdict:

The EUT operating at frequency hopping mode and the employed channel number is following;

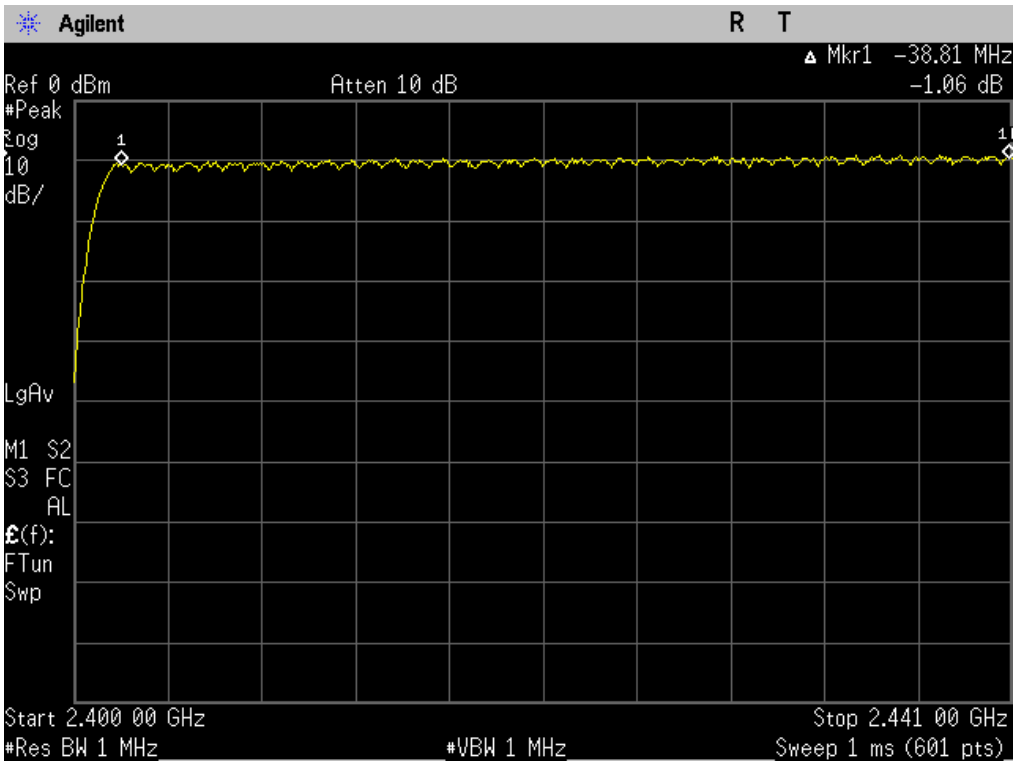
Test Mode	Frequency Band (MHz)	Channel Numbers	Limits	Result
GFSK Mode (1Mbps)	2402-2480	79	≥15	PASS
π/4DQPSK (2Mbps)	2402-2480	79	≥15	PASS
8-DPSK (3Mbps)	2402-2480	79	≥15	PASS

B. Test Plots





(GFSK Mode)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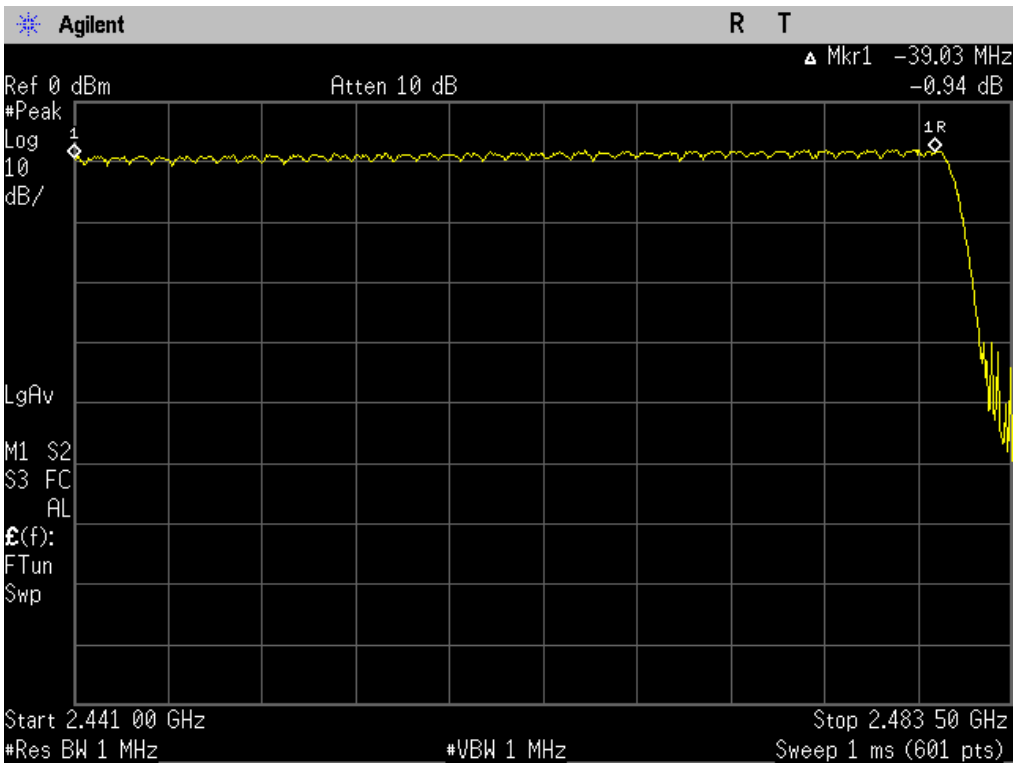
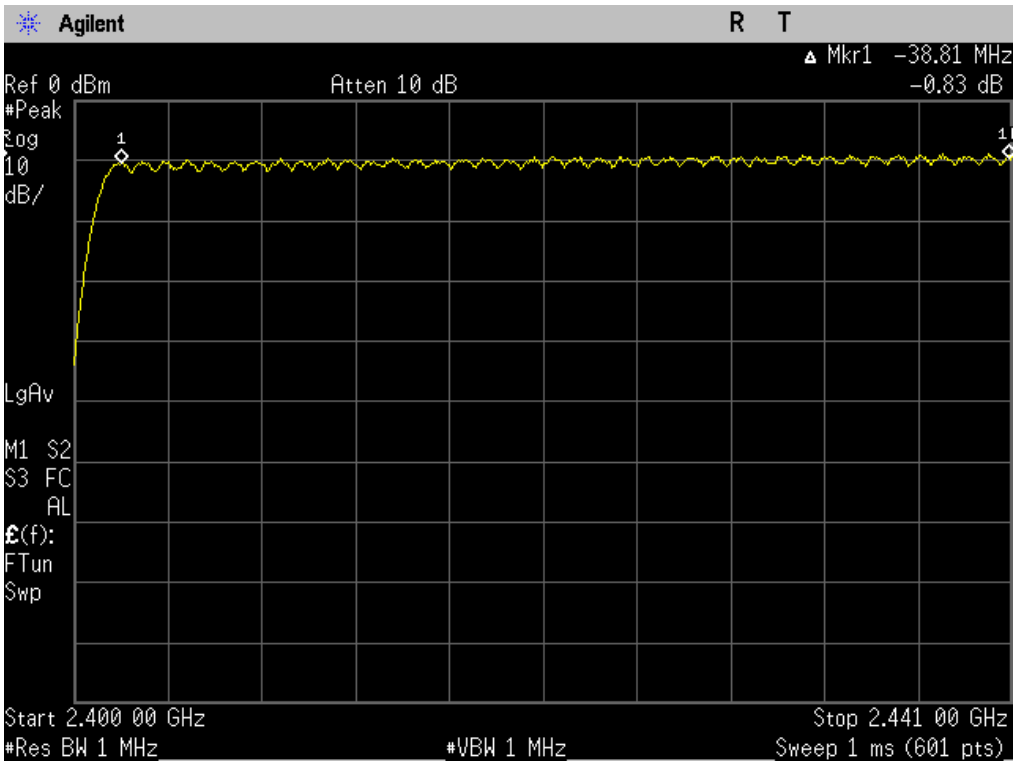
R T
Mkr1 -38.81 MHz
-1.06 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 2.400 00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 2.441 00 GHz
Sweep 1 ms (601 pts)


Agilent
R T
Mkr1 -39.03 MHz
-0.94 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 2.441 00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 2.483 50 GHz
Sweep 1 ms (601 pts)

(π /4DQPSK)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R T
Mkr1 -38.81 MHz
-0.83 dB
Ref 0 dBm
Atten 10 dB
#Peak
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LgAv
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S3 FC
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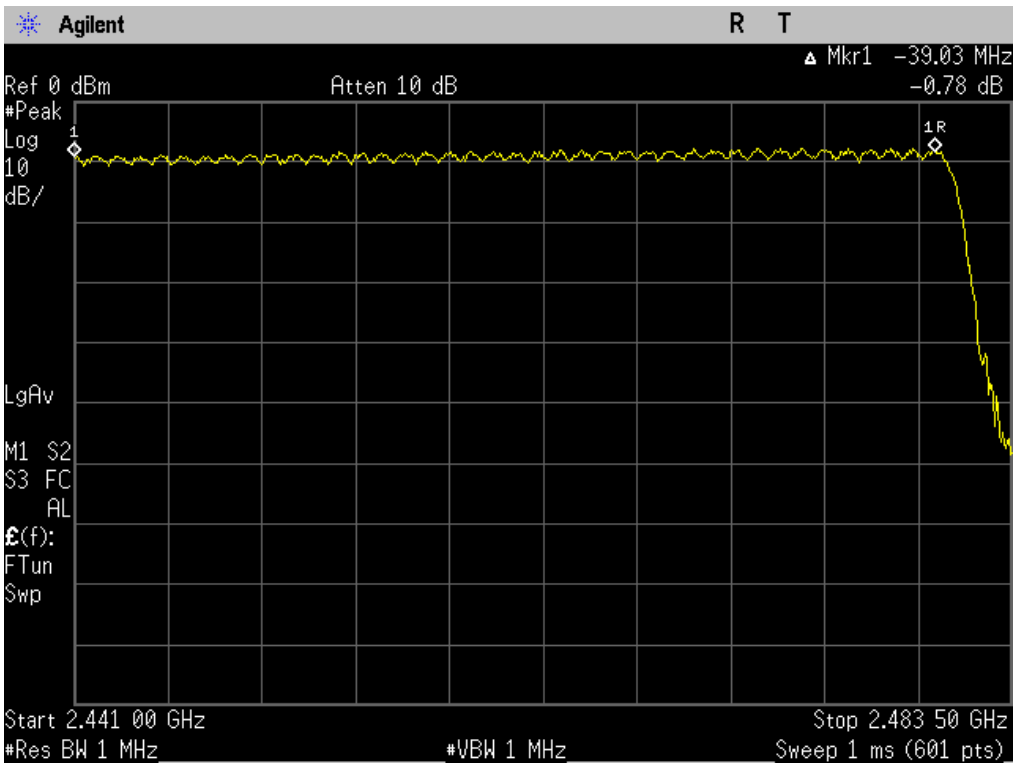
FTun
Swp
Start 2.400 00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 2.441 00 GHz
Sweep 1 ms (601 pts)

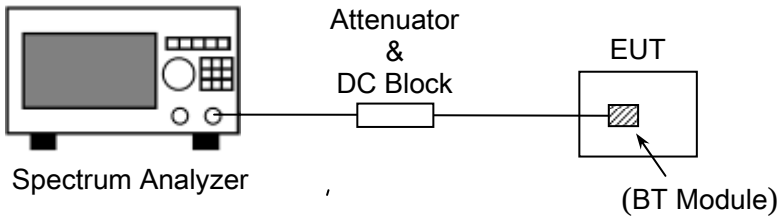

Agilent
R T
Mkr1 -39.03 MHz
-0.78 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 2.441 00 GHz
#Res BW 1 MHz
#VBW 1 MHz
Stop 2.483 50 GHz
Sweep 1 ms (601 pts)

(8-DPSK)

3. PEAK OUTPUT POWER

3.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



3.2 Definition

According to FCC section 15.247(b),(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

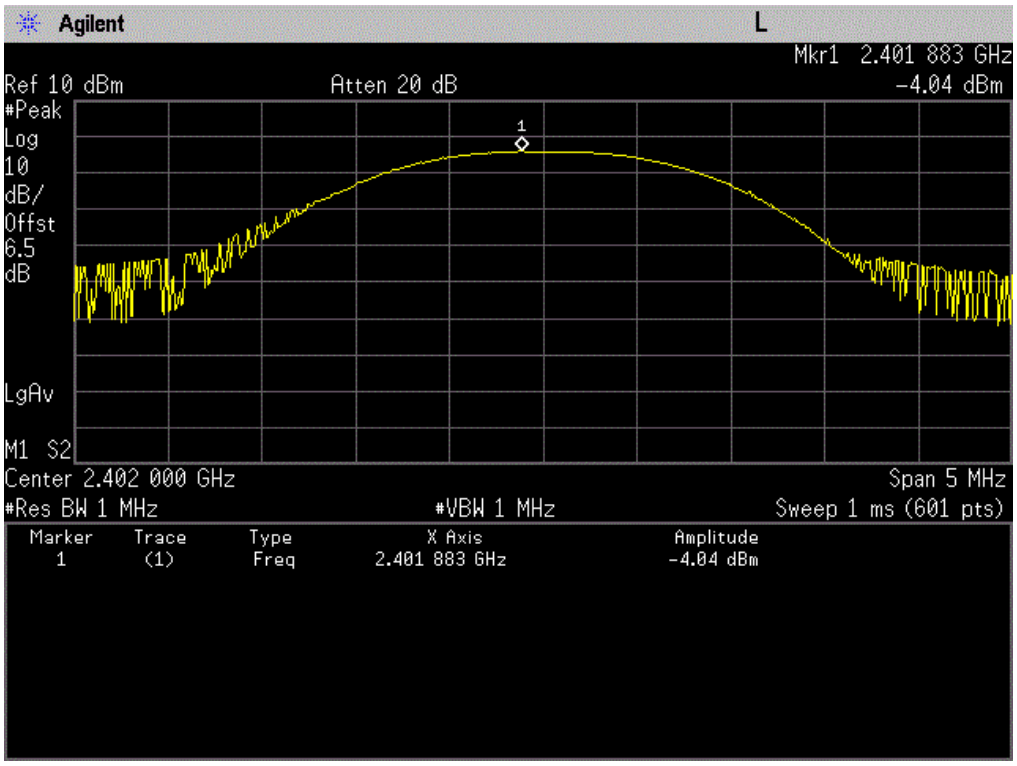
3.3 Test Result

A. Test Verdict:

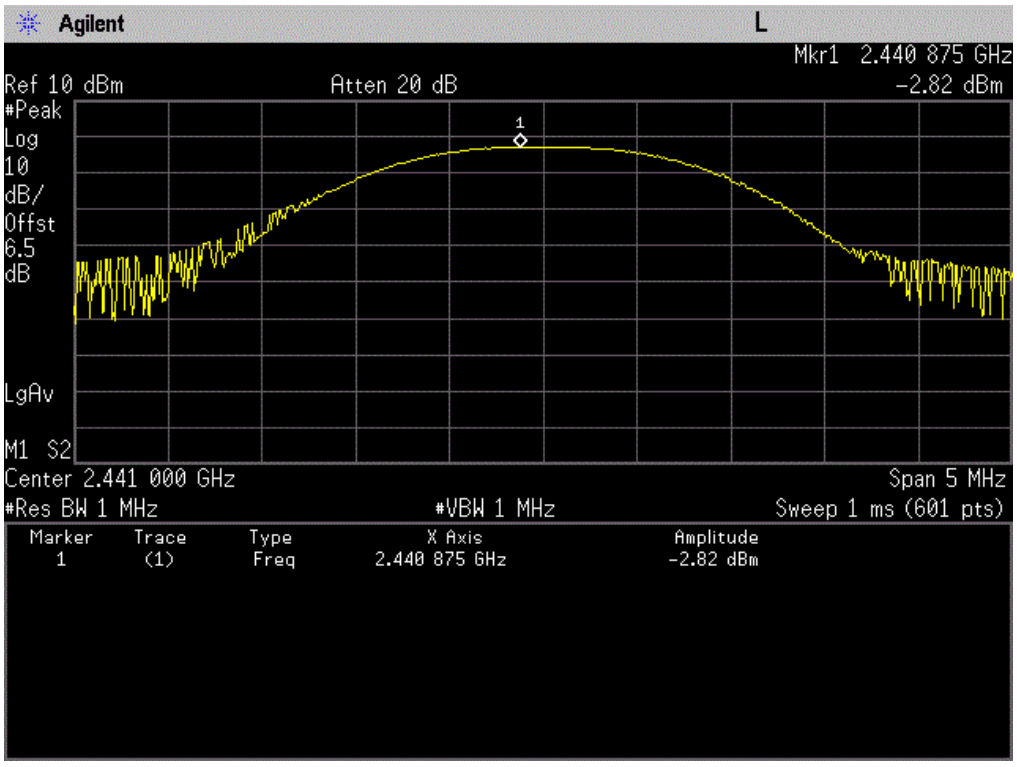
The lowest, middle and highest channels of each rate mode are record as following;

Test Mode	Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
			dBm	W	dBm	W	
GFSK Mode (1Mbps)	0	2402	-4.04	0.00039	20.96	0.125	PASS
	39	2441	-2.82	0.00052			PASS
	78	2480	-1.74	0.00067			PASS
π /4DQPSK (2Mbps)	0	2402	-4.96	0.00032	20.96	0.125	PASS
	39	2441	-3.65	0.00043			PASS
	78	2480	-2.31	0.00059			PASS
8-DPSK (3Mbps)	0	2402	-4.93	0.00032	20.96	0.125	PASS
	39	2441	-3.67	0.00043			PASS
	78	2480	-2.30	0.00059			PASS

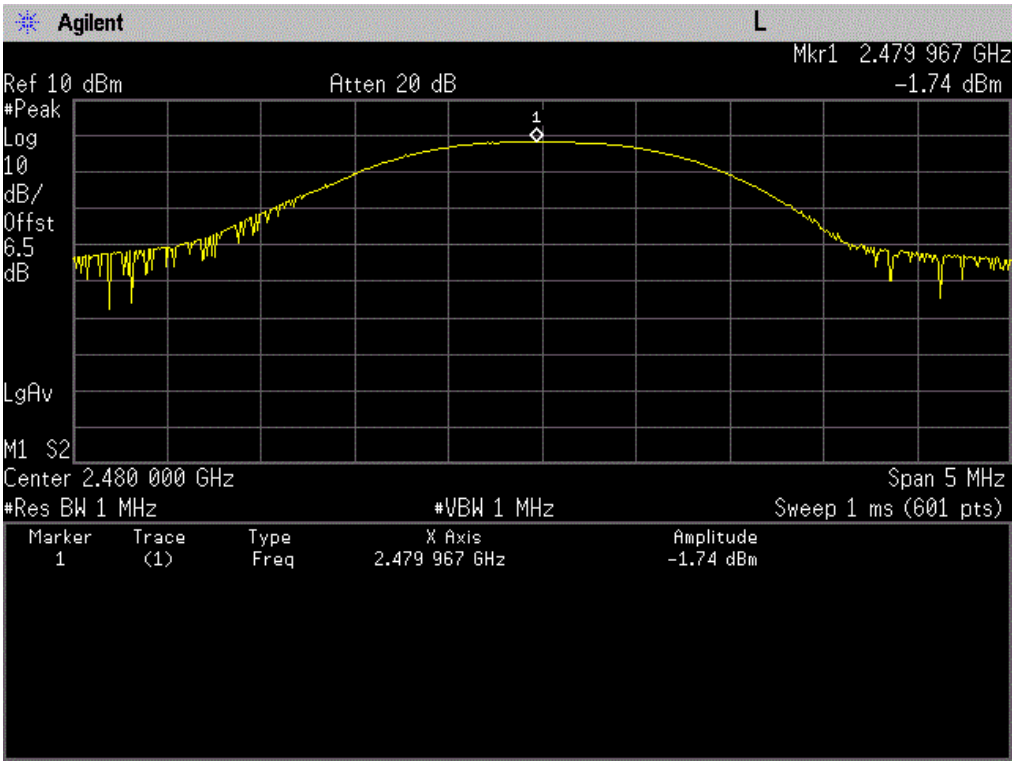
B. Test Plots



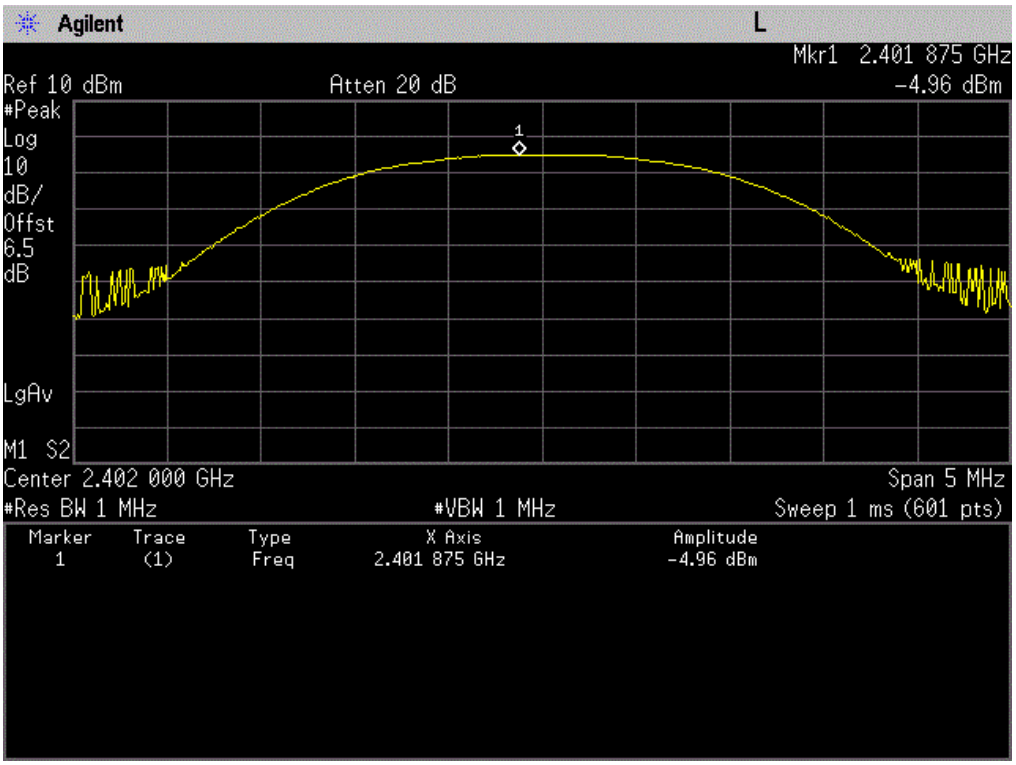
(GFSK Mode Low Channel)



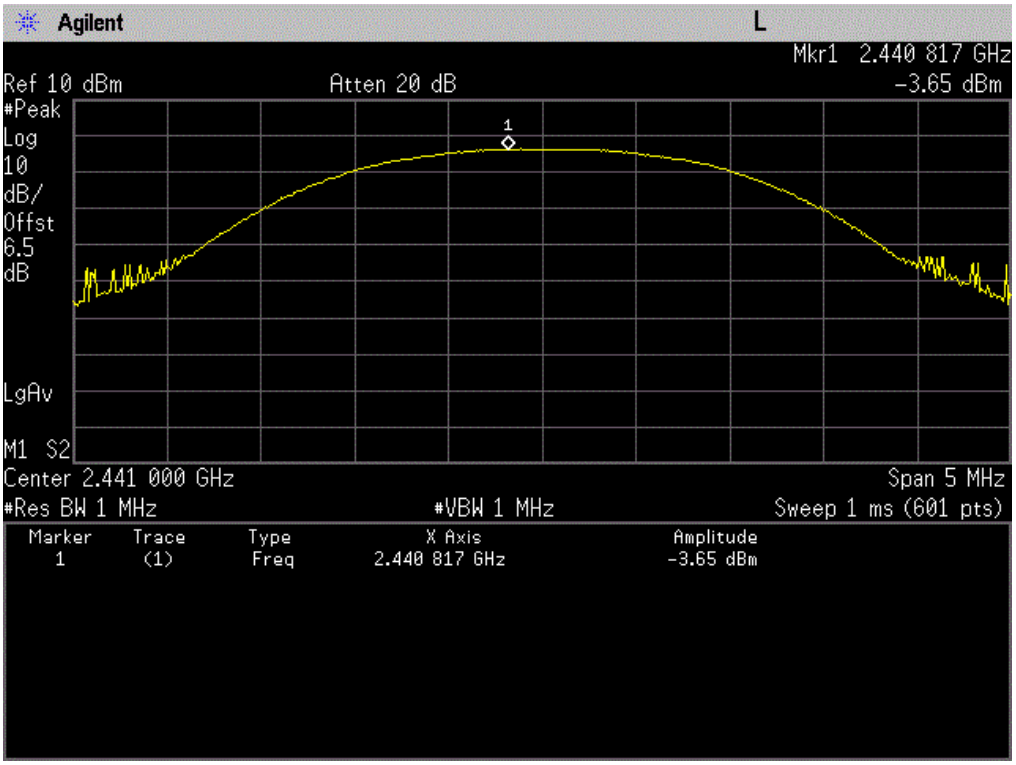
(GFSK Mode Middle Channel)



(GFSK Mode High Channel)



(π /4DQPSK Mode Low Channel)



