

FCC Part 15C

Measurement And Test Report

For

QINGDAO WINTEC SYSTEM CO., LTD

NO.3 Building, NO.151, Zhuzhou Road, Laoshan District, Qingdao, China

FCC ID: ZUNIDT800

Aug. 14, 2015

This Report Concerns: ☒ Original Report	Equipment Type: pos terminal
Report Number:	MTI150630001RF-2
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Reviewed By:	Tim Zhang <i>Tim Zhang</i>
Approved & Authorized By:	Hebe Lee <i>Hebe Lee</i> 
Test Date:	Aug. 01, 2015 - Aug. 14, 2015
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1. General Information about EUT

1.1 Client Information

Applicant	:	QINGDAO WINTEC SYSTEM CO., LTD
Address	:	NO.3 Building, NO.151, Zhuzhou Road, Laoshan District, Qingdao, China
Manufacturer	:	QINGDAO WINTEC SYSTEM CO., LTD
Address	:	Wintec Park, Xinye Road, High-Tech Zone, Qingdao, China
Trade	:	WINTEC
EUT Name	:	pos terminal
Model No.	:	IDT800
Serial No.	:	N/A
Model Difference	:	N/A
Standards	:	FCC Part 15, Subpart C (15.247:2014)
Test Method	:	ANSI C63.10: 2013
Conclusions	:	PASS
		In the configuration tested, the EUT complied with the standards specified above, The EUT technically complies with the FCC and IC requirements

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	pos terminal
Models No.	:	IDT800
Product Description	:	Operation Frequency: Bluetooth:2402~2480MHz
		Number of Channel: Bluetooth:79 Channels see note (2)
		Max Peak Output Power: GFSK:-2.043 dBm (Conducted Power)
		Antenna Gain: 2 dBi (Integral Antenna)
		Modulation Type: GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps) 8-DPSK(3 Mbps)
Power Supply	:	DC power supplied by AC/DC Adapter DC power by Li-ion Battery

Power Rating	:	MODEL: WT1203000 INPUT: 100V-240V~ 50/60Hz 1.6A. Output: 12V===3.0A DC 7.4V 2000mAh Li-ion Battery.
Connecting I/O Port(S)	:	Please refer to the User's Manual

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:

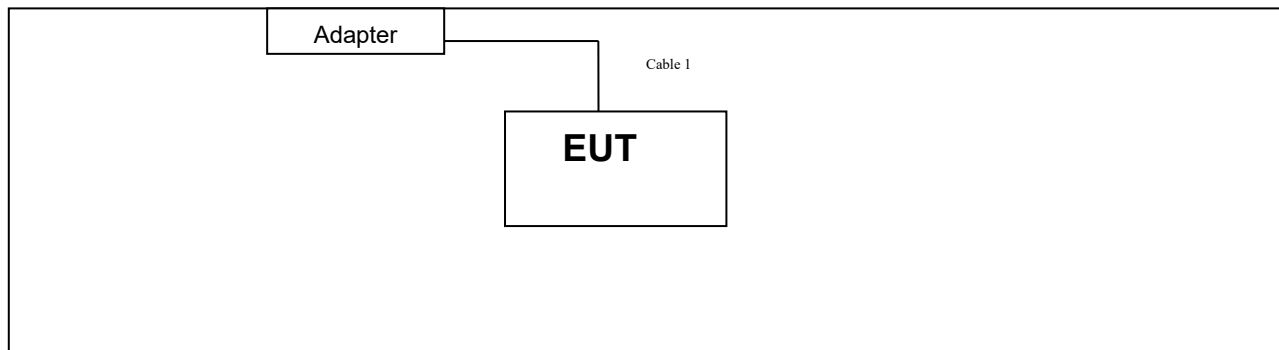
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	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		

(4) The Antenna information about the equipment is provided by the applicant.

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	Used “√”
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	YES	YES	0.8M	

1.5 Description of Test Mode

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

For Radiated Test	
Final Test Mode	Description
Mode 1	AC Charging with TX B Mode

For Radiated Test	
Final Test Mode	Final Test Mode
Mode 1	AC Charging with TX B Mode
Mode 2	TX Mode(GFSK) Channel 00/39/78

Mode 3	TX Mode($\pi/4$ -DQPSK) Channel 00/39/78
Mode 4	TX Mode(8-DPSK) Channel 00/39/78
Mode 5	Hopping Mode(GFSK)
Mode 6	Hopping Mode($\pi/4$ -DQPSK)
Mode 7	Hopping Mode(8-DPSK)

Note:

- (1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test mode above.

According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels.

- (2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of Bluetooth mode.

Test Software Version	Test Program: RF Control Kit V1.0. exe		
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
$\pi/4$ -DQPSK	DEF	DEF	DEF
8-DPSK	DEF	DEF	DEF

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, Nanshan District, Shenzhen, Guangdong China

FCC Registration No.:811562

2. Test Summary

FCC Part 15 Subpart C(15.247)			
Standard Section	Test Item	Judgment	Remark
15.203	Antenna Requirement	PASS	N/A
15.207	Conducted Emission	PASS	N/A
15.205	Restricted Bands	PASS	N/A
15.247(a)(1)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	Dwell Time	PASS	N/A
15.247(b)(1)	Peak Output Power	PASS	N/A
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A
15.247(c)	Radiated Spurious Emission	PASS	N/A
15.247(c)	Antenna Conducted Spurious Emission	PASS	N/A
15.247(a)	20dB Bandwidth	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.			

3. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 02, 2015	Aug.01, 2016
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 02, 2015	Aug.01, 2016
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 02, 2015	Aug.01, 2016
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 02, 2015	Aug.01, 2016
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 02, 2015	Aug.01, 2016
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 02, 2015	Aug.01, 2016
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 02, 2015	Aug.01, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 06, 2015	Mar.05, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 06, 2015	Mar.05, 2016
Horn Antenna	Schwarzbeck	BBHA 9170	373	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	11909A	185903	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 06, 2015	Mar.05, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 06, 2015	Mar.05, 2016

4. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard

FCC Part 15.207

3.1.2 Test Limit

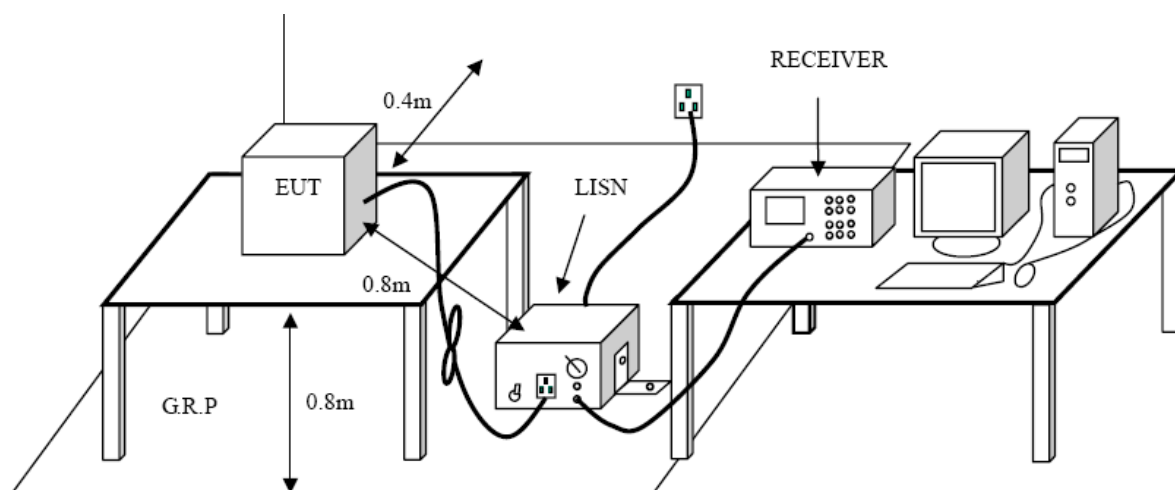
Conducted Emission Test Limit

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.

3.2 Test Setup



3.3 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.

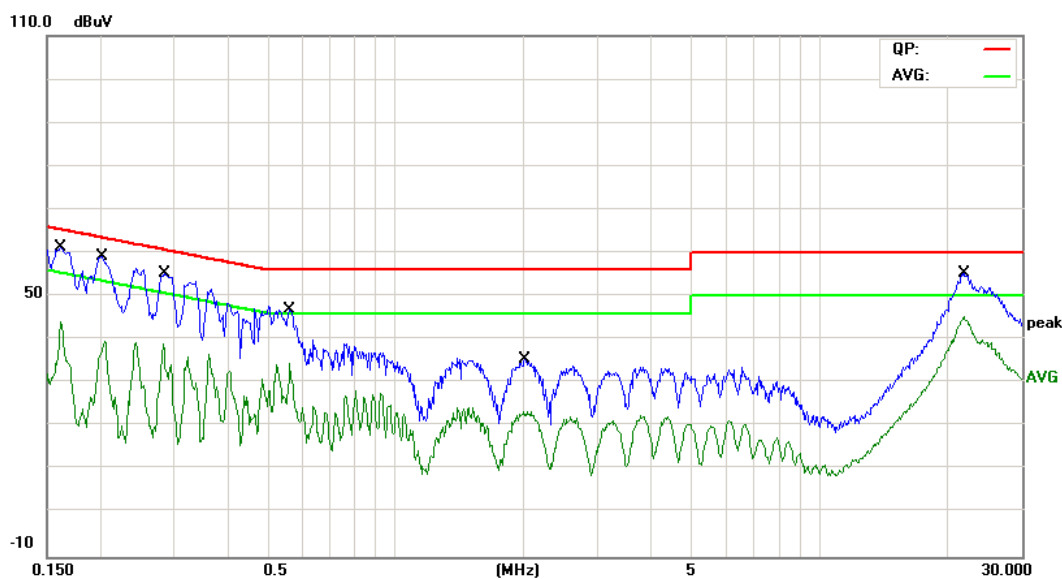
3.4 EUT Operating Mode

Please refer to the description of test mode.

3.5 Test Data

Please see the next page.

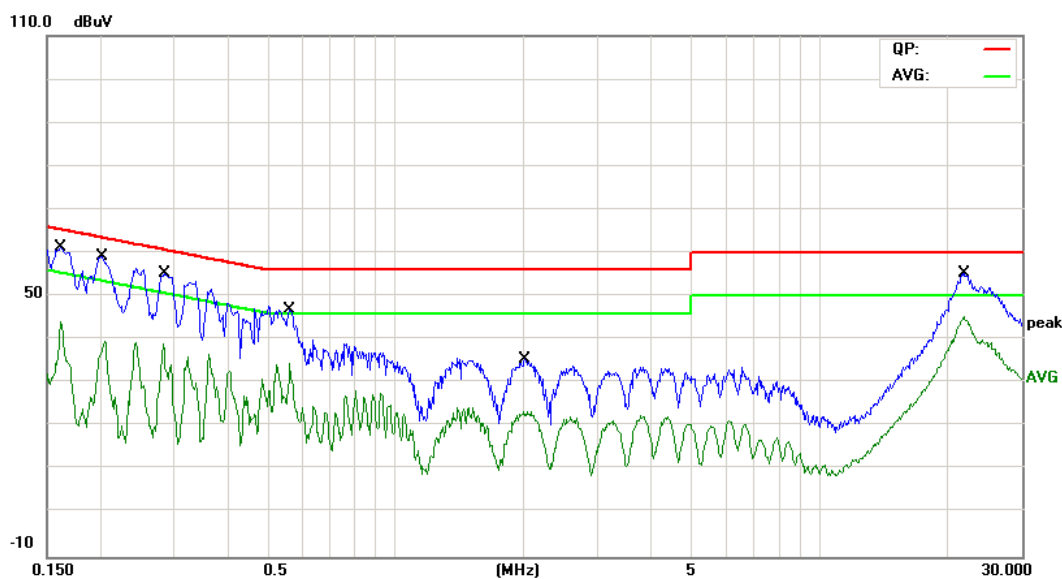
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	AC Charging with TX B Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1620	51.14	10.12	61.26	65.36	-4.10	QP	
2		0.1620	34.08	10.12	44.20	55.36	-11.16	AVG	
3		0.2832	45.09	10.09	55.18	60.72	-5.54	QP	
4		0.2832	28.82	10.09	38.91	50.72	-11.81	AVG	
5		0.5620	36.87	10.02	46.89	56.00	-9.11	QP	
6		0.5620	24.57	10.02	34.59	46.00	-11.41	AVG	
7		1.3980	25.50	10.12	35.62	56.00	-20.38	QP	
8		1.3980	14.20	10.12	24.32	46.00	-21.68	AVG	
9		2.0140	25.40	10.06	35.46	56.00	-20.54	QP	
10		2.0140	13.49	10.06	23.55	46.00	-22.45	AVG	
11		22.0300	45.15	10.06	55.21	60.00	-4.79	QP	
12		22.0300	35.14	10.06	45.20	50.00	-4.80	AVG	

Emission Level= Read Level+ Correct Factor

EUT:	Pos terminal	Model Name :	IDT800
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	Comment
1		0.1780	48.38	10.12	58.50	64.57	-6.07	QP	
2		0.1780	27.18	10.12	37.30	54.57	-17.27	AVG	
3		0.2060	46.75	10.12	56.87	63.36	-6.49	QP	
4		0.2060	25.51	10.12	35.63	53.36	-17.73	AVG	
5		0.2660	39.46	10.10	49.56	61.24	-11.68	QP	
6		0.2660	20.33	10.10	30.43	51.24	-20.81	AVG	
7		0.5620	32.80	10.02	42.82	56.00	-13.18	QP	
8		0.5620	21.66	10.02	31.68	46.00	-14.32	AVG	
9		1.2016	24.19	10.14	34.33	56.00	-21.67	QP	
10		1.2016	13.36	10.14	23.50	46.00	-22.50	AVG	
11		22.1180	40.84	10.06	50.90	60.00	-9.10	QP	
12	*	22.1180	34.88	10.06	44.94	50.00	-5.06	AVG	

Emission Level= Read Level+ Correct Factor

5. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC Part 15.209

4.1.2 Test Limit

Radiated Emission Limit (9 kHz~1000MHz)

