

FCC Part 15C
Measurement And Test Report
For

ProcessingPoint, Inc

2796 Loker Avenue W.Suite 111, Carlsbad, CA 92010

FCC ID: SPLMB3000

Oct. 13, 2015

This Report Concerns: ☒ Original Report	Equipment Type: pos terminal
Report Number:	MTI150630003RF-2
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Reviewed By:	Leon Chen <i>Leon Chen</i>
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Test Date:	Aug. 23, 2015 - Oct. 12, 2015
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1. General Information about EUT

1.1 Client Information

Applicant	:	ProcessingPoint, Inc
Address	:	2796 Loker Avenue W.Suite 111, Carlsbad, CA 92010
Manufacturer	:	QINGDAO WINTEC SYSTEM CO., LTD
Address	:	Wintec Park, Xinye Road, High-Tech Zone, Qingdao, China
Trade	:	uAccept
EUT Name	:	pos terminal
Model No.	:	MB3000
Serial No.	:	MB1500, MB1750, MB4000
Model Difference	:	All the models above are identical in interior structure, electrical circuits and components; just model names are different for marking requirement.
Standards	:	FCC Part 15, Subpart C (15.247:2014)
Test Method	:	ANSI C63.4: 2009
Conclusions	:	PASS

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	pos terminal
Models No.	:	MB3000
Product Description	:	Operation Frequency: Bluetooth:2402~2480MHz
	:	Number of Channel: Bluetooth:79 Channels see note (3)
	:	Antenna Gain: 2dBi (Integral Antenna)
	:	Modulation Type: GFSK 1Mbps(1 Mbps) $\pi/4$ -DQPSK(2 Mbps) 8DPSK(3 Mbps)
Power Supply	:	DC power supplied by AC/DC Adapter DC power by Li-ion Battery
Adapter Information:	:	MODEL: EA10521F-240 INPUT: 100V-240V~ 50/60Hz 1.8A. Output: 24V $\overline{=}$ 2.5A

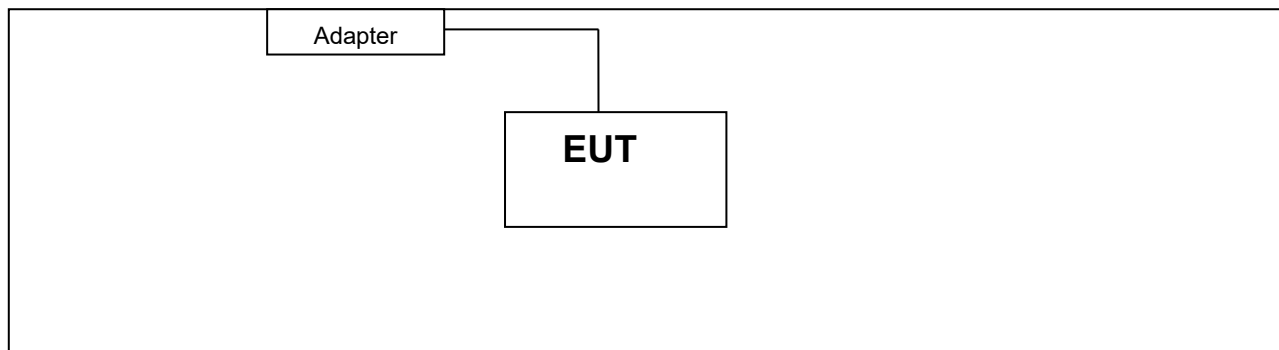
Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.
- (3) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/DOC	Manufacturer	Note
/	/	/	/	/
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Adapter DC line	No	YES	0.8M	

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

For Radiated Test	
Final Test Mode	Final Test Mode
Mode 1	TX Mode

1.6 Measurement Uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xU_c(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission of receivers	± 1 dB
Radiated emission of transmitter	± 6 dB
Radiated emission of receiver	± 6 dB
Temperature	± 1 degree
Humidity	± 5 %

1.7 Test Facility

Shenzhen Toby Technology Co., Ltd.

Add.: 1 A/F., Bldg.6, Yusheng Industrial Zone The National Road No.107 Xixiang Section 467

FCC Registration No.:811562

2. Test Summary

FCC Part 15 Subpart C(15.247)		
Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.247(d)	Band edge spurious emission	PASS
15.247(a)(1)	Hopping Channel Separation	PASS
15.247(a)(1)	Time of occupancy (dwell time)	PASS
15.247(b)(1)	Peak Output Power	PASS
15.247(b)(1)	Number of Hopping Frequency	PASS
15.247(c)	Radiated Spurious Emission	PASS
15.247(c)	Antenna Conducted Spurious Emission	PASS
15.247(a)	20dB Bandwidth	PASS

3. Test Equipment

For AC power line conducted emission:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
LISN	R&S	ENV216	101313	2015.12.06
LISN	SCHWARZBECK	NNLK 8129	8129245	2015.12.25
Pulse Limiter	SCHWARZBECK	VTSD 9561F	9716	2015.12.25
Test Cable	N/A	N/A	C01	2015.12.06
EMI Test Receiver	R&S	ESCI	101160	2015.12.06

For Radiated emission:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Log-Bicon Antenna	MESS-ELEKTRO NIK	VULB 9160	3058	2015.12.11
Horn Antenna	Schwarzbeck	BBHA 9120D	631	2015.12.05
Horn Antenna	Schwarzbeck	BBHA 9170	373	2015.12.05
Test Cable	United Microwave	57793	1m	2015.12.05
Test Cable	United Microwave	A30A30-5006	10M	2015.12.05
Microwave Pre_amplifier	Agilent	8449B	3008A01714	2015.12.05
Pre-Amplifier	Anritsu	MH648A	M09961	2015.12.05
EMI Test Receiver	R&S	ESCI-7	101318	2015.12.05

For RF conducted emission:

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Spectrum analyzer	Agilent	E4470B	MY41441082	2016.06.01

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4. Conducted Emission Test

4.1 Limit

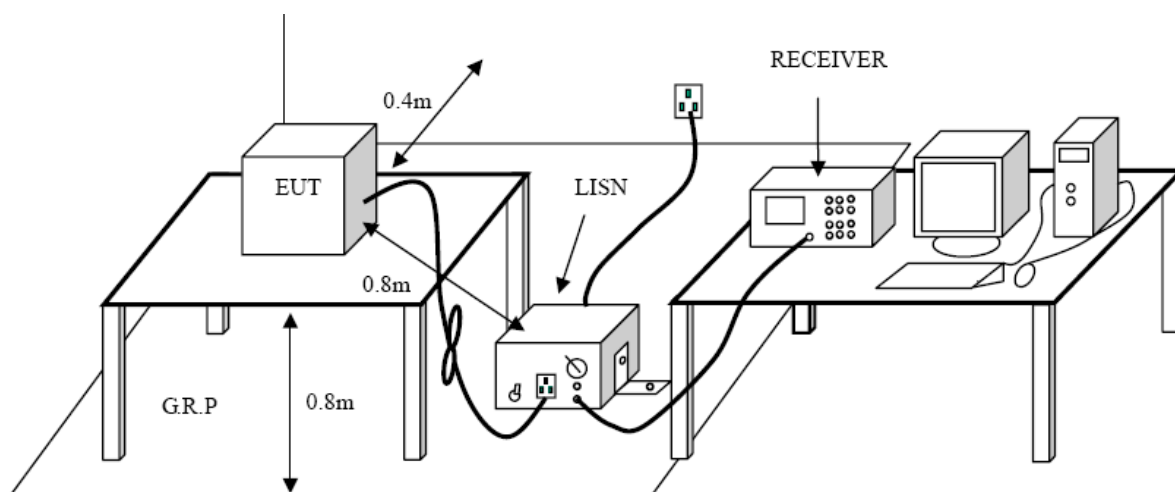
Conducted Emission Test Limit

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

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

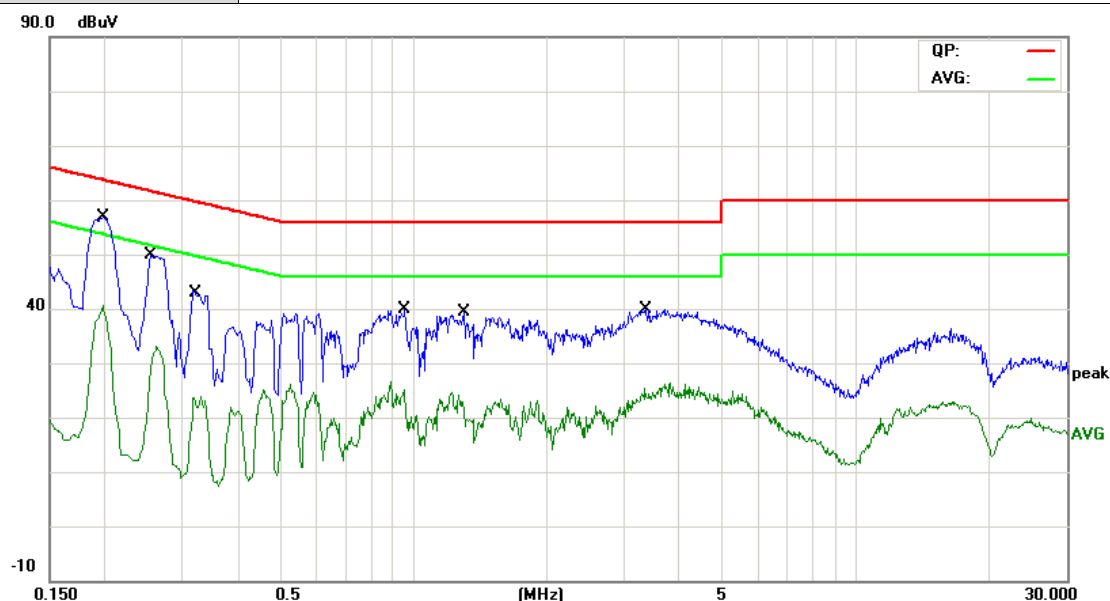
4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Please see the next page.

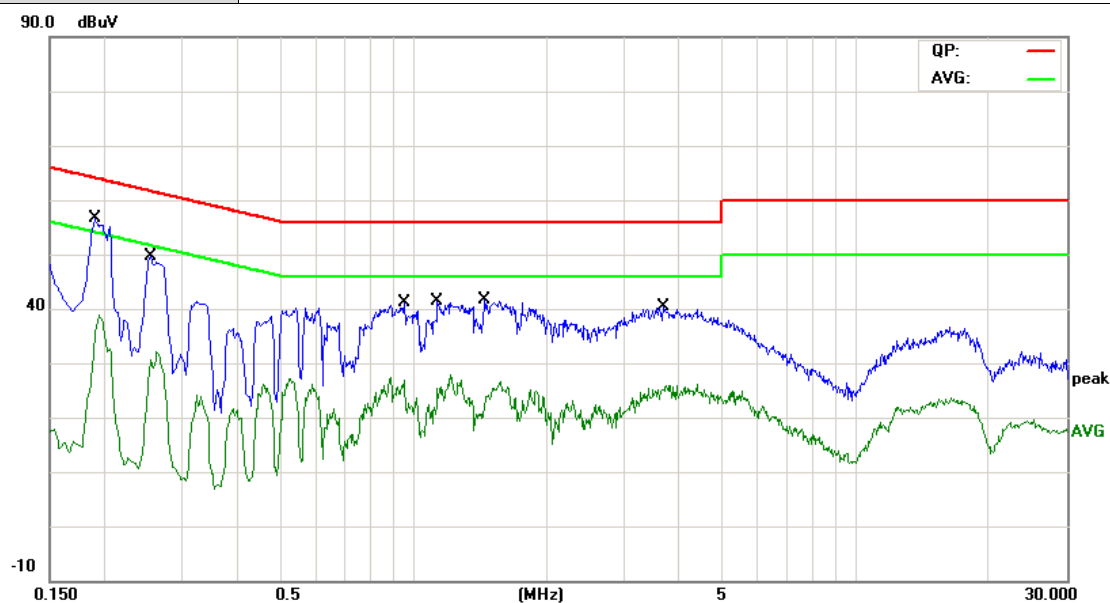
EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	AC Charging with BT Working Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1980	43.27	10.02	53.29	63.69	-10.40	QP
2		0.1980	27.73	10.02	37.75	53.69	-15.94	AVG
3		0.2540	36.09	10.02	46.11	61.62	-15.51	QP
4		0.2540	18.03	10.02	28.05	51.62	-23.57	AVG
5		0.3234	27.65	10.02	37.67	59.62	-21.95	QP
6		0.3234	11.82	10.02	21.84	49.62	-27.78	AVG
7		0.9540	27.21	10.07	37.28	56.00	-18.72	QP
8		0.9540	14.38	10.07	24.45	46.00	-21.55	AVG
9		1.2980	25.48	10.06	35.54	56.00	-20.46	QP
10		1.2980	12.38	10.06	22.44	46.00	-23.56	AVG
11		3.3540	25.16	10.01	35.17	56.00	-20.83	QP
12		3.3540	13.76	10.01	23.77	46.00	-22.23	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	AC Charging with TX B Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1900	42.50	10.00	52.50	64.03	-11.53	QP
2		0.1900	24.04	10.00	34.04	54.03	-19.99	AVG
3		0.2540	35.31	10.02	45.33	61.62	-16.29	QP
4		0.2540	18.26	10.02	28.28	51.62	-23.34	AVG
5		0.9540	28.37	10.07	38.44	56.00	-17.56	QP
6		0.9540	15.59	10.07	25.66	46.00	-20.34	AVG
7		1.1340	27.08	10.06	37.14	56.00	-18.86	QP
8		1.1340	14.37	10.06	24.43	46.00	-21.57	AVG
9		1.4460	27.44	10.06	37.50	56.00	-18.50	QP
10		1.4460	12.14	10.06	22.20	46.00	-23.80	AVG
11		3.6660	25.66	10.00	35.66	56.00	-20.34	QP
12		3.6660	15.42	10.00	25.42	46.00	-20.58	AVG