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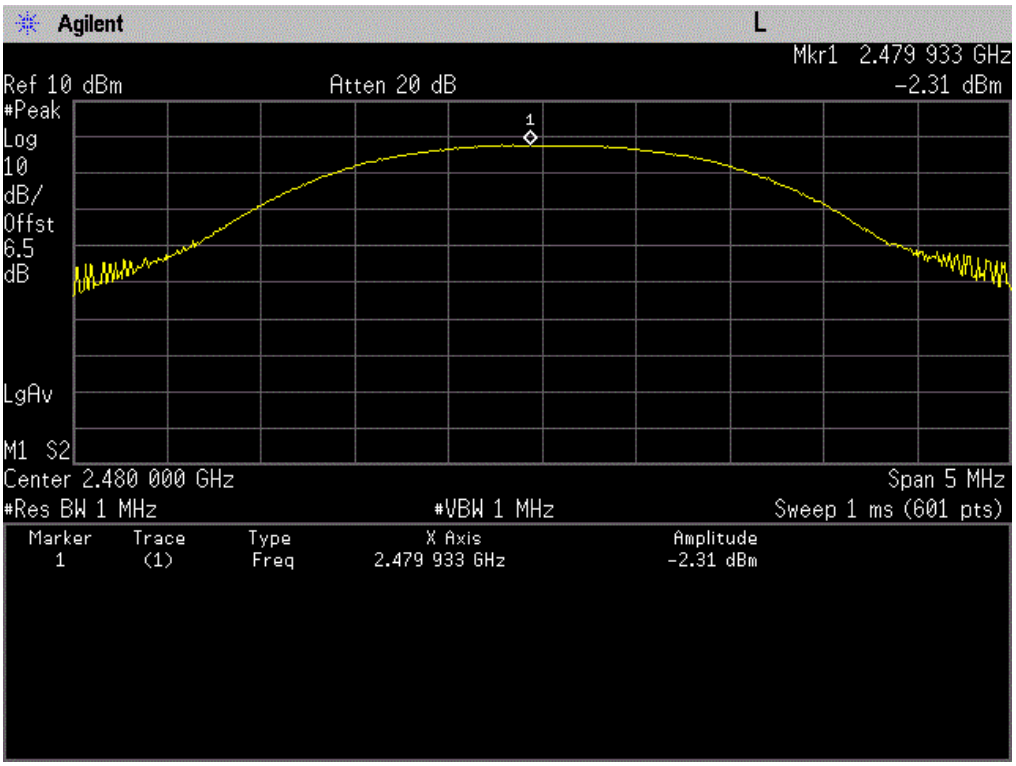
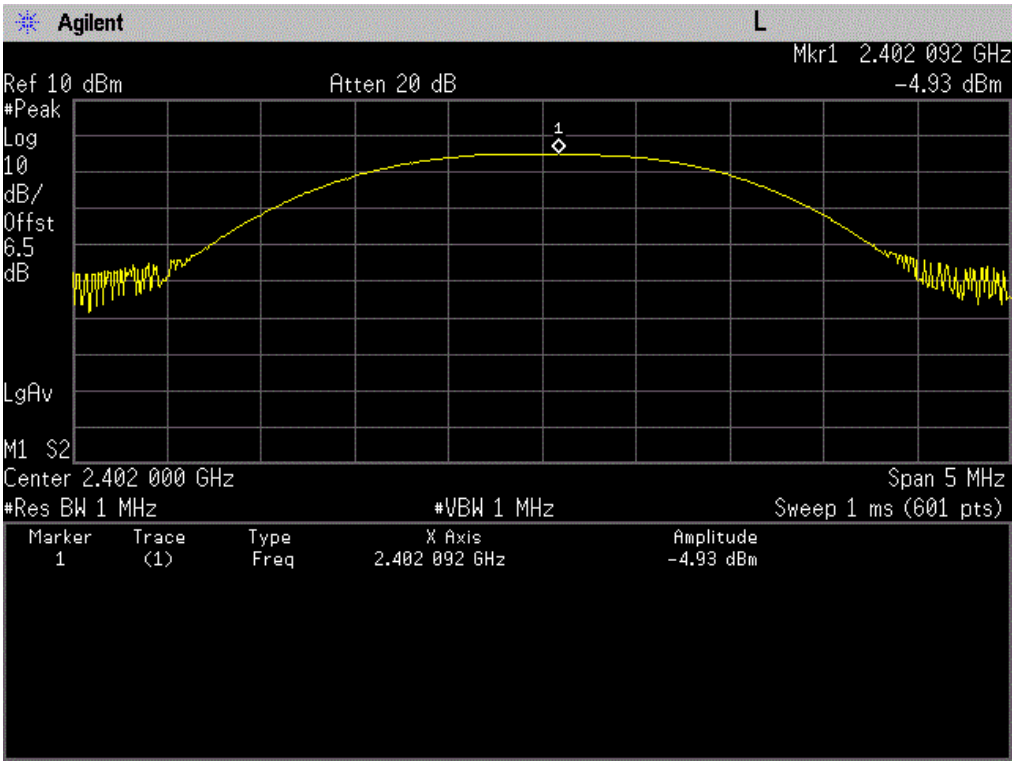
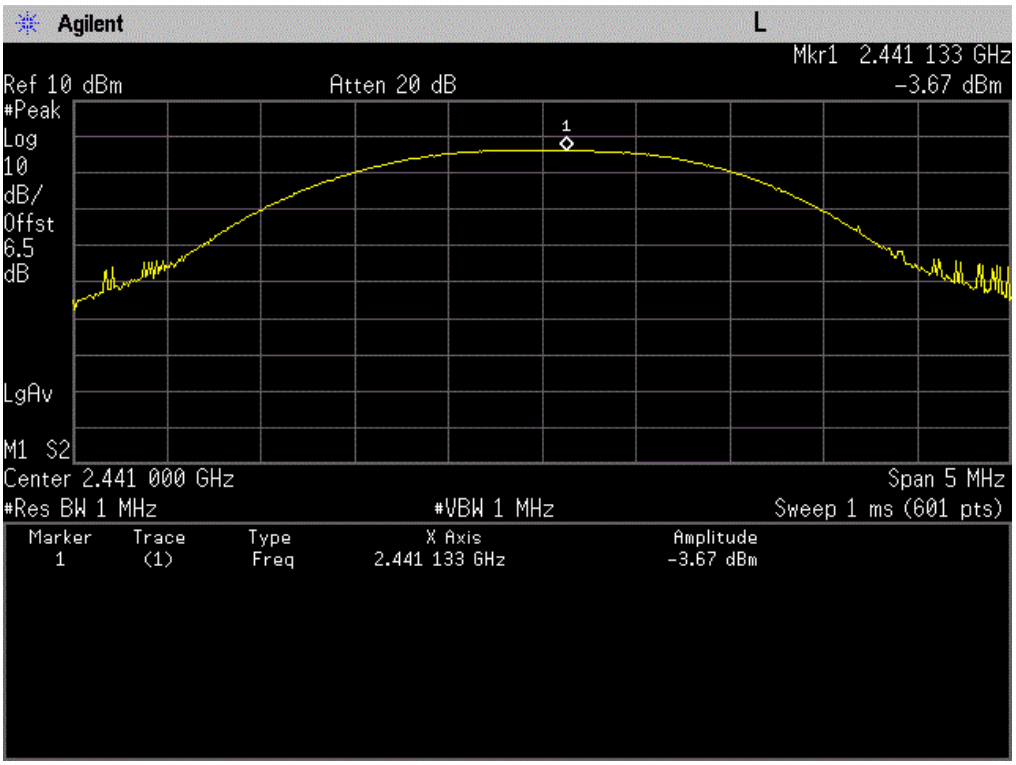


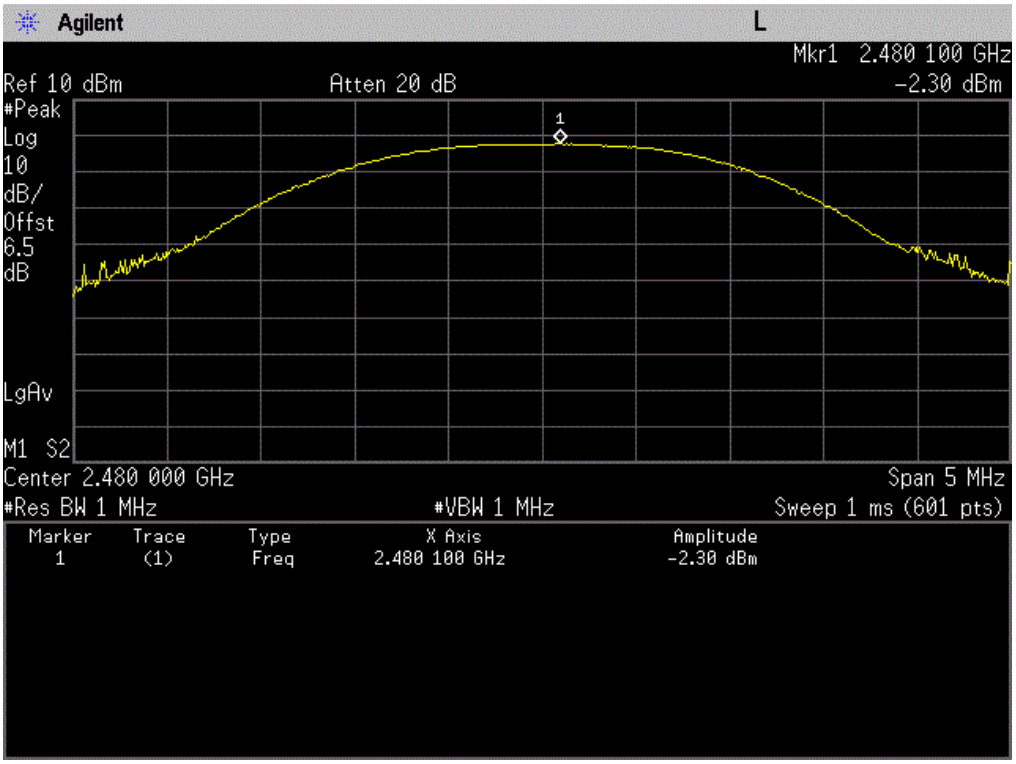
(π /4DQPSK Mode High Channel)



(8-DPSK Mode Low Channel)



(8-DPSK Mode Middle Channel)

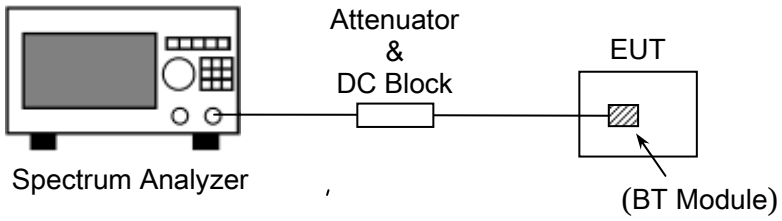


(8-DPSK Mode High Channel)

4. 20DB BANDWIDTH

4.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



4.2 Definition

According to FCC section 15.247(a),(1), The 20dB bandwidth is know as the 99% emission bandwidth, or 20dB bandwidth (10*log1%=20dB) taking the total RF output power.

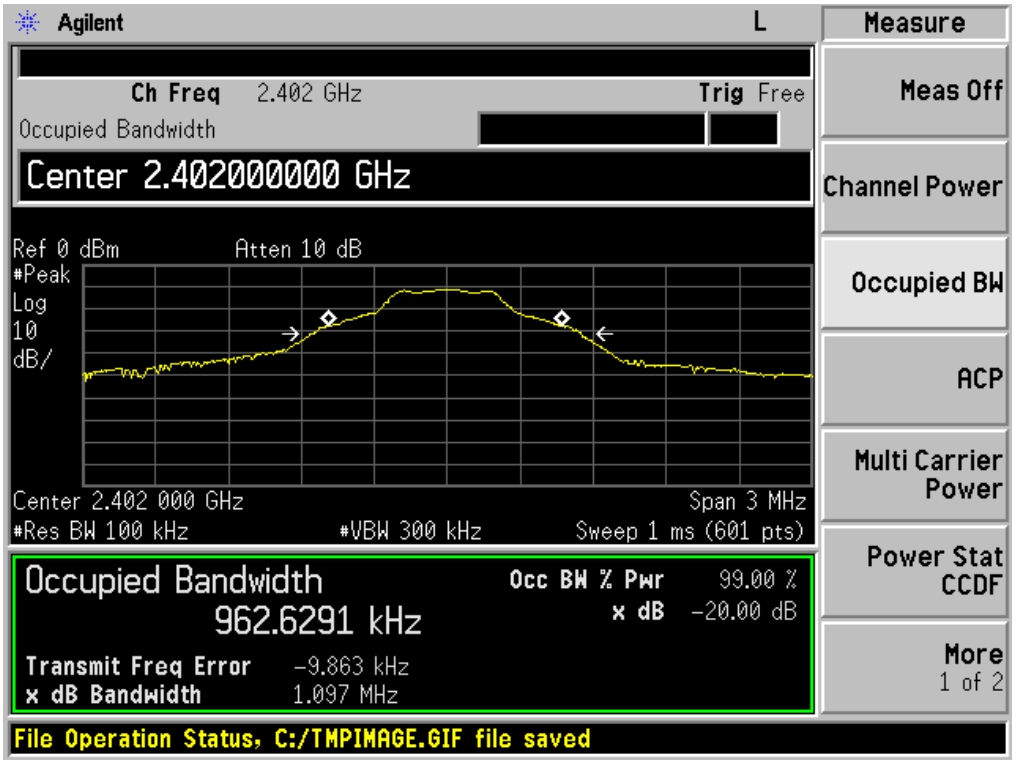
4.3 Test Result

A. Test Verdict:

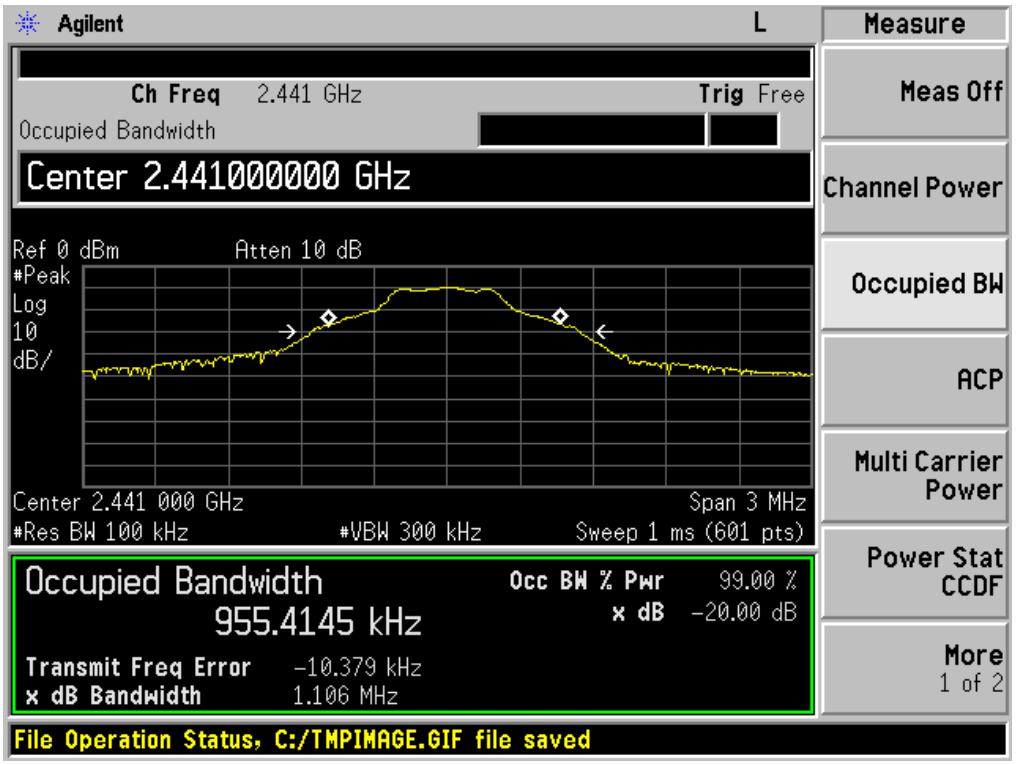
The EUT operating at frequency hopping-off mode and the 20dB measurement result is following;

Test Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	Verdict
GFSK Mode (1Mbps)	0	2402	1.097	PASS
	39	2441	1.106	PASS
	78	2480	1.101	PASS
π/4DQPSK (2Mbps)	0	2402	1.386	PASS
	39	2441	1.384	PASS
	78	2480	1.388	PASS
8-DPSK (3Mbps)	0	2402	1.381	PASS
	39	2441	1.384	PASS
	78	2480	1.383	PASS

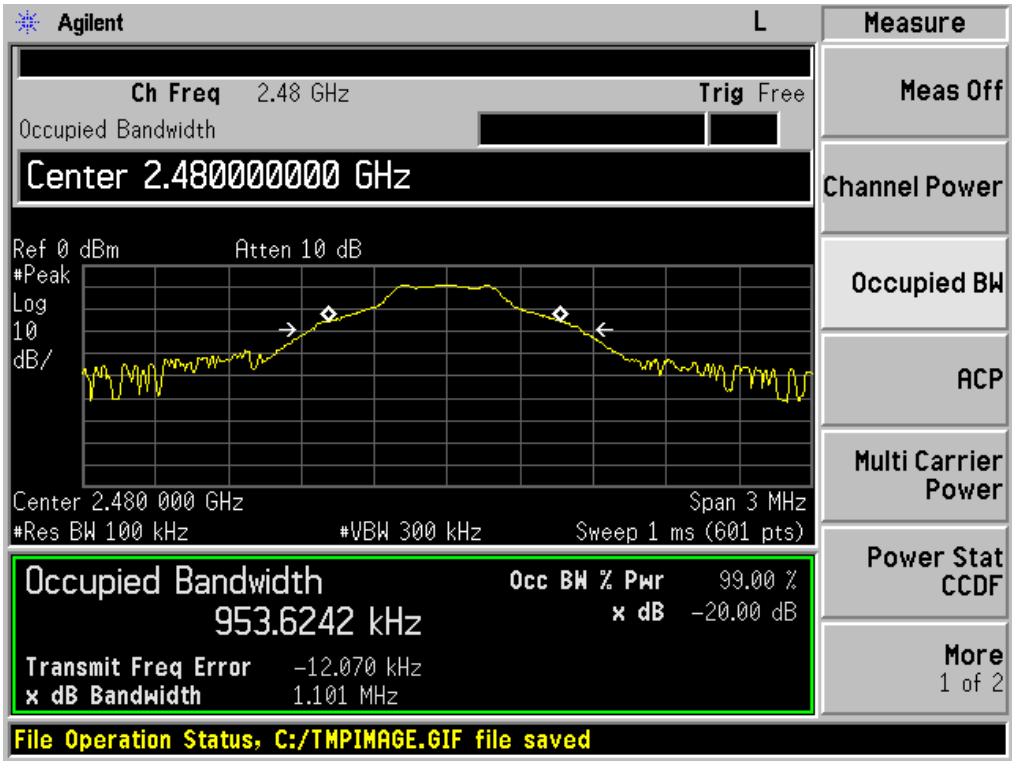
B. Test Plots



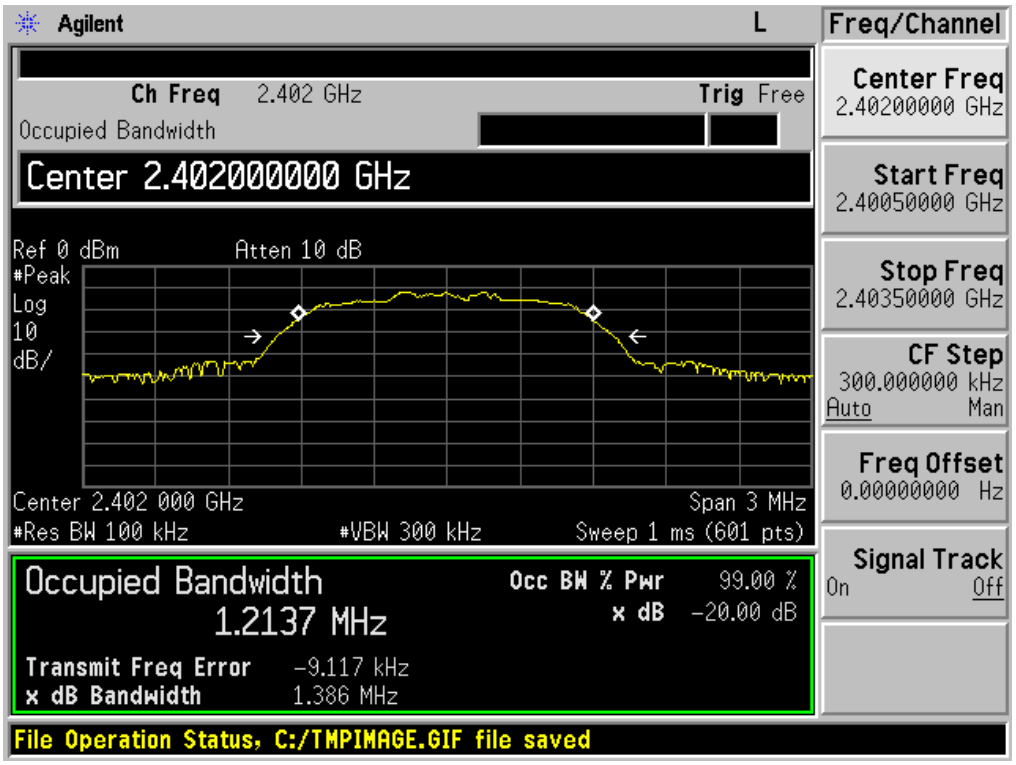
(GFSK Mode Low Channel)



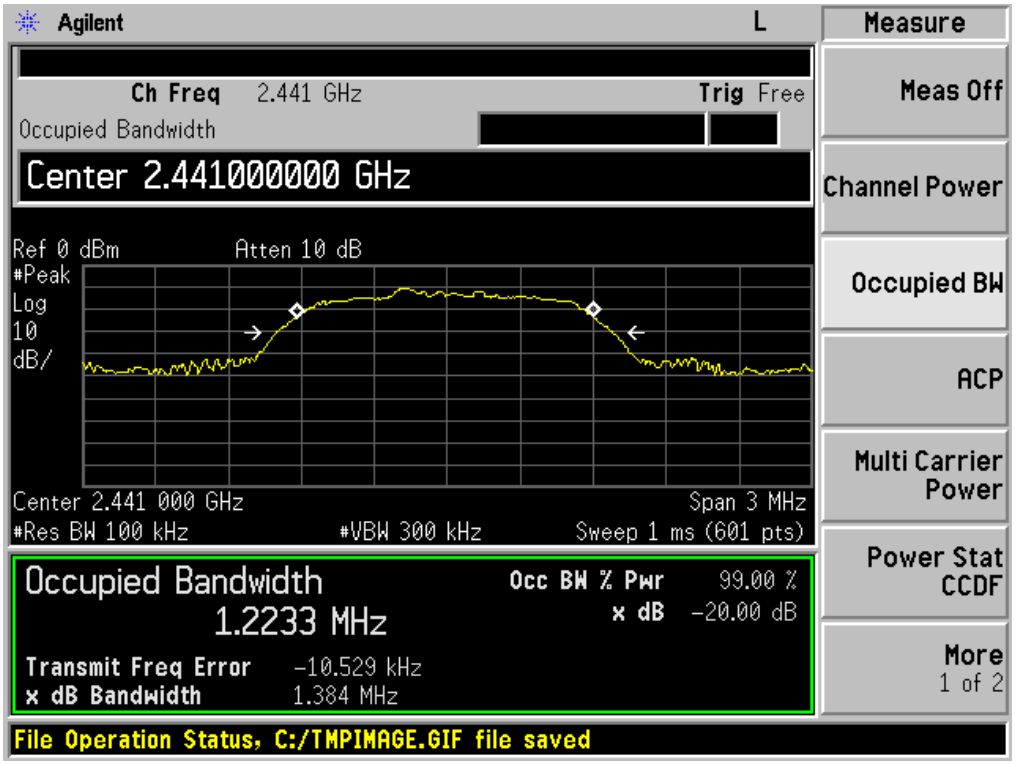
(GFSK Mode Middle Channel)



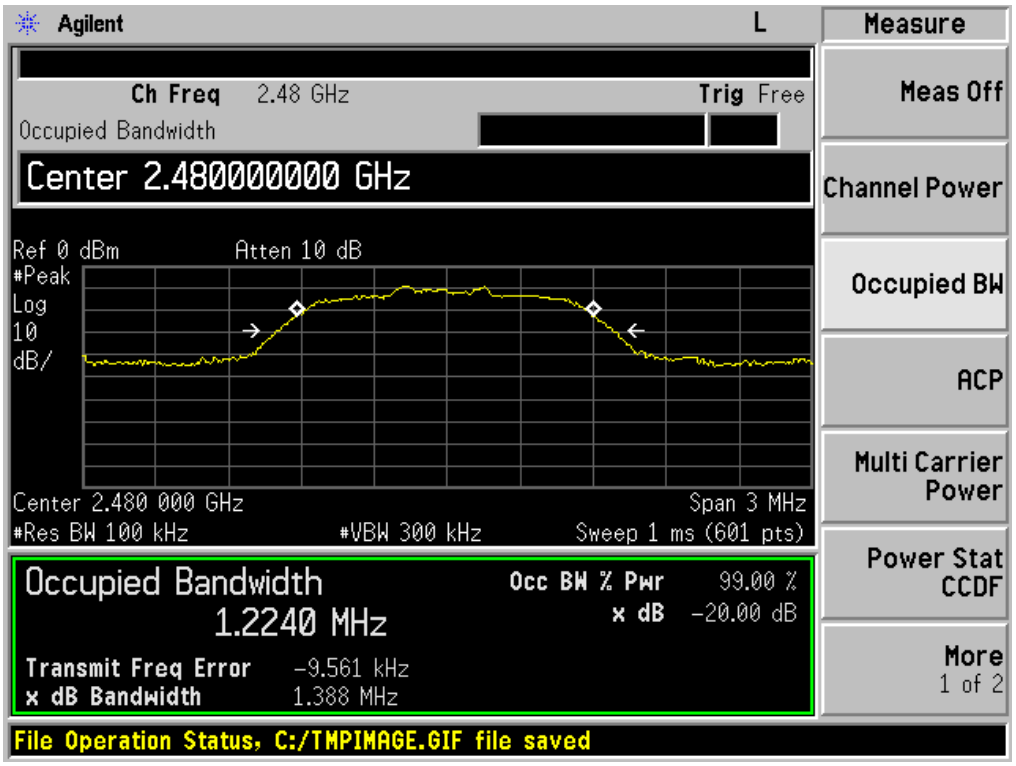
(GFSK Mode High Channel)