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
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

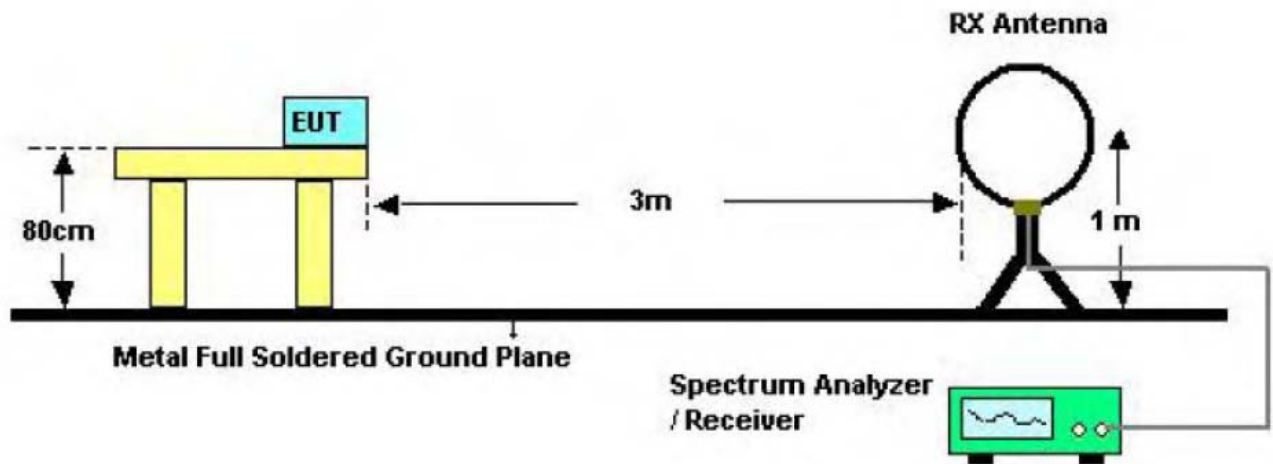
Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
Above 1000	74	54

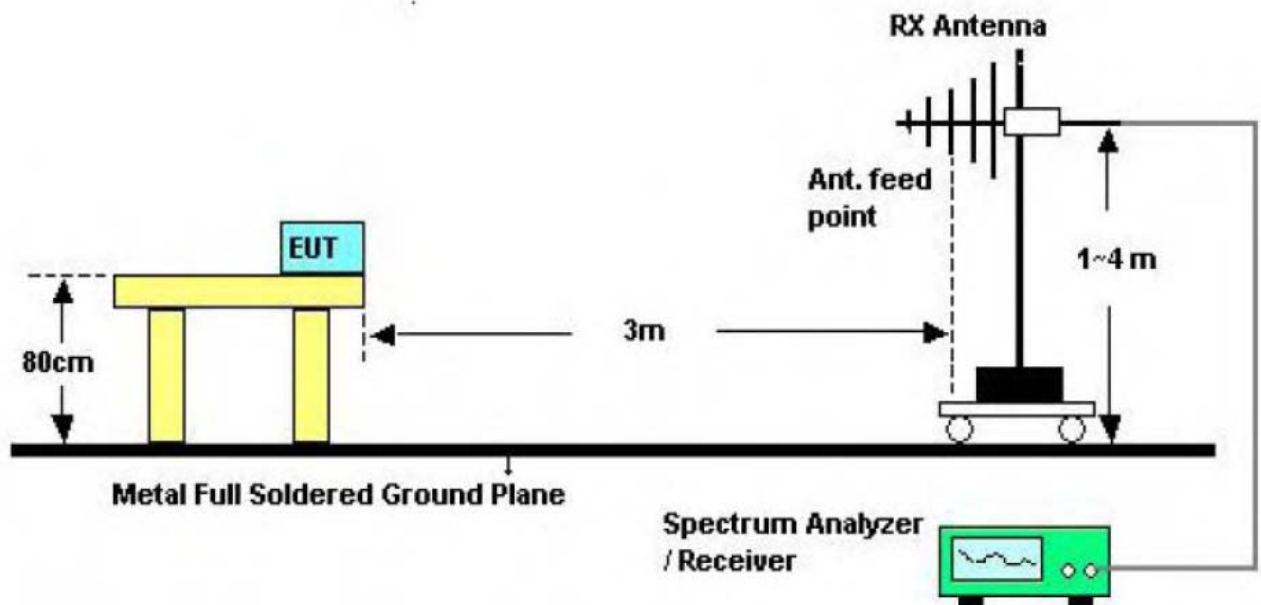
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

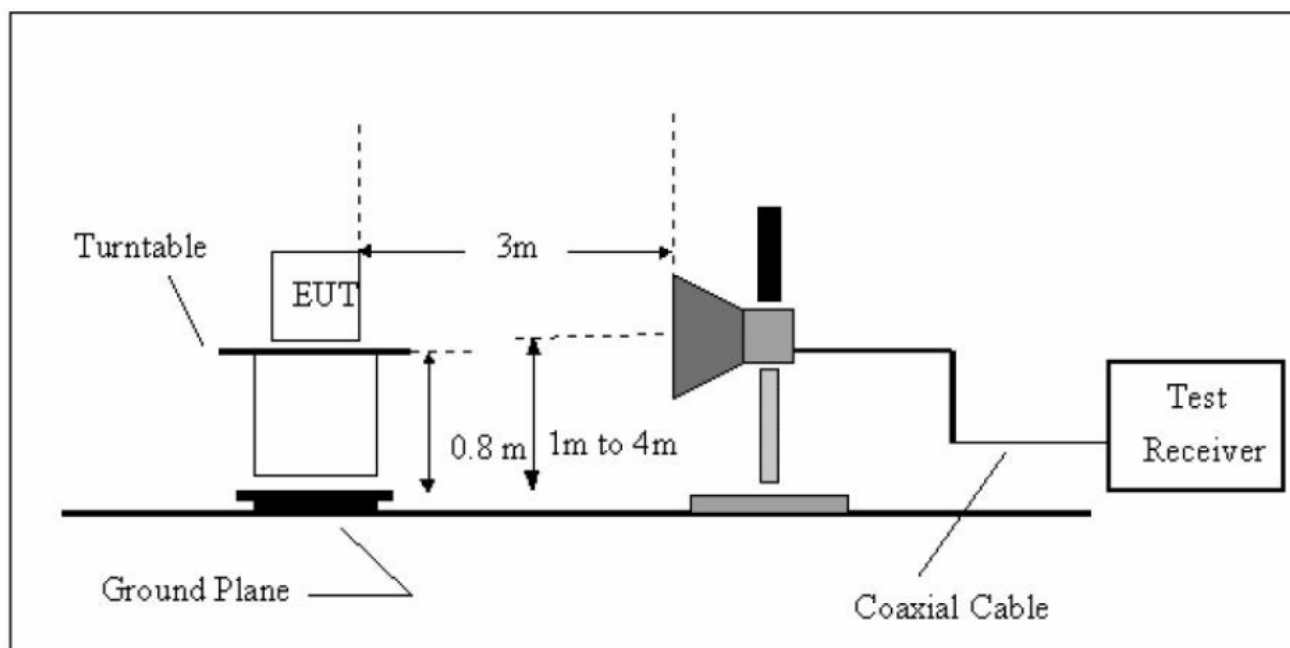
4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

4.3 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.

4.4 EUT Operating Condition

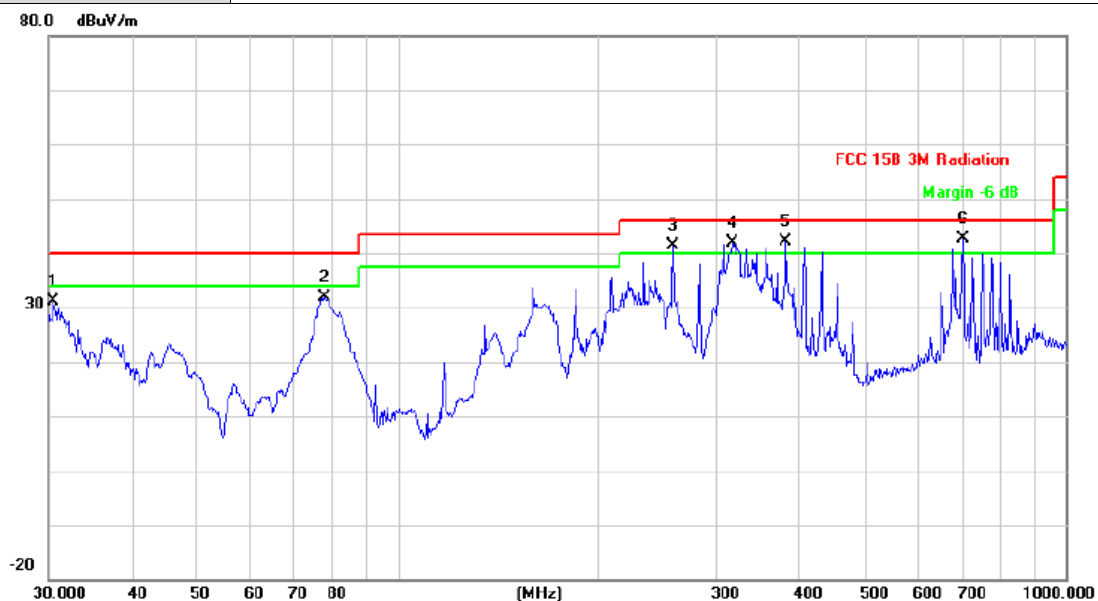
The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.

4.5 Test Data

Remark: During testing 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.

Test data please refer the following pages.

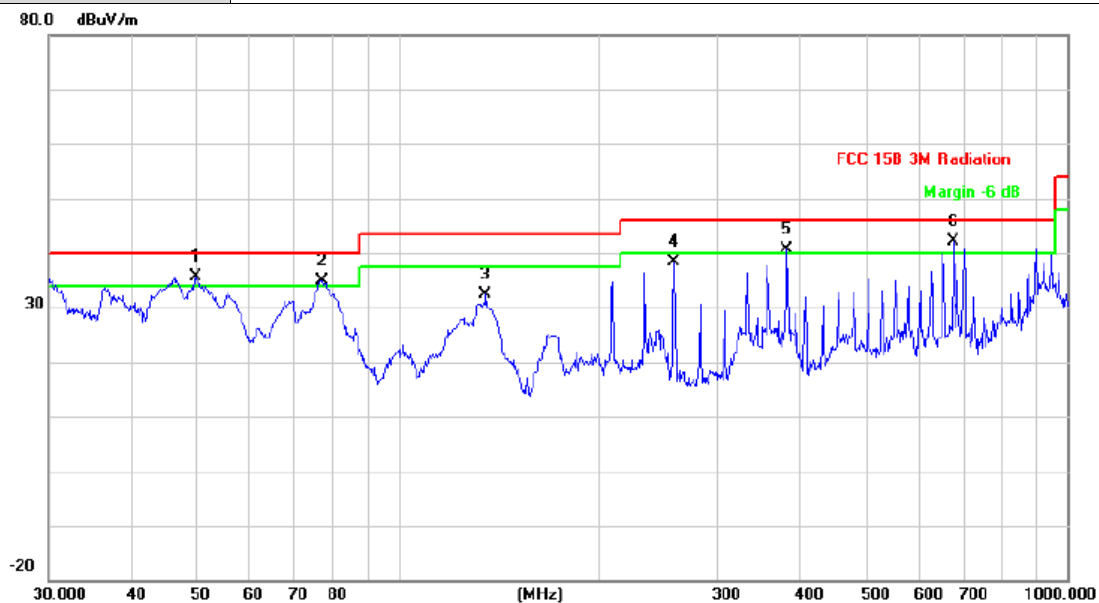
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		30.5304	45.50	-14.28	31.22	40.00	-8.78	peak			
2		77.5926	55.15	-23.36	31.79	40.00	-8.21	peak			
3	!	258.3263	59.34	-17.94	41.40	46.00	-4.60	peak			
4	!	316.5889	58.36	-16.45	41.91	46.00	-4.09	peak			
5	!	381.2485	56.20	-14.05	42.15	46.00	-3.85	peak			
6	*	701.7607	49.49	-6.88	42.61	46.00	-3.39	peak			

Emission Level= Read Level+ Correct Factor

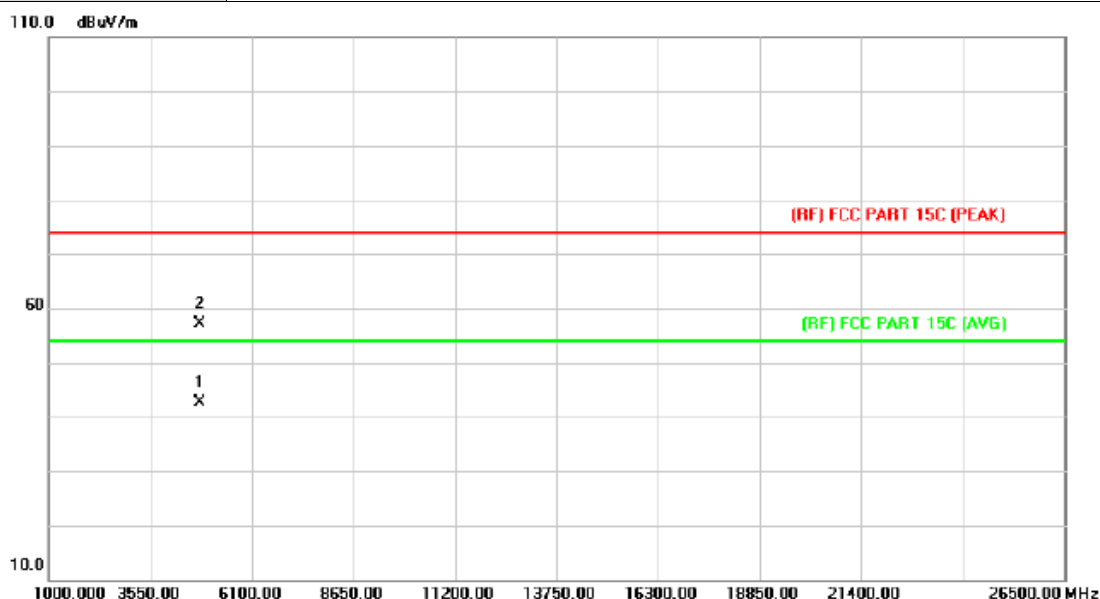
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	!	49.7068	59.82	-24.27	35.55	40.00	-4.45	peak		
2	!	77.0502	58.20	-23.38	34.82	40.00	-5.18	peak		
3		135.0319	54.46	-22.08	32.38	43.50	-11.12	peak		
4		258.3263	56.24	-17.94	38.30	46.00	-7.70	peak		
5	!	381.2485	54.68	-14.05	40.63	46.00	-5.37	peak		
6	*	677.5797	49.63	-7.48	42.15	46.00	-3.85	peak		