Emission Level= Read Level+ Correct Factor

5. Radiated Emission Test

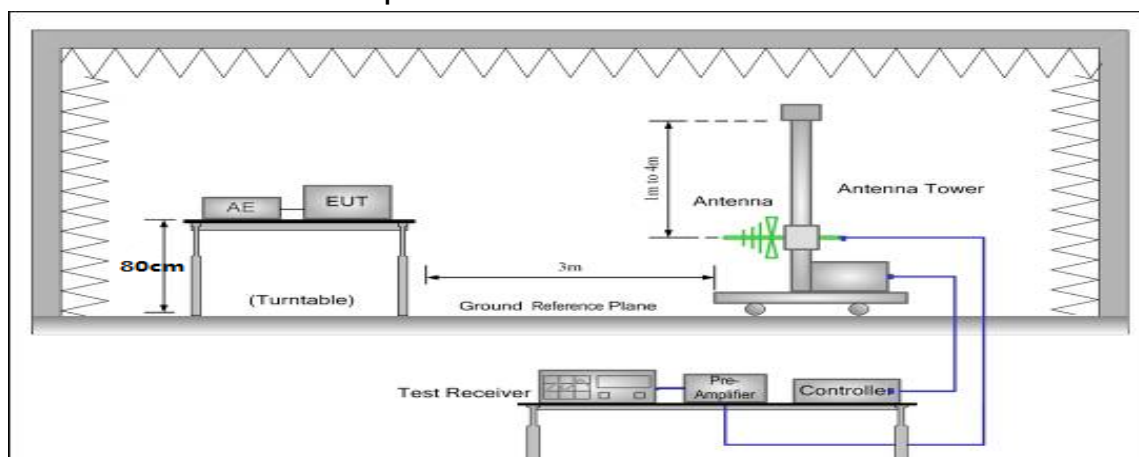
5.1 Limit

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. 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).

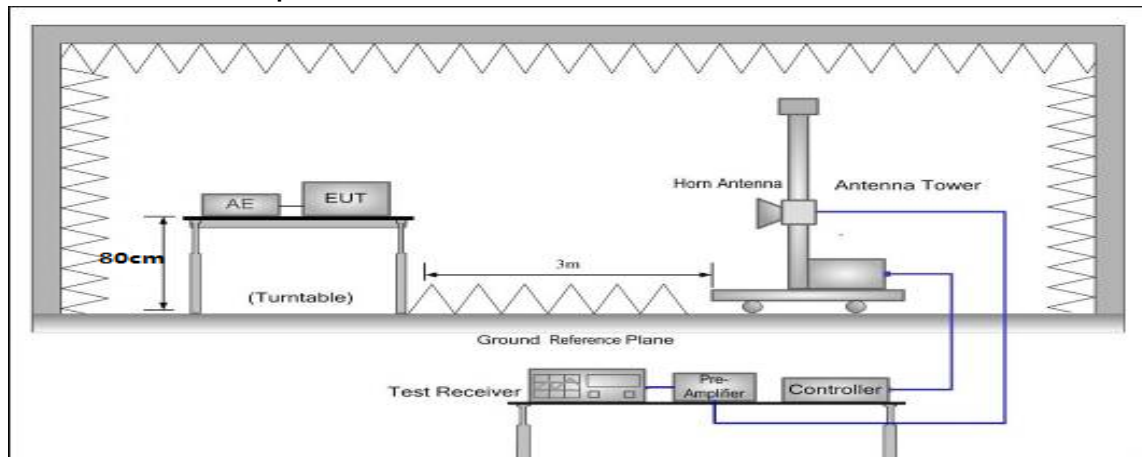
Frequency (MHz)	Field strength $\mu\text{V/m}$	Field strength $\text{dB}\mu\text{V/m}$	Detector	Measurement distance
30-88	100	40	QP	3m
88-216	150	43.5	QP	
216-960	200	46	QP	
960-1000	500	46	QP	
Above 1000	500	54	AV	
Above 1000	5000	74	PK	

5.2 Test Setup

Bellow 1000MHz Test Setup



Above 1GHz Test Setup



5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

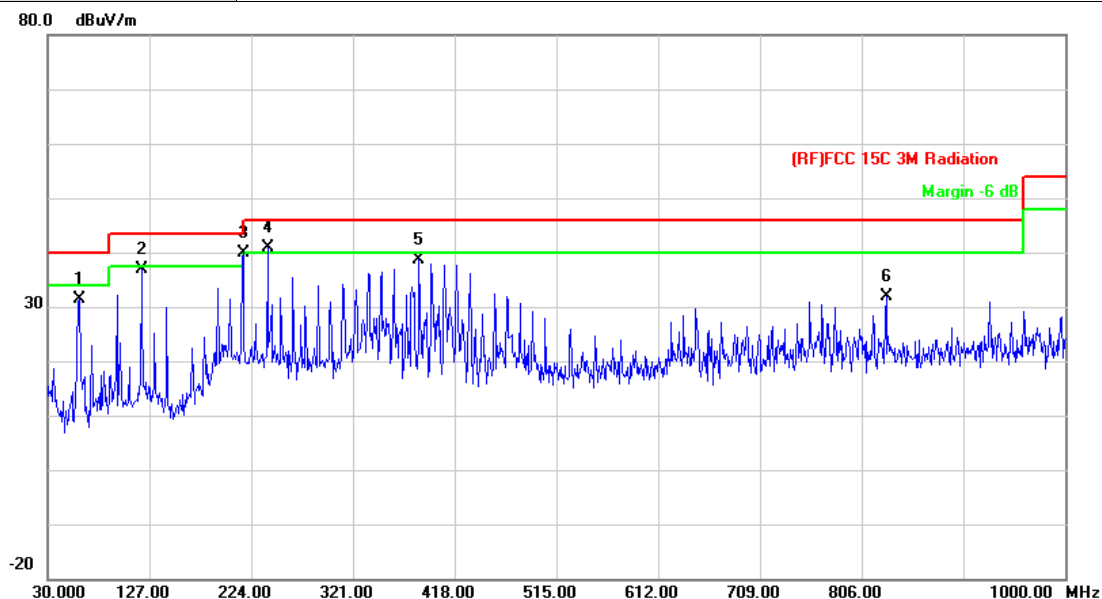
The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.

5.5 Test Data

Test data please refer the following pages.

Blew 1GHz:

EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

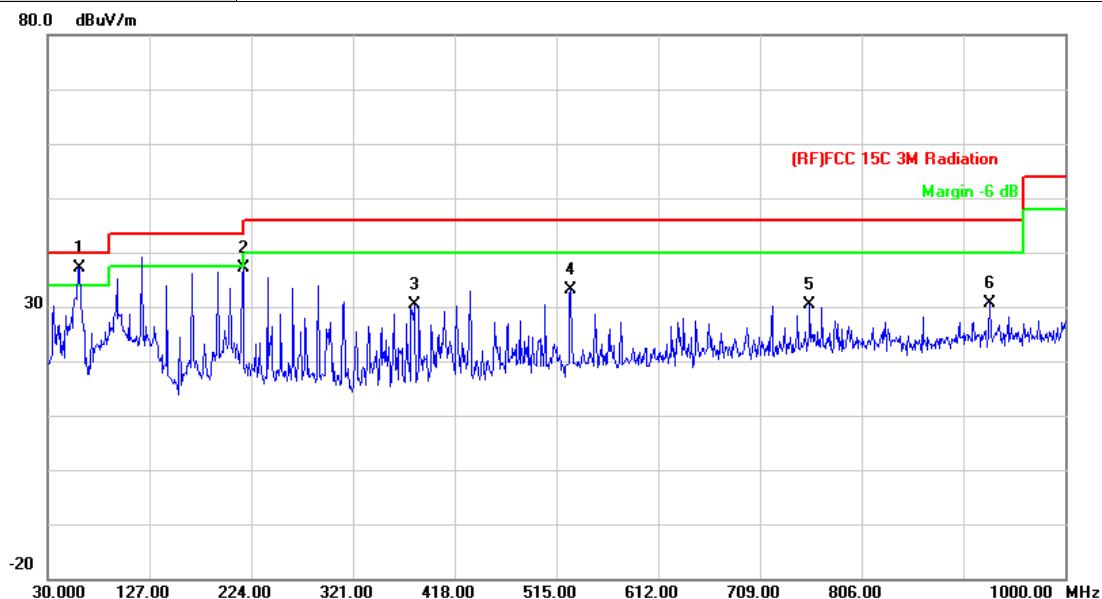


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		60.0700	55.83	-24.51	31.32	40.00	-8.68	peak
2		119.2400	59.46	-22.46	37.00	43.50	-6.50	peak
3		216.2400	59.55	-19.69	39.86	46.00	-6.14	peak
4	*	239.5200	59.60	-18.62	40.98	46.00	-5.02	peak
5		384.0500	52.59	-13.86	38.73	46.00	-7.27	peak
6		829.2800	38.30	-6.36	31.94	46.00	-14.06	peak

Emission Level= Read Level+ Correct Factor

Blew 1GHz:

EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	60.0700	61.56	-24.51	37.05	40.00	-2.95	peak
2		216.2400	56.71	-19.69	37.02	46.00	-8.98	peak
3		379.2000	44.45	-14.18	30.27	46.00	-15.73	peak
4		528.5800	43.21	-10.14	33.07	46.00	-12.93	peak
5		756.5300	37.37	-6.99	30.38	46.00	-15.62	peak
6		928.2200	35.42	-4.81	30.61	46.00	-15.39	peak

Emission Level= Read Level+ Correct Factor

Above 1GHz

Modulation Type: GFSK					
Low channel: 2402 MHz					
Frequency (MHz)	Ant. Pol. H/V	Emission level	Limit	Margin (dB)	Detector
2390	H	46.63	74	27.37	Peak
4804	H	45.89	74	28.11	Peak
2390	V	45.04	74	28.96	Peak
4804	V	37.12	74	36.88	Peak
Middle channel: 2441 MHz					
Frequency (MHz)	Ant. Pol. H/V	Emission level	Limit	Margin (dB)	Detector
4882	H	43.19	74	30.81	Peak
4882	V	40.12	74	33.88	Peak
High channel: 2480 MHz					
Frequency (MHz)	Ant. Pol. H/V	Emission level	Limit	Margin (dB)	Detector
2483.5	H	44.19	74	29.81	Peak
4960	H	43.91	74	30.09	Peak
2483.5	V	42.12	74	31.88	Peak
4960	V	35.24	74	38.76	Peak

Note:

PK Emission Level= Antenna Factor +Cable Loss - Amp. Factor + Reading

AV Emission Level= PK Emission Level+20log (duty cycle) or set the RBW/VBW to be 1MHz/10Hz to read the level.

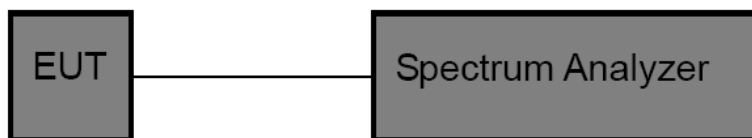
If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

6. Band edge spurious emission

6.1 Limit

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.