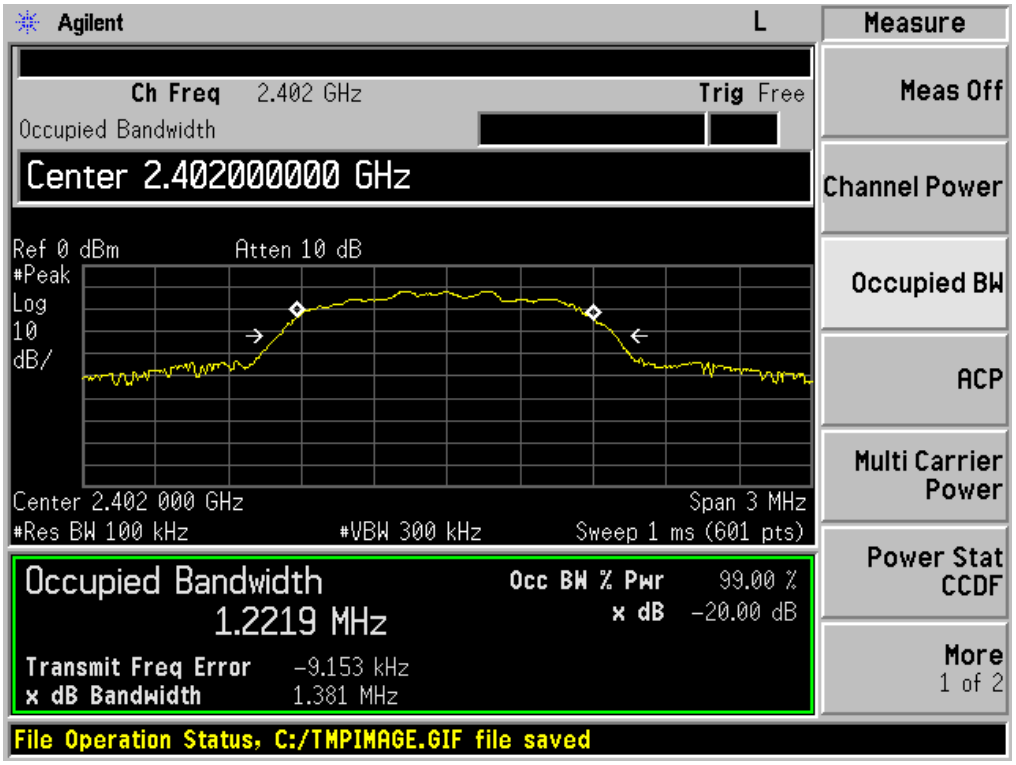
(π /4DQPSK Mode Low Channel)



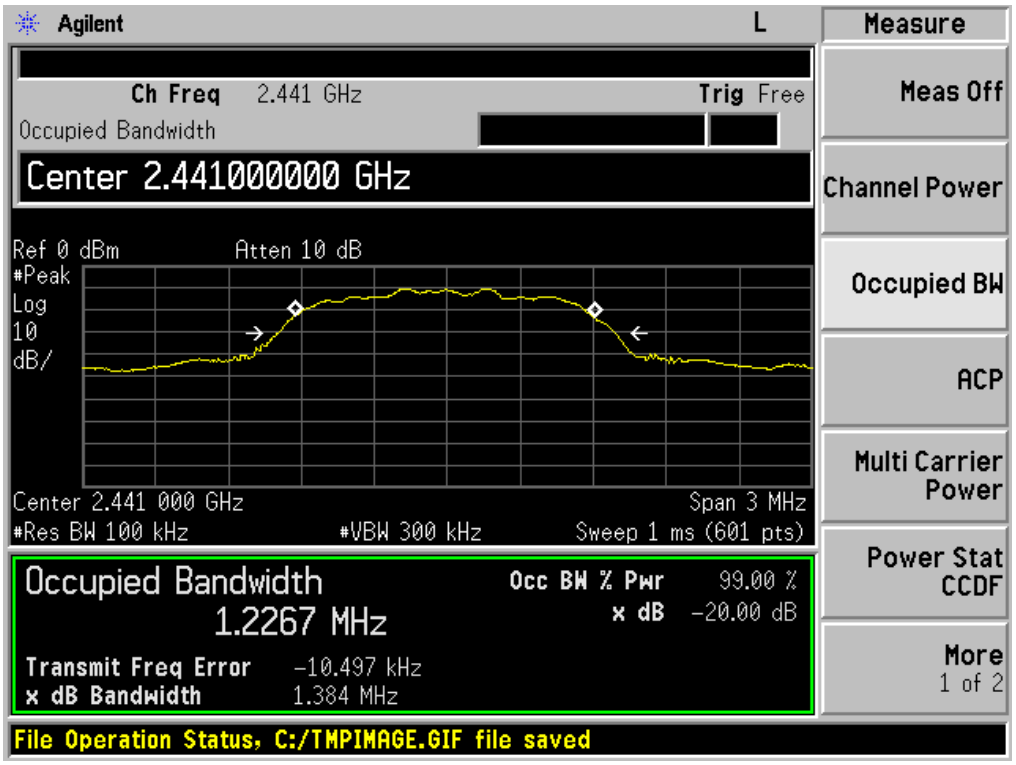
(π /4DQPSK Mode Middle Channel)



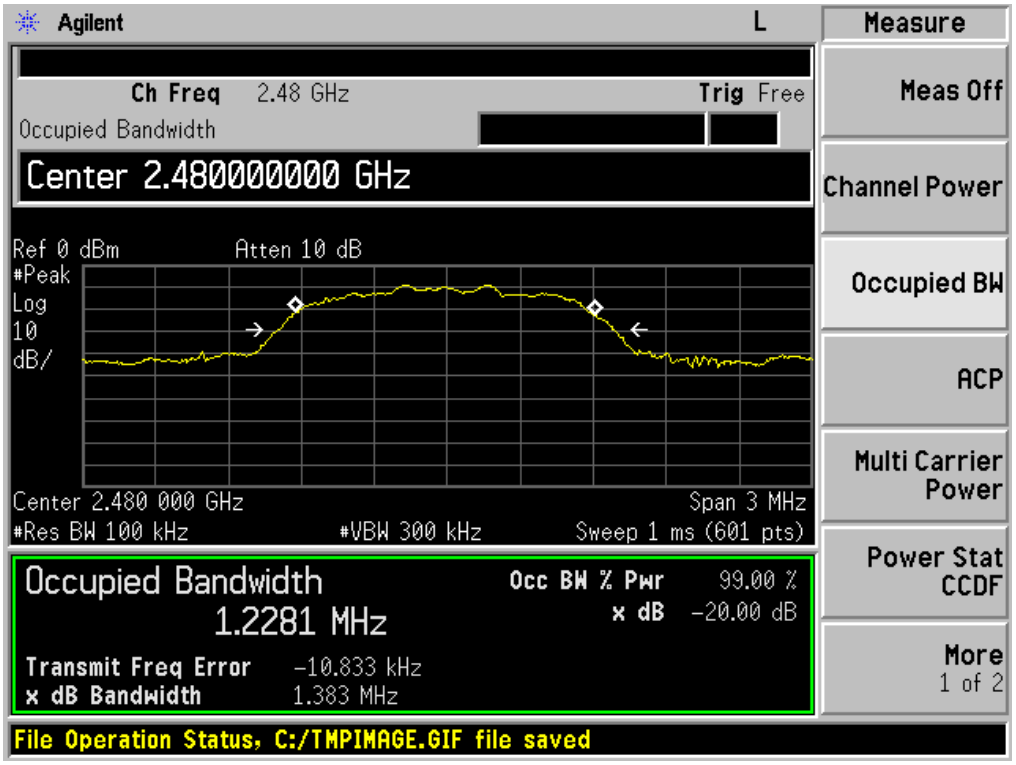
(π /4DQPSK Mode High Channel)



(8-DPSK Mode Low Channel)



(8-DPSK Mode Middle Channel)

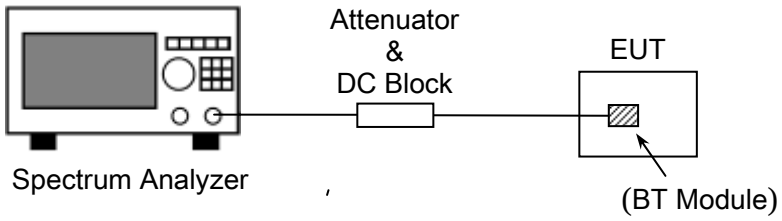


(8-DPSK Mode High Channel)

5. CARRIED FREQUENCY SEPARATION

5.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



5.2 Definition

According to FCC section 15.247(a),(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

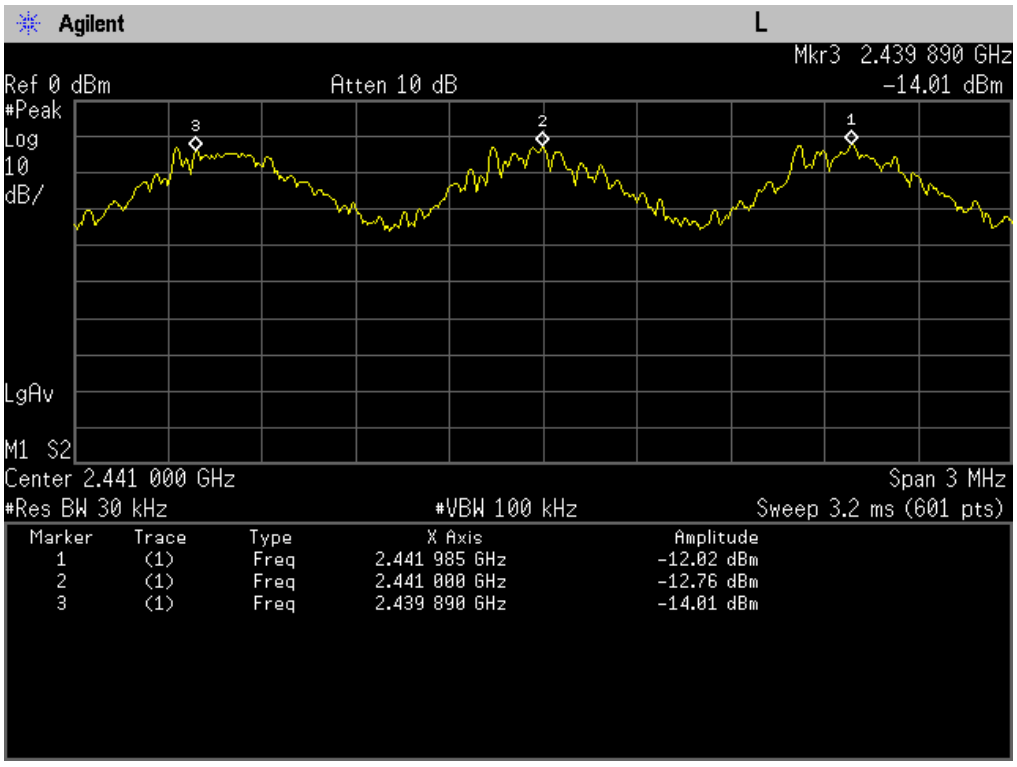
5.3 Test Result

A. Test Verdict:

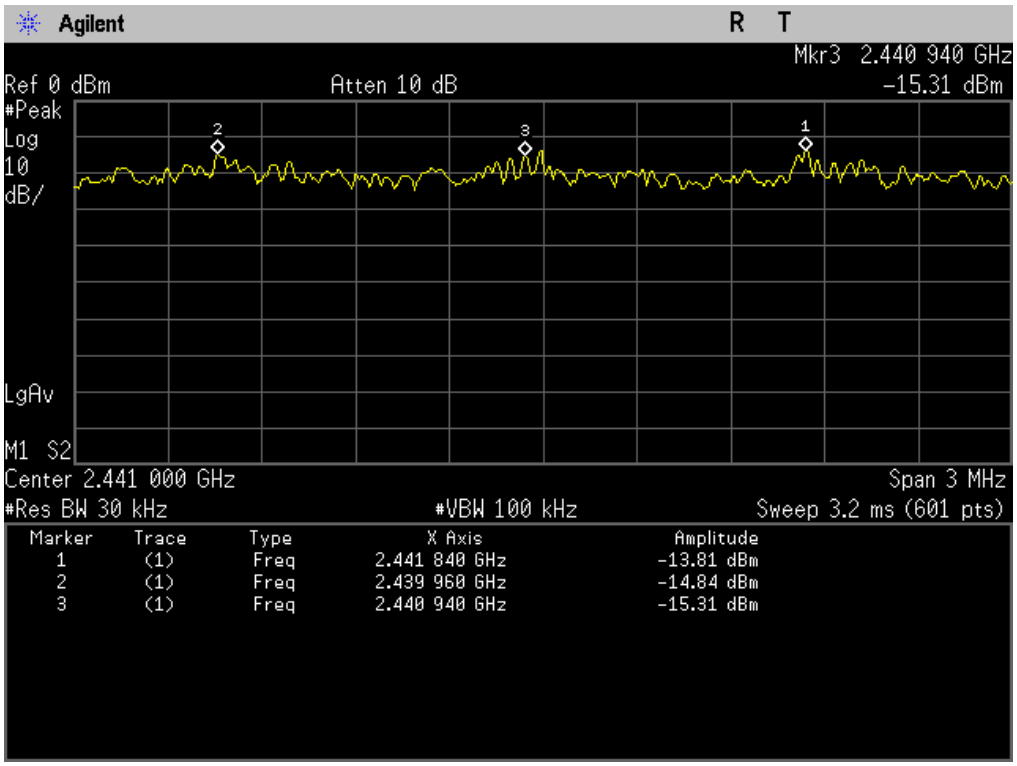
The EUT operating at frequency hopping-on mode and the measurement result is following;

Test Mode	Frequency Separation (MHz)	Limits	Limits (≥ two-thirds 20 dB bandwidth)	Result
GFSK Mode (1Mbps)	1.000	≥25KHz	0.734	PASS
π /4DQPOSK (2Mbps)	1.000	≥25KHz	0.925	PASS
8-DPSK (3Mbps)	1.005	≥25KHz	0.923	PASS

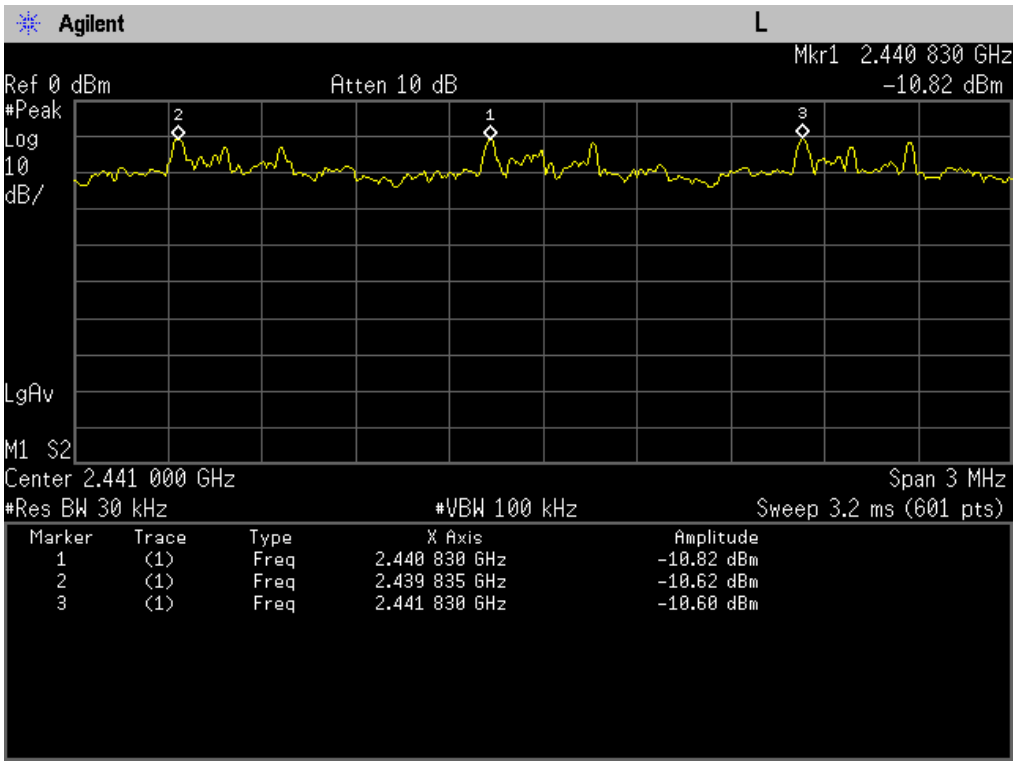
B. Test Plots



(GFSK Mode)



(π/4DQPOSK)

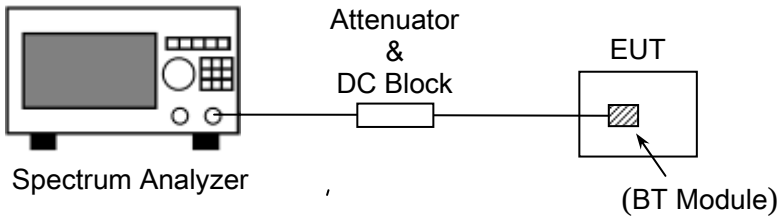

Agilent
L
Mkr1 2.440 830 GHz
Ref 0 dBm
Atten 10 dB
-10.82 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
Center 2.441 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.440 830 GHz -10.82 dBm
2 (1) Freq 2.439 835 GHz -10.62 dBm
3 (1) Freq 2.441 830 GHz -10.60 dBm

(8-DPSK)

6. TIME OF OCCUPANCY (DWELL TIME)

6.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



6.2 Definition

According to FCC section 15.247(a),(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

6.3 Test Result

A. Test Verdict:

The Dwell Time and Period calculated formulas is;

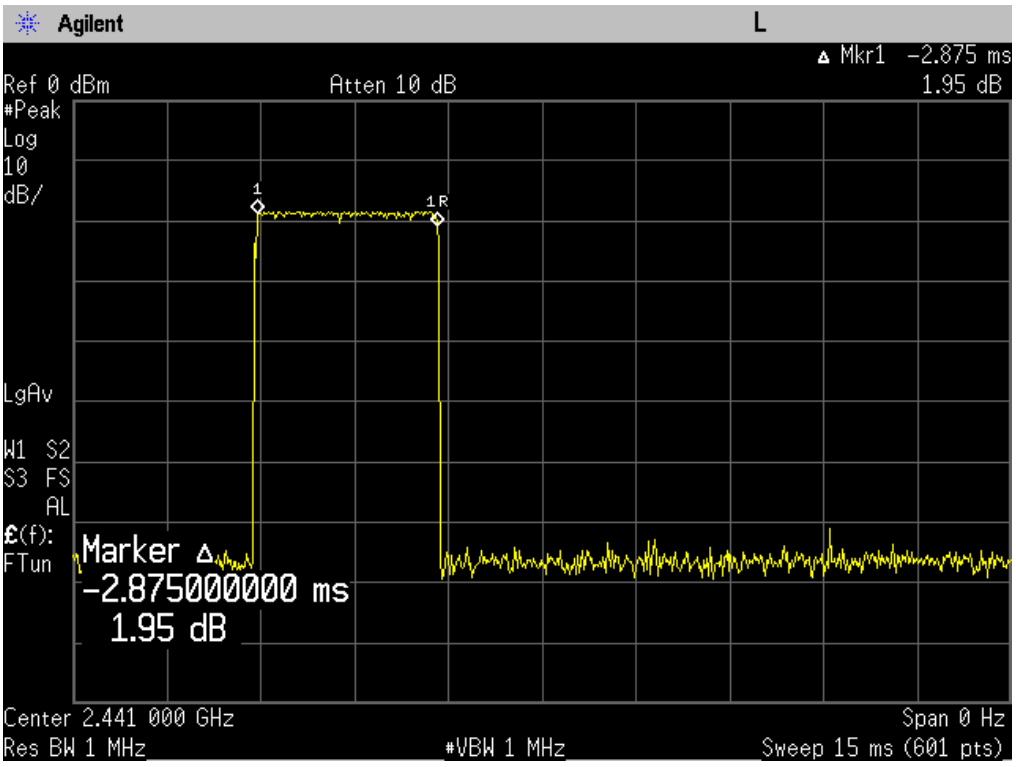
{Total Of Dwell Time} = {Pulse Time} * (1600 / 6) / {Number Of Hopping Frequency} * {Period}

{Period} = 0.4s * {Number Of Hopping Frequency}

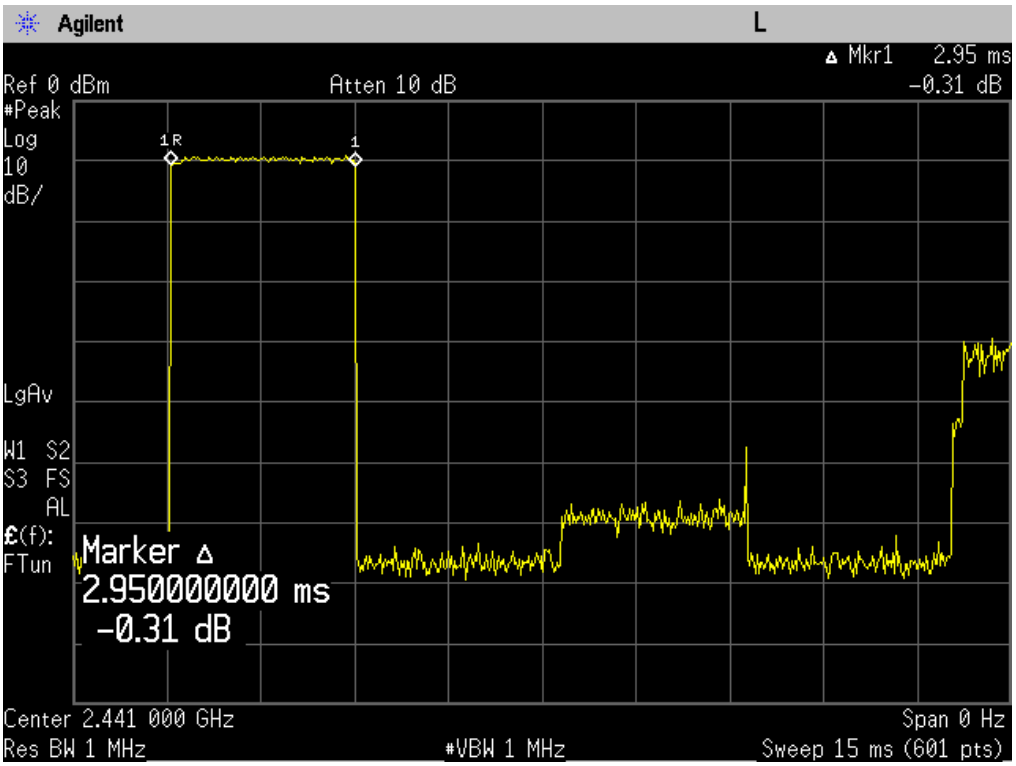
The EUT operating at frequency hopping-on mode and the measurement result is following;

Test Mode	Pulse Time (ms)	Total of Dwell Time (ms)	Limits (ms)	Result
GFSK Mode (1Mbps)	2.875	306.67	400	PASS
π/4DQPOSK (2Mbps)	2.950	314.67	400	PASS
8-DPSK (3Mbps)	2.925	312.00	400	PASS

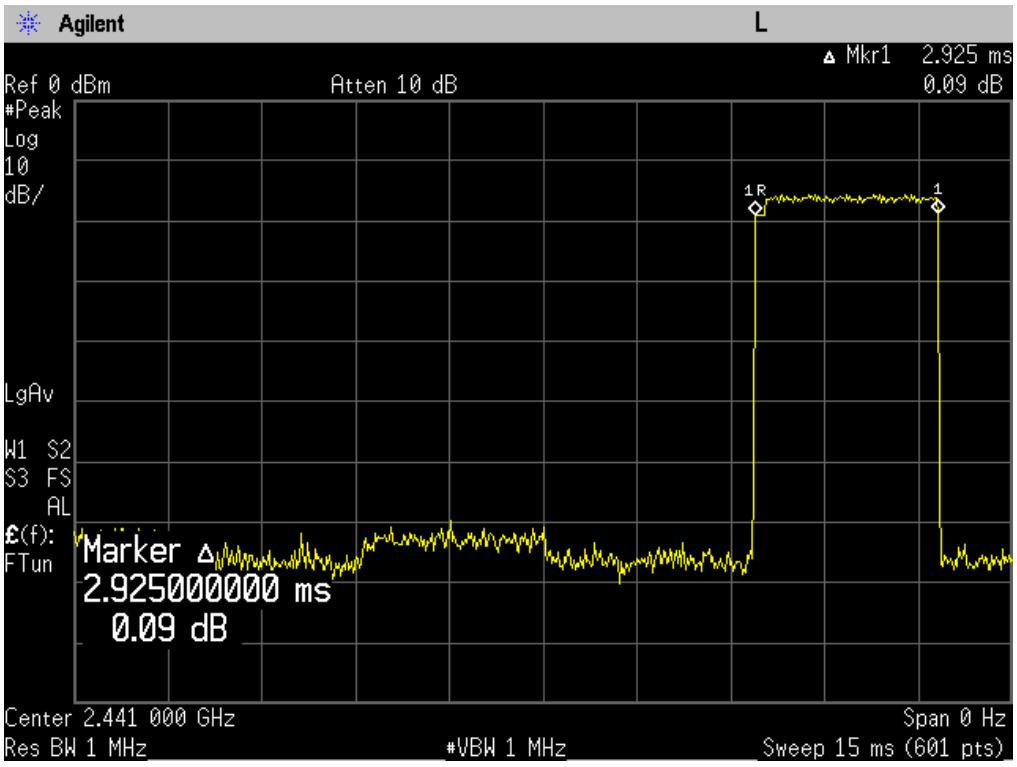
B. Test Plots



(GFSK Mode)



(π /4DQPOSK)

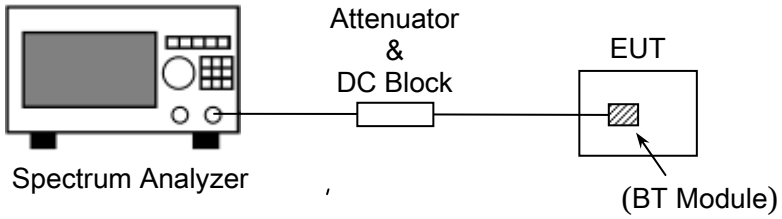

Agilent
L
Mkr1 2.925 ms
0.09 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 S2
S3 FS
AL
£(f):
FTun
Marker Δ
2.925000000 ms
0.09 dB
Center 2.441 000 GHz
Res BW 1 MHz
#VBW 1 MHz
Span 0 Hz
Sweep 15 ms (601 pts)

(8-DPSK)

7. CONDUCTED SPURIOUS EMISSION

7.1 Test Setup

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.