Emission Level= Read Level+ Correct Factor

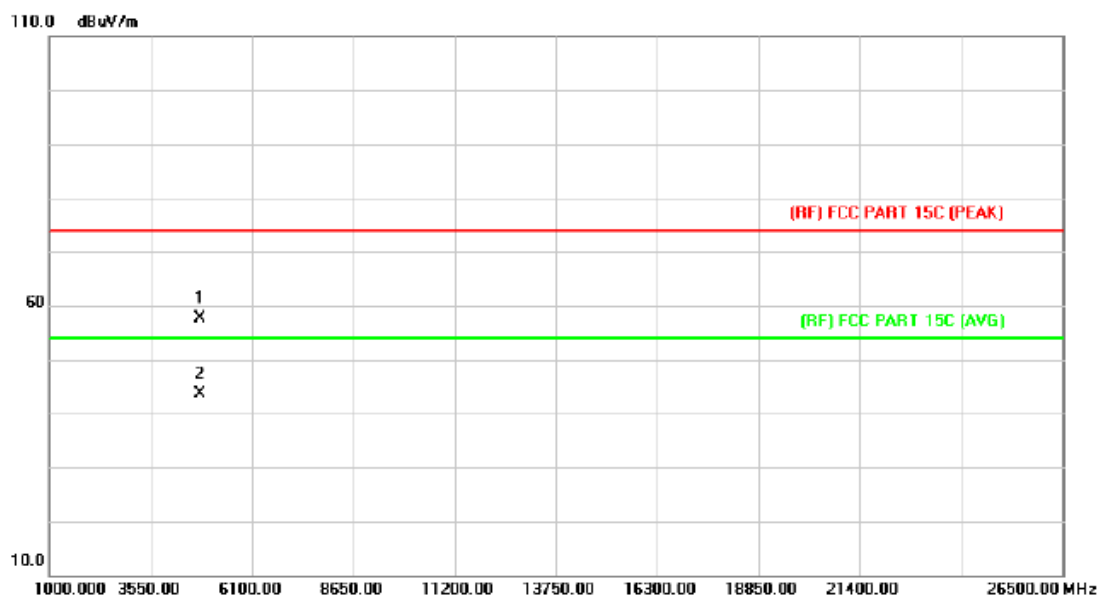
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.112	29.28	13.44	42.72	54.00	-11.28	AVG
2		4804.291	43.68	13.44	57.12	74.00	-16.88	peak

Emission Level= Read Level+ Correct Factor

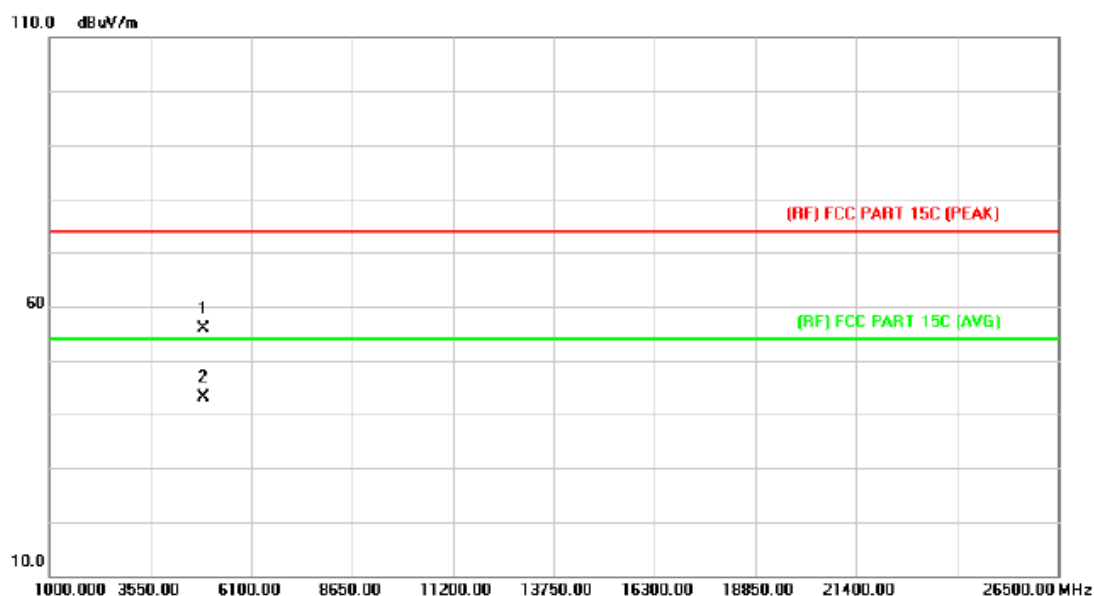
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4803.450	44.12	13.44	57.56	74.00	-16.44 peak
2	*	4804.020	30.21	13.44	43.65	54.00	-10.35 AVG

Emission Level= Read Level+ Correct Factor

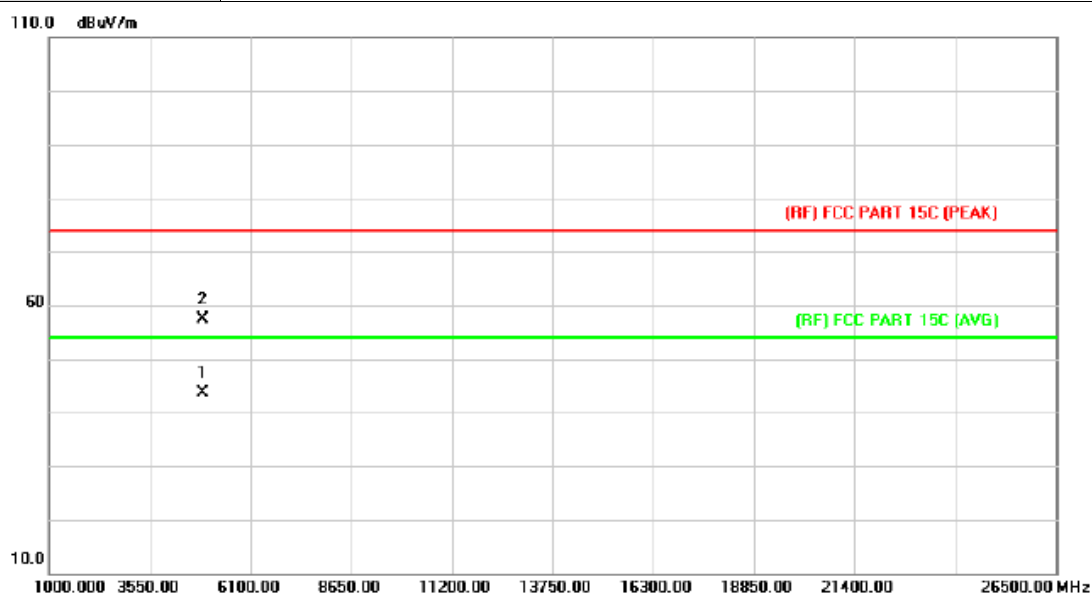
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4881.940	41.96	13.90	55.86	74.00	-18.14 peak
2	*	4881.940	29.14	13.90	43.04	54.00	-10.96 AVG

Emission Level= Read Level+ Correct Factor

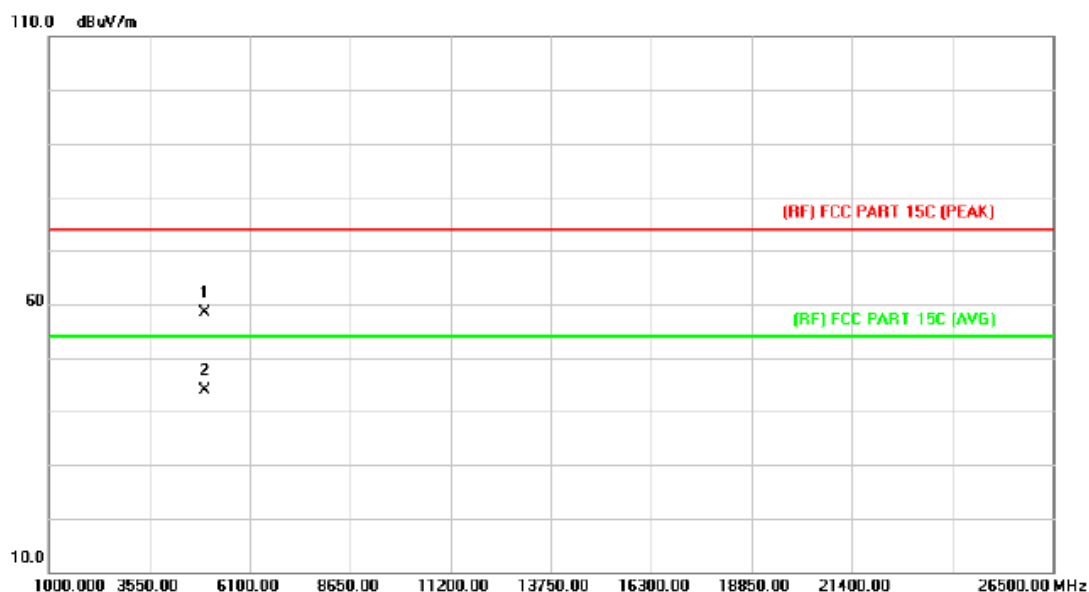
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4881.990	29.78	13.90	43.68	54.00	-10.32	AVG
2		4882.170	43.46	13.90	57.36	74.00	-16.64	peak

Emission Level= Read Level+ Correct Factor

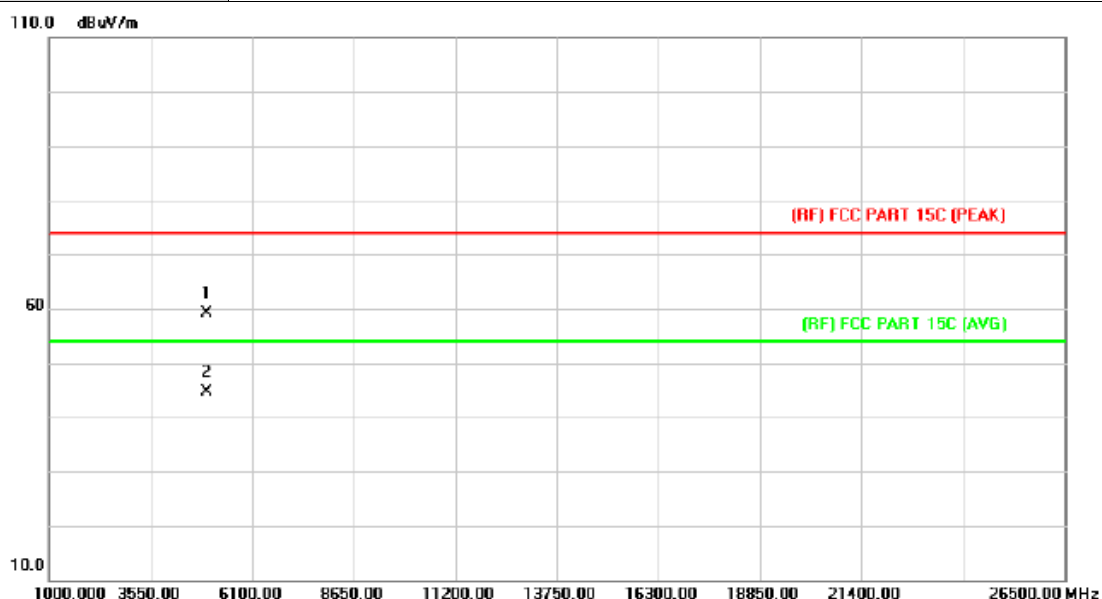
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4959.580	44.00	14.36	58.36	74.00	-15.64 peak
2	*	4959.820	29.50	14.36	43.86	54.00	-10.14 AVG

Emission Level= Read Level+ Correct Factor

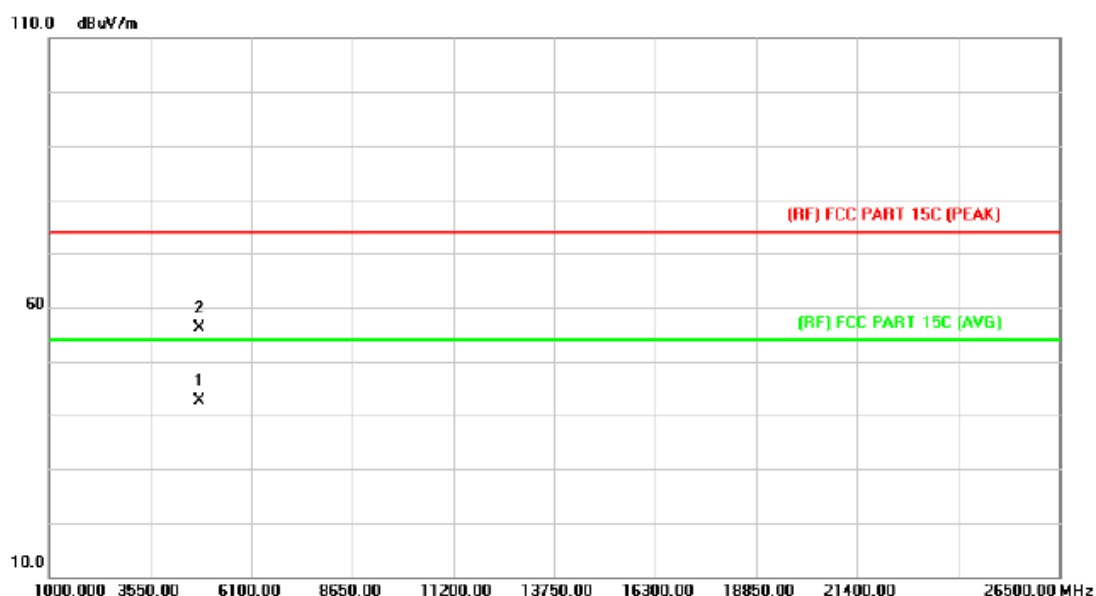
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4959.800	44.86	14.36	59.22	74.00	-14.78	peak
2	*	4959.910	30.20	14.36	44.56	54.00	-9.44	AVG