6.2 Test Setup



6.3 Test Procedure

Use the following spectrum analyzer settings:

Set RBW=100 kHz. VBW $\geq$ 3RBW. Detector =peak, Sweep time = auto couple,

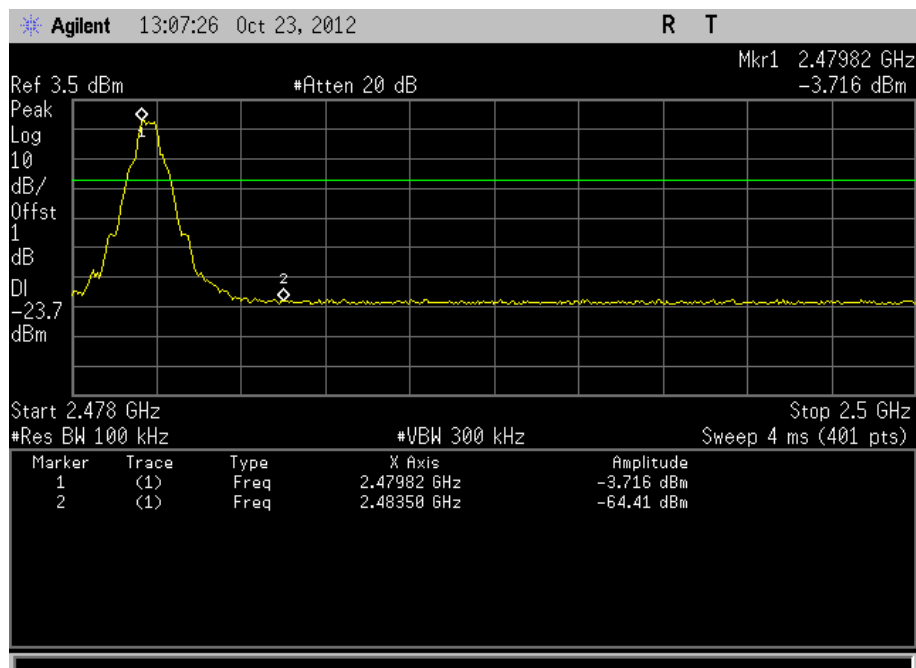
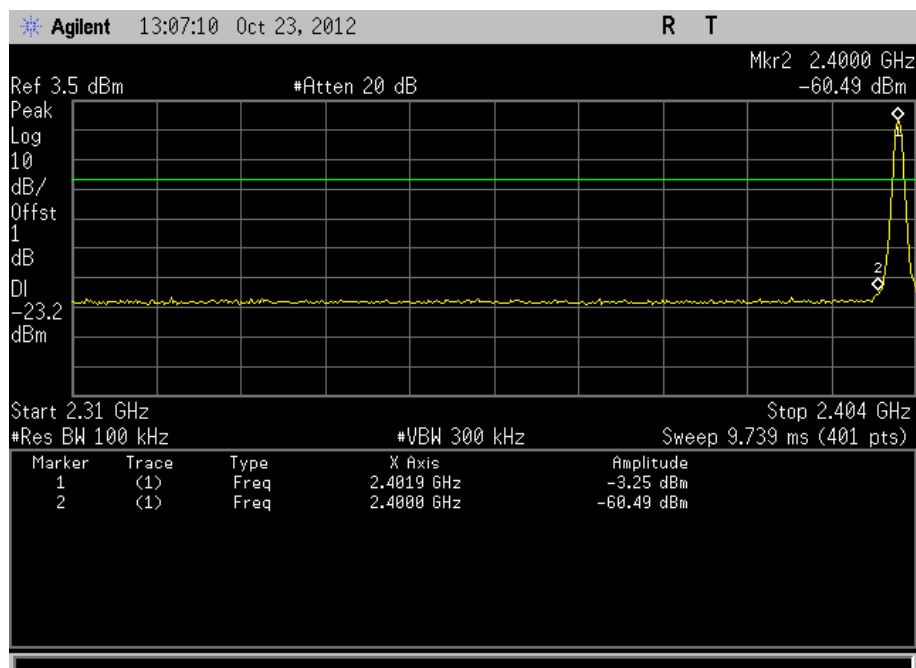
Trace mode = max hold.

6.4 EUT Operating Condition

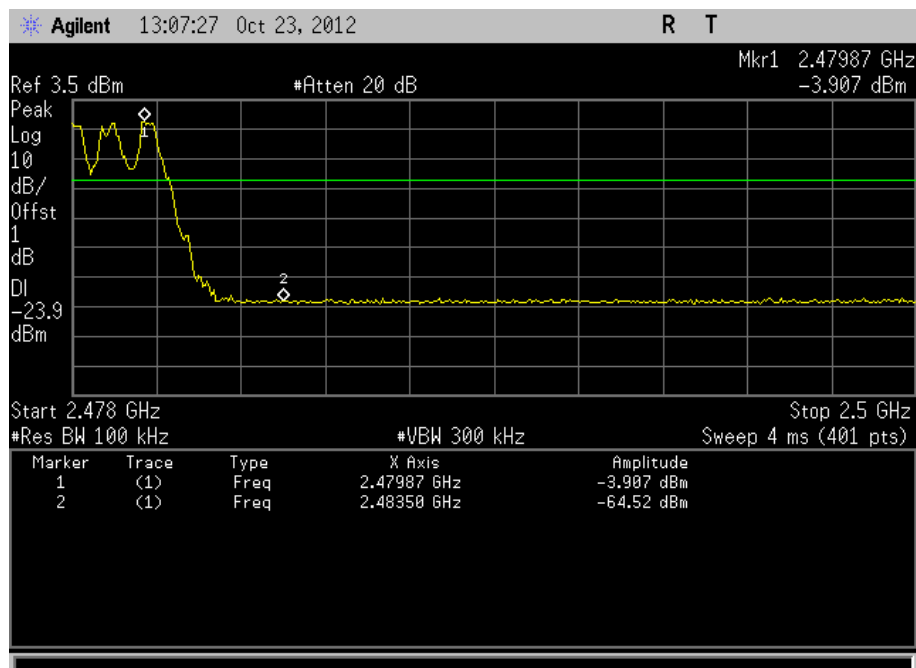
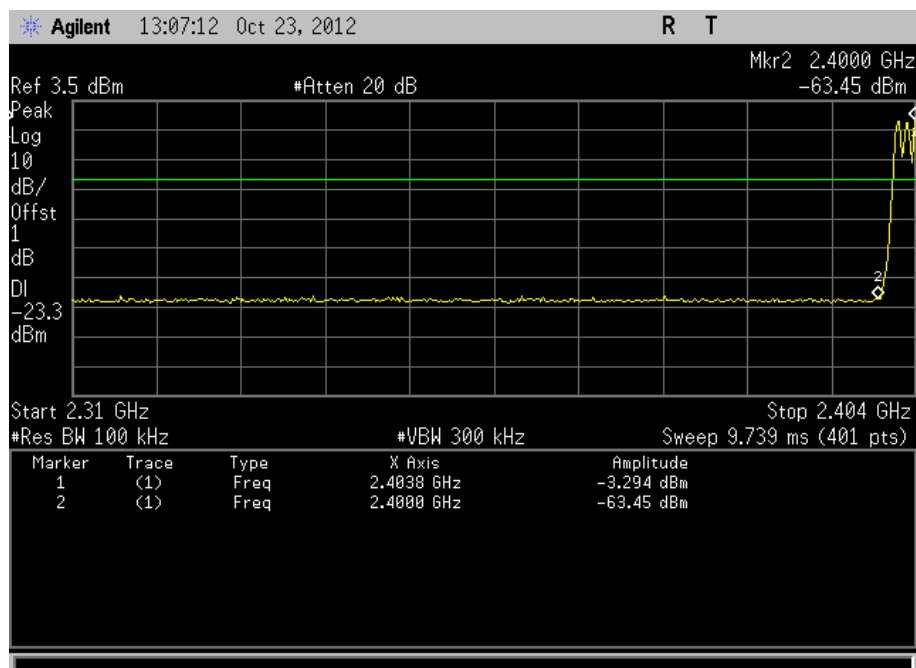
The Equipment Under Test was set to Continual Transmitting in maximum power.

6.5 Test Data

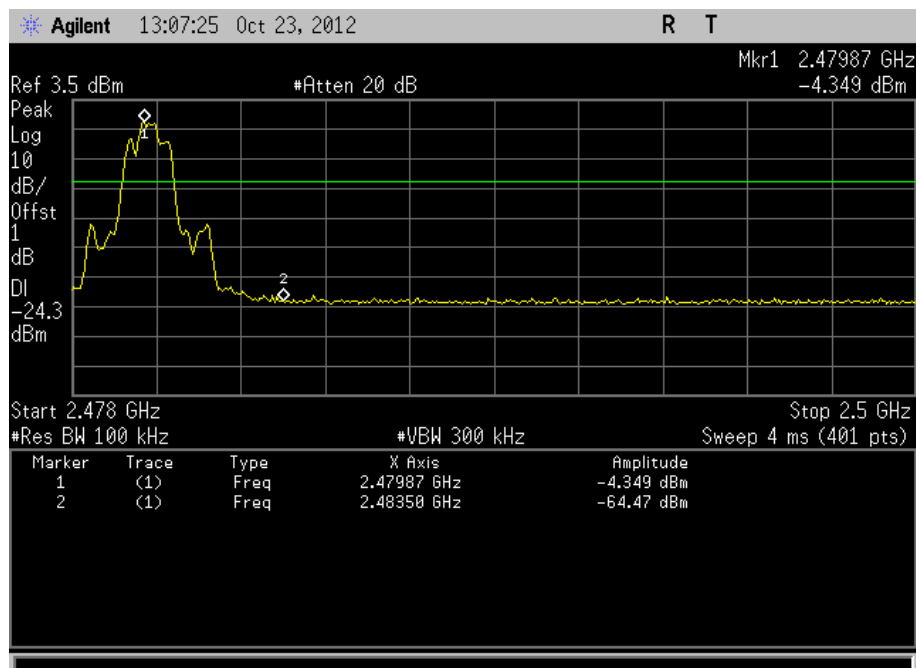
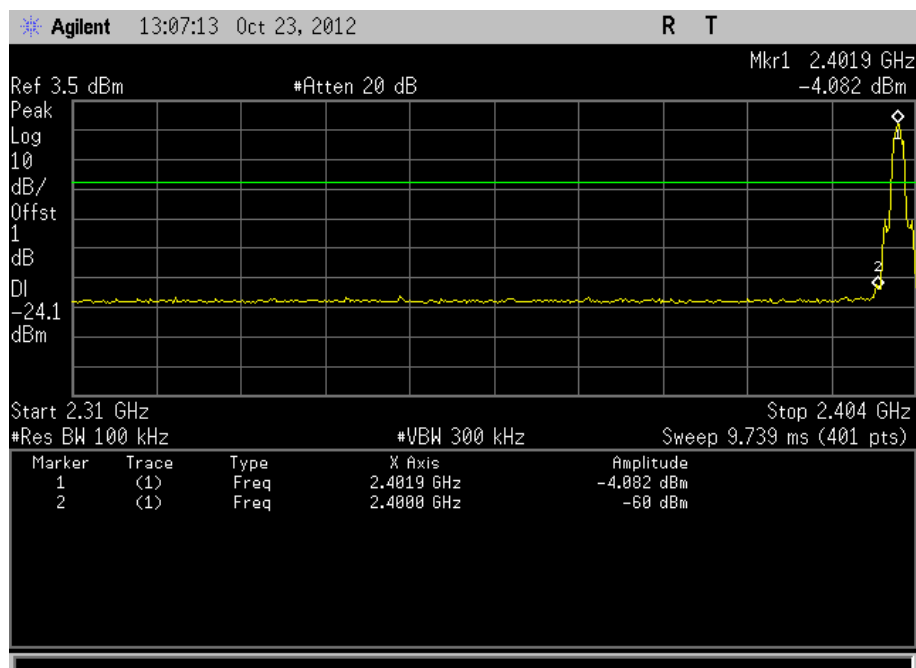
EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