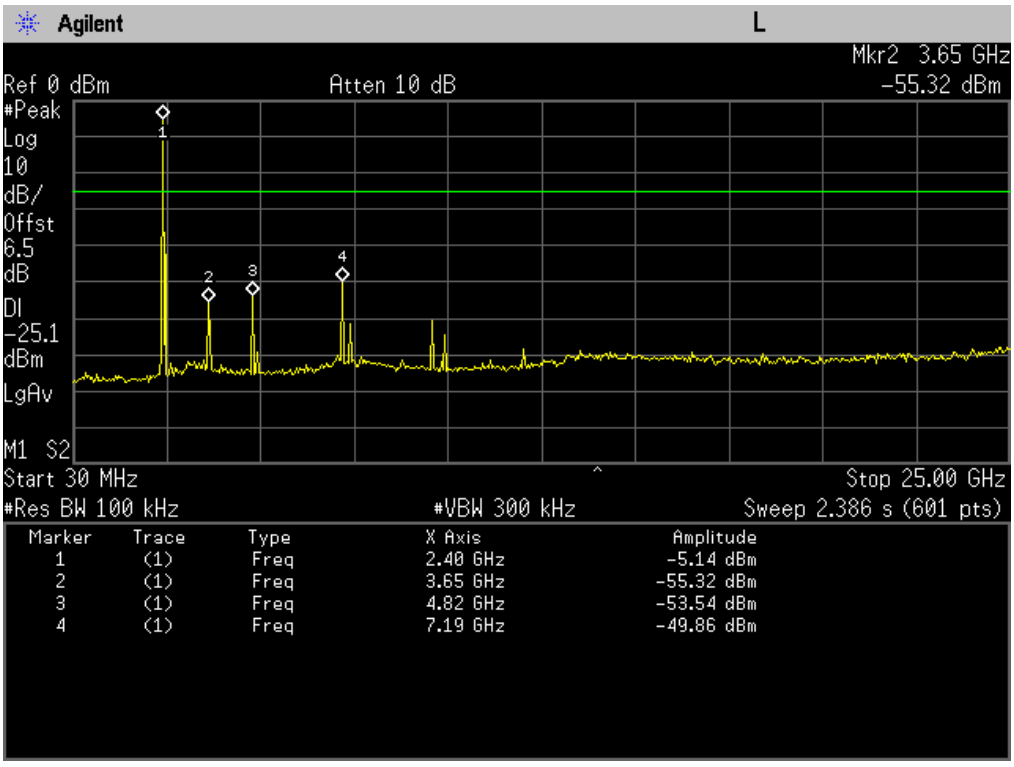
7.2 Definition

According to FCC section 15.247(d), In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits

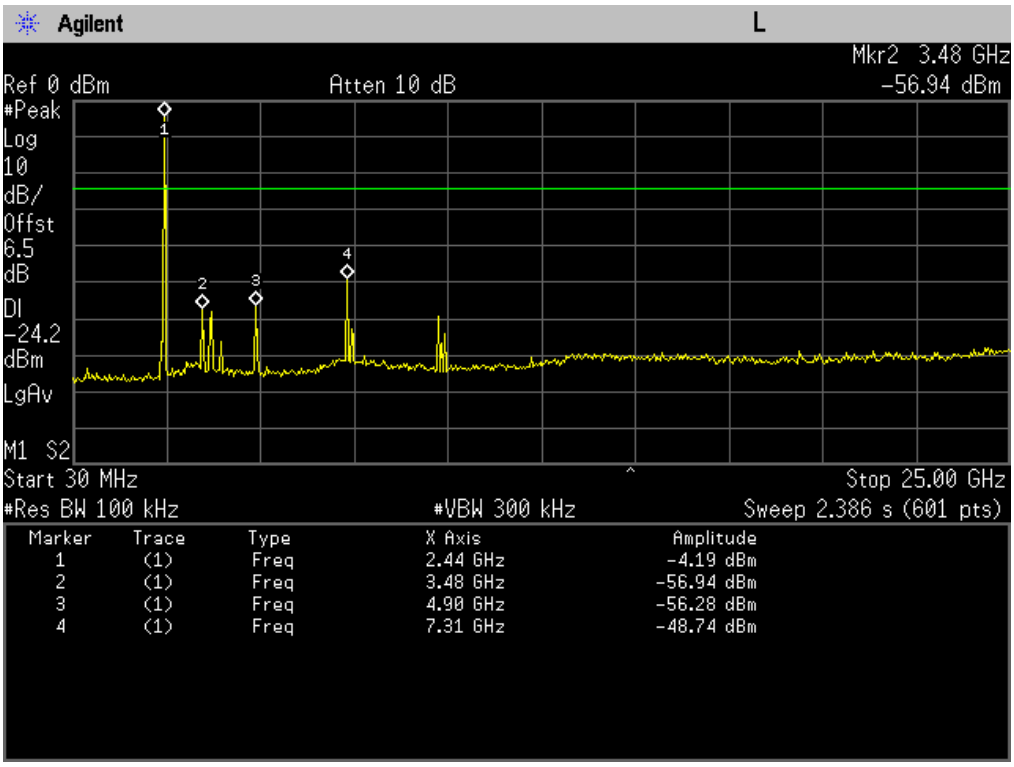
7.3 Test Result

The measurement frequency range is form 30MHz to the 10th Harmonic of fundamental frequency during test the EUT was operating at frequency hopping-off mode and the measurement result is following;

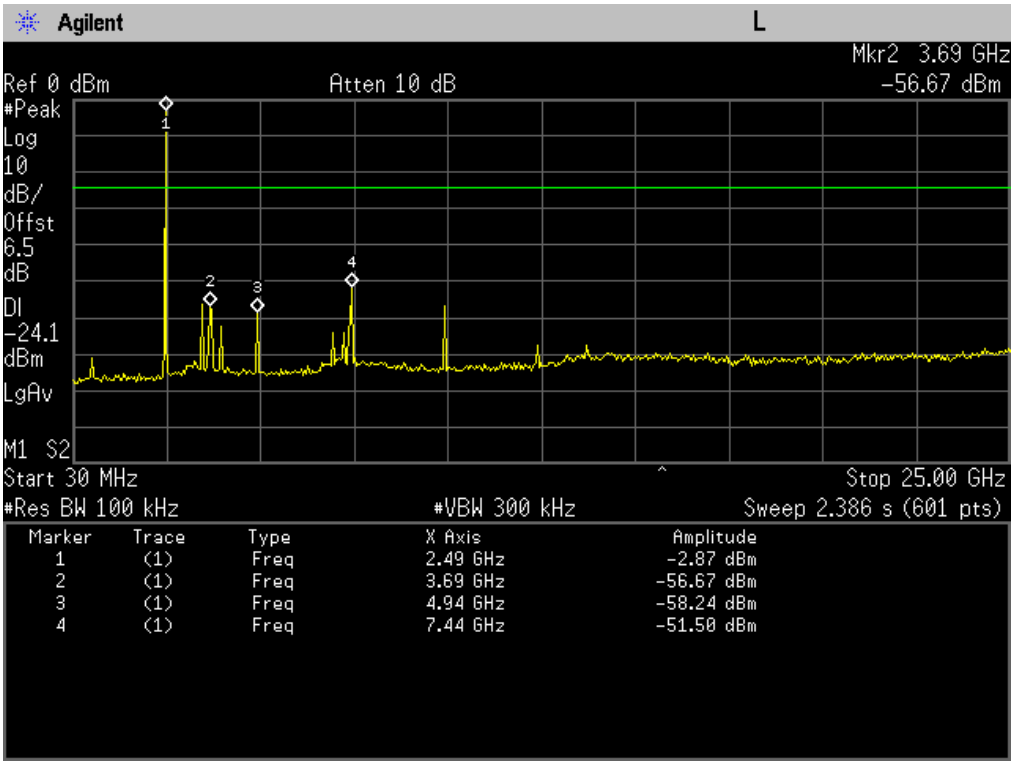
Test Plots



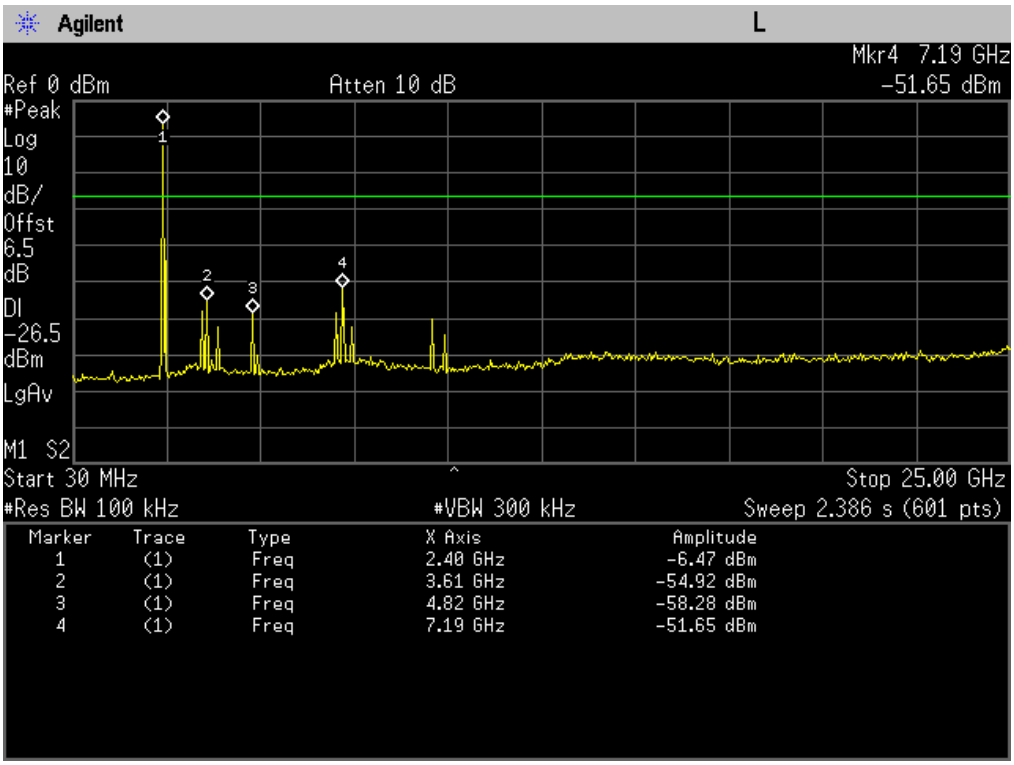
(GFSK Mode Low Channel)



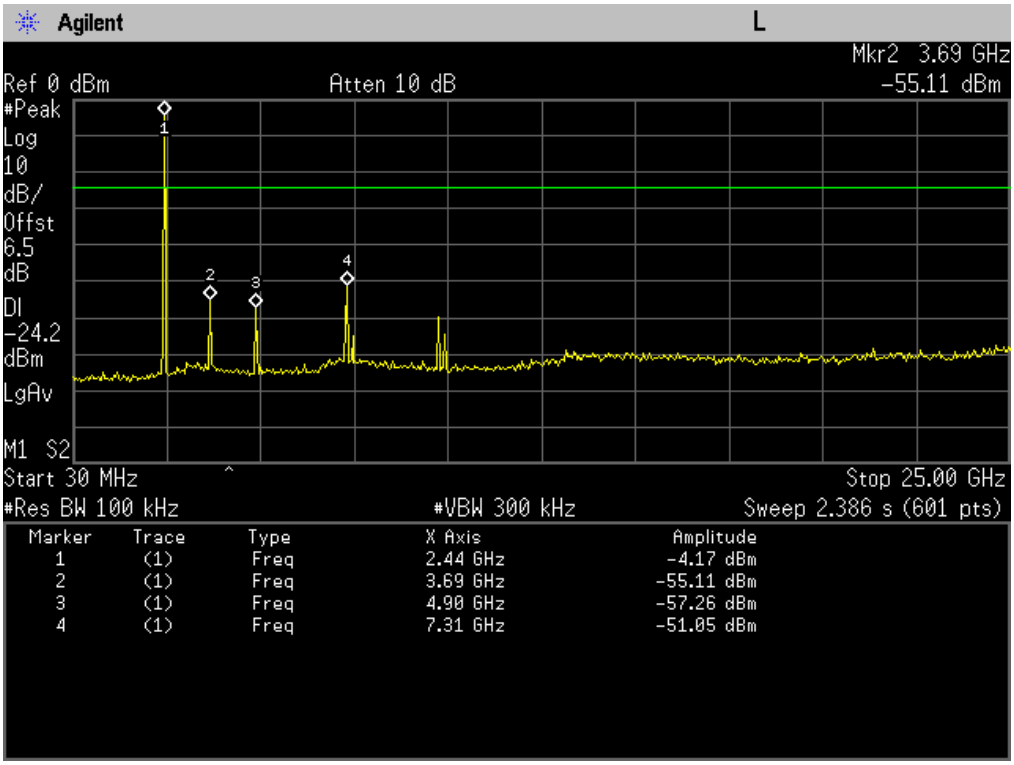
(GFSK Mode Middle Channel)



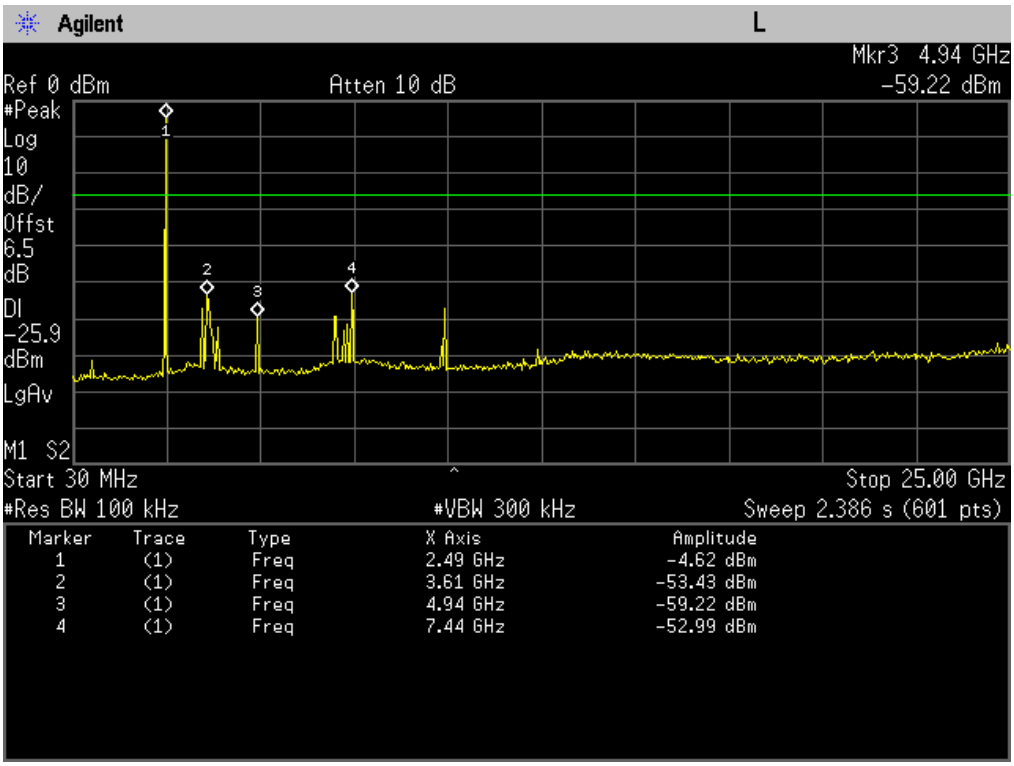
(GFSK Mode High Channel)



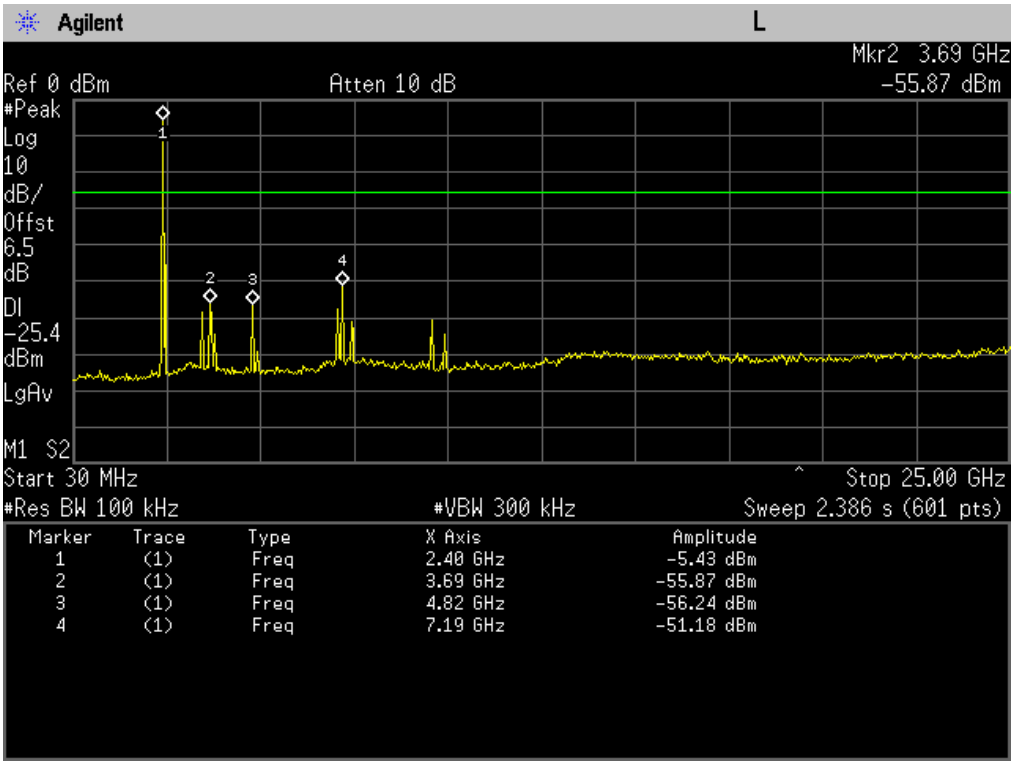
(π /4DQPOSK Mode Low Channel)



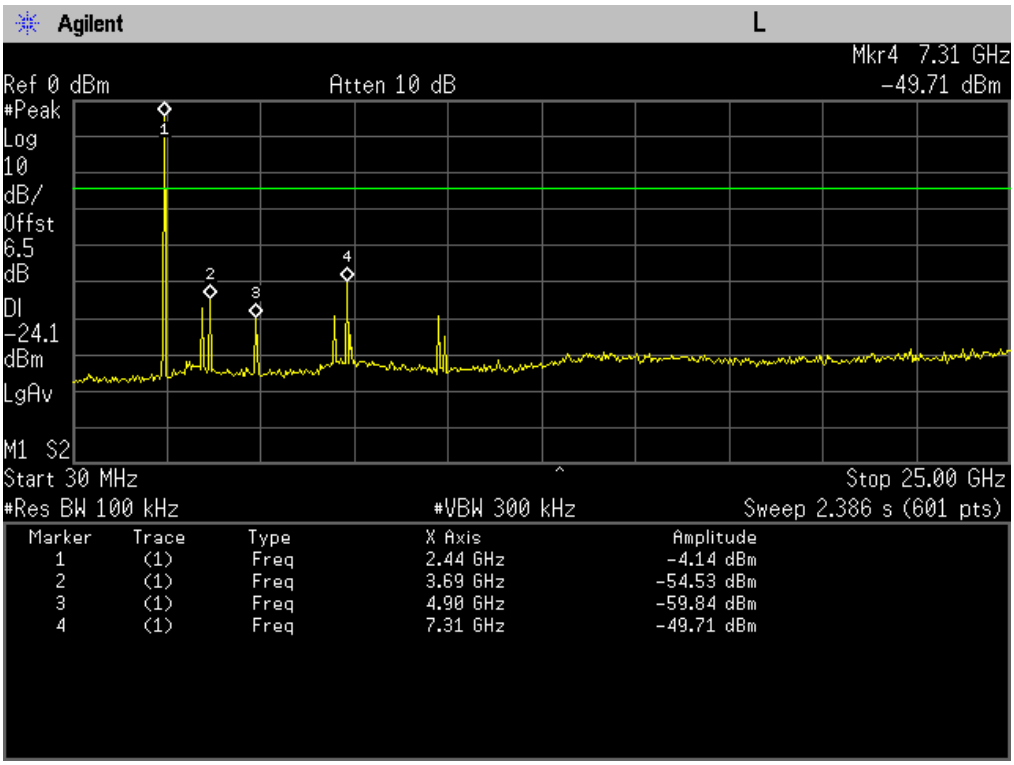
(π /4DQPOSK Mode Middle Channel)



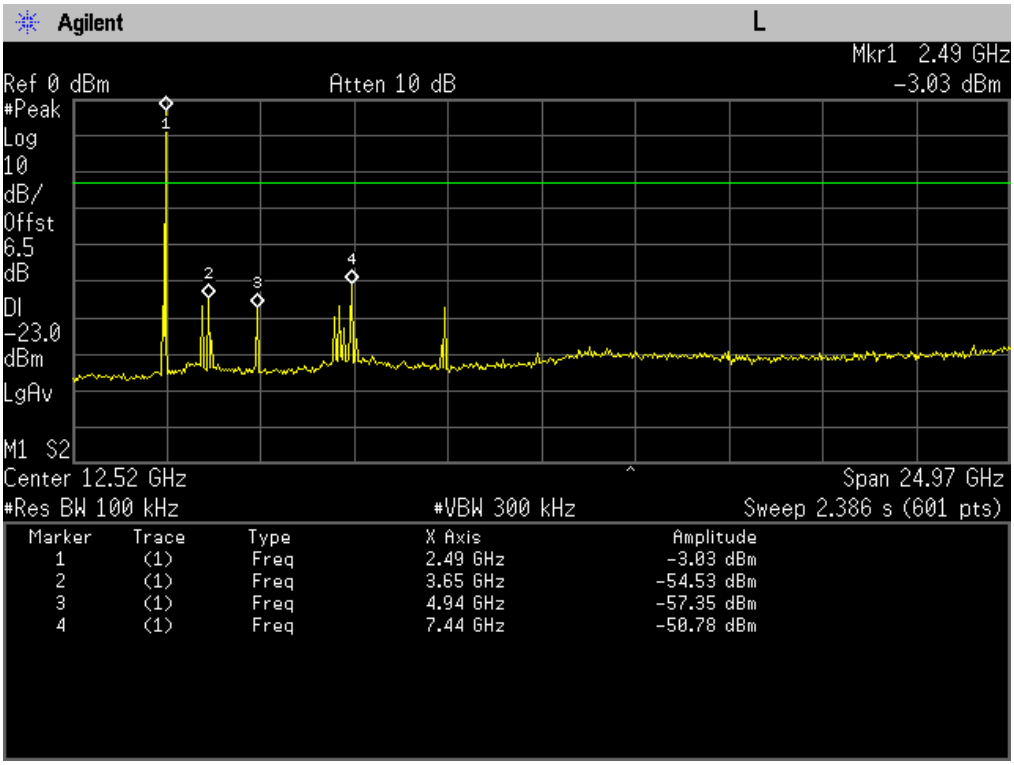
(π /4DQPOSK Mode High Channel)



(8-DPSK Mode Low Channel)



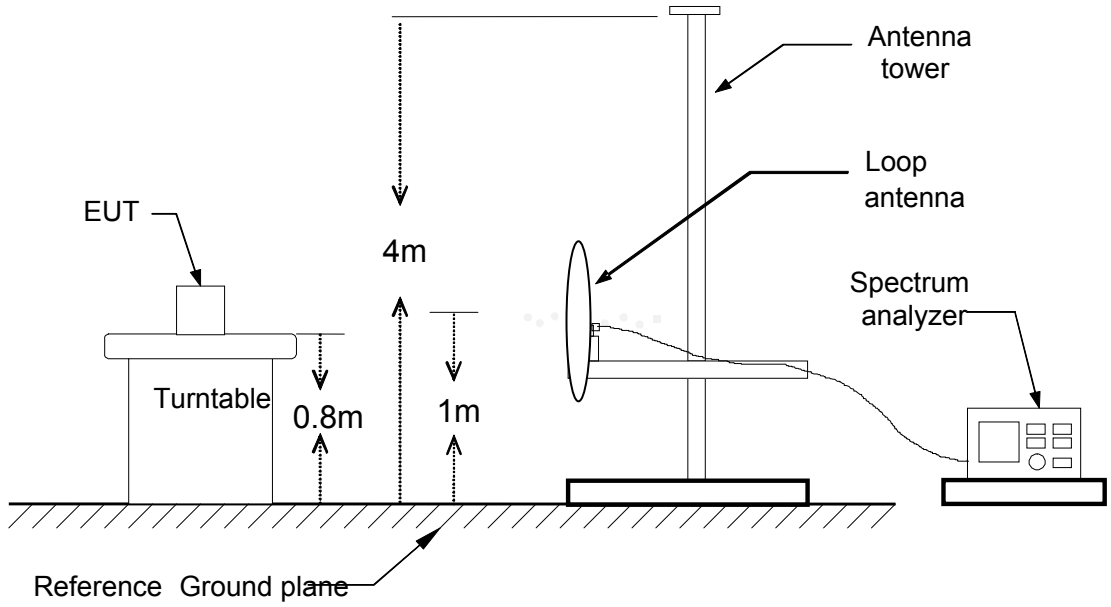
(8-DPSK Mode Middle Channel)



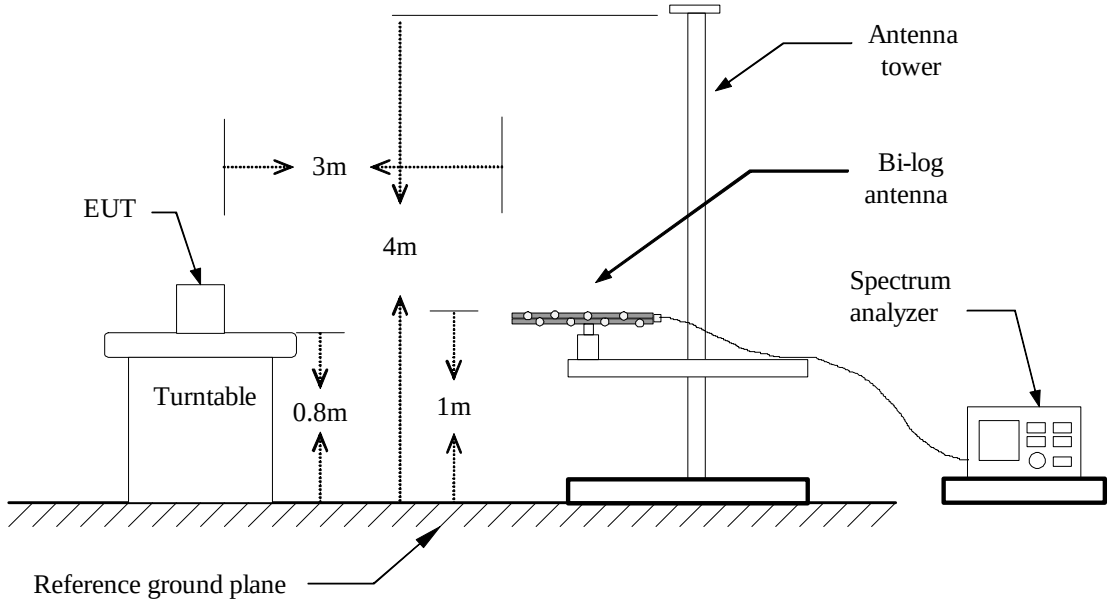
(8-DPSK Mode High Channel)

8. RADIATED SPURIOUS EMISSION

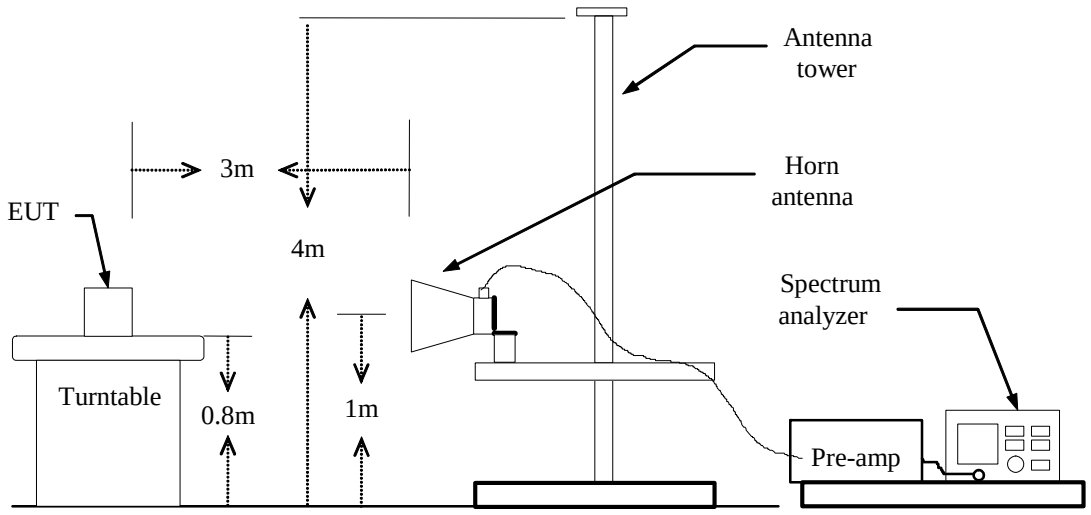
8.1 Test Setup



Blow 1GHz:



Above 1GHz:



8.2 Definition

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

8.3 Test procedures

1. The EUT is placed on a turntable, which is 0.8m above ground plane.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Set the spectrum analyzer in the following setting as:

   Below 1GHz: RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

   Above 1GHz : PEAK: RBW=VBW=1MHz / Sweep=AUTO

   AVERAGE: RBW=1MHz / VBW=1MHz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

8.4 Test Result

Form 9 KHz to 30MHz:

Freq.	Ant. Pol	Peak	Ant. / CL	Actual Fs	Peak	Peak
(MHz)	H/V	Reading	CF		Limit	Margin
		(dBuV)	(dB)	Peak	(dBuV/m)	(dB)
				(dBuV/m)		
	H					
	H					
	H					
N/A						>20
	V					
	V					
	V					
N/A						>20

-Note: No test data was detected in below 30MHz.