Emission Level= Read Level+ Correct Factor

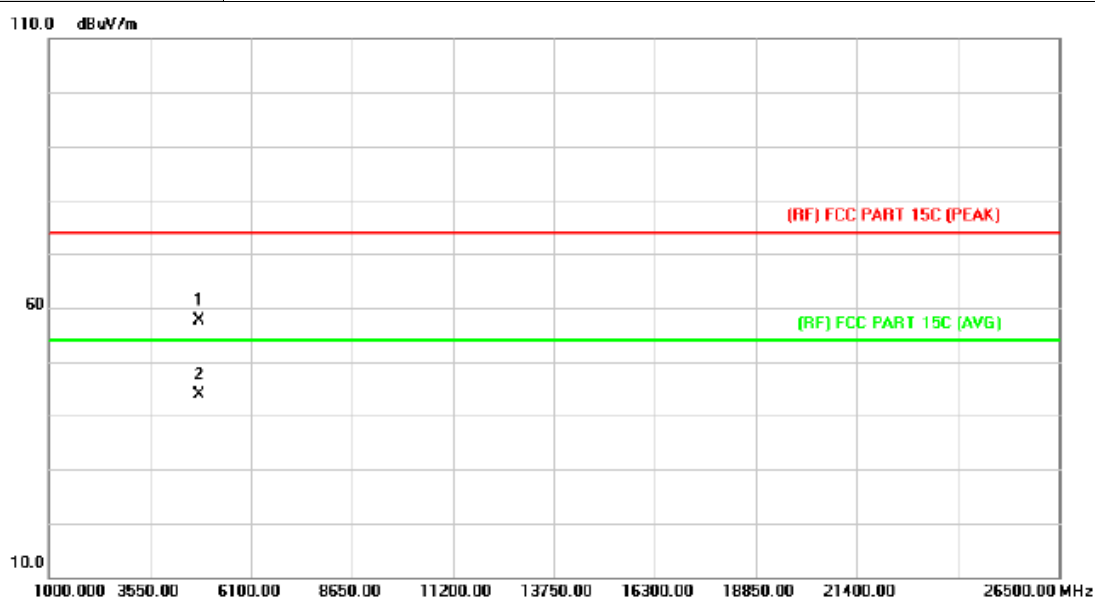
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.940	29.12	13.44	42.56	54.00	-11.44	AVG
2		4804.200	42.79	13.44	56.23	74.00	-17.77	peak

Emission Level= Read Level+ Correct Factor

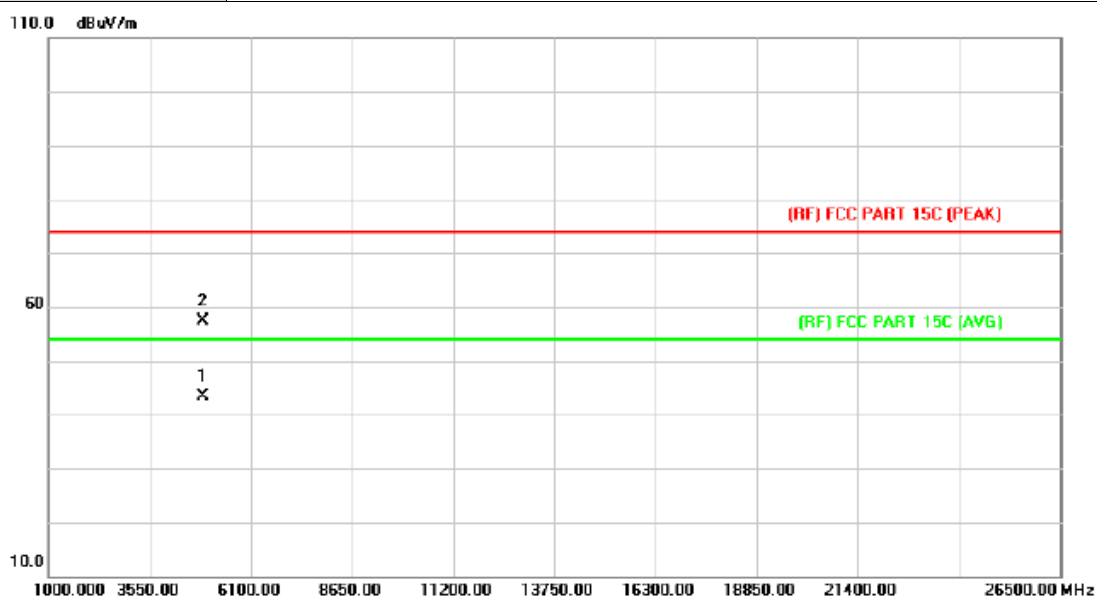
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4804.010	44.24	13.44	57.68	74.00	-16.32	peak
2	*	4804.120	30.45	13.44	43.89	54.00	-10.11	AVG

Emission Level= Read Level+ Correct Factor

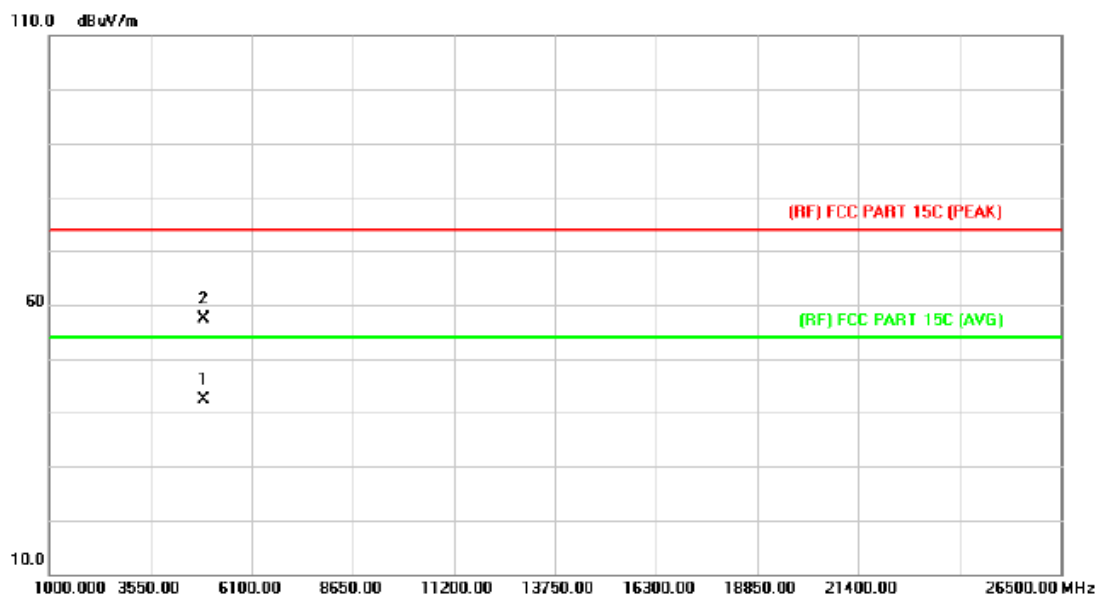
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4881.963	29.36	13.90	43.26	54.00	-10.74	AVG
2		4881.985	43.46	13.90	57.36	74.00	-16.64	peak

Emission Level= Read Level+ Correct Factor

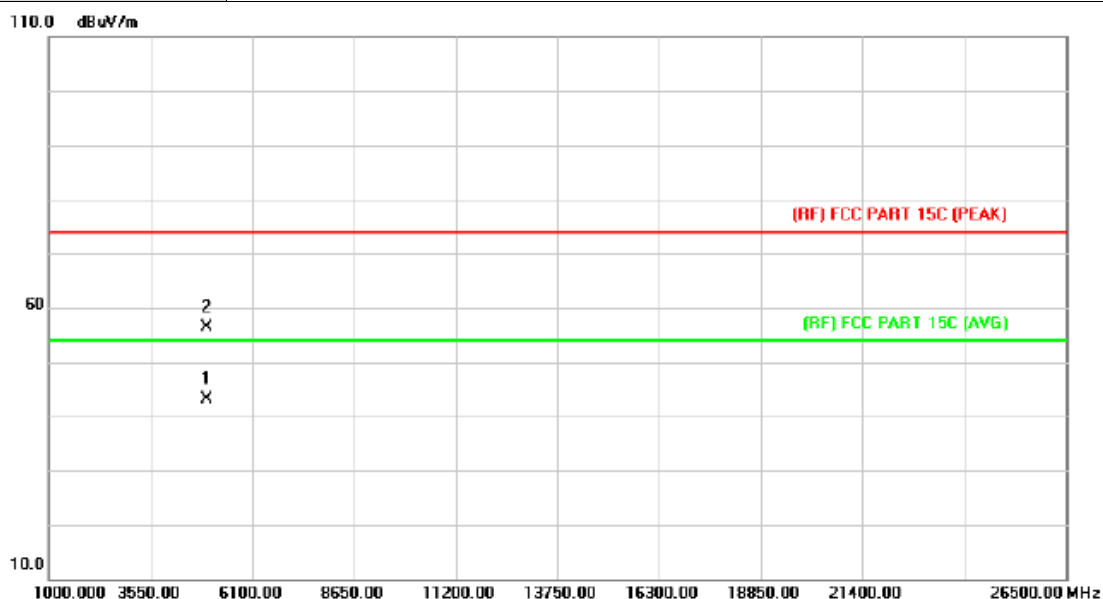
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.967	28.46	13.90	42.36	54.00	-11.64	AVG
2		4881.987	43.41	13.90	57.31	74.00	-16.69	peak

Emission Level= Read Level+ Correct Factor

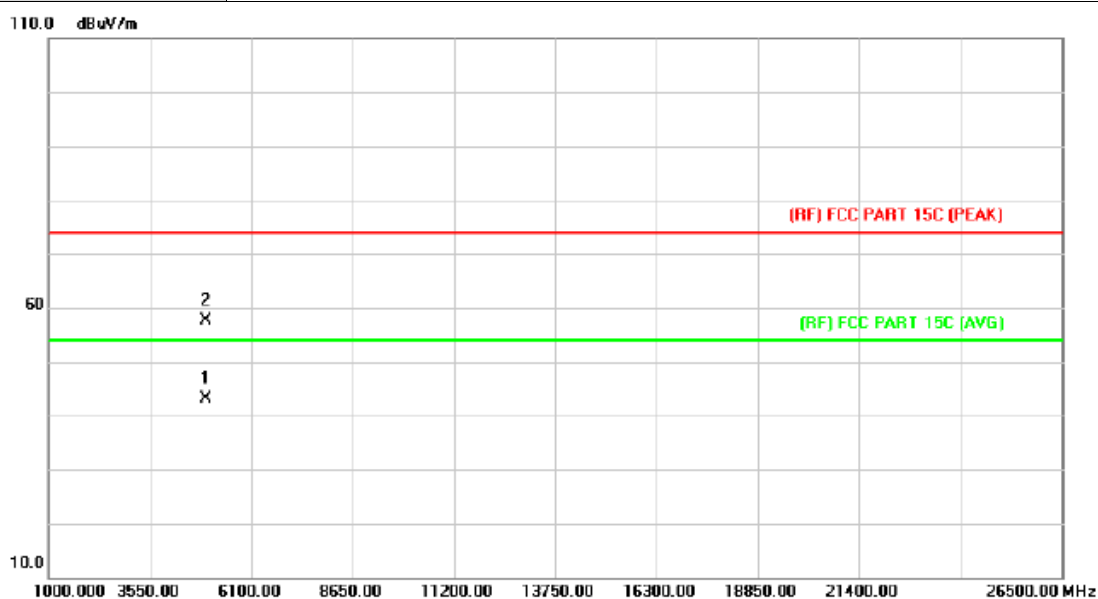
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4959.854	28.76	14.36	43.12	54.00	-10.88	AVG
2		4959.932	42.00	14.36	56.36	74.00	-17.64	peak

Emission Level= Read Level+ Correct Factor

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4959.963	28.76	14.36	43.12	54.00	-10.88	AVG
2		4959.971	43.33	14.36	57.69	74.00	-16.31	peak

Emission Level= Read Level+ Correct Factor

6. Restricted Bands Requirement

5.1 Test Standard and Limit

5.1.1 Test Standard

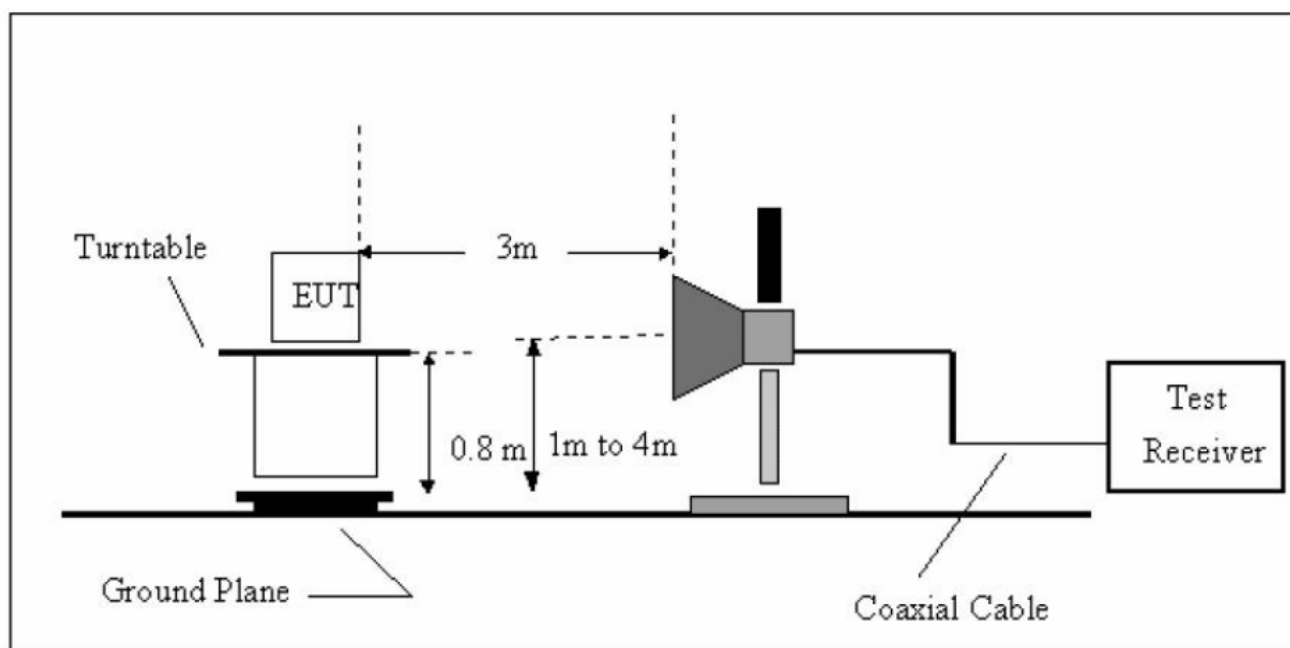
FCC Part 15.209

FCC Part 15.205

5.1.2 Test Limit

Restricted Frequency Band (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54
Note: All restriction bands have been tested, only the worst case is reported.		