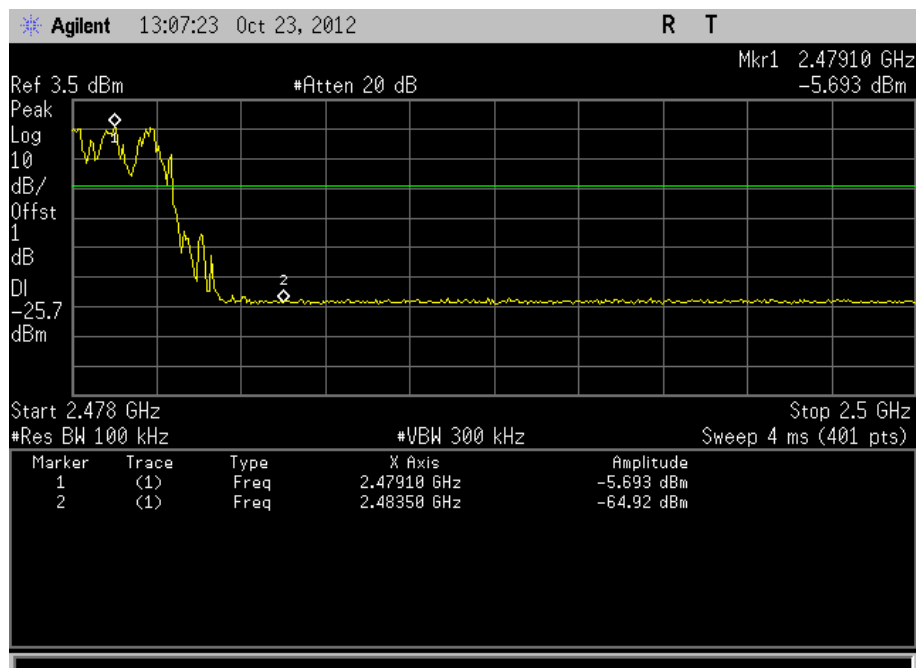
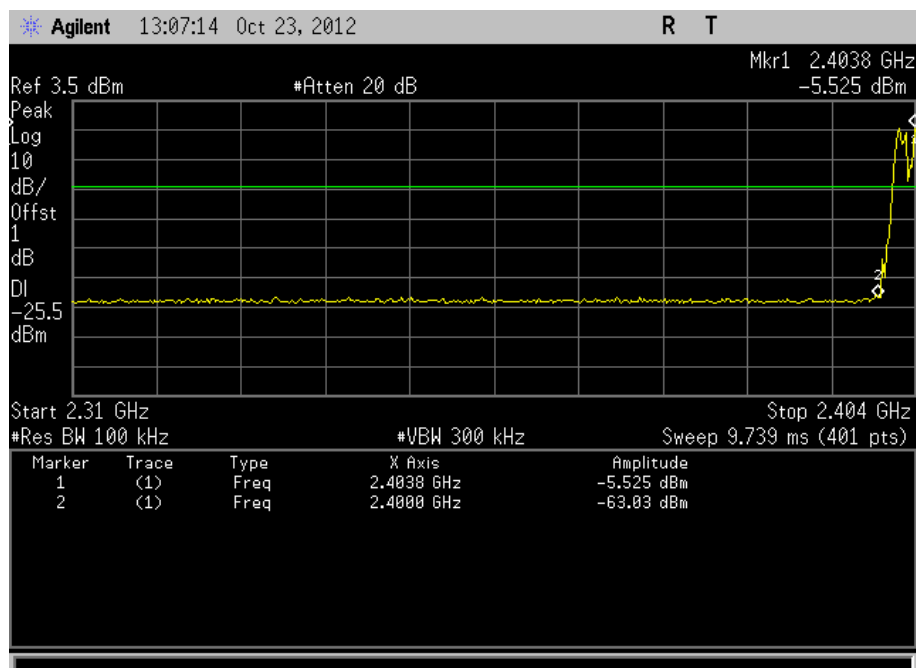
EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	GFSK Hopping Mode		
Remark:	N/A		



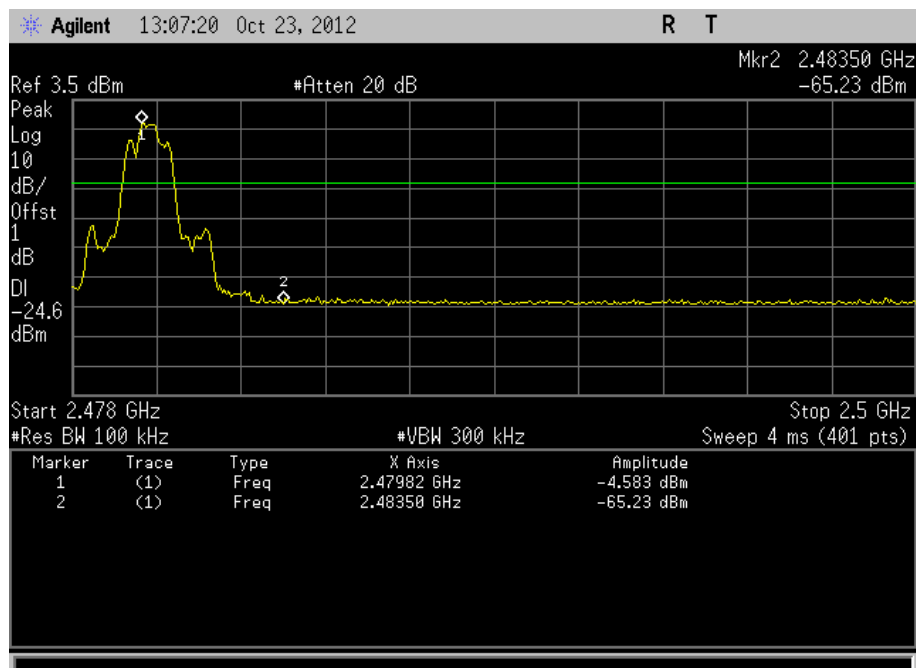
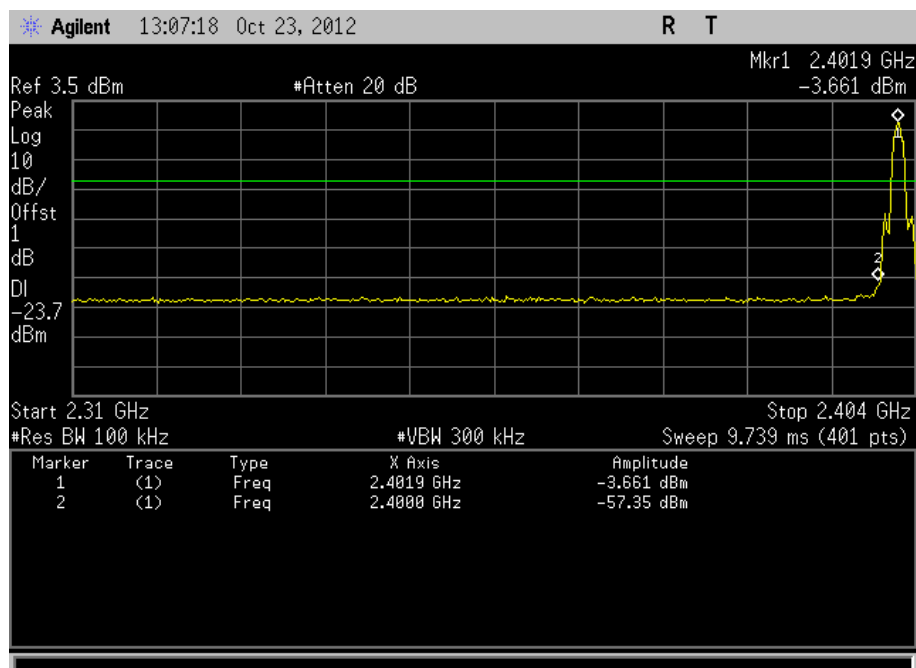
EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX π /4-DQPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



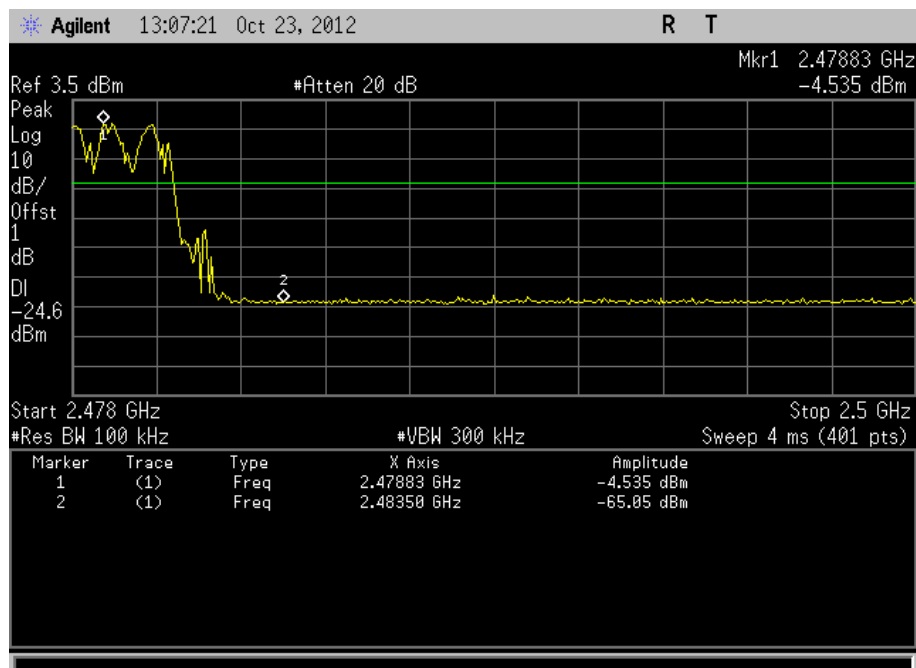
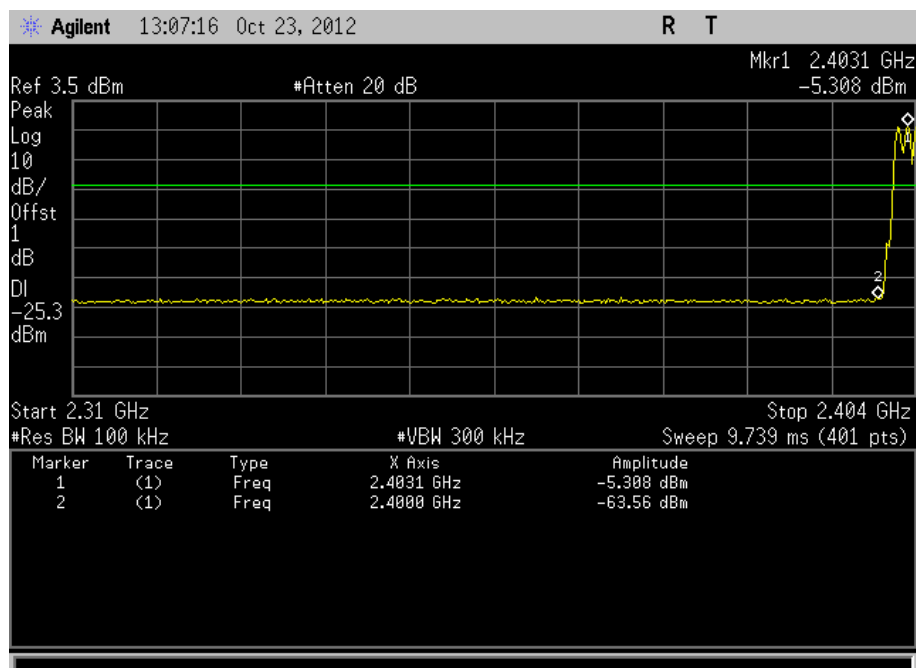
EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	π /4-DQPSK Hopping Mode		
Remark:	N/A		



EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX 8DPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	8DPSK Hopping Mode		
Remark:	N/A		

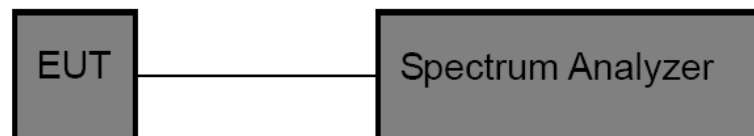


7. Number of Hopping Channel

7.1 Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

7.2 Test Setup



7.3 Test Procedure

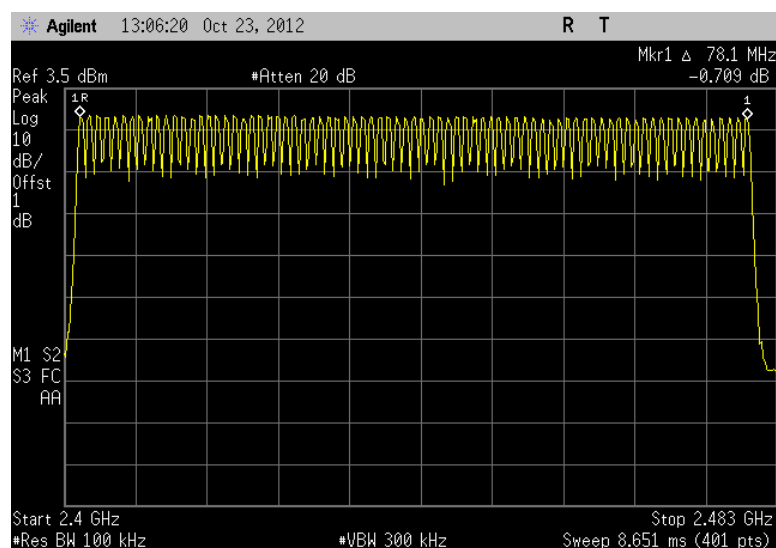
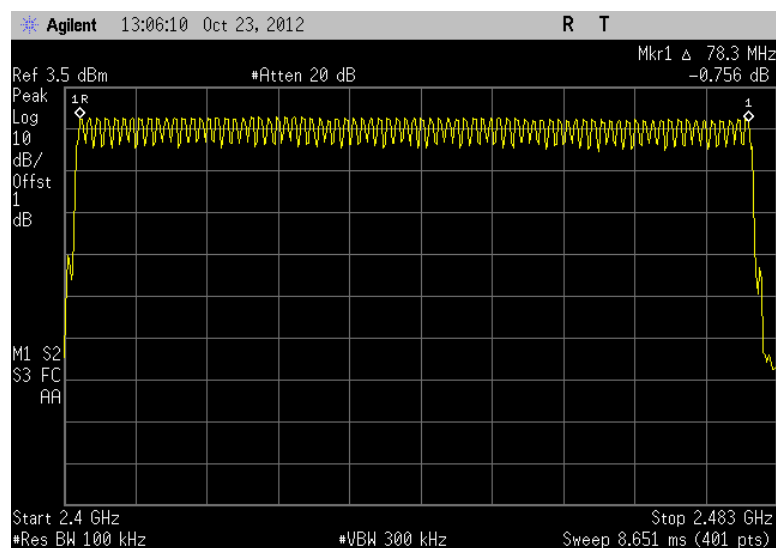
- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=300 KHz, Sweep time= Auto.