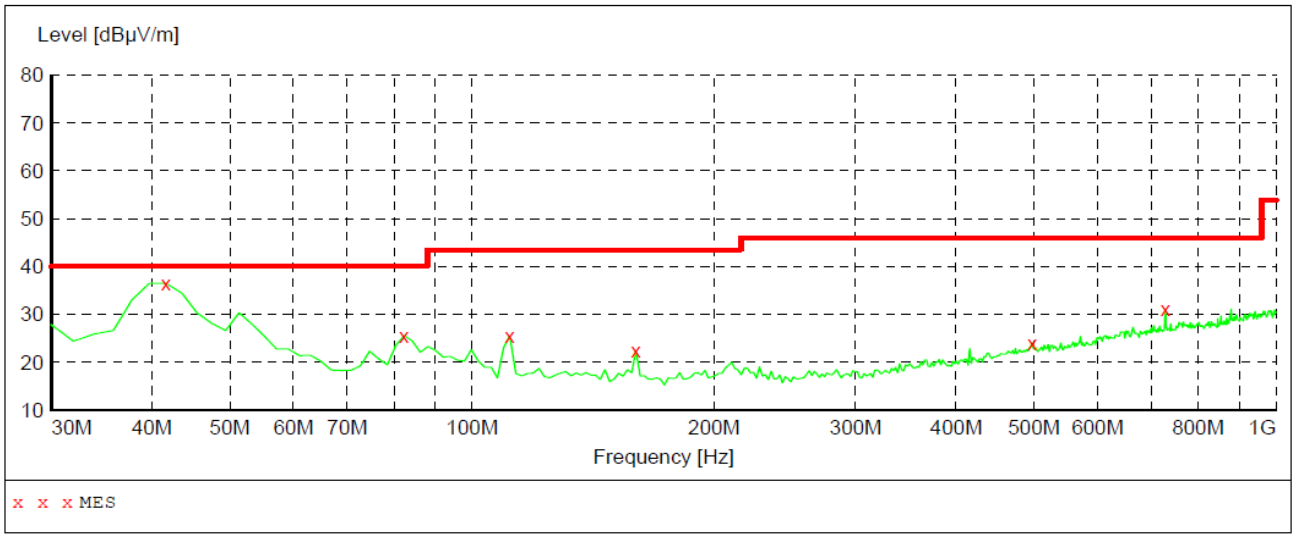
Form 30 MHz to 1GHz:

Radiation Emission Test FCC PART 15B

EUT: MOBILE PHONE
Manufacturer:
Operating Condition: Bluetooth Mode
Test Site: 3m Chamber
Operator: NICE
Test Specification:
Comment:
Start of Test: 9/13/2013 / 4:33:59PM

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



9/13/2013 4:38PM

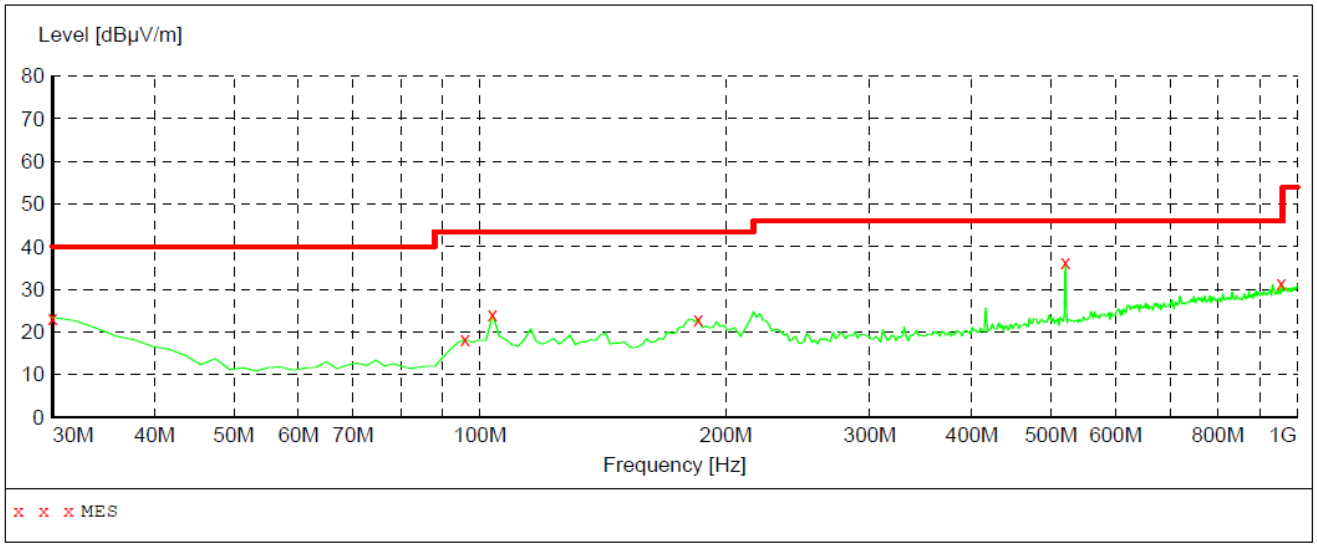
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Polarization
41.640000	36.50	12.5	40.0	3.5	---	VERTICAL
82.380000	25.60	9.0	40.0	14.4	---	VERTICAL
111.480000	25.40	14.1	43.5	18.1	---	VERTICAL
159.980000	22.50	13.9	43.5	21.0	---	VERTICAL
497.540000	24.10	20.4	46.0	21.9	---	VERTICAL
728.400000	31.10	23.9	46.0	14.9	---	VERTICAL

Radiation Emission Test FCC PART 15B

EUT: MOBILE PHONE
Manufacturer:
Operating Condition: Bluetooth Mode
Test Site: 3m Chamber
Operator: NICE
Test Specification:
Comment:
Start of Test: 9/13/2013 / 4:41:19PM

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



9/13/2013 4:42PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.40	21.1	40.0	16.6	---	0.0	0.00	HORIZONTAL
95.960000	18.20	10.6	43.5	25.3	---	0.0	0.00	HORIZONTAL
103.720000	24.00	12.5	43.5	19.5	---	0.0	0.00	HORIZONTAL
185.200000	23.10	13.4	43.5	20.4	---	0.0	0.00	HORIZONTAL
520.820000	36.40	20.5	46.0	9.6	---	0.0	0.00	HORIZONTAL
957.320000	31.40	26.7	46.0	14.6	---	0.0	0.00	HORIZONTAL

Above 1 GHz

Operation Mode: GFSK CH Low **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2402.00	H	93.82	N/A	N/A	N/A	/
4804.00	H	48.04	N/A	74.00	54.00	-25.96
N/A						>20
2402.00	V	99.40	N/A	N/A	N/A	/
4804.00	V	43.62	N/A	74.00	54.00	-30.38
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: GFSK CH Mid **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2441.00	H	95.49	N/A	N/A	N/A	/
4882.00	H	43.95	N/A	74.00	54.00	-30.05
N/A						>20
2441.00	V	100.83	N/A	N/A	N/A	/
4882.00	V	40.33	N/A	74.00	54.00	-33.67
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: GFSK CH High **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2480.00	H	94.27	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2480.00	V	97.32	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: π/4DQPOSK CH Low **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2402.00	H	91.68	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2402.00	V	94.52	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

   a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

   b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: π/4DQPOSK CH Mid **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2441.00	H	89.97	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2441.00	V	91.53	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: π/4DQPOSK CH High **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2480.00	H	91.72	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2480.00	V	93.08	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: 8-DPSK CH Low **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2402.00	H	88.41	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2402.00	V	90.29	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: 8-DPSK CH Mid **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2441.00	H	91.55	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2441.00	V	94.26	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

Operation Mode: 8-DPSK CH High **Test Date:** 2013-09-13

Freq.	Ant. Pol	Actual Fs		Peak	AV	Peak
(MHz)	H/V			Limit	Limit	Margin
		Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
		(dBuV/m)	(dBuV/m)			
2480.00	H	89.63	N/A	N/A	N/A	/
	H	N/A	N/A	74.00	54.00	N/A
N/A						>20
2480.00	V	92.45	N/A	N/A	N/A	/
	V	N/A	N/A	74.00	54.00	N/A
N/A						>20

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

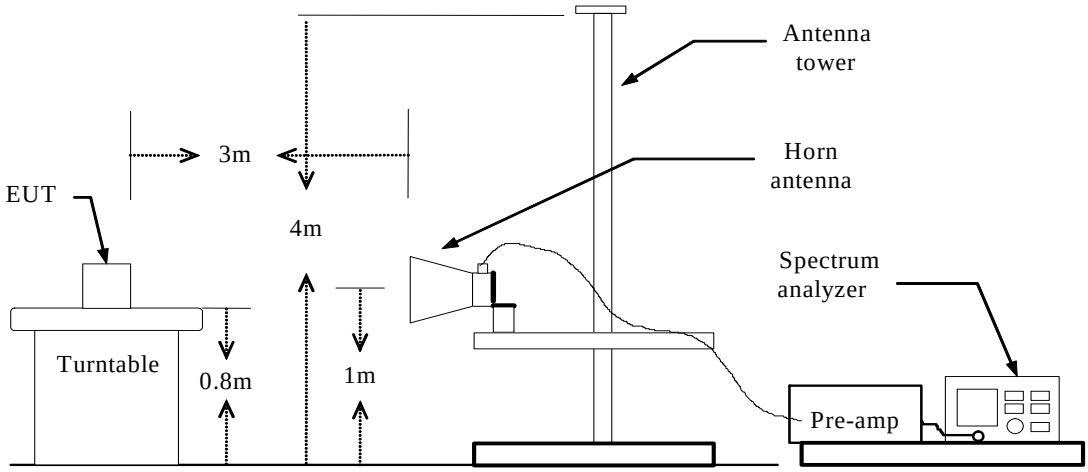
4. Spectrum setting:

    a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.

    b. AV Setting 1GHz- 26GHz, RBW = 1MHz, VBW = 10 Hz, Sweep time = auto.

9. BAND EDGE

9.1 Test Setup



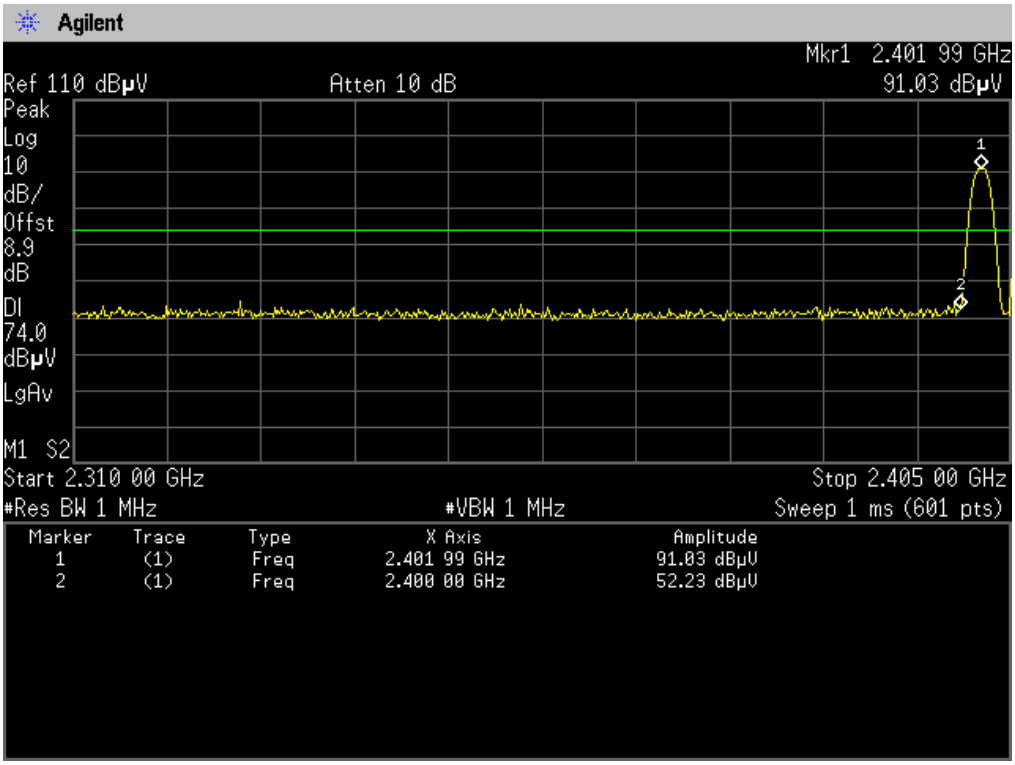
9.2 Definition

According to FCC section 15.249(a), 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.

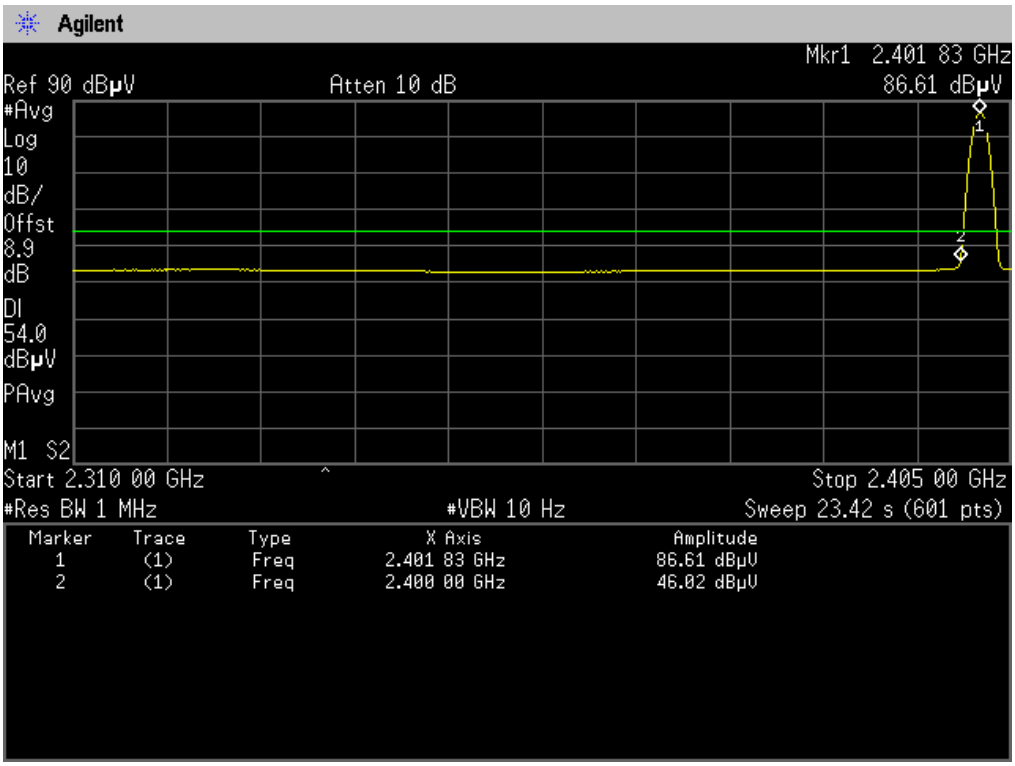
9.3 Test Result

The EUT operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

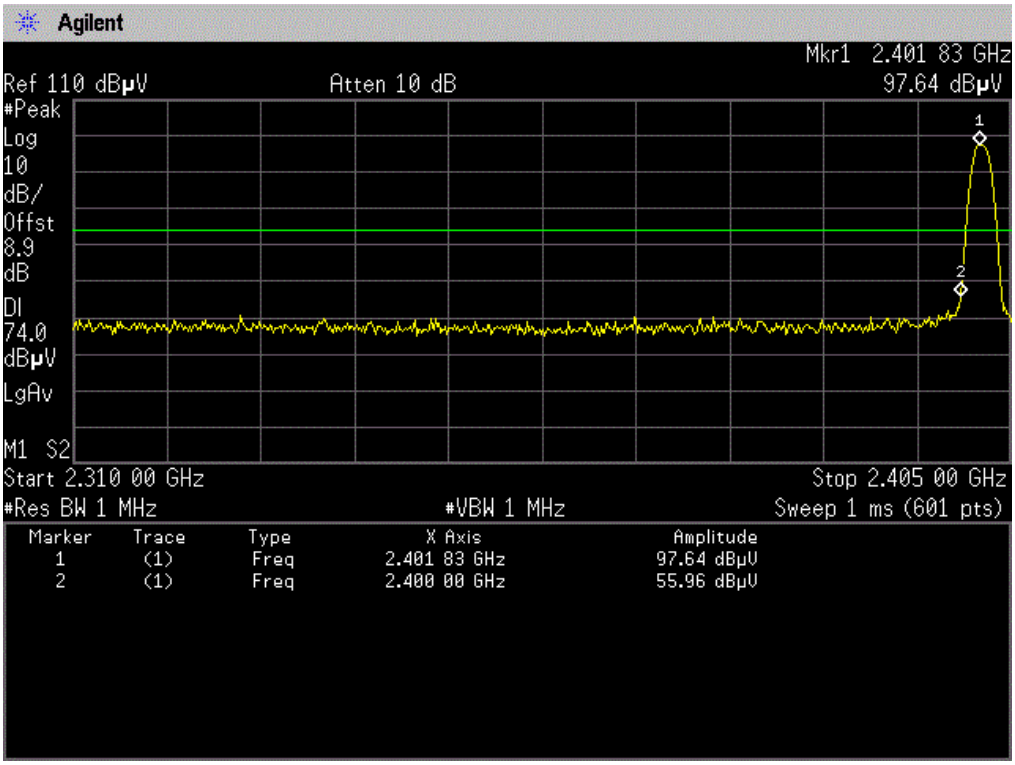
Test Plot:



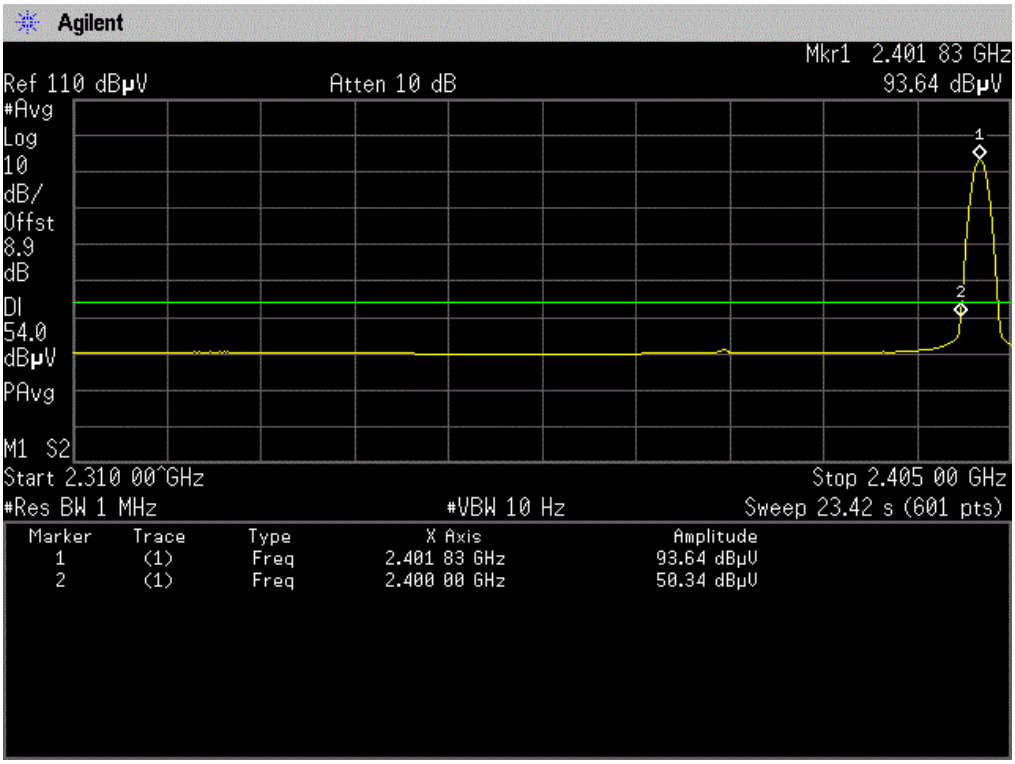
(GFSK CH Low, Vertical, Peak)



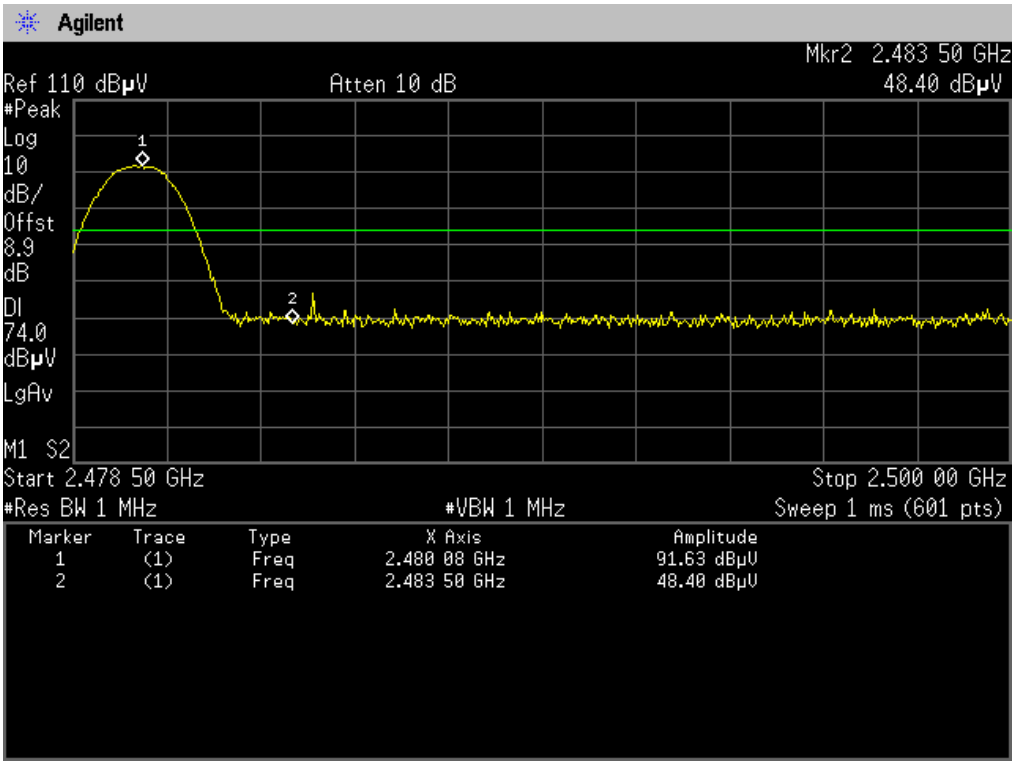
(GFSK CH Low, Vertical, Average)