5.2 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 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

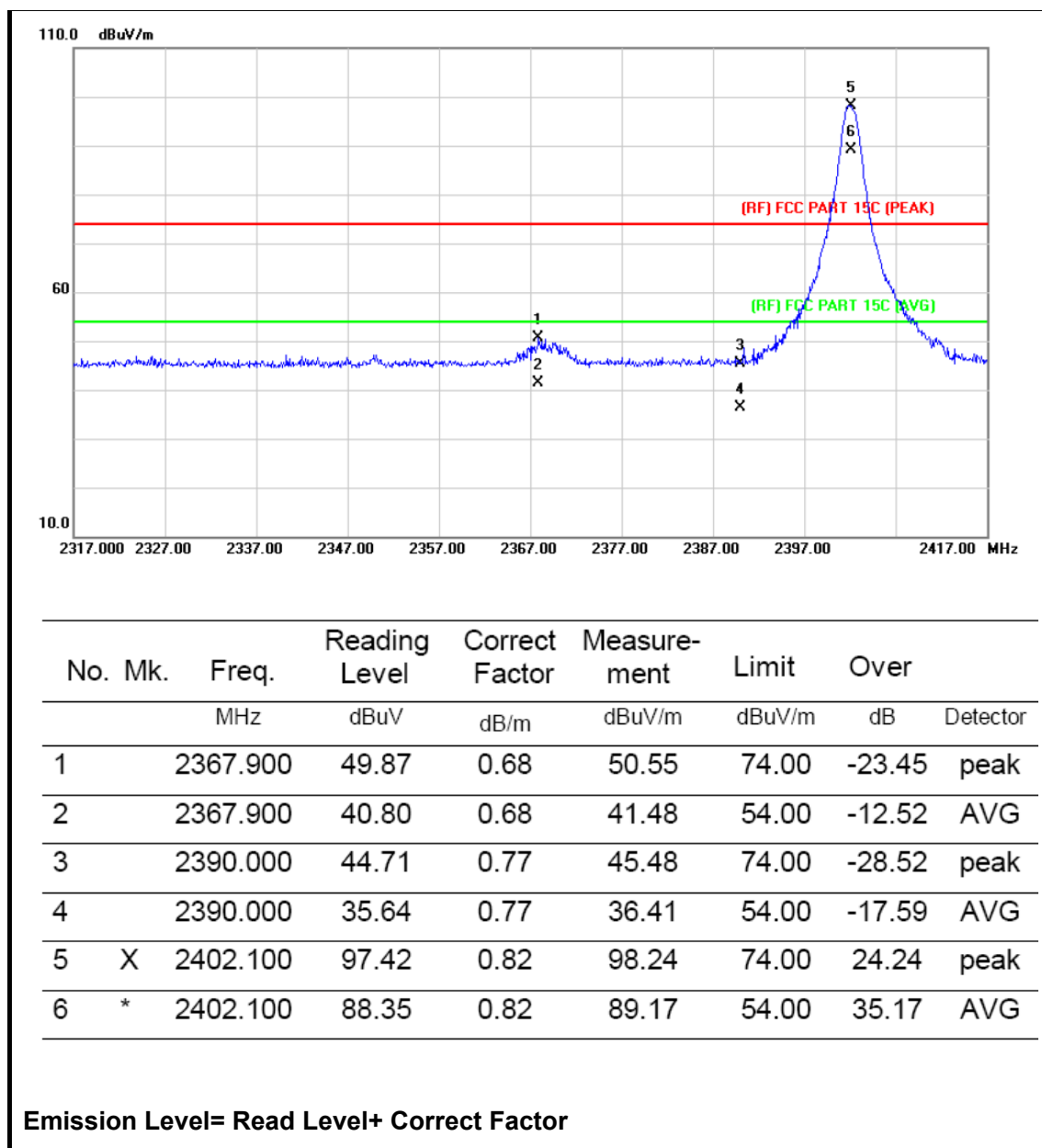
The Equipment Under Test was set to Continual Transmitting in maximum power.

5.5 Test Data

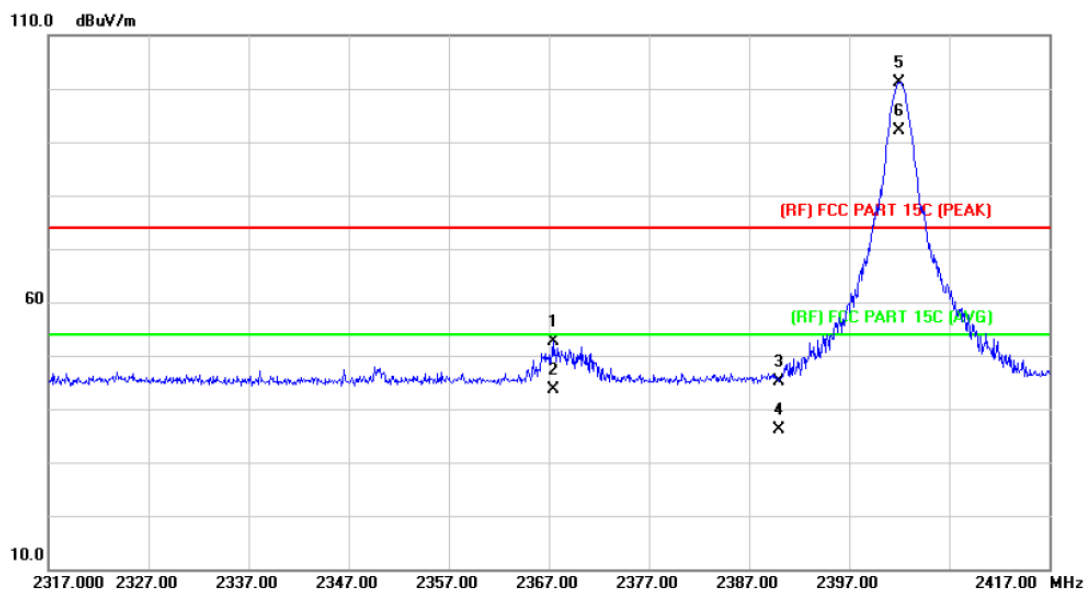
All restriction bands have been tested, only the worst case is reported.

(1) Radiation Test

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



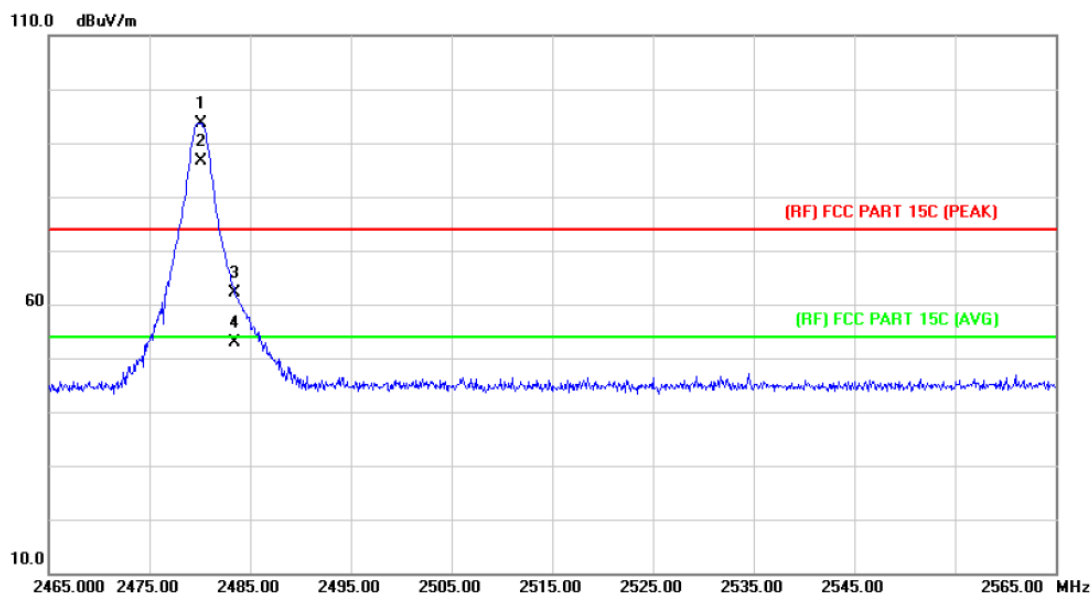
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2367.400	51.98	0.68	52.66	74.00	-21.34	peak
2		2367.400	42.91	0.68	43.59	54.00	-10.41	AVG
3		2390.000	44.47	0.77	45.24	74.00	-28.76	peak
4		2390.000	35.40	0.77	36.17	54.00	-17.83	AVG
5	X	2402.000	100.39	0.82	101.21	74.00	27.21	peak
6	*	2402.000	91.32	0.82	92.14	54.00	38.14	AVG

Emission Level= Read Level+ Correct Factor

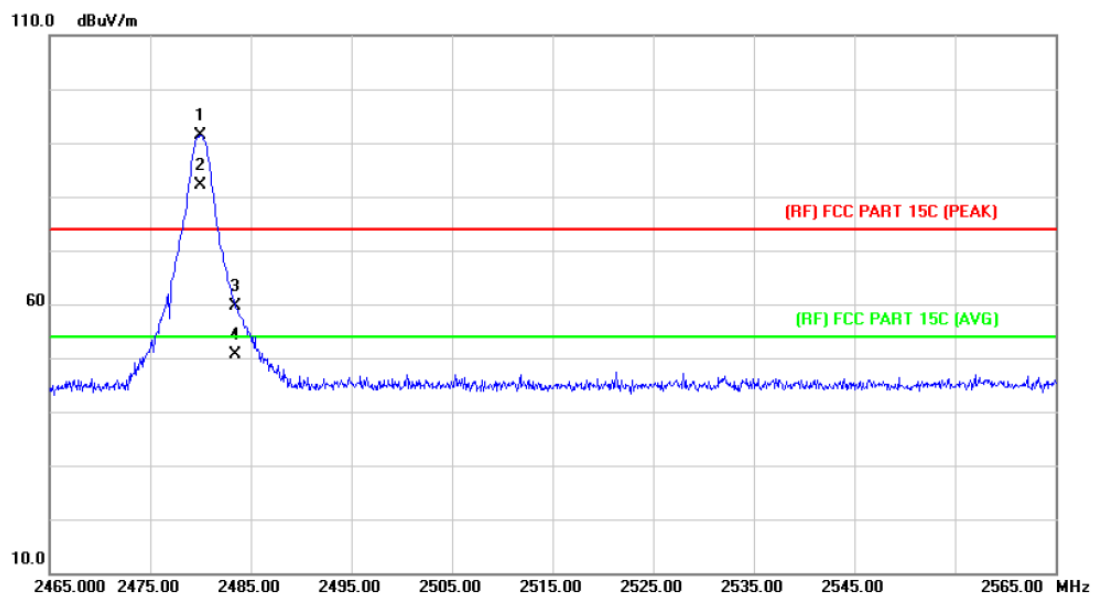
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2480.100	92.59	1.15	93.74	74.00	19.74	peak
2	*	2480.100	85.52	1.15	86.67	54.00	32.67	AVG
3		2483.500	60.88	1.17	62.05	74.00	-11.95	peak
4		2483.500	51.81	1.17	52.98	54.00	-1.02	AVG