7.4 EUT Operating Condition

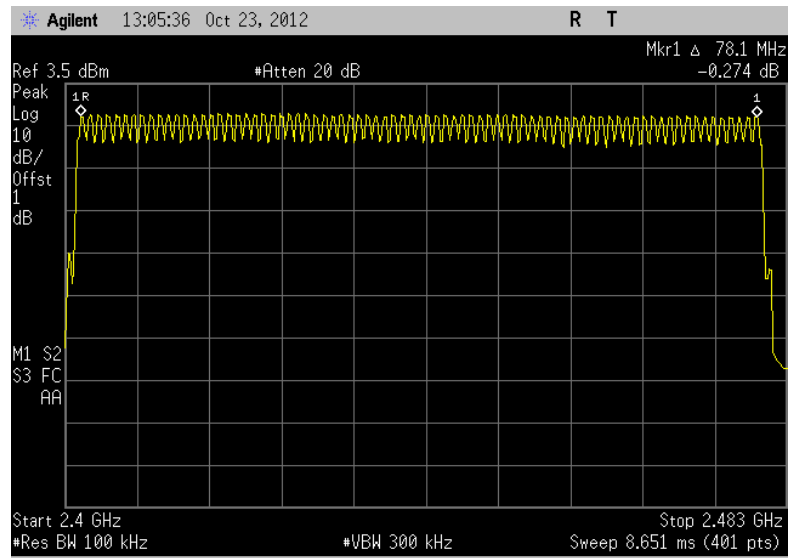
The EUT was set to the Hopping Mode.

7.5 Test Data

EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	Hopping Mode (GFSK, $\pi/4$ -DQPSK/,8DPSK)		
Mode	Quantity of Hopping Channel	Limit	
GFSK	79	>15	
$\pi/4$ -DQPSK	79		
8DPSK	79		

GFSK Mode **$\pi/4$ -DQPSK Mode**

8DPSK

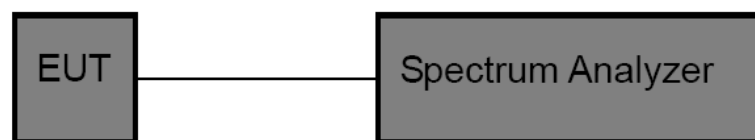


8. Time of Occupancy

8.1 Limit

Section	Test Item	Limit
15.247(a)(1)	Time of Occupancy	0.4 sec

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

8.4 EUT Operating Condition

The EUT was set to the Hopping Mode.

8.5 Test Data

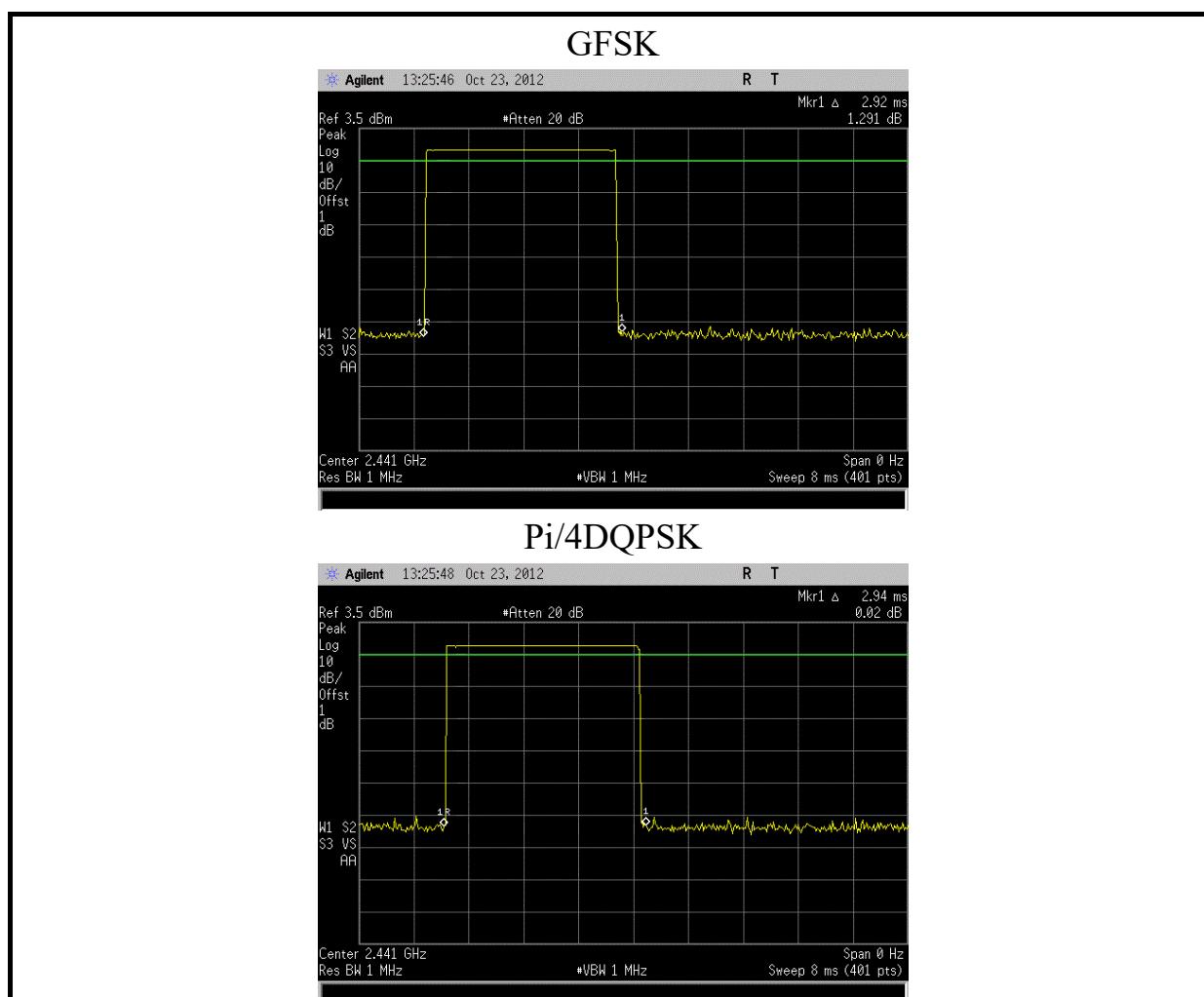
Mode	Packet	Hops Over Occupancy Time (hops)	Package Transfer Time (ms)	Dwell time (second)	Limit (second)	Result
GFSK	DH5	106.67	2.92	0.311	0.4	PASS
$\pi/4$ -DQPSK	2-DH5	106.67	2.94	0.314	0.4	PASS
8DPSK	3-DH5	106.67	2.94	0.314	0.4	PASS

Note: 1. In normal mode, hopping rate is 1600 hops/s with 6 slots in 79 hopping channels.

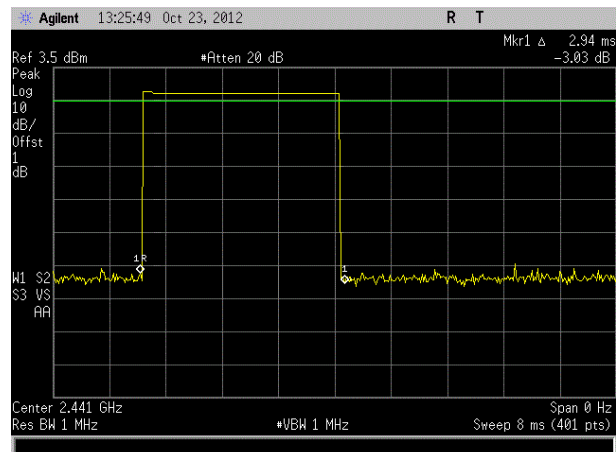
With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) (s), Hops Over Occupancy Time comes to
 $(1600 / 6 / 79) \times (0.4 \times 79) = 106.67$ hops

2. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

Test plots as follows:



8DPSK

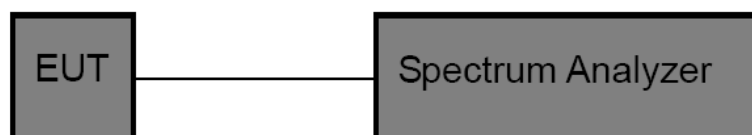


9. Channel Separation and Bandwidth Test

9.1 Limit

Test Item	Limit	Frequency Range(MHz)
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

9.2 Test Setup



9.3 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting:

For Bandwidth test:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW $\geq$ 1% of the 20 dB bandwidth

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For frequency separation:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) $\geq$ 1% of the span

Video (or Average) Bandwidth (VBW) $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

(3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at

the fundamental frequency.

9.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

9.5 Test Data

20dB Bandwidth:

Test channel	20dB Occupy Bandwidth (MHz)			
	GFSK	$\pi/4$ -DQPSK	8DPSK	Conclusion
Lowest	0.81	1.138	1.165	PASS
Middle	0.808	1.144	1.164	PASS
Highest	0.81	1.149	1.165	PASS

Test plots as follows:

GFSK Modulation

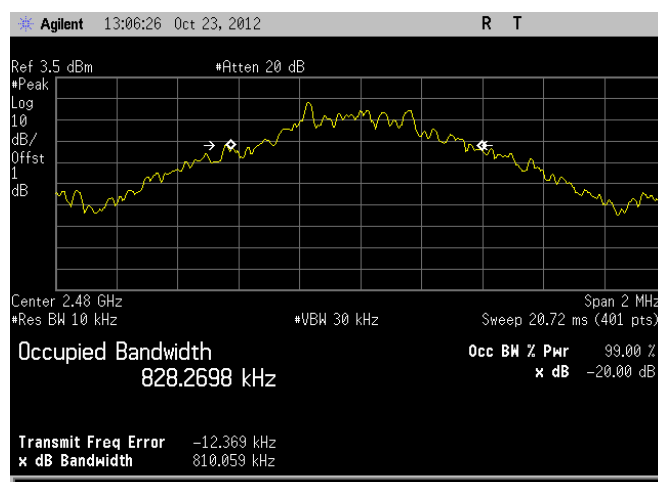
Lowest channel



Middle channel

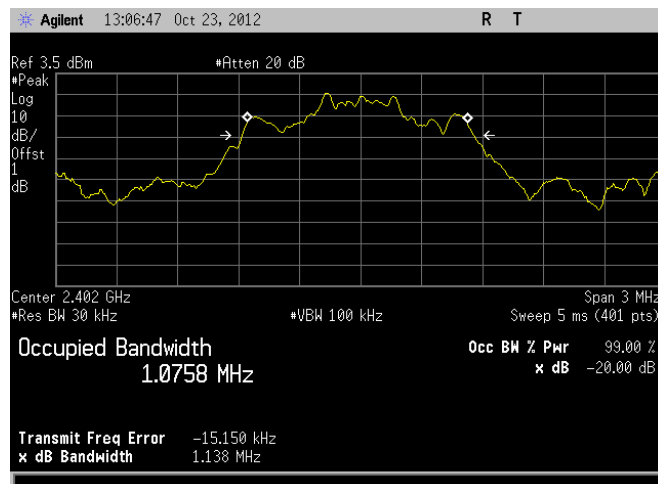


Highest channel

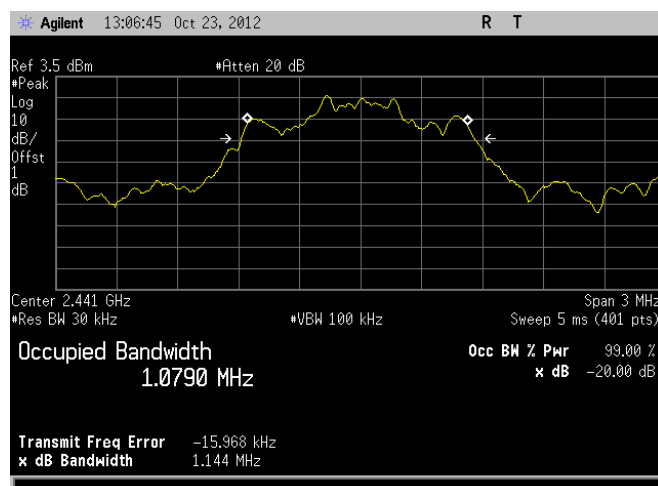


$\pi/4$ -DQPSK Modulation

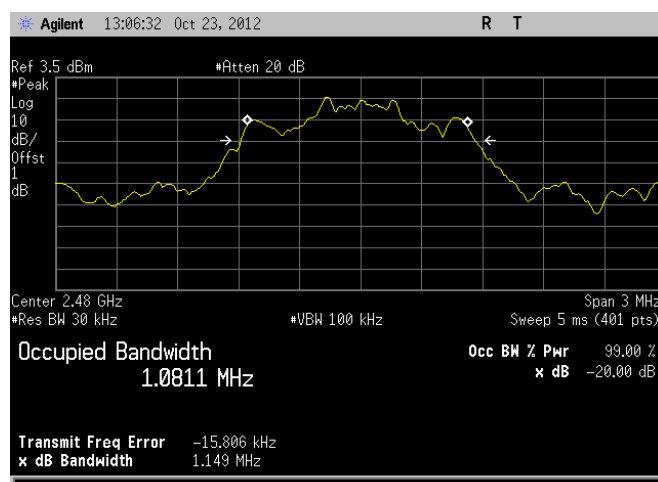
Lowest channel



Middle channel

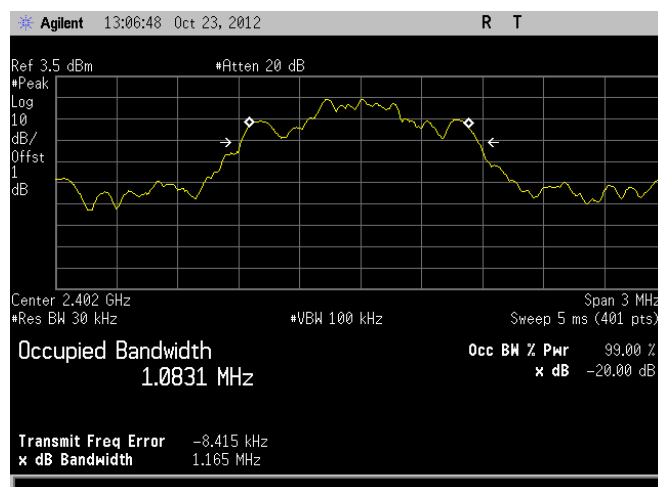


Highest channel

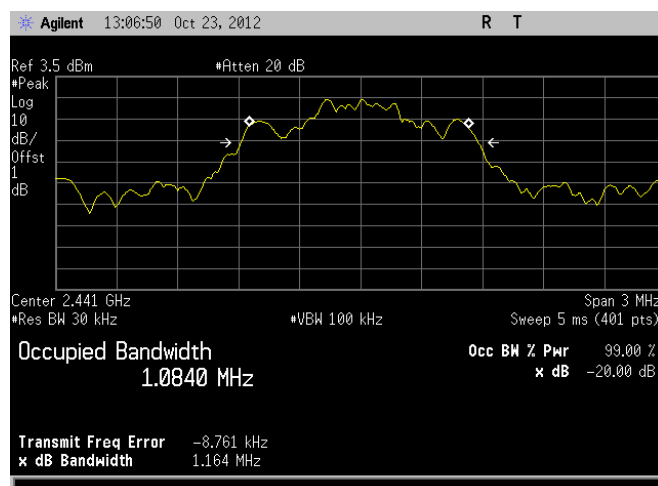


8DPSK Modulation

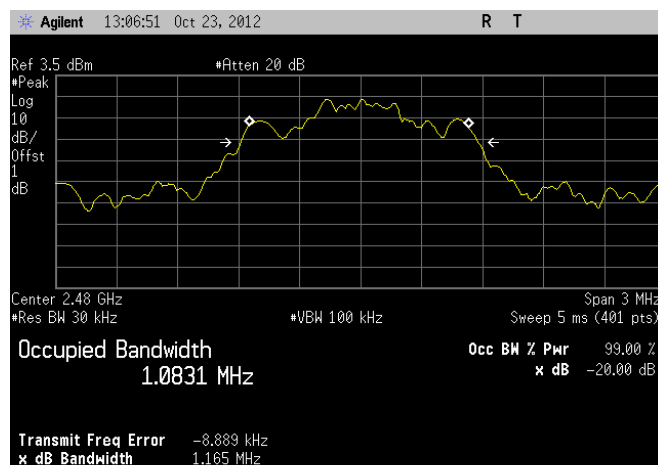
Lowest channel



Middle channel



Highest channel



Channel Separation:

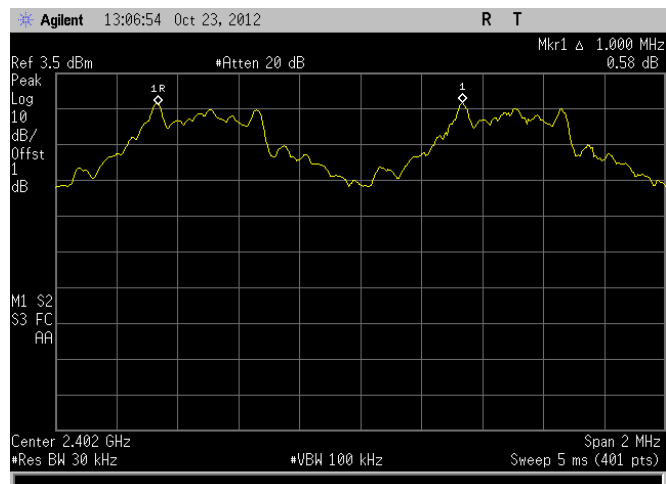
GFSK mode			
Test channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
Lowest	1	0.54	PASS
Middle	1.005	0.54	PASS
Highest	1.01	0.54	PASS

Pi/4-DQPSK mode			
Test channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
Lowest	1	0.766	PASS
Middle	1.005	0.766	PASS
Highest	1	0.766	PASS

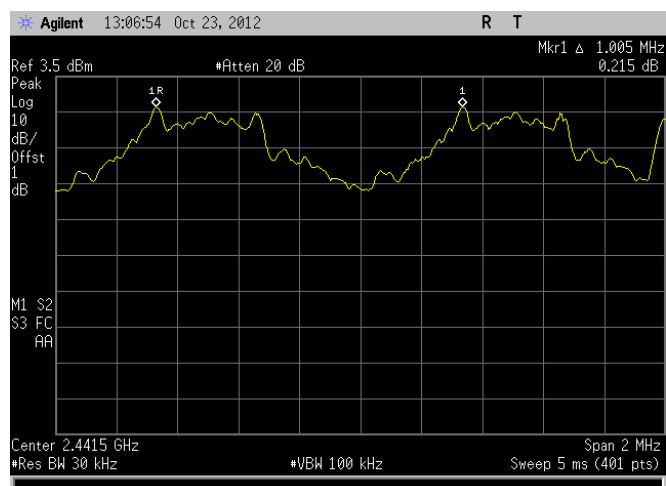
8DPSK mode			
Test channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
Lowest	1	0.777	PASS
Middle	1	0.777	PASS
Highest	1	0.777	PASS