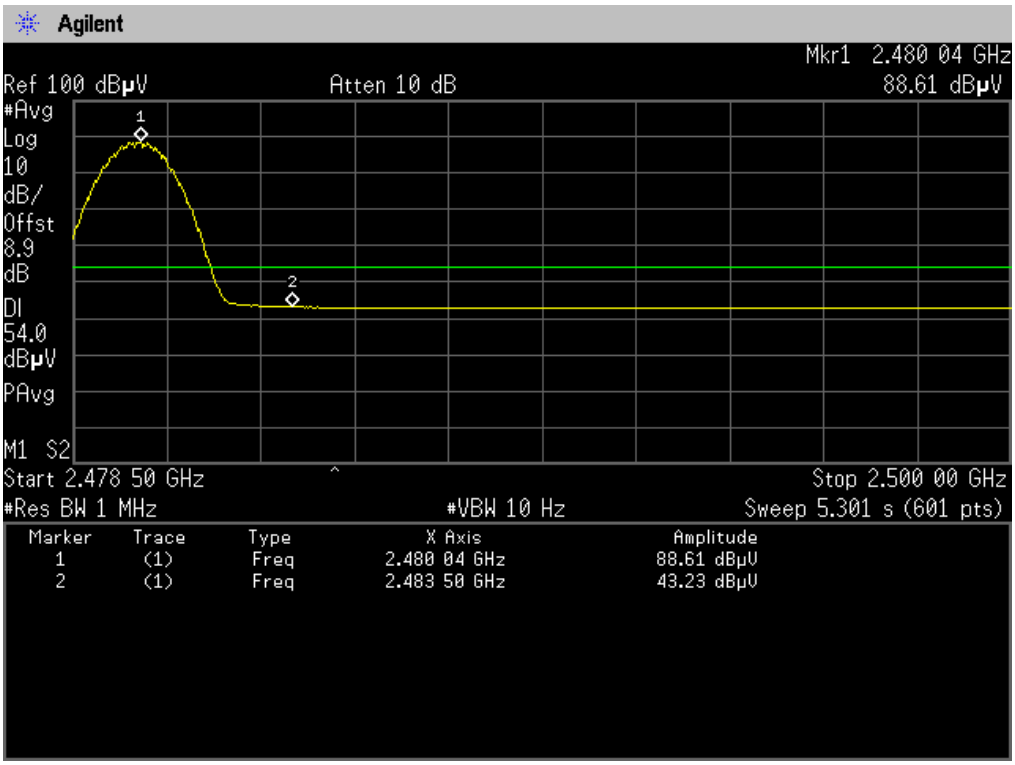
(GFSK CH Low, Horizontal, Peak)



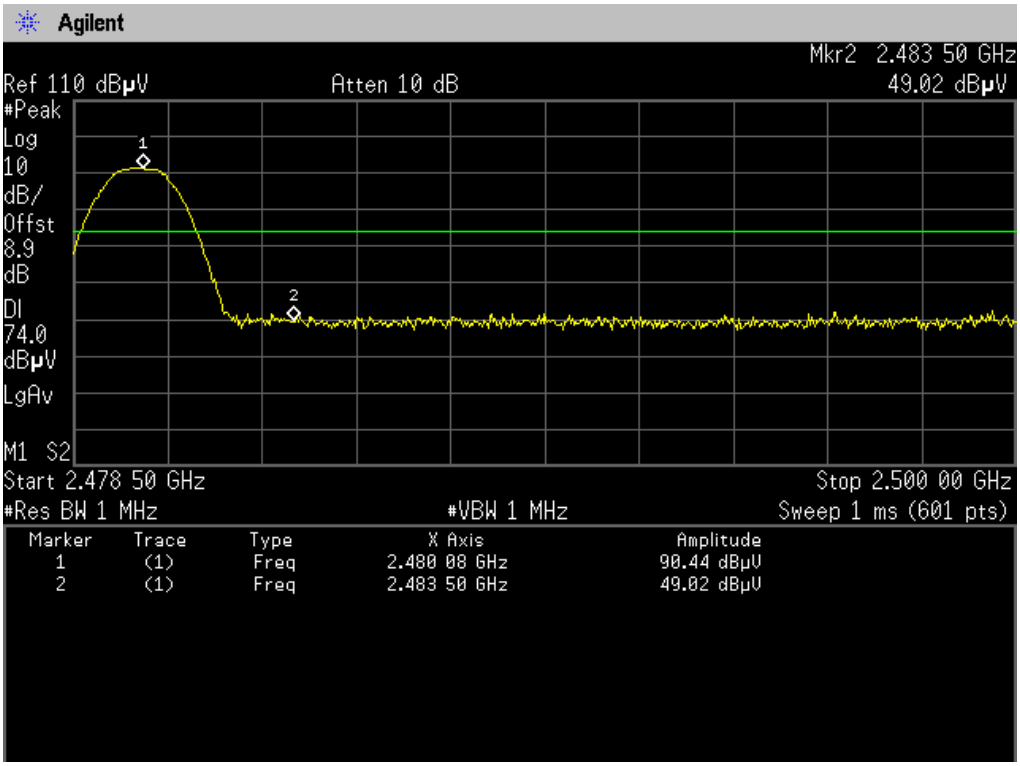
(GFSK CH Low, Horizontal, Average)



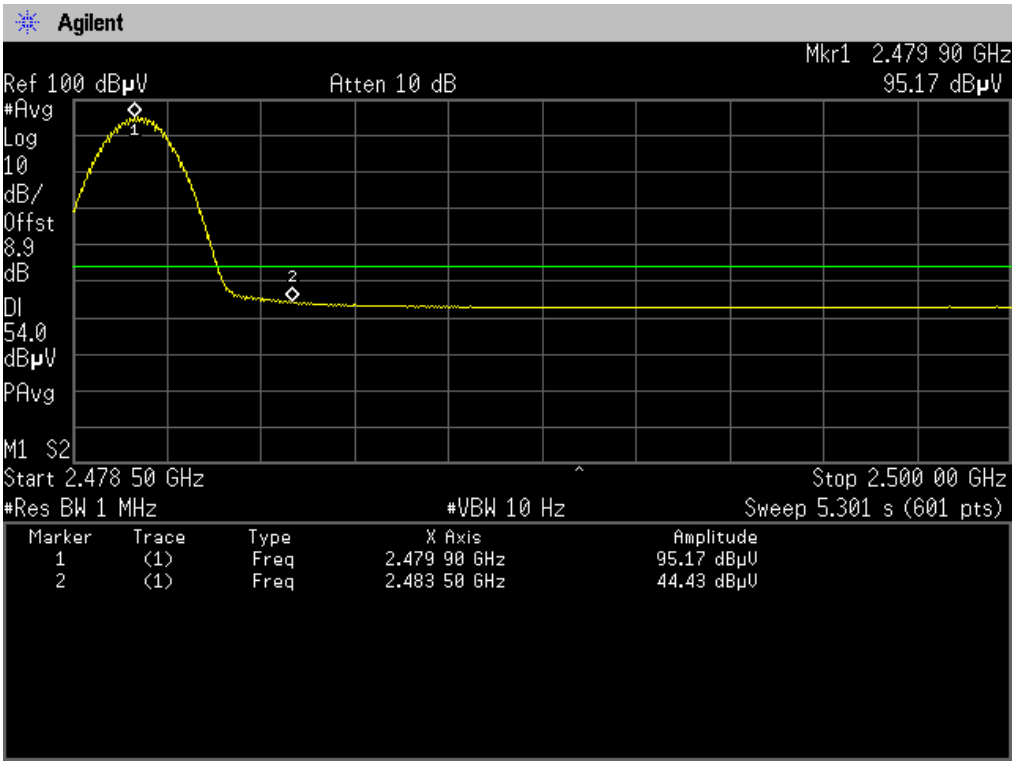
(GFSK CH High, Vertical, Peak)



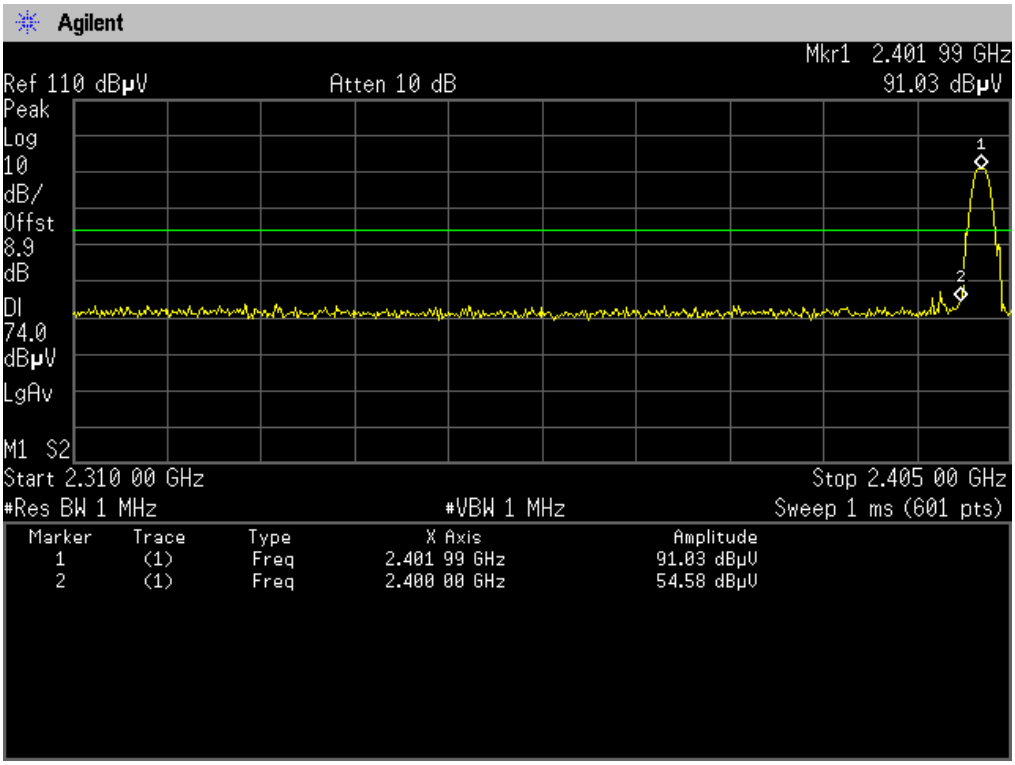
(GFSK CH High, Vertical, Average)



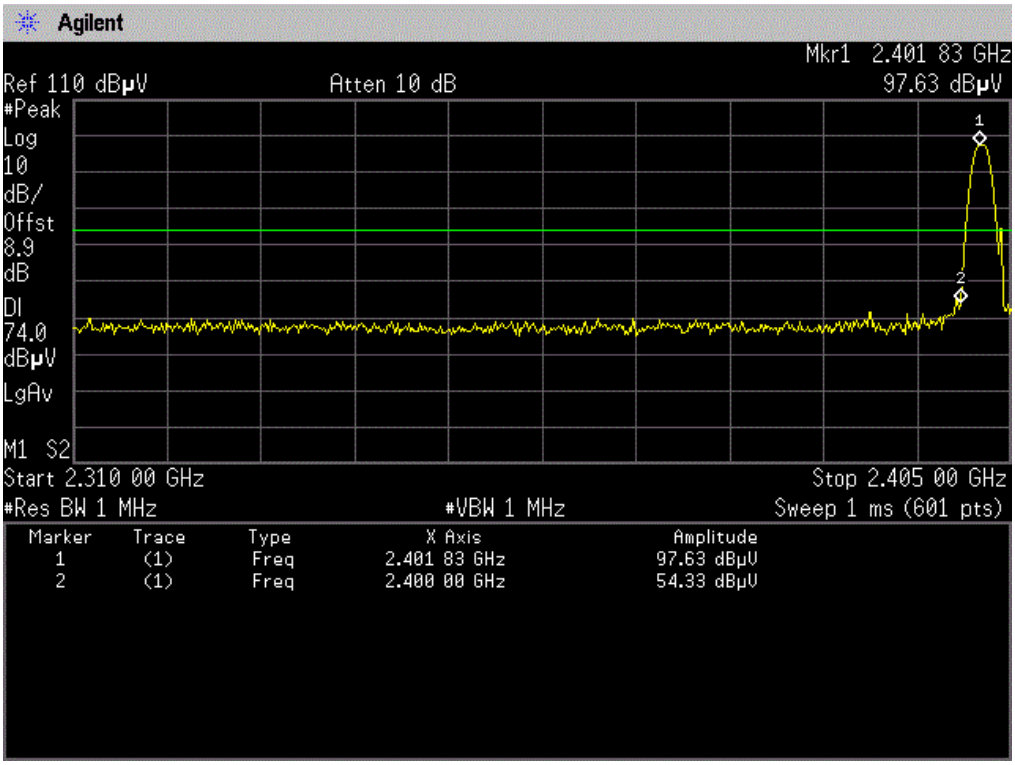
(GFSK CH High, Horizontal, Peak)



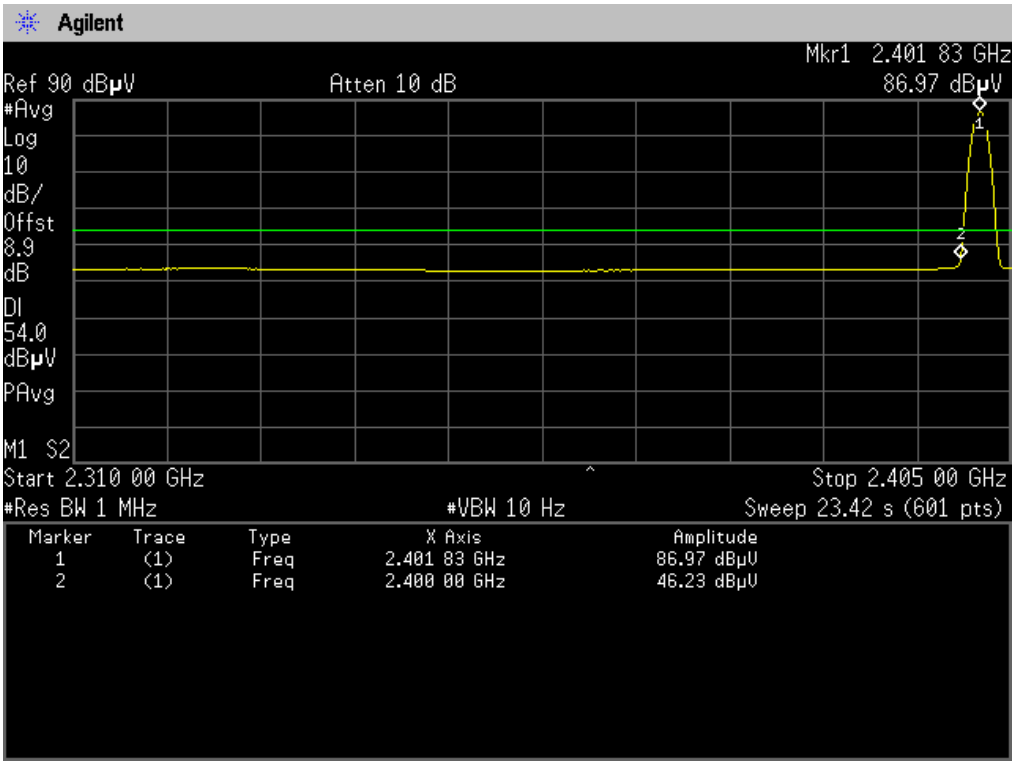
(GFSK CH High, Horizontal, Average)



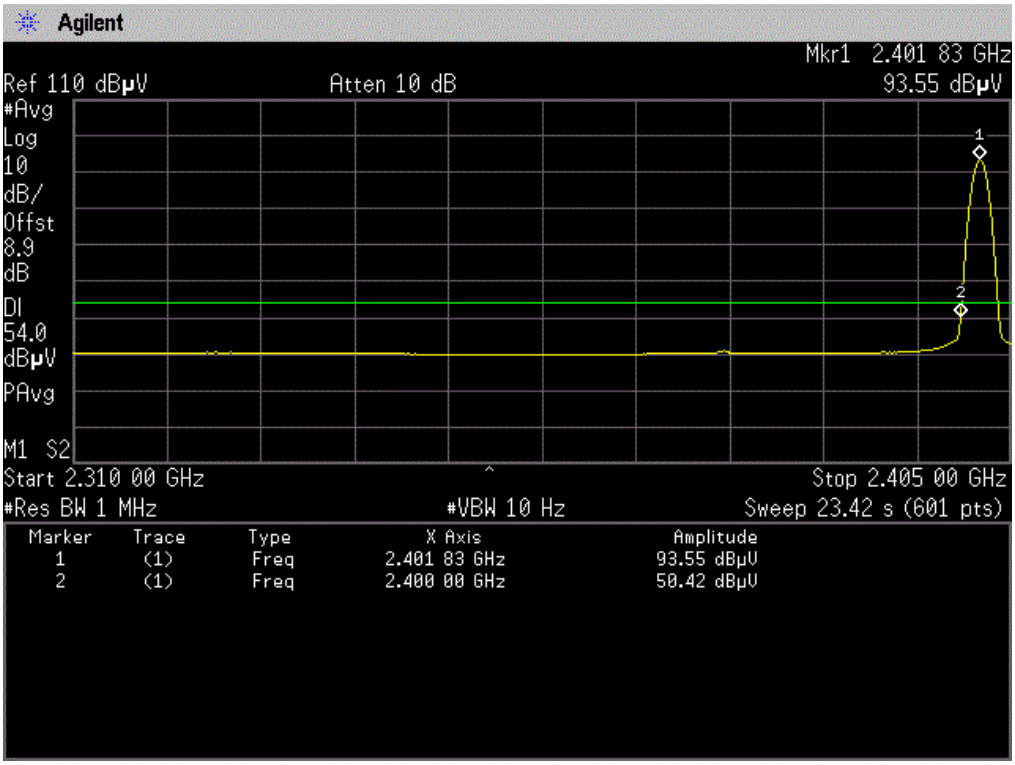
(π /4DQPOSK CH Low, Vertical, Peak)



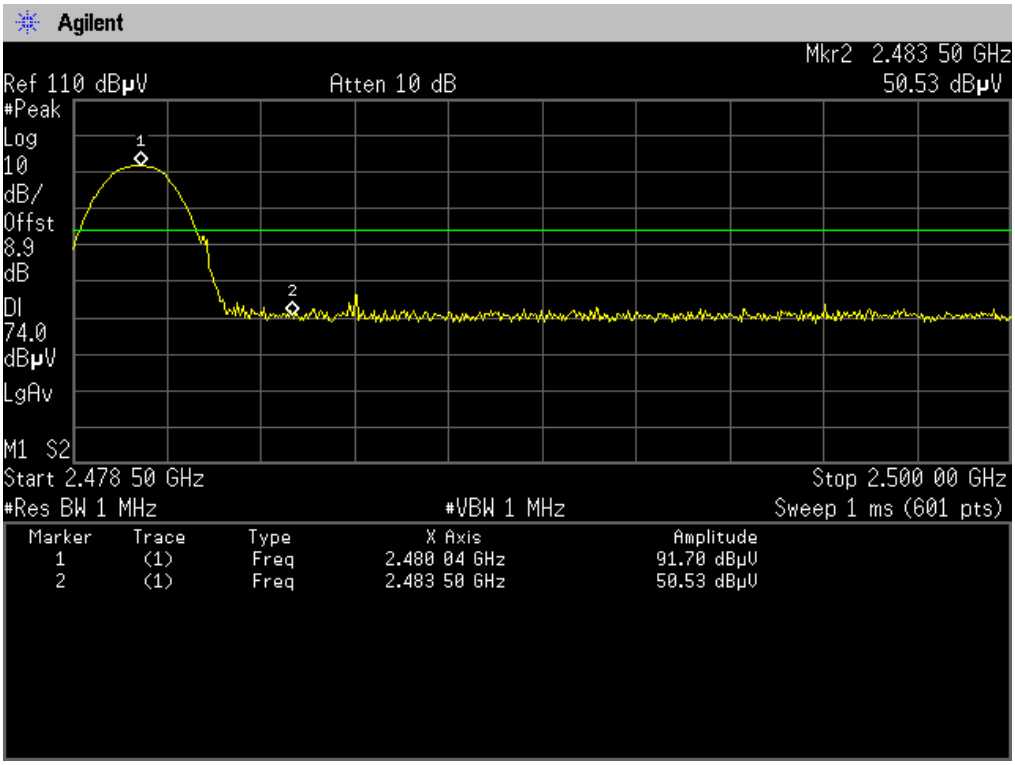
(π /4DQPOSK CH Low, Horizontal, Peak)



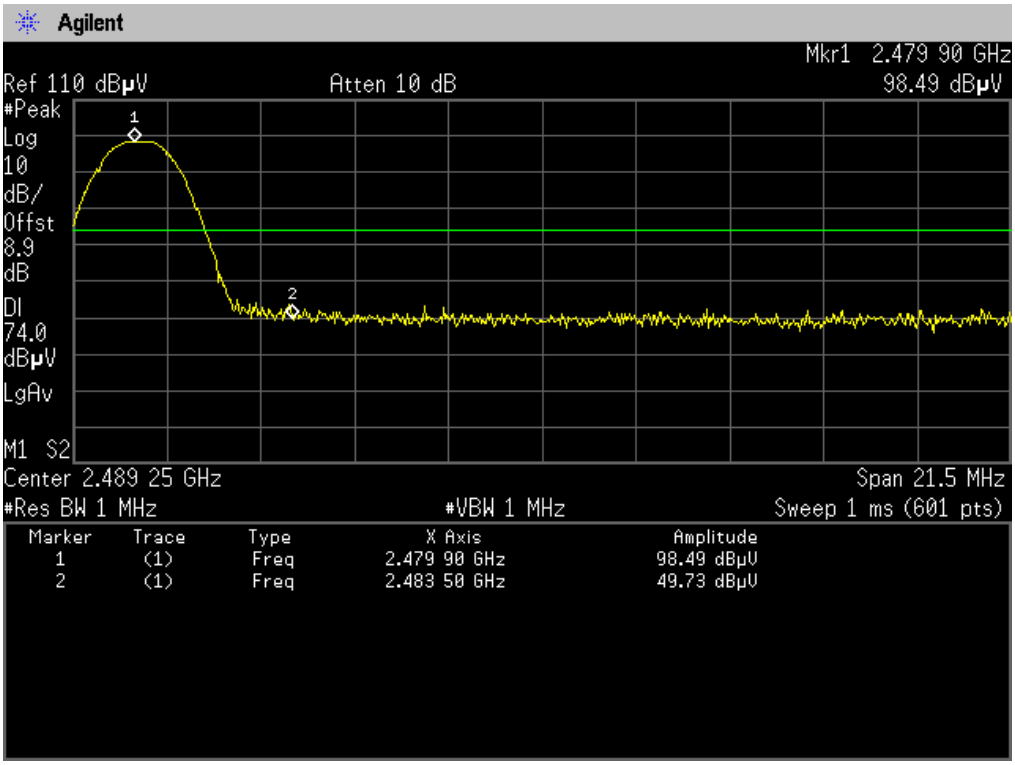
(π /4DQPOSK CH Low, Vertical, Average)



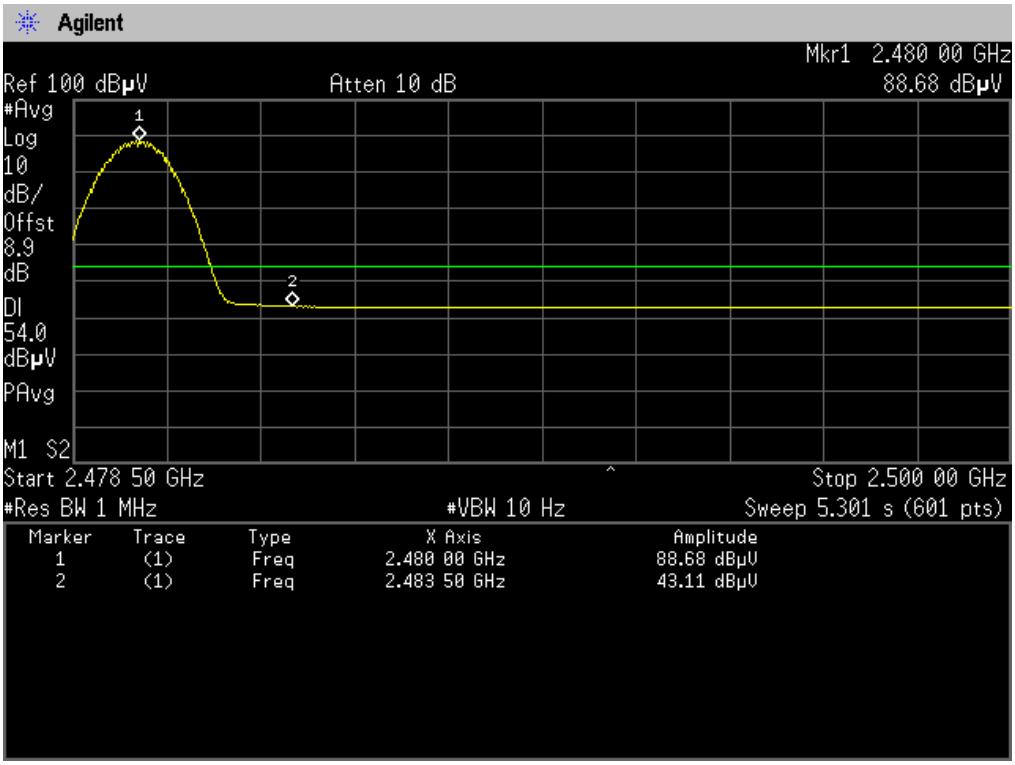
(π /4DQPOSK CH Low, Horizontal, Average)