Emission Level= Read Level+ Correct Factor

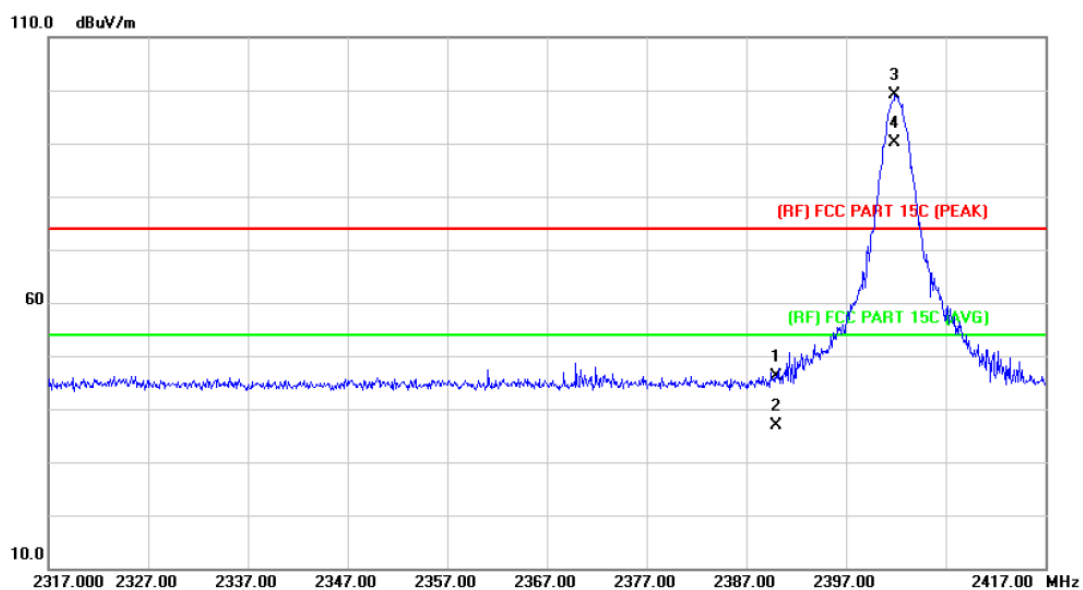
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2480.000	90.17	1.15	91.32	74.00	17.32	peak
2	*	2480.000	81.10	1.15	82.25	54.00	28.25	AVG
3		2483.500	58.47	1.17	59.64	74.00	-14.36	peak
4		2483.500	49.40	1.17	50.57	54.00	-3.43	AVG

Emission Level= Read Level+ Correct Factor

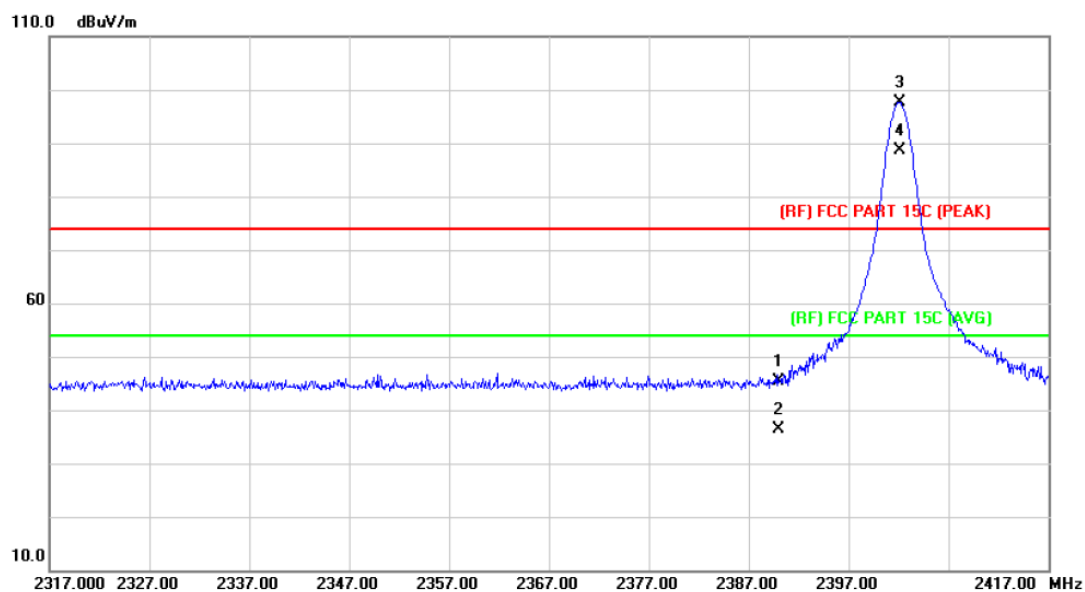
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	45.25	0.77	46.02	74.00	-27.98	peak
2		2390.000	36.18	0.77	36.95	54.00	-17.05	AVG
3	X	2401.900	98.26	0.82	99.08	74.00	25.08	peak
4	*	2401.900	89.19	0.82	90.01	54.00	36.01	AVG

Emission Level= Read Level+ Correct Factor

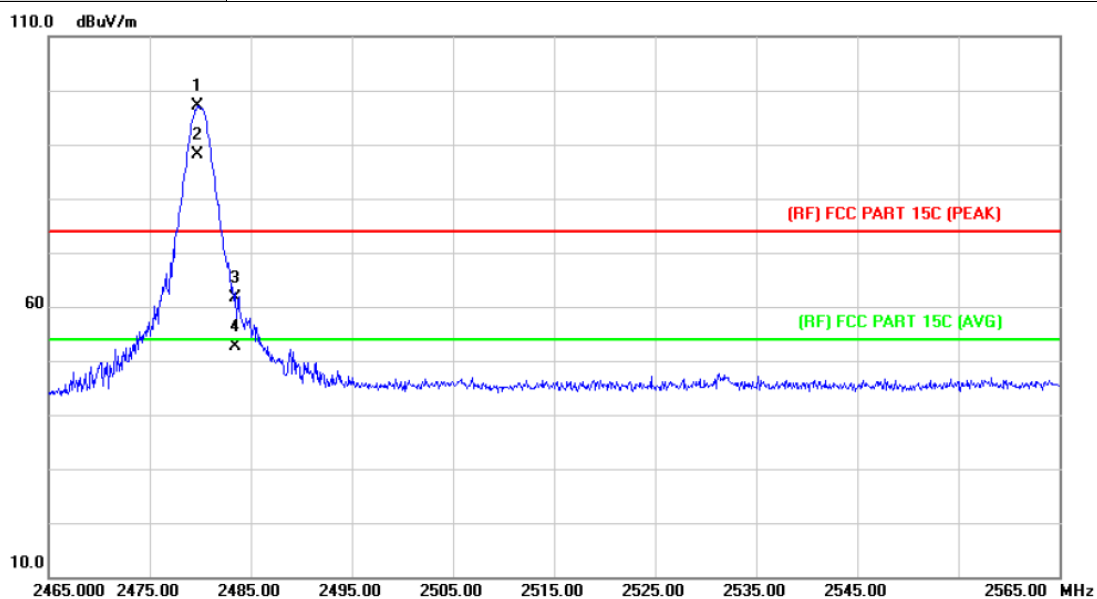
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	44.57	0.77	45.34	74.00	-28.66 peak
2		2390.000	35.50	0.77	36.27	54.00	-17.73 AVG
3	X	2402.100	96.92	0.82	97.74	74.00	23.74 peak
4	*	2402.100	87.85	0.82	88.67	54.00	34.67 AVG

Emission Level= Read Level+ Correct Factor

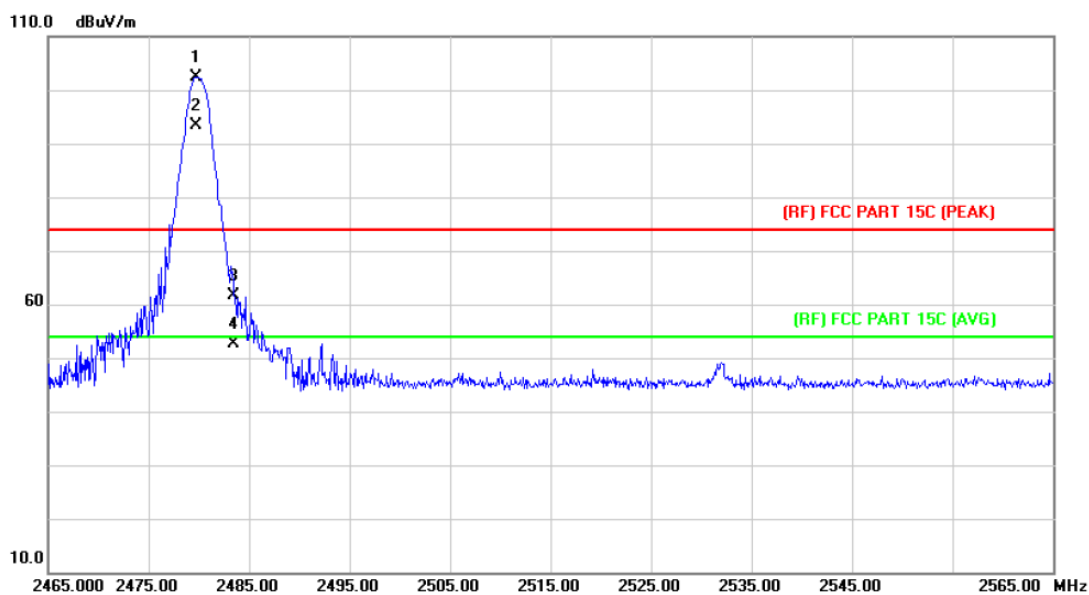
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2479.700	95.96	1.15	97.11	74.00	23.11	peak
2	*	2479.700	86.89	1.15	88.04	54.00	34.04	AVG
3		2483.500	60.45	1.17	61.62	74.00	-12.38	peak
4		2483.500	51.38	1.17	52.55	54.00	-1.45	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	N/A		

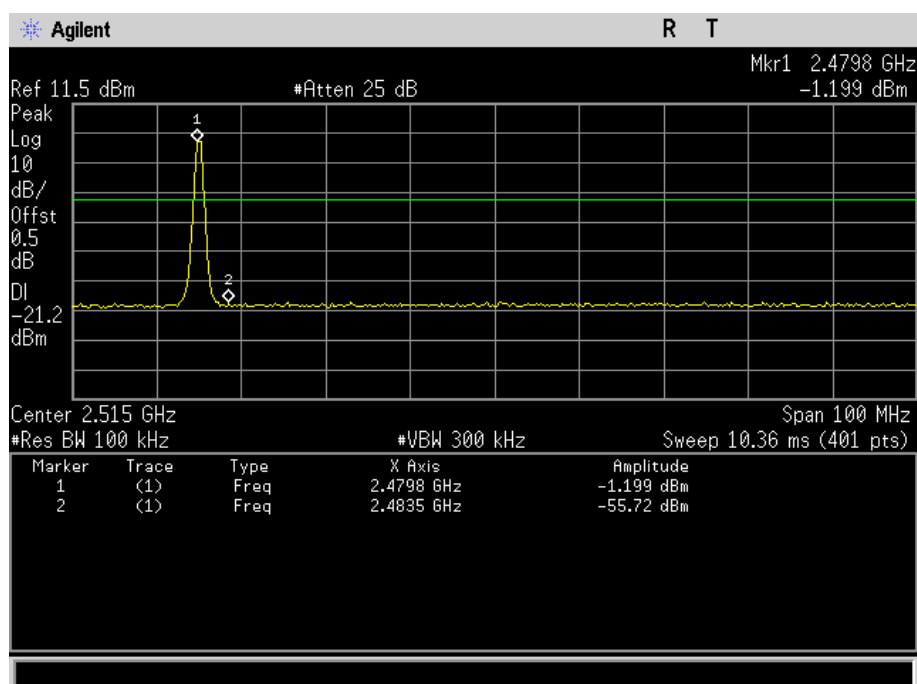
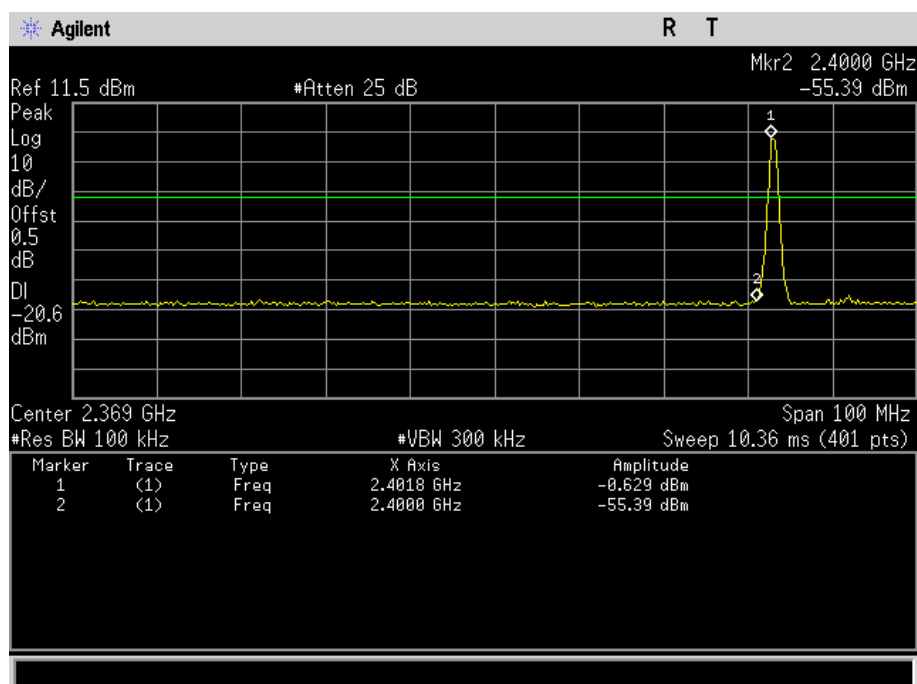


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2479.700	101.28	1.15	102.43	74.00	28.43	peak
2	*	2479.700	92.21	1.15	93.36	54.00	39.36	AVG
3		2483.500	60.47	1.17	61.64	74.00	-12.36	peak
4		2483.500	51.40	1.17	52.57	54.00	-1.43	AVG