GFSK Modulation

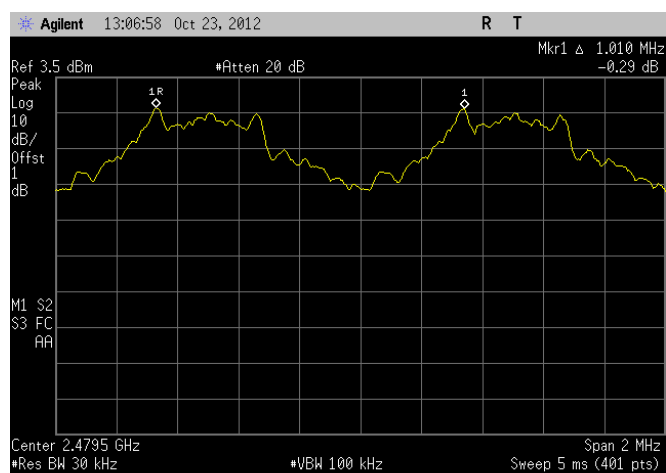
Lowest channel



Middle channel

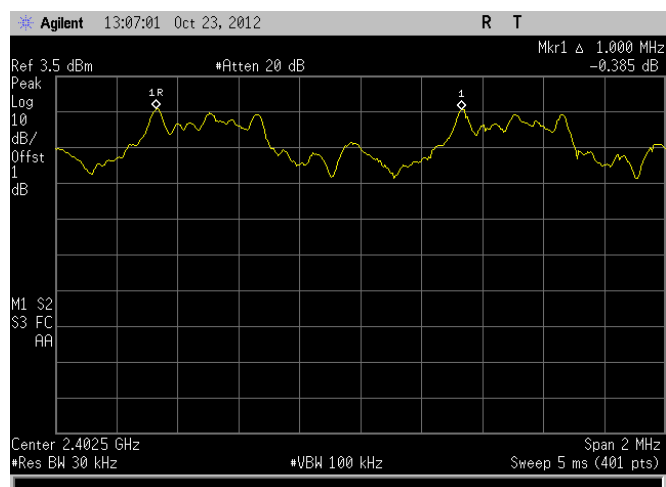


Highest channel

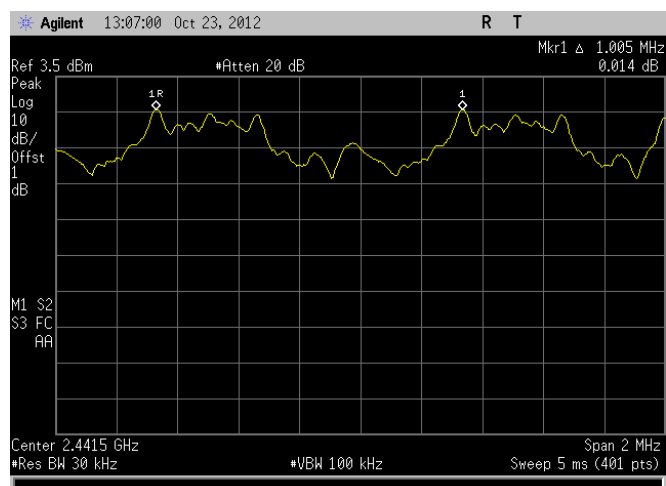


$\pi/4$ -DQPSK Modulation

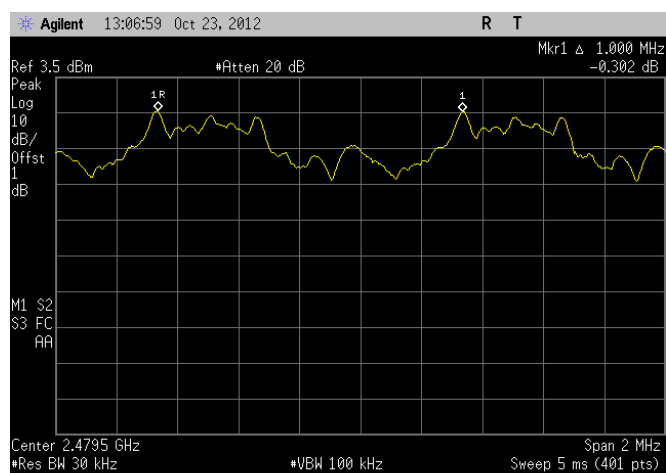
Lowest channel



Middle channel

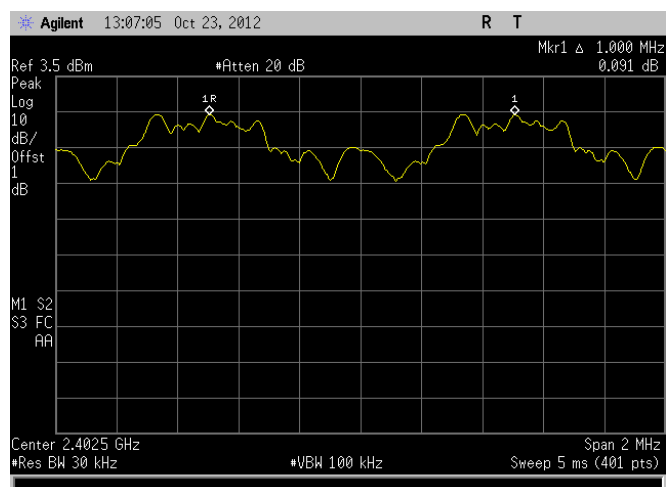


Highest channel

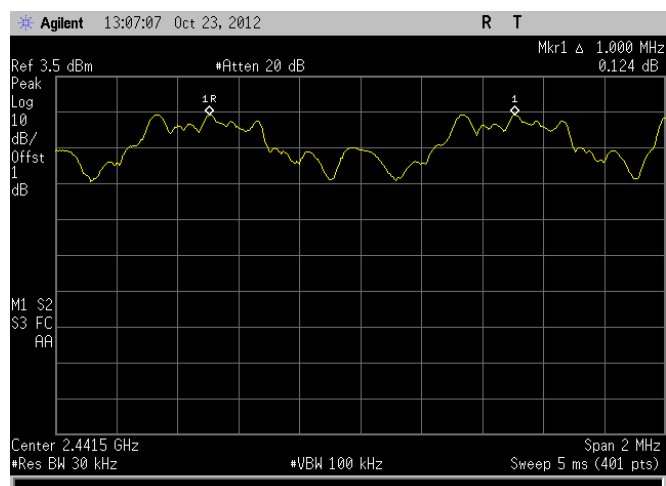


8DPSK Modulation

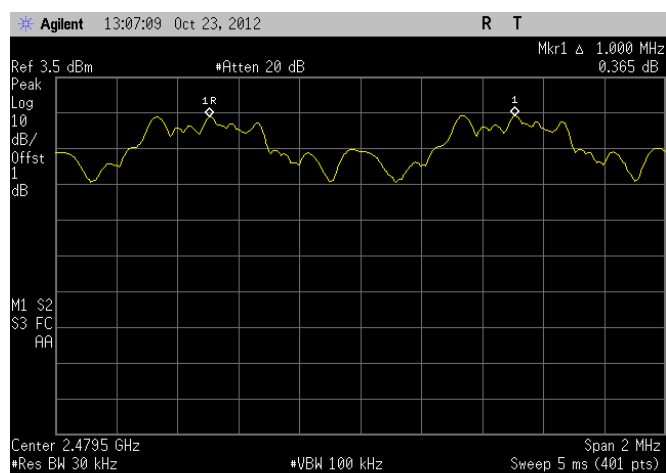
Lowest channel



Middle channel



Highest channel

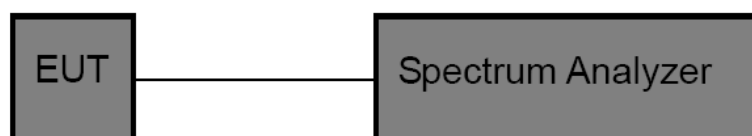


10. Peak Output Power Test

10.1 Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	<125 mW(21dBm)	2400~2483.5

10.2 Test Setup



10.3 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting:

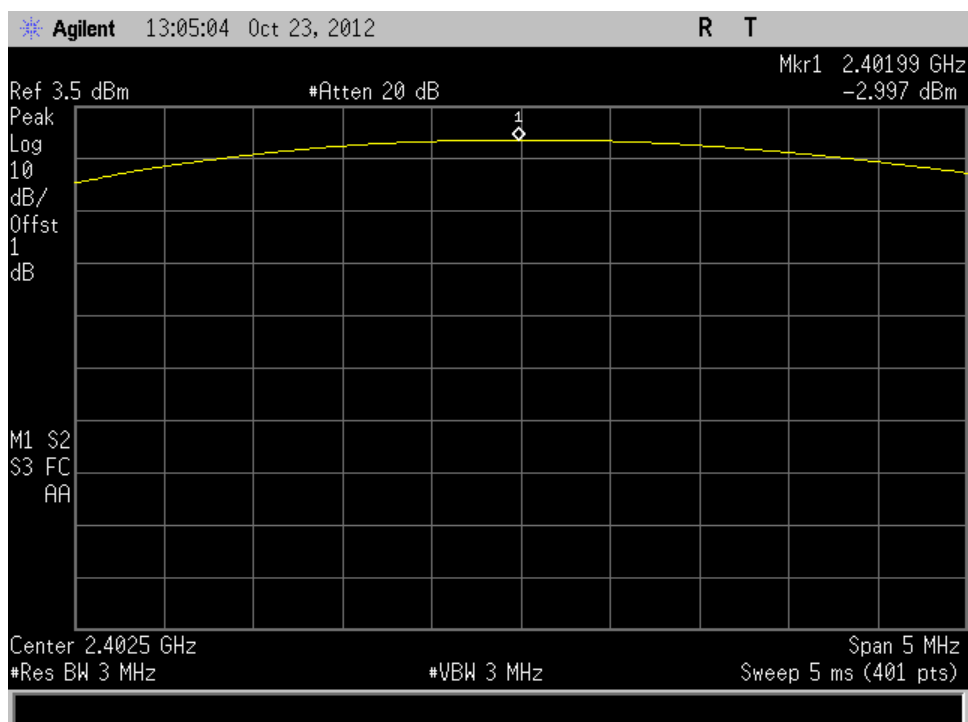
Peak Detector: RBW=3 MHz, VBW=3 MHz

10.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

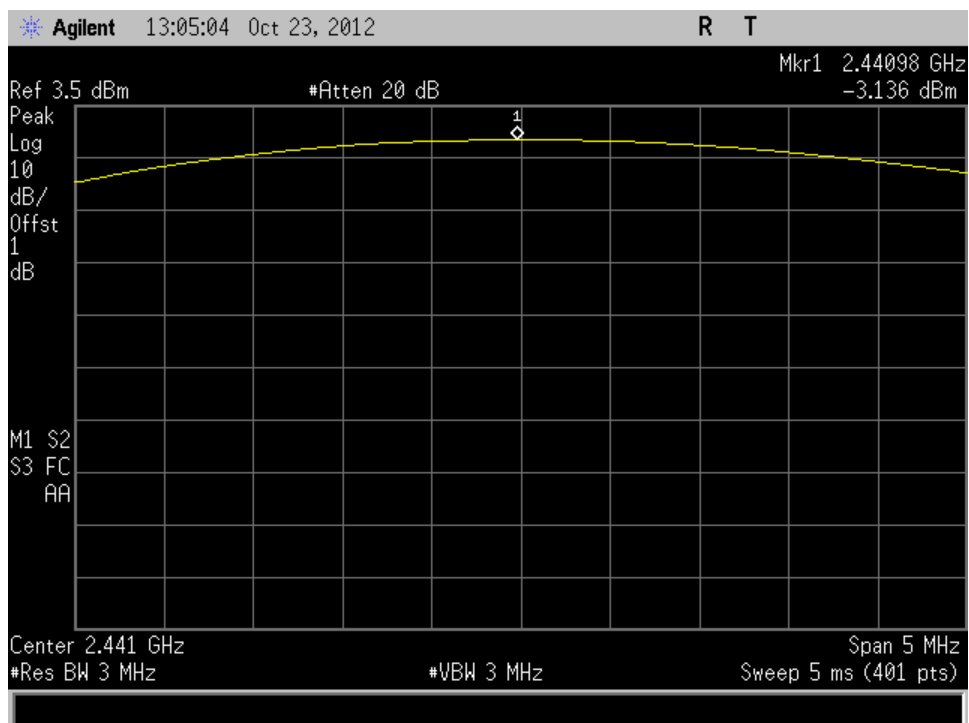
10.5 Test Data

EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-2.997	21	
2441	-3.136		
2480	-3.422		