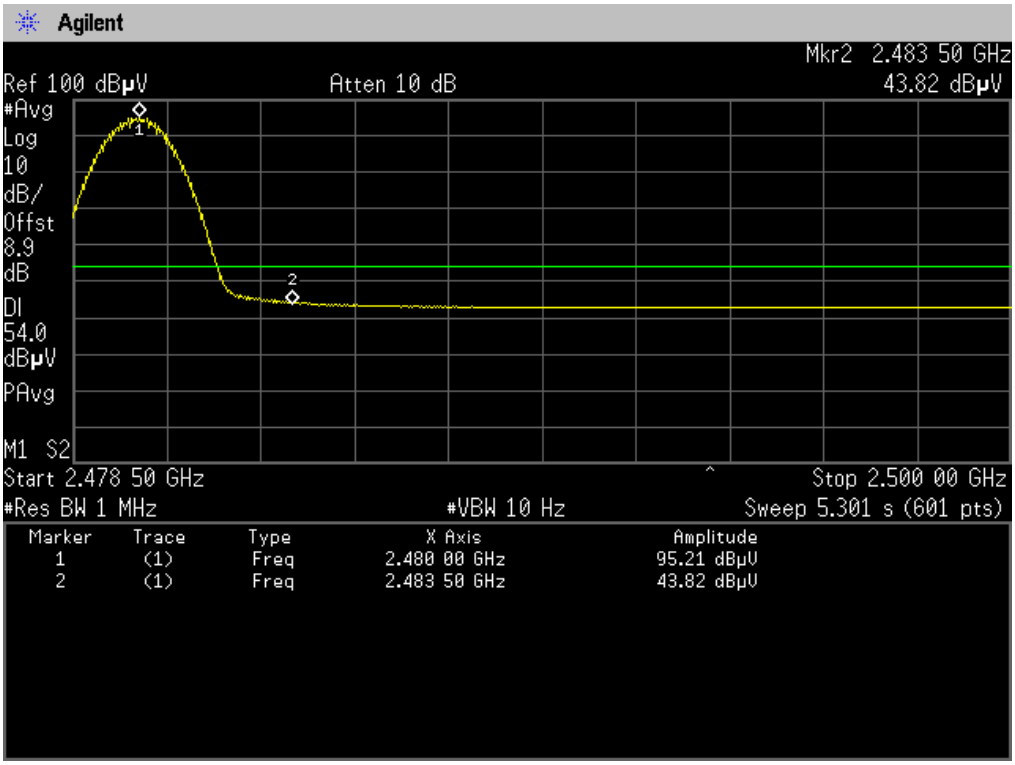
(π /4DQPOSK CH High, Vertical, Peak)



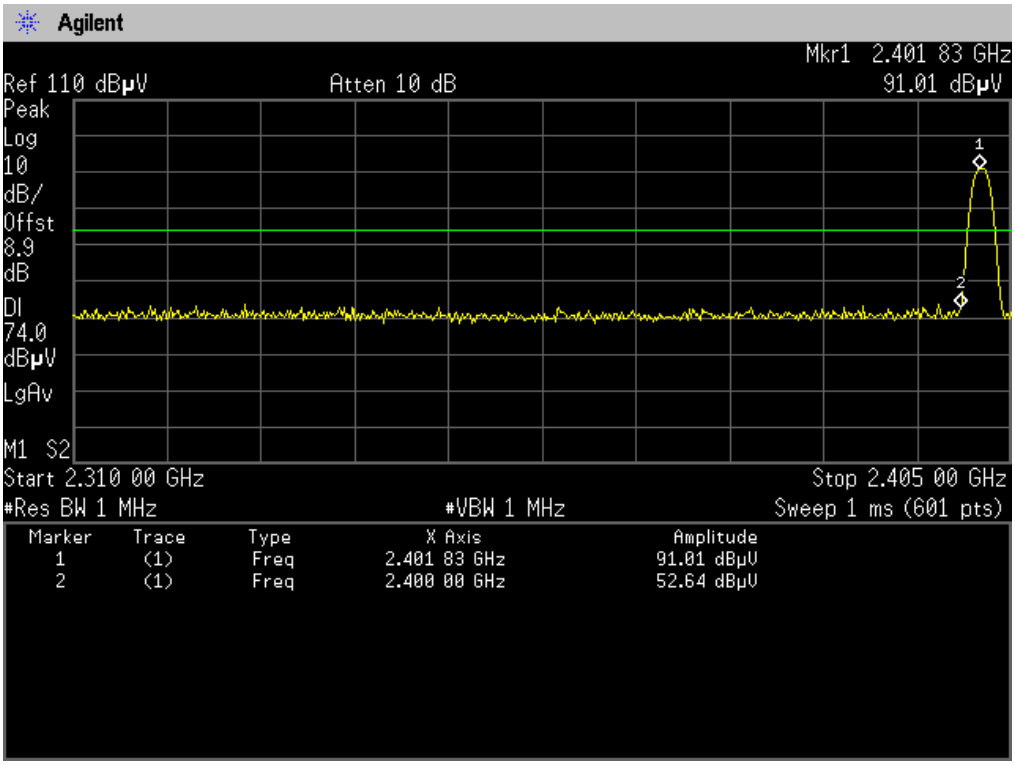
(π /4DQPOSK CH High, Horizontal, Peak)



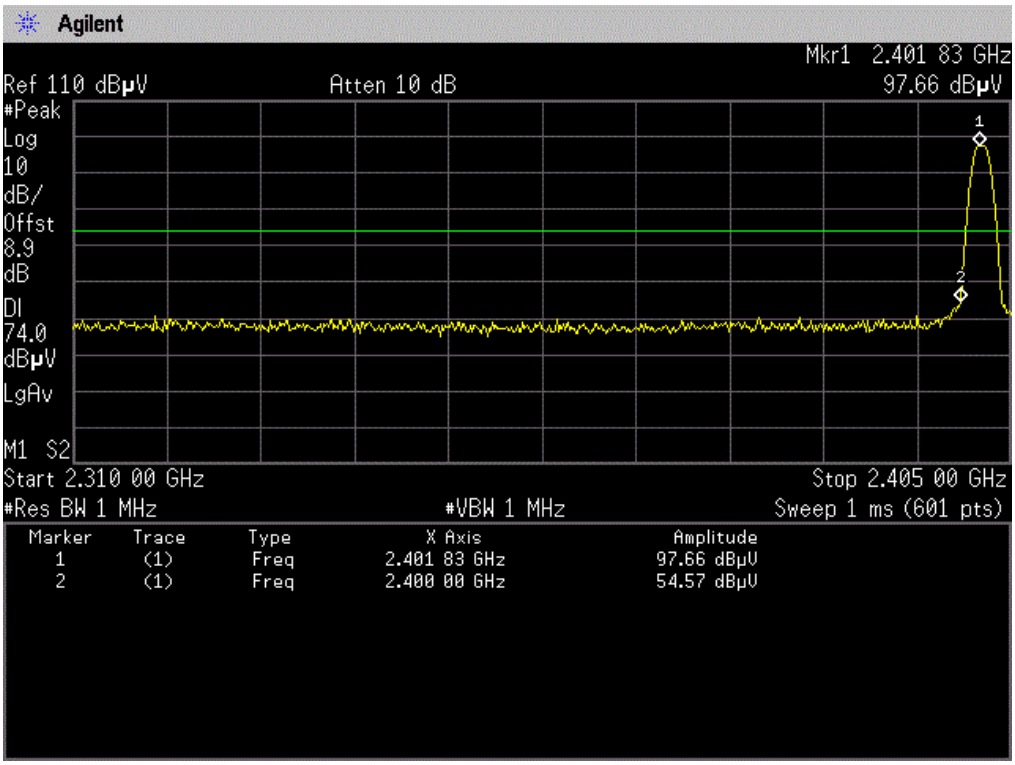
(π /4DQPOSK CH High, Vertical, Average)



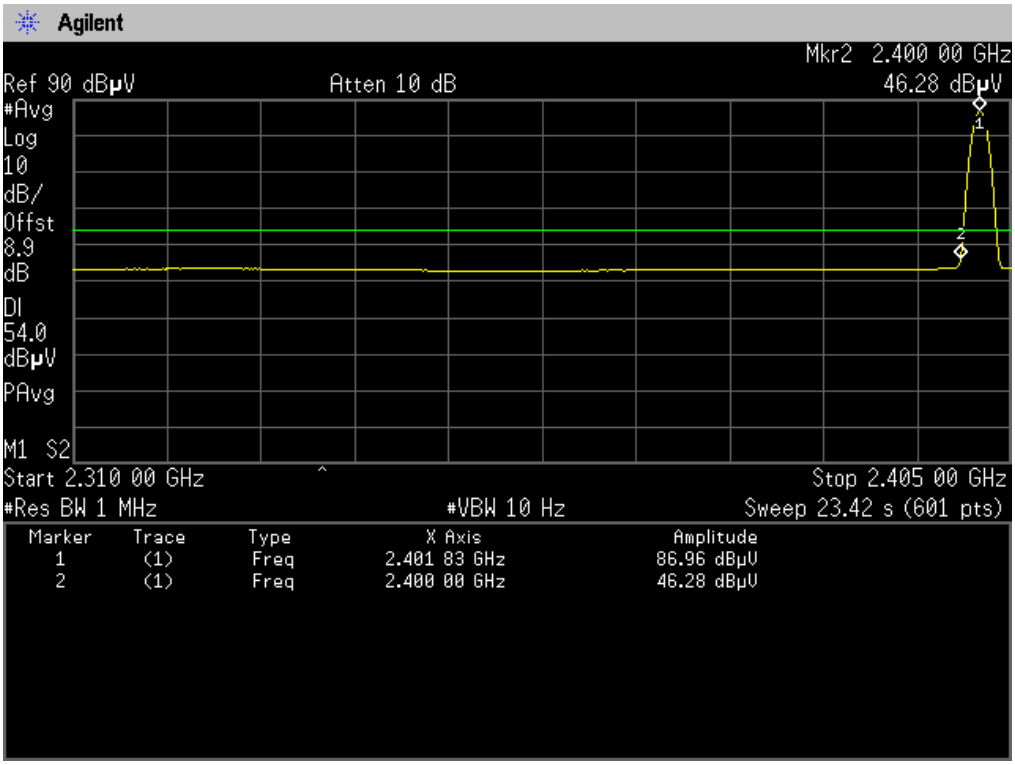
(π /4DQPOSK CH High, Horizontal, Average)



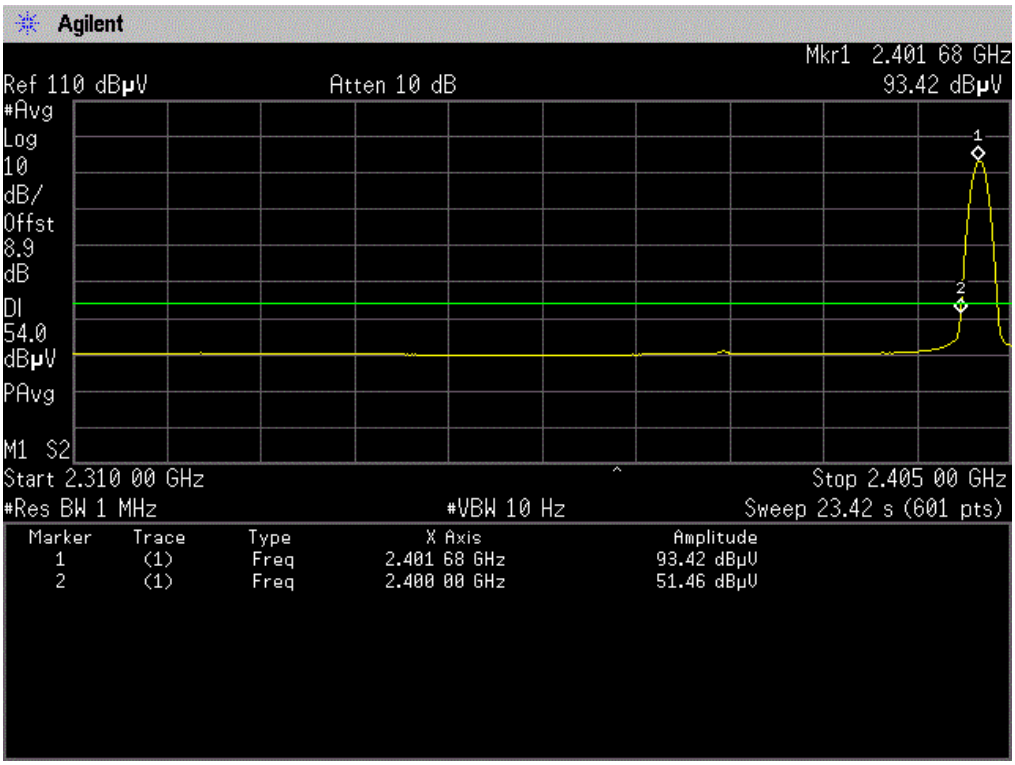
(8-DPSK CH Low, Vertical, Peak)



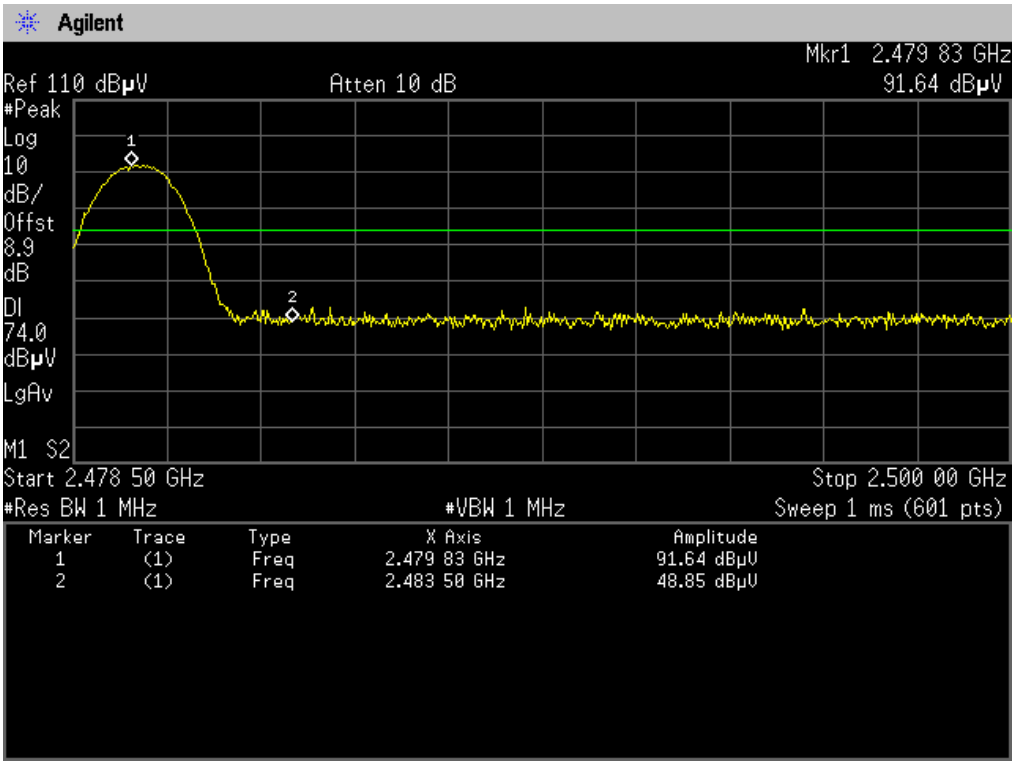
(8-DPSK CH Low, Horizontal, Peak)



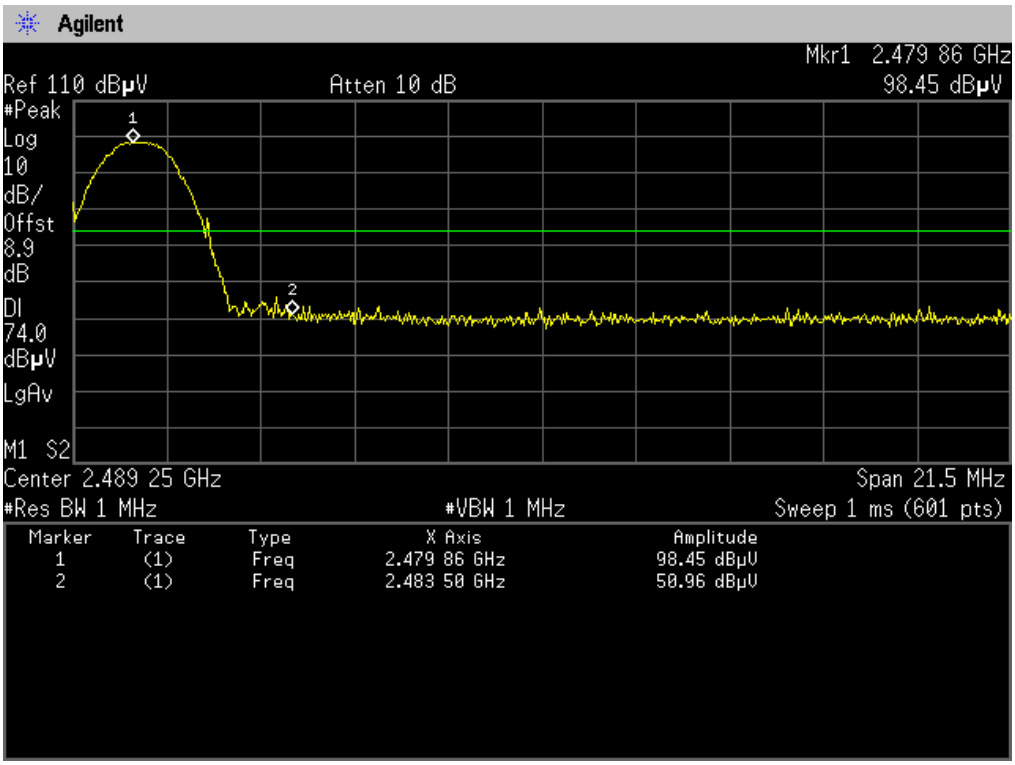
(8-DPSK CH Low, Vertical, Average)



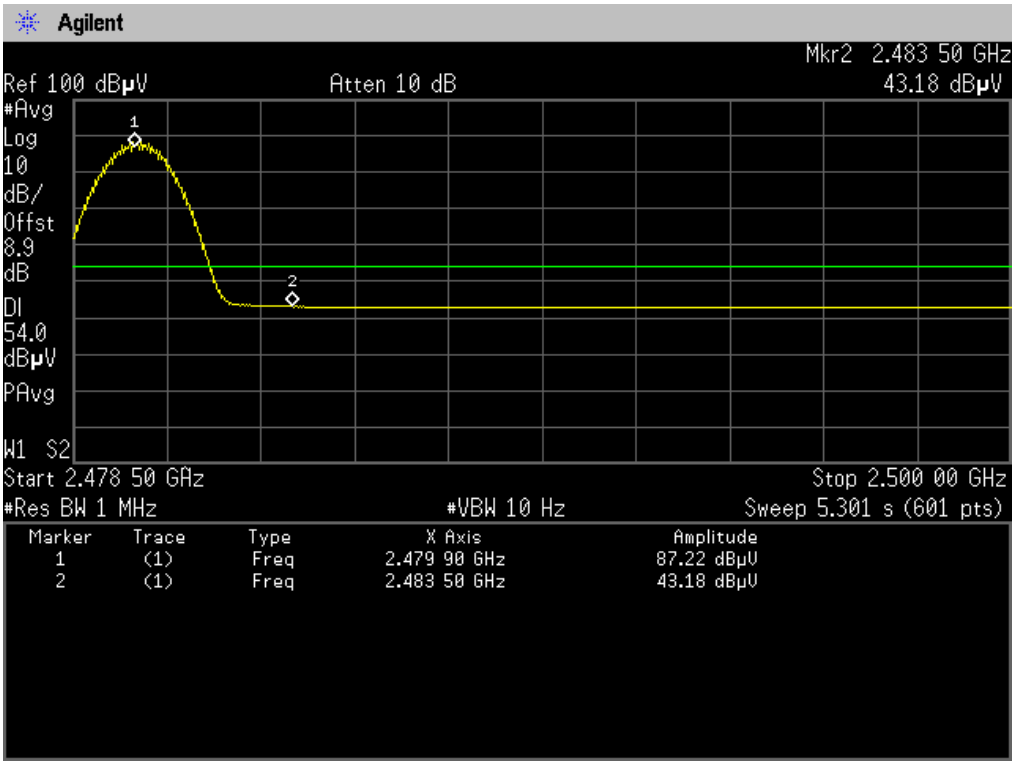
(8-DPSK CH Low, Horizontal, Average)



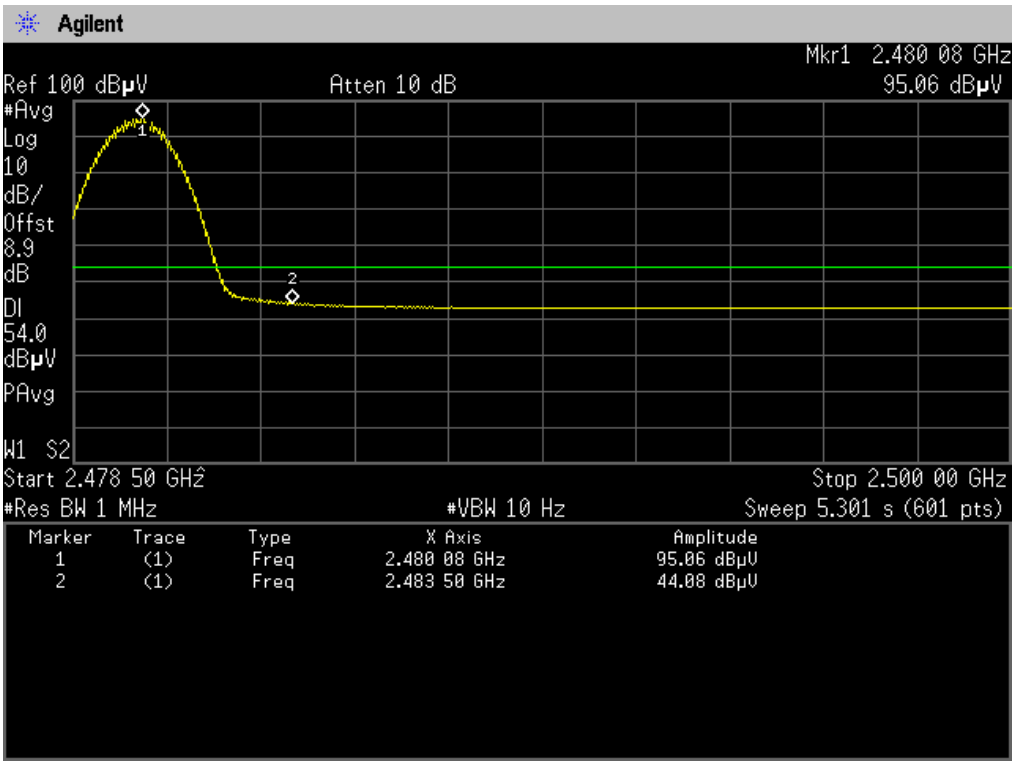
(8-DPSK CH High, Vertical, Peak)



(8-DPSK CH High, Horizontal, Peak)



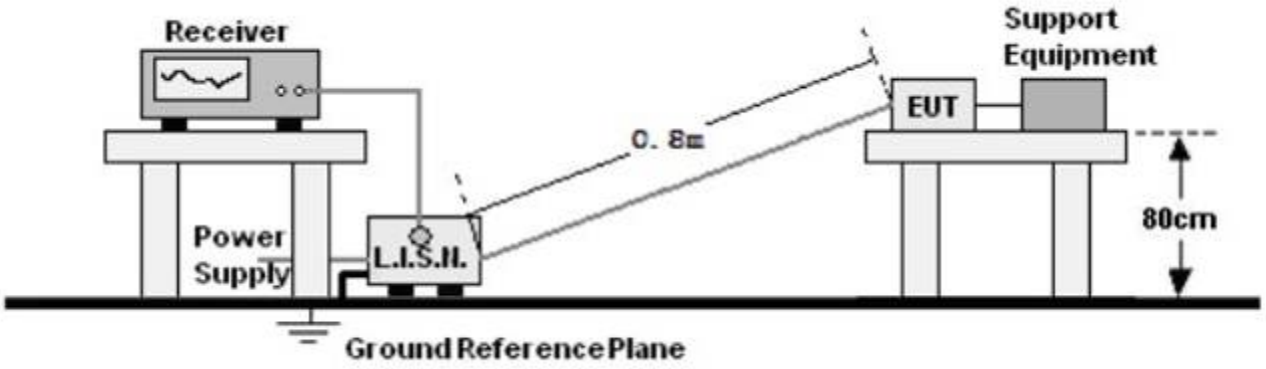
(8-DPSK CH High, Vertical, Average)



(8-DPSK CH High, Horizontal, Average)

10. LINE CONDUCTED EMISSION TEST

10.1 Test Setup



10.2 Limits of Line Conducted Disturbance

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

10.3 Test Procedure

1. The EUT and support equipment were placed on a nonconductive table 0.8m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane. The EUT connected to the main through Line Impedance Stability Network (L.I.S.N) to provide a 50 Ω/50uH coupling impedance for the measuring equipment. The support equipment is also connected to the main power through a LISN that provides a 50 Ω/50uH coupling impedance with 50 Ω terminations. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission.

2. The RBW of the receiver was set at 9 kHz. The frequency range from 150 kHz to 30 MHz was checked. Run the receiver's pre-scan to record the maximum disturbance generated from EUT in all power lines in the full band.