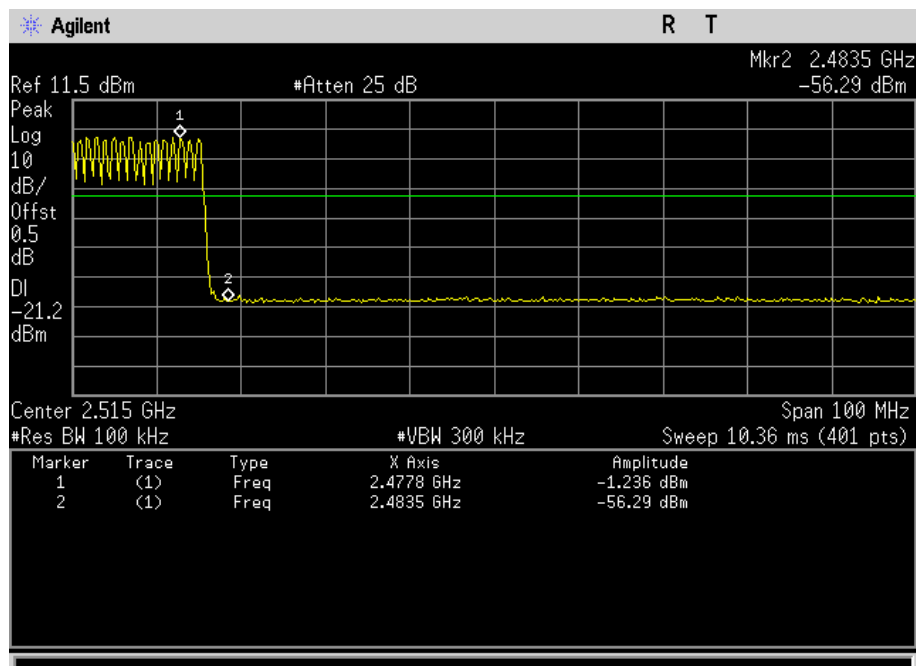
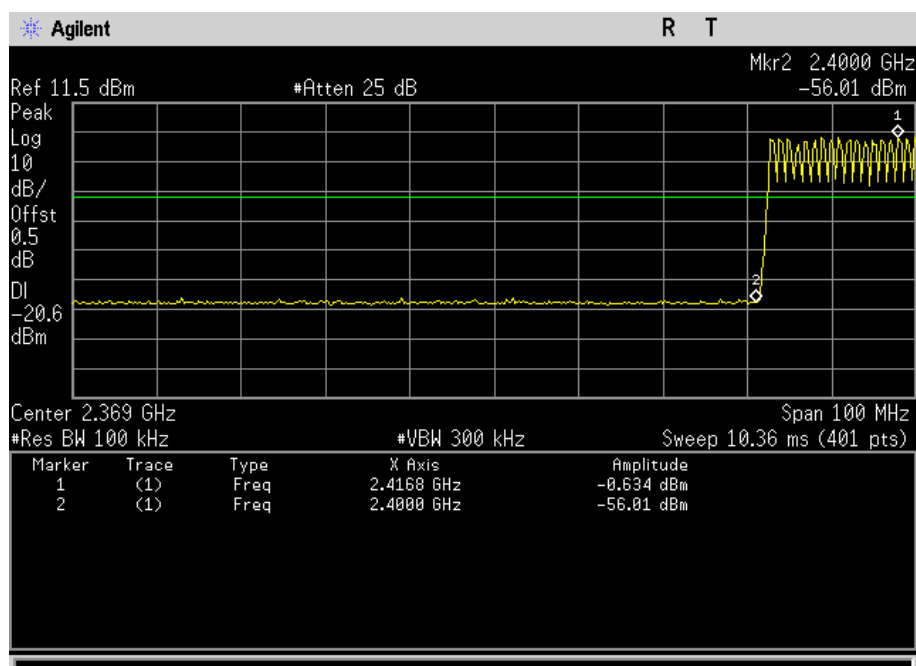
Emission Level= Read Level+ Correct Factor

(2) Conducted Test

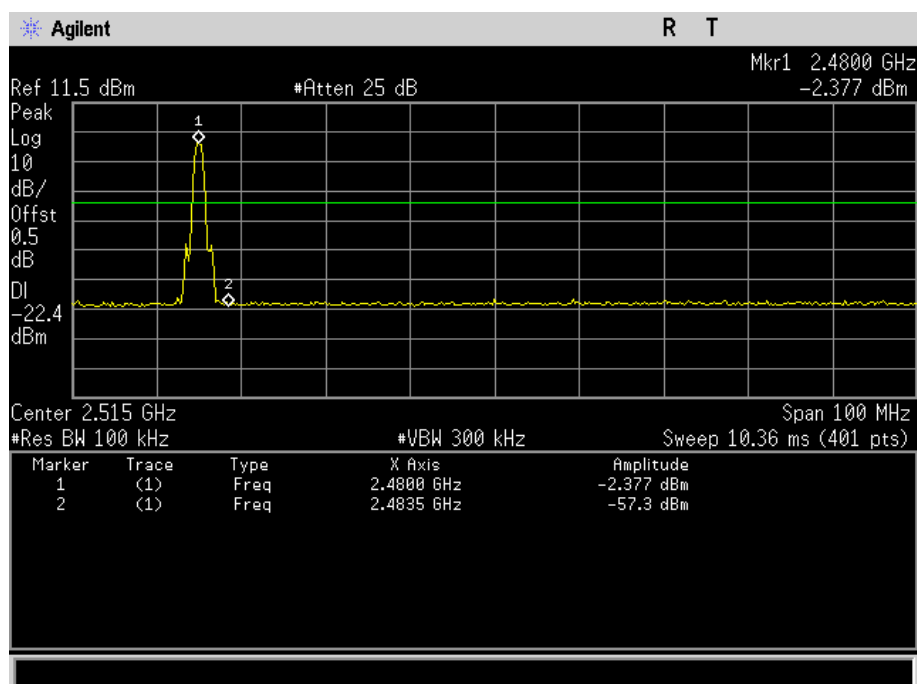
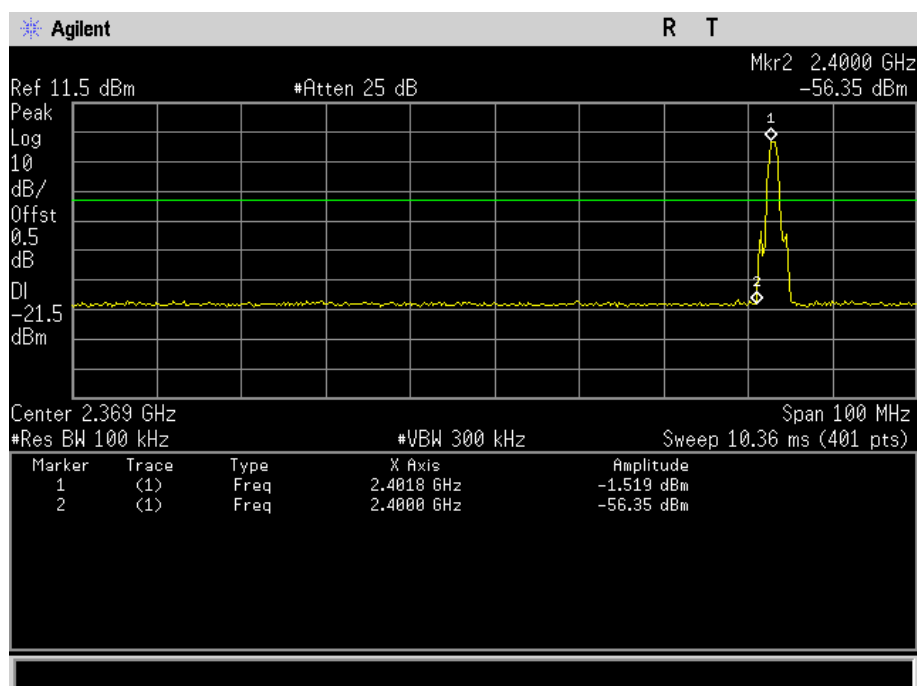
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



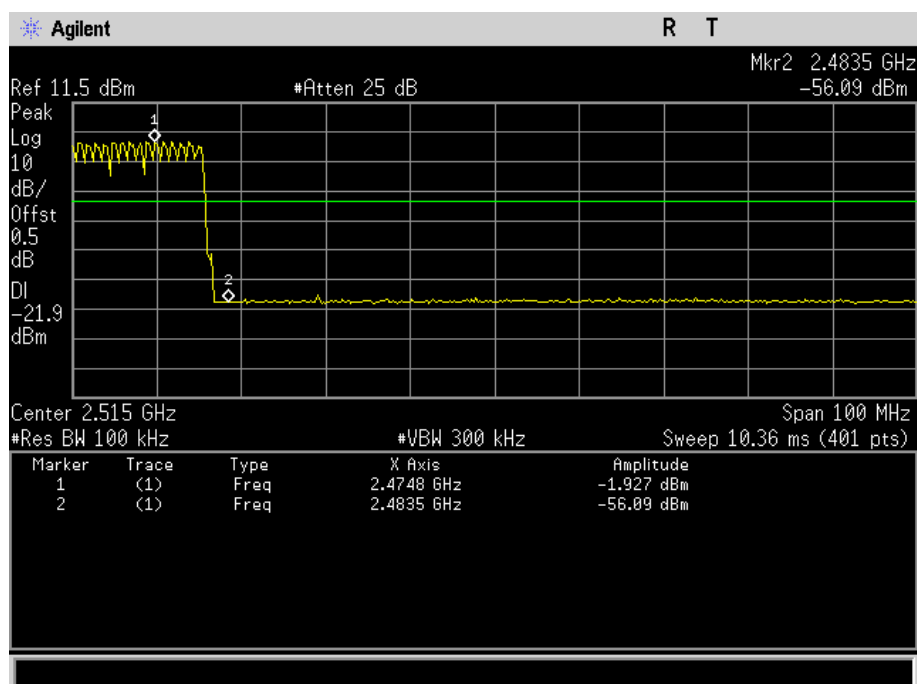
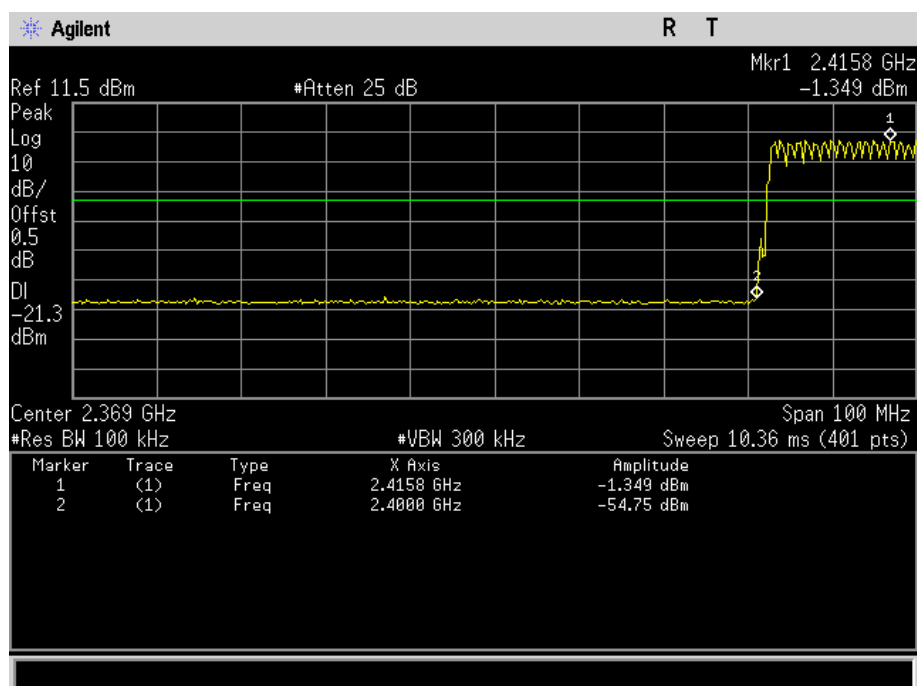
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	GFSK Hopping Mode		
Remark:	N/A		



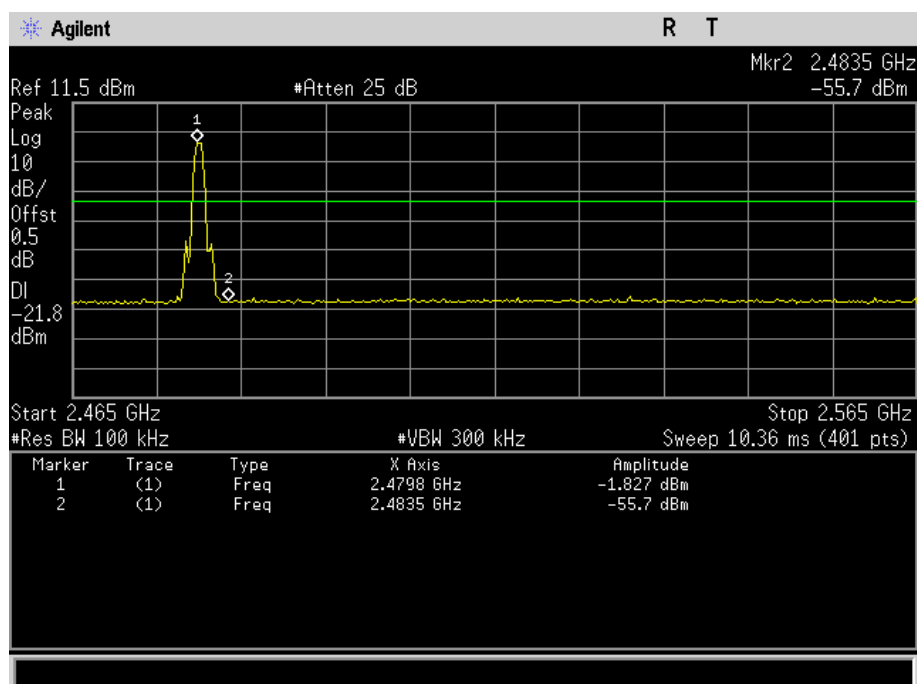
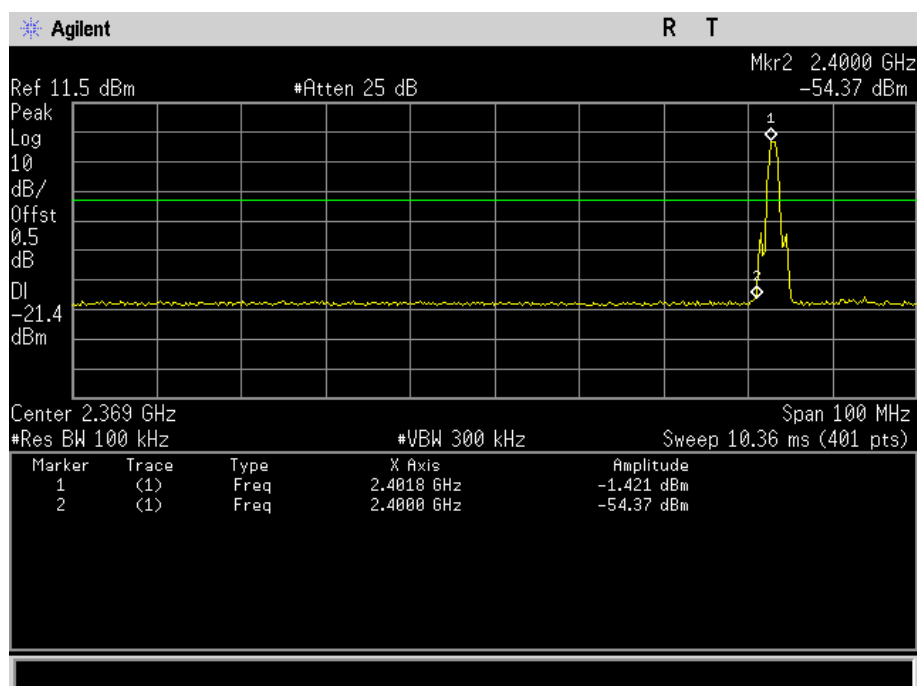
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	$\pi/4$ -DQPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