GFSK TX Mode**2402 MHz**

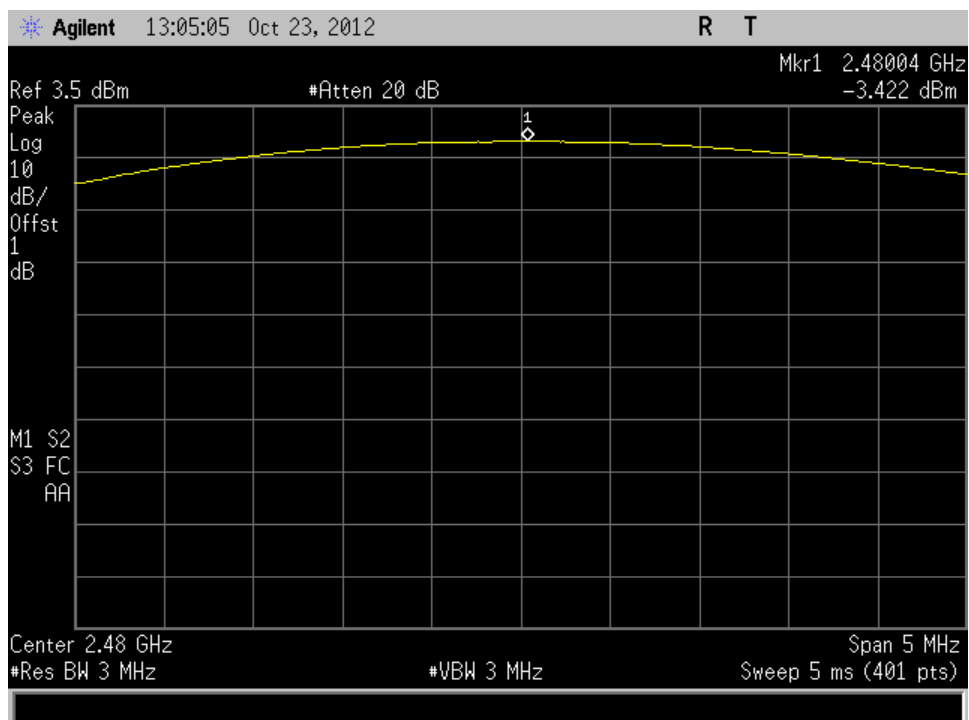
GFSK TX Mode

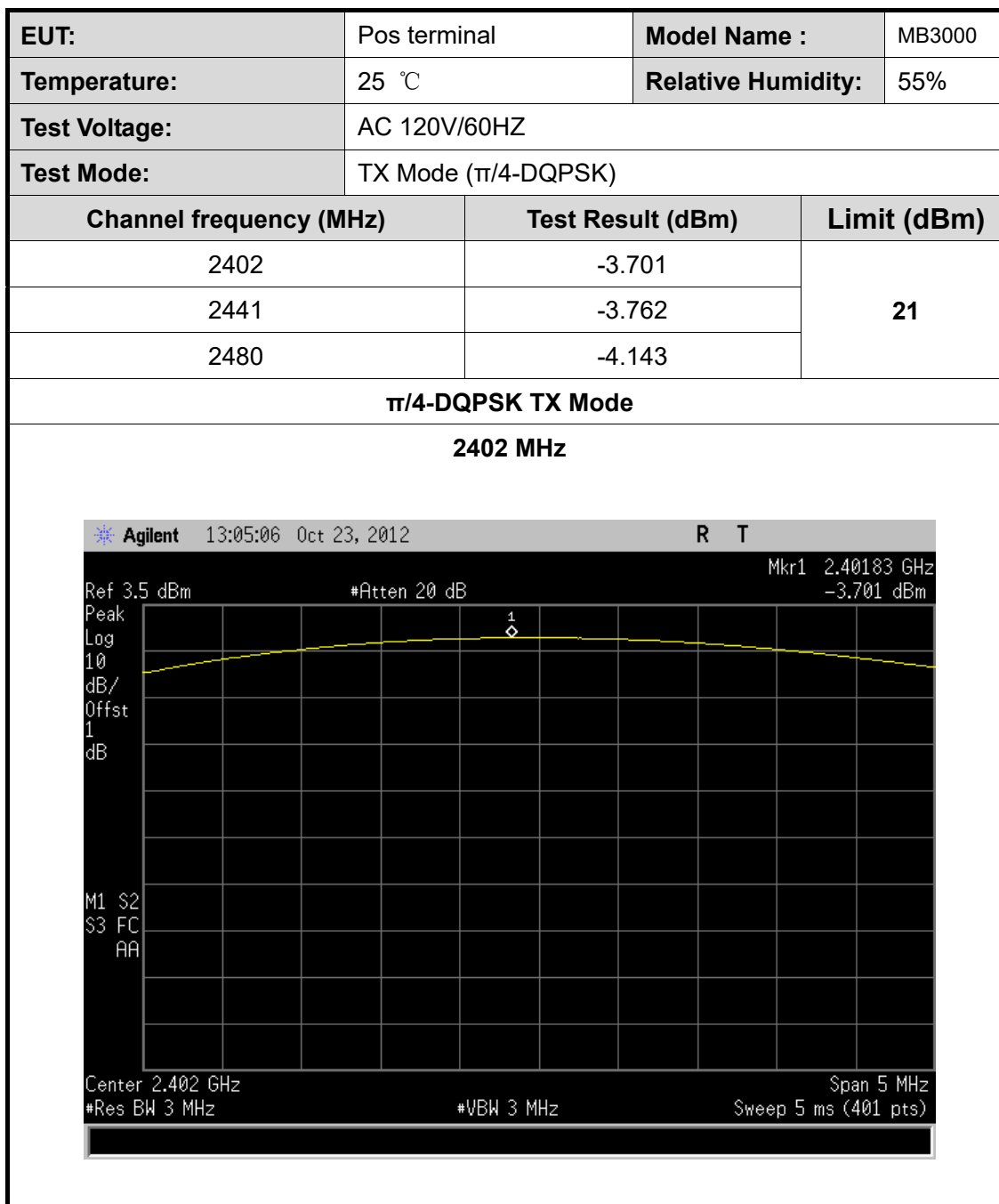
2441 MHz



GFSK TX Mode

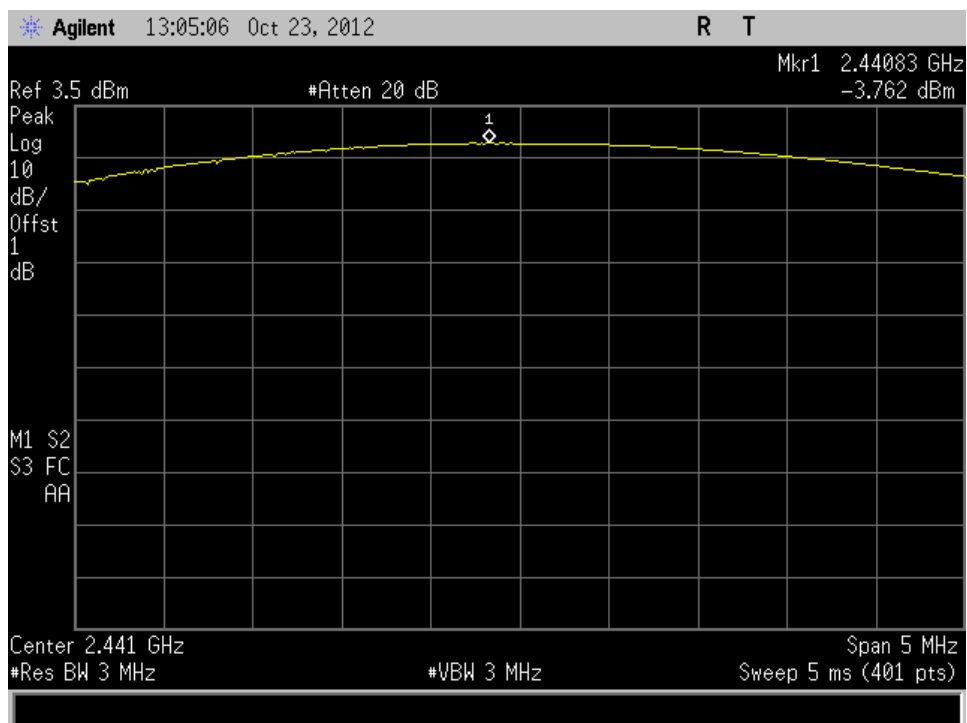
2480 MHz



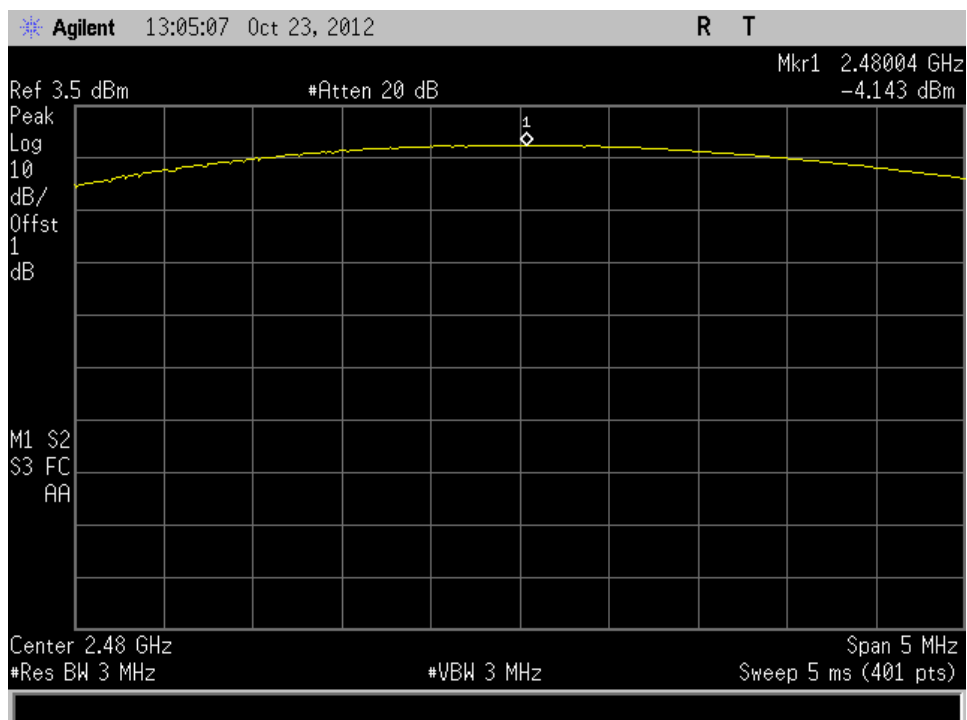


$\pi/4$ -DQPSK TX Mode

2441 MHz

 $\pi/4$ -DQPSK TX Mode

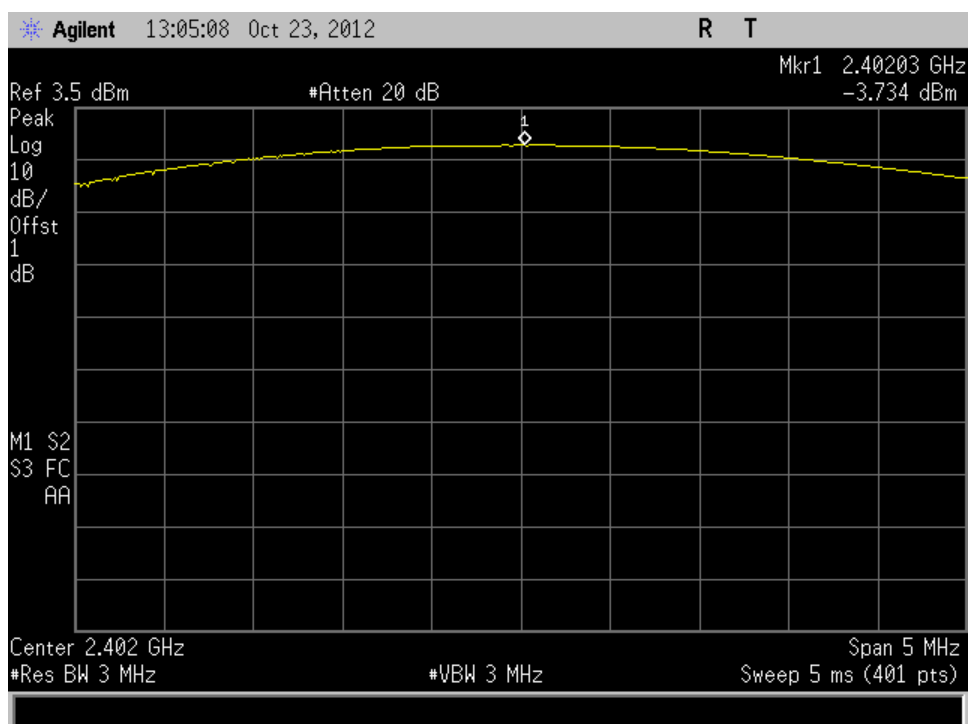
2480 MHz



EUT:	Pos terminal	Model Name :	MB3000
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode (8DPSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-3.734	21	
2441	-3.809		
2480	-4.162		

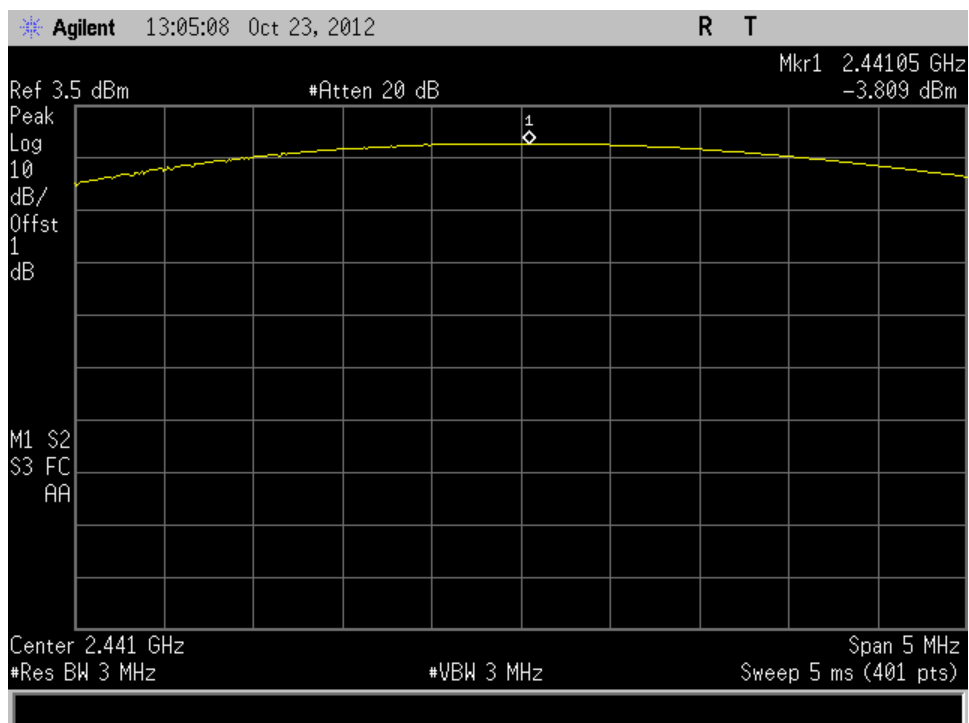
8DPSK TX Mode

2402 MHz



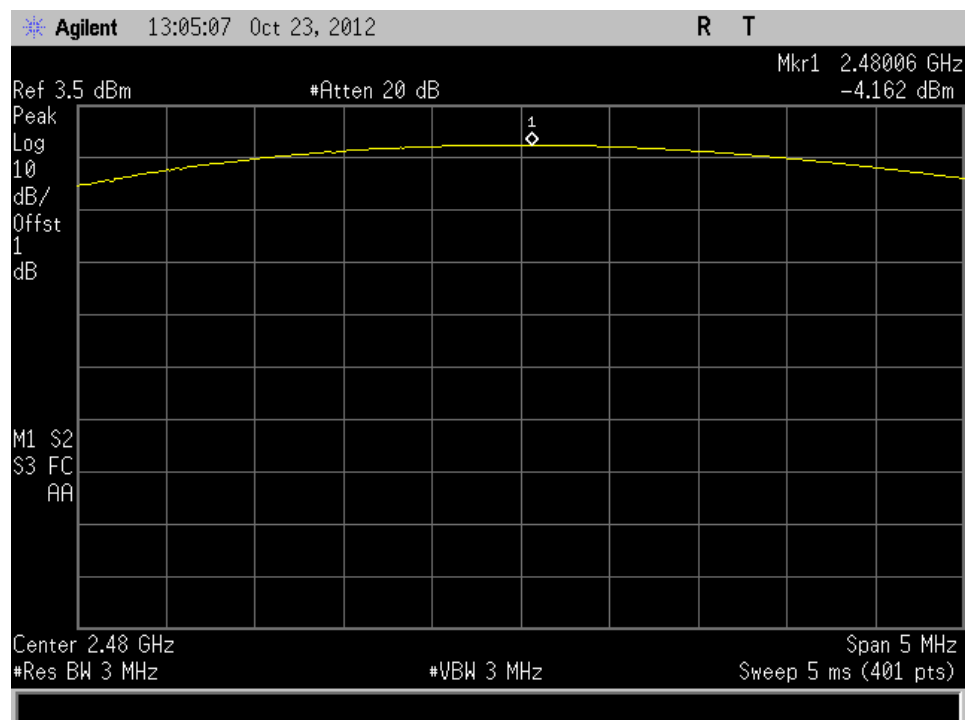
8-DPSK TX Mode

2441 MHz



8-DPSK TX Mode

2480 MHz



11. Antenna Requirement

11.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Result

The EUT antenna is an integral Antenna, the antenna gain is 2dBi. It complies with the standard requirement.