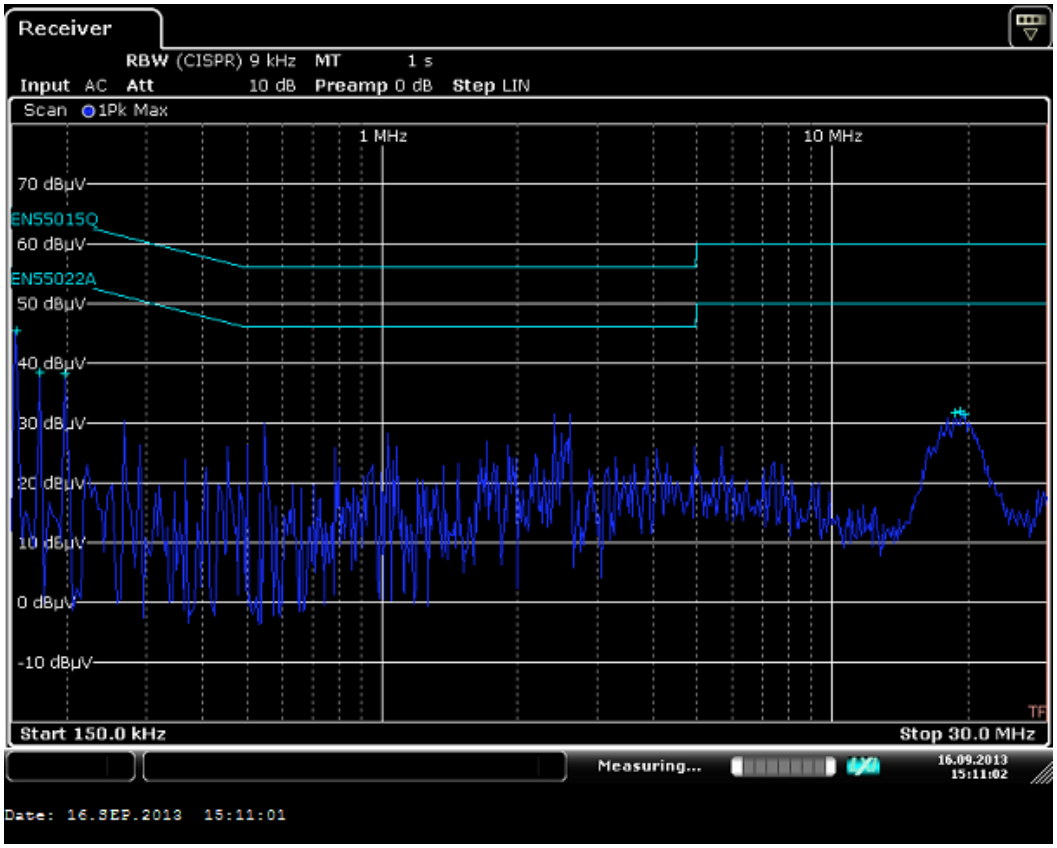
3. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

10.4 Test Result

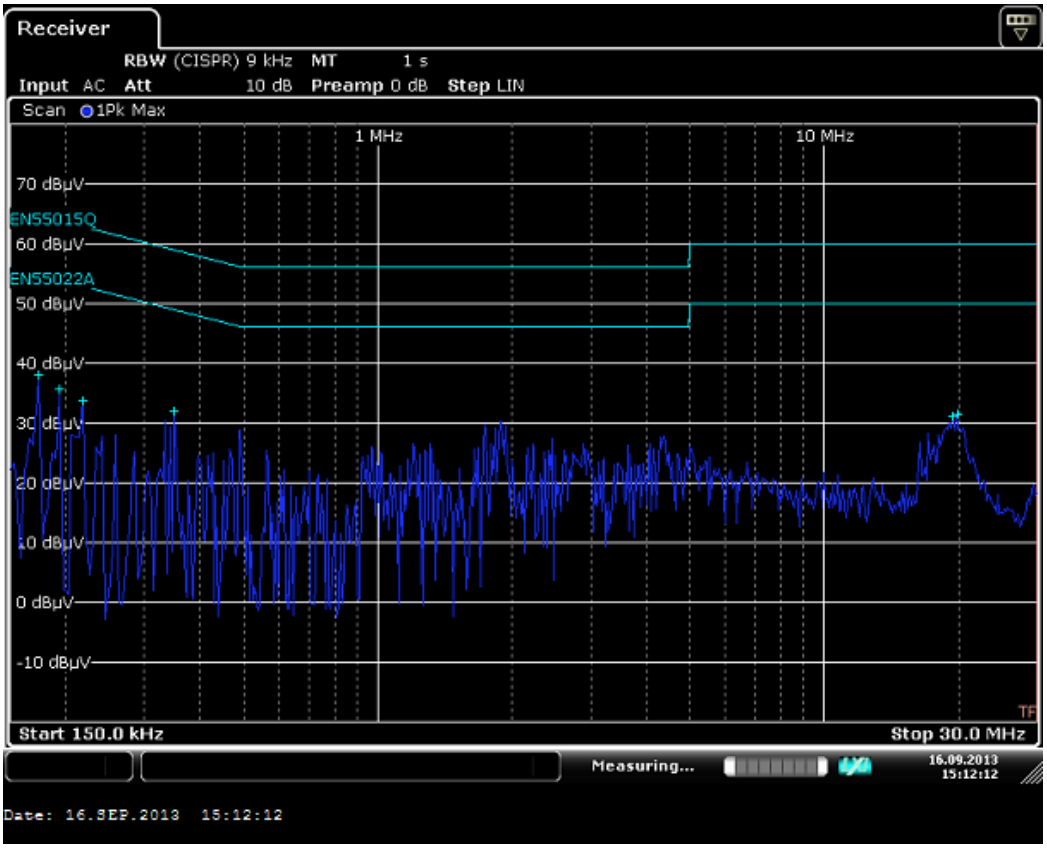
Test Verdict:

No.	Frequency	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Result
1	154.0000kHz	45.44	65.78	-20.34	L	Peak	Pass
2	174.0000kHz	38.53	64.77	-26.24	L	Peak	Pass
3	198.0000kHz	38.28	63.69	-25.41	L	Peak	Pass
4	18.7500MHz	31.79	60.00	-28.21	L	Peak	Pass
5	19.2940MHz	31.93	60.00	-28.07	L	Peak	Pass
6	19.6700MHz	31.59	60.00	-28.41	L	Peak	Pass
7	174.0000kHz	38.05	64.77	-26.72	N	Peak	Pass
8	194.0000kHz	35.55	61.86	-28.31	N	Peak	Pass
9	218.0000kHz	33.77	62.89	-29.12	N	Peak	Pass
10	350.0000kHz	32.05	58.96	-26.91	N	Peak	Pass
11	19.3940MHz	31.17	60.00	-28.83	N	Peak	Pass
12	19.8660MHz	31.59	60.00	-28.41	N	Peak	Pass

Test Plots:



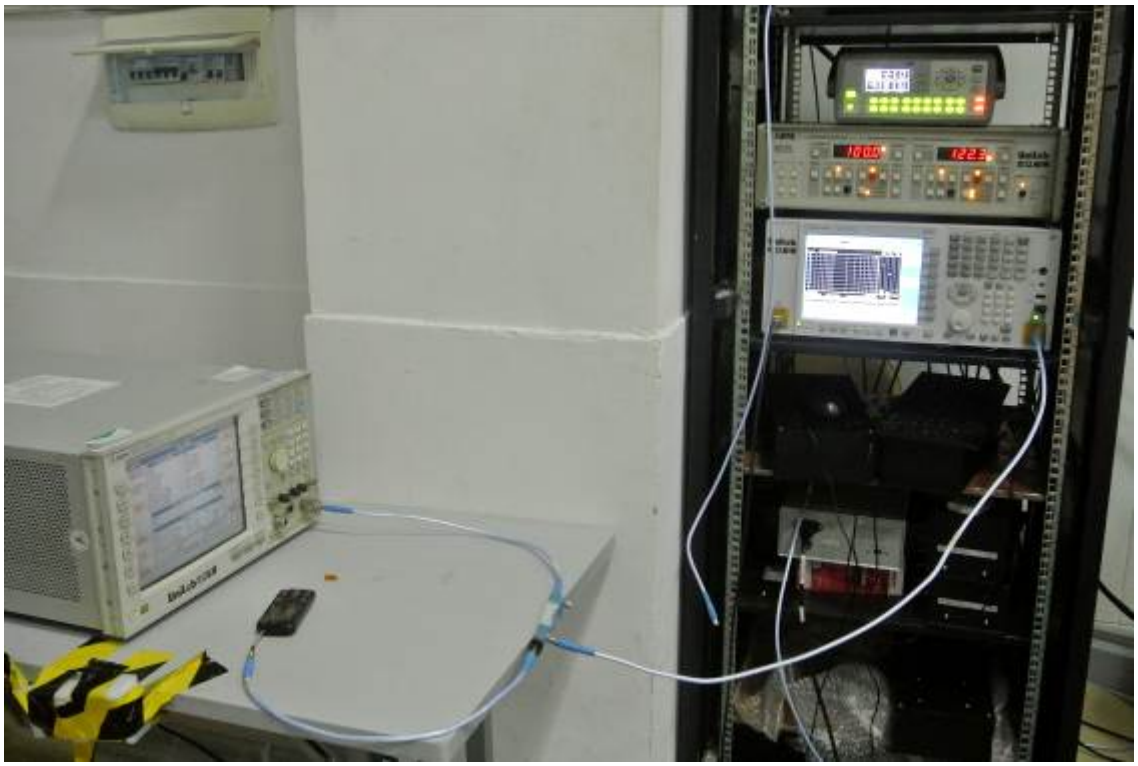
(Phase: L)



(Phase: N)

APPENDIX I PHOTOGRAPHS OF TEST SETUP

RF TEST SETUP



RADIATED TEST SETUP

CONDUCTED DISTURBANCE TEST SETUP

APPENDIX II PHOTOGRAPHS OF EUT

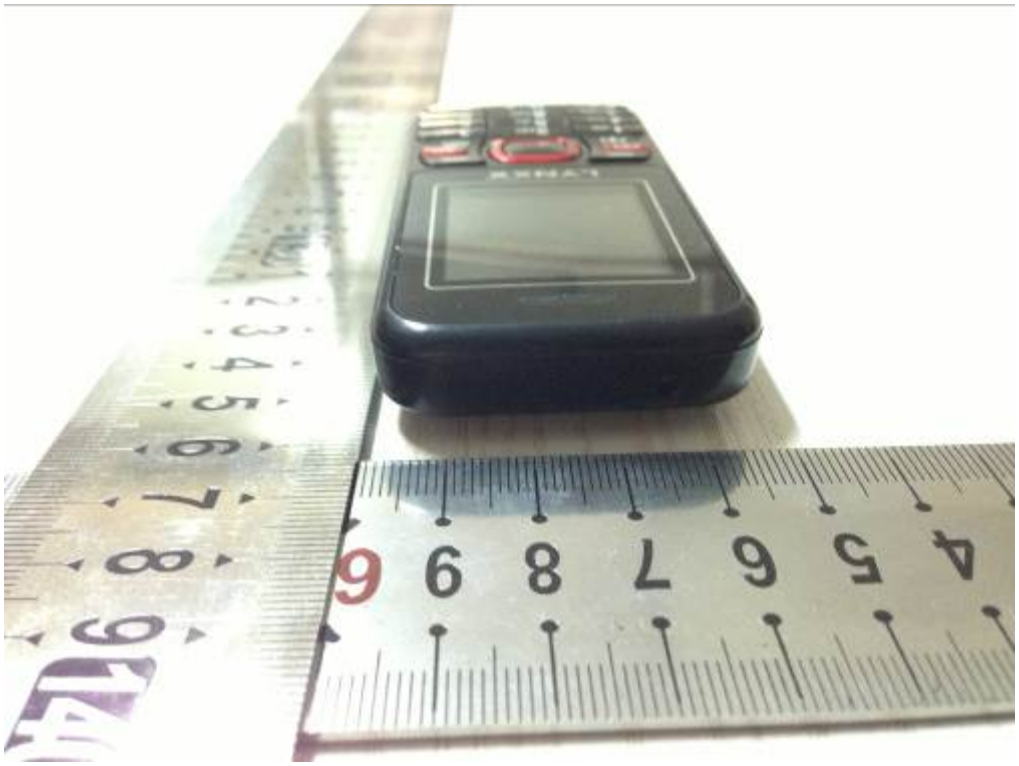
FRONT VIEW OF SAMPLE

BACK VIEW OF SAMPLE

LEFT VIEW OF SAMPLE

RIGHT VIEW OF SAMPLE

UP VIEW OF SAMPLE

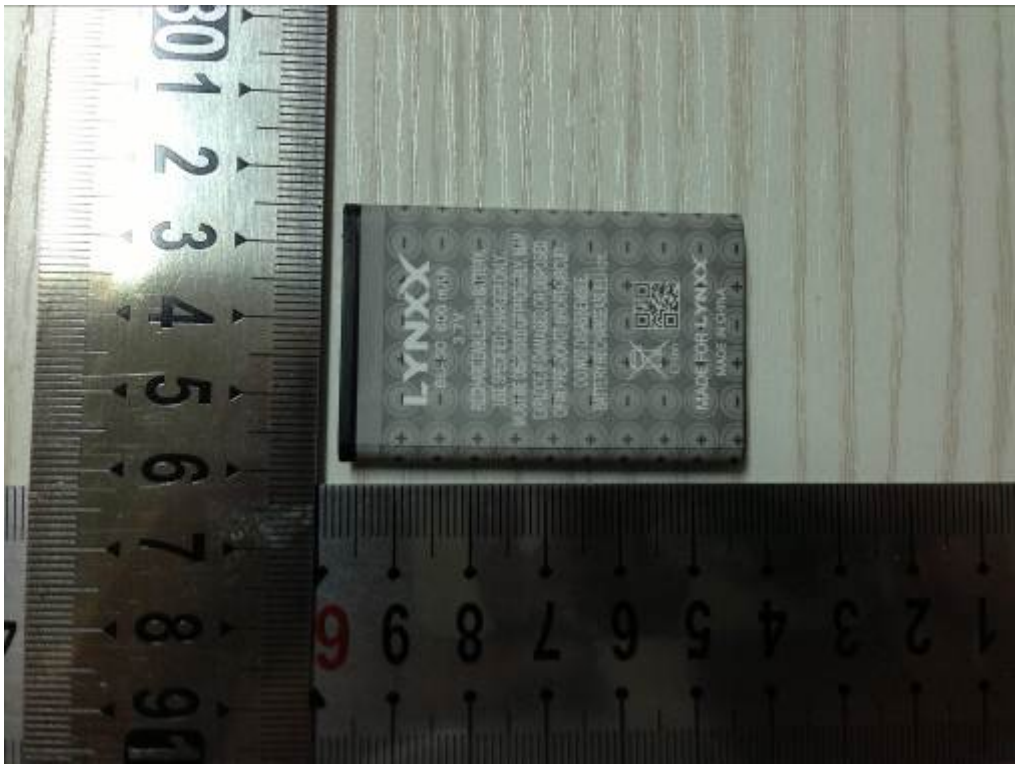


DOWN VIEW OF SAMPLE

PHOTO OF CHARGER

PHOTO OF HEADPHONE

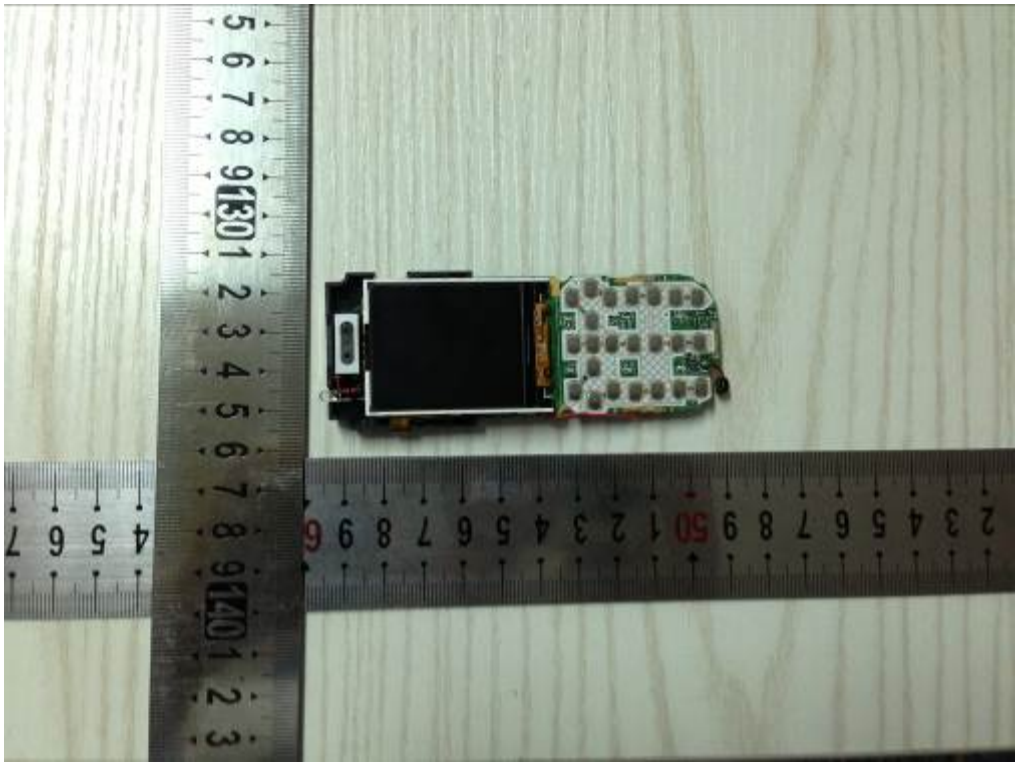
PHOTO OF BATTERY



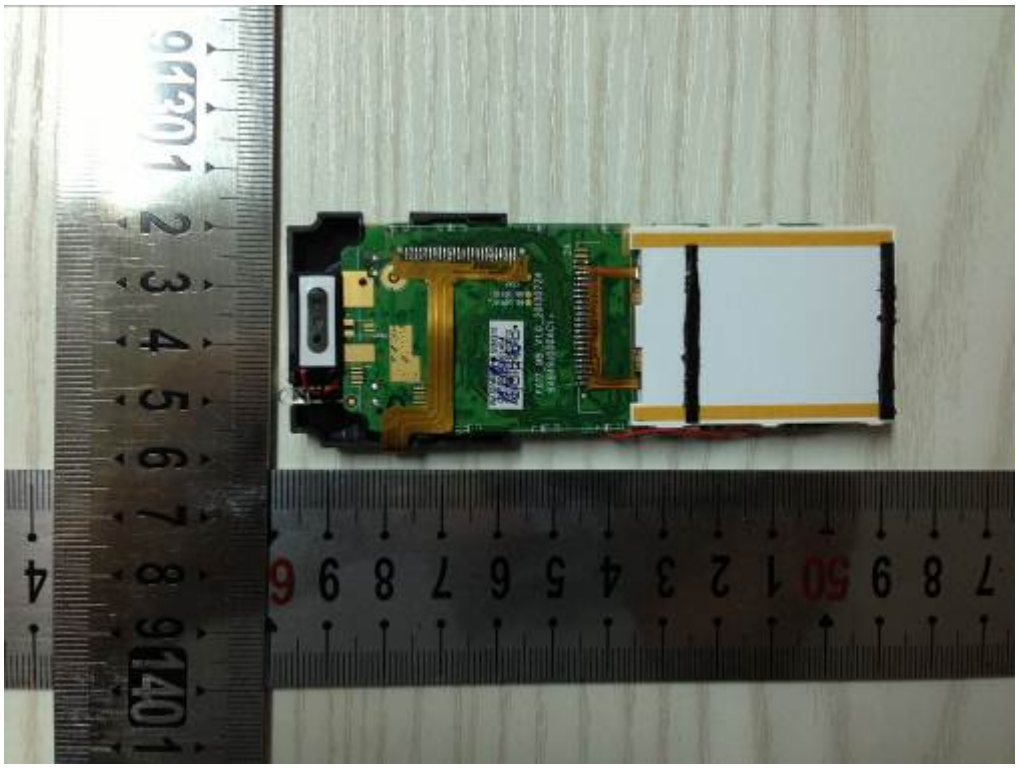
INTERNAL PHOTO OF SAMPLE - 1

INTERNAL PHOTO OF SAMPLE -2

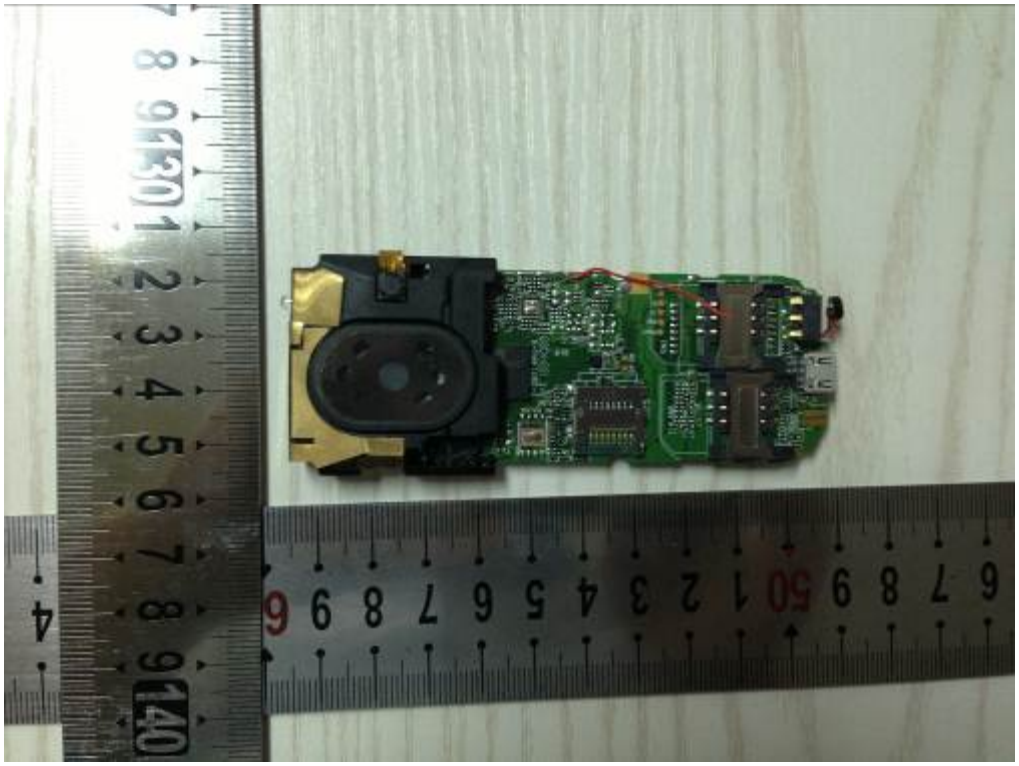
INTERNAL PHOTO OF SAMPLE - 3



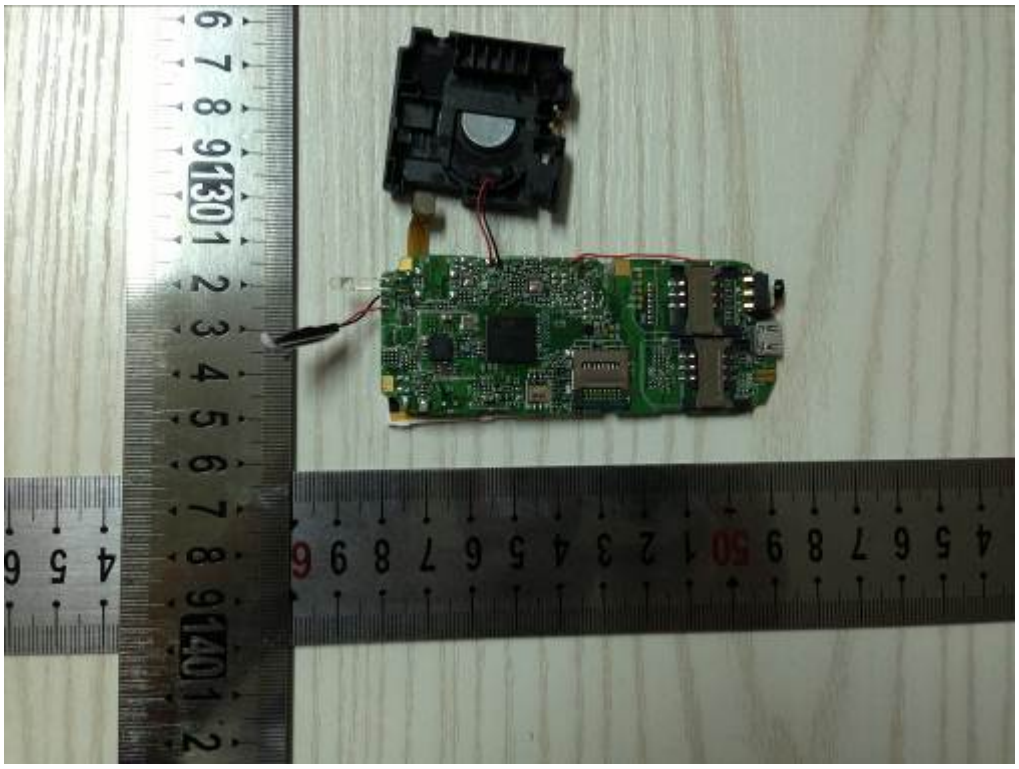
INTERNAL PHOTO OF SAMPLE - 4



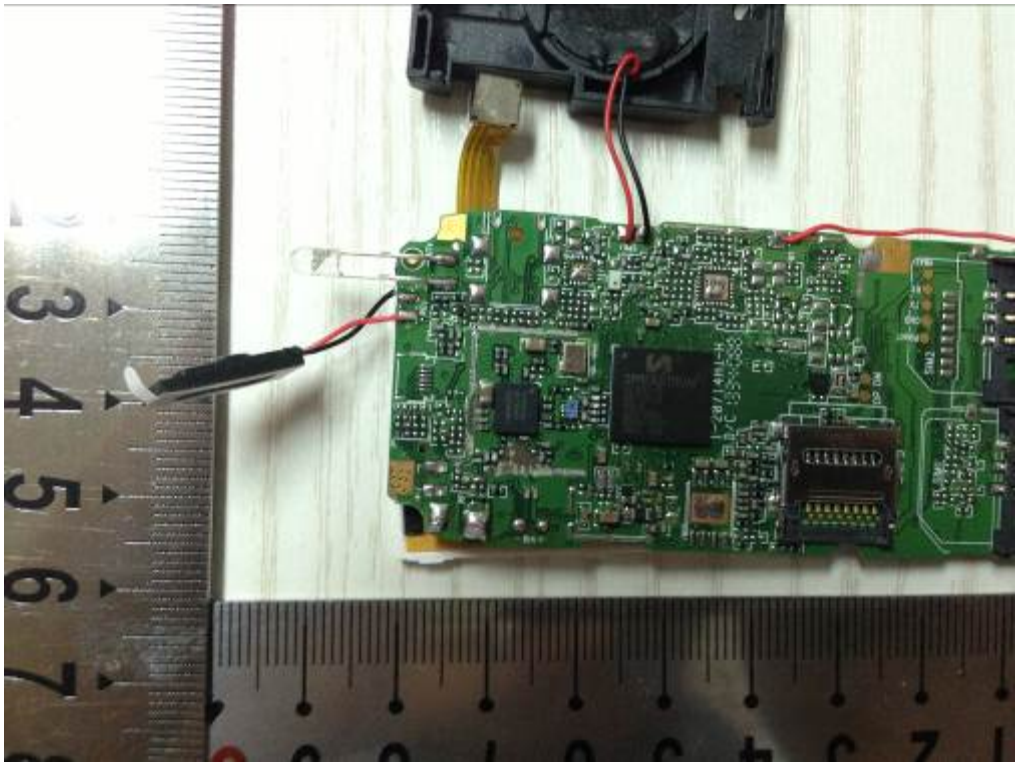
INTERNAL PHOTO OF SAMPLE - 5



INTERNAL PHOTO OF SAMPLE - 6



INTERNAL PHOTO OF SAMPLE - 7



-- END OF REPROT --