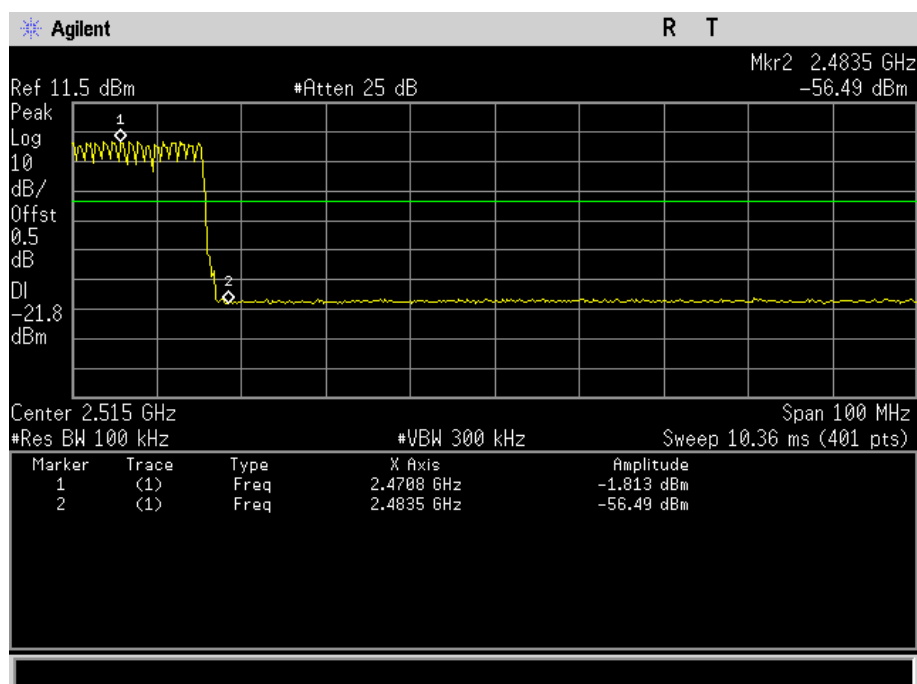
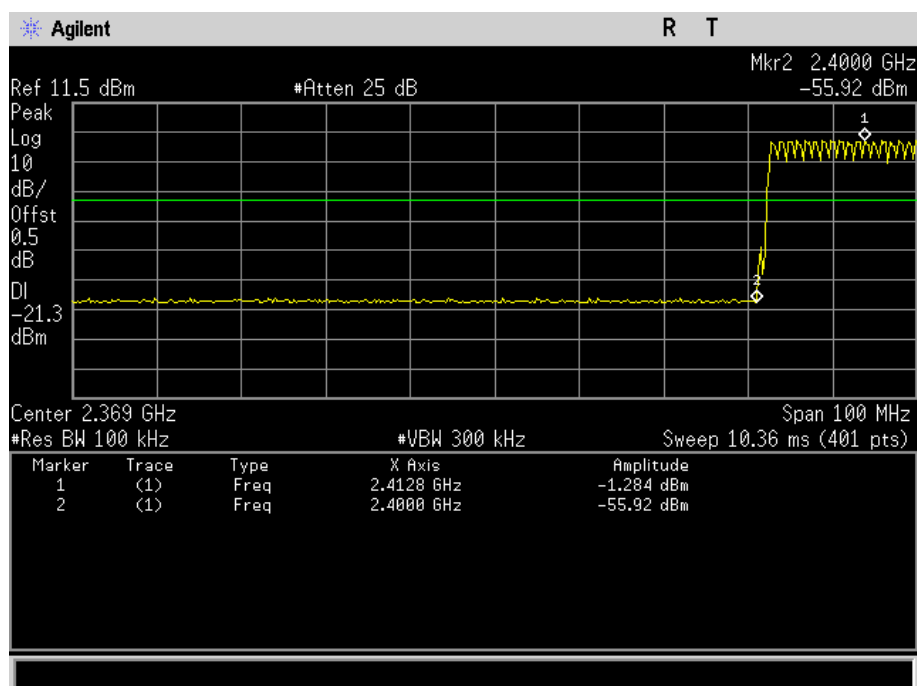
EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	$\pi/4$ -DQPSK Hopping Mode		
Remark:	N/A		



EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX 8-DPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	8-DPSK Hopping Mode		
Remark:	N/A		



7. Number of Hopping Channel

6.1 Test Standard and Limit

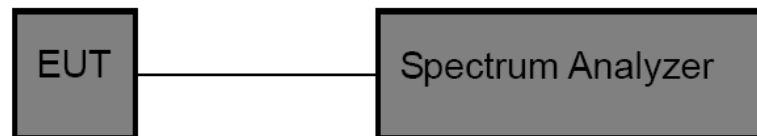
6.1.1 Test Standard

FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

6.2 Test Setup



6.3 Test Procedure

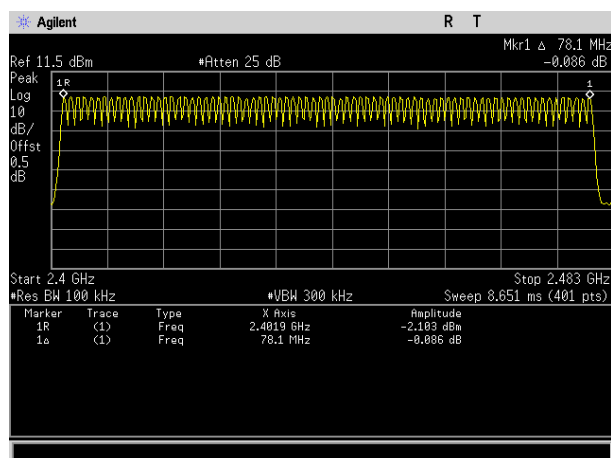
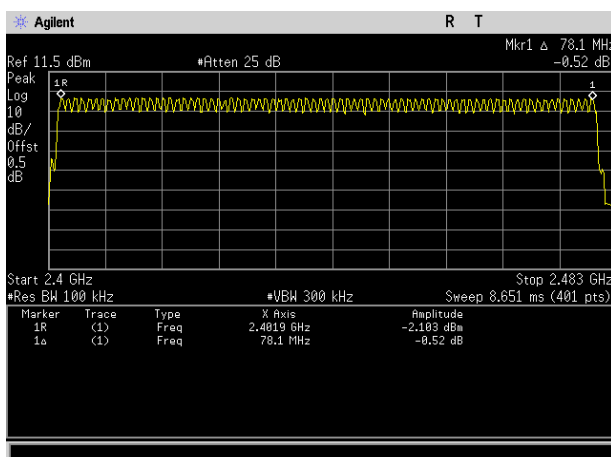
- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

6.4 EUT Operating Condition

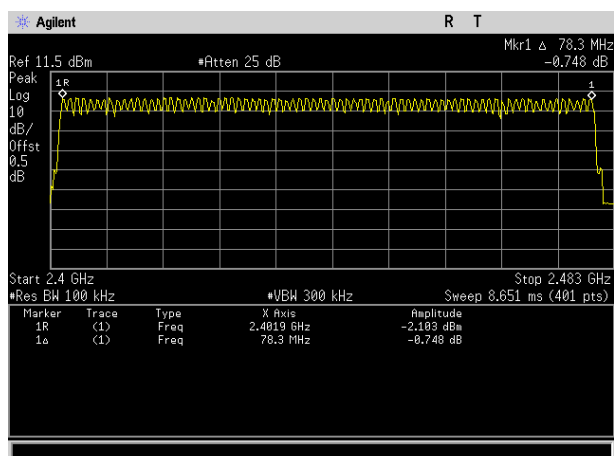
The EUT was set to the Hopping Mode by the Customer.

6.5 Test Data

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	Hopping Mode (GFSK/ $\pi/4$ -DQPSK/ 8-DPSK)		
Frequency Range	Quantity of Hopping Channel	Limit	
2402MHz~2480MHz	79	>15	

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

8-DPSK mode



8. Average Time of Occupancy

7.1 Test Standard and Limit

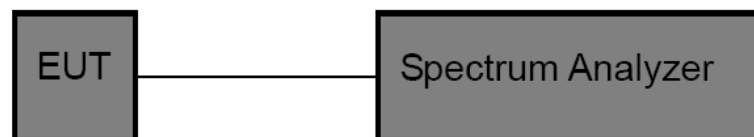
5.1.1 Test Standard

FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210 Annex 8(A8.1d)	Average Time of Occupancy	0.4 sec

7.2 Test Setup



7.3 Test Procedure

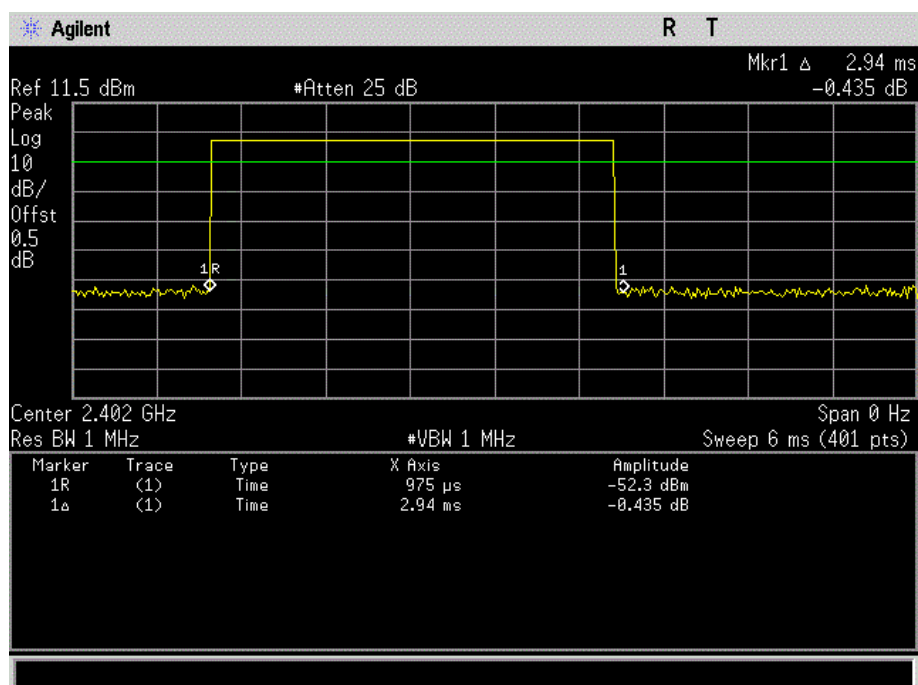
- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (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.

7.4 EUT Operating Condition

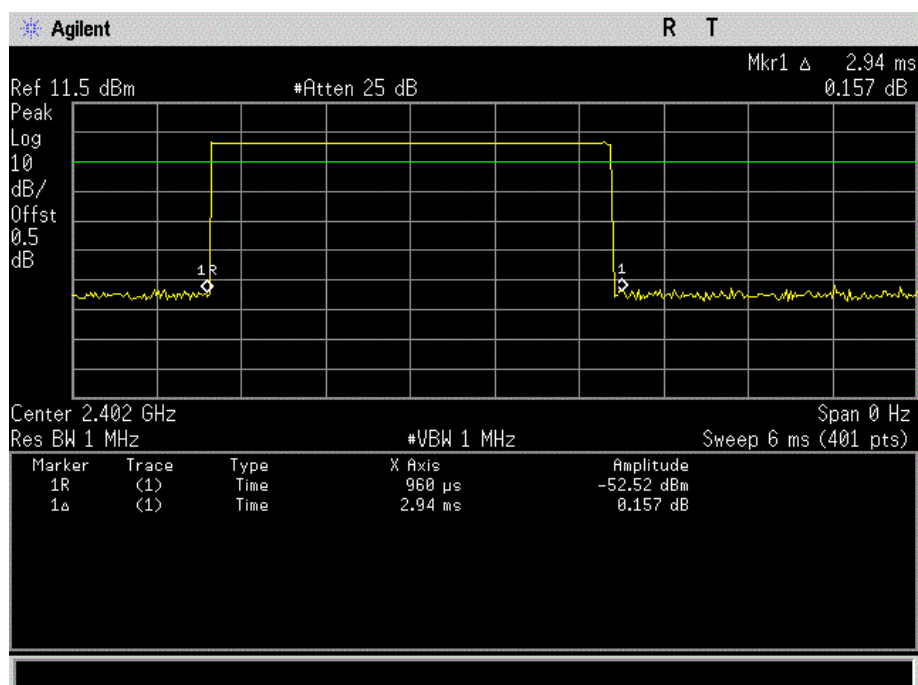
The EUT was set to the Hopping Mode by the Customer.

7.5 Test Data

EUT:		Pos terminal		Model Name :		IDT800
Temperature:		25 °C		Relative Humidity:		55%
Test Voltage:		AC 120V/60HZ				
Test Mode:		Hopping Mode (GFSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result	
2402	2.94	313.6	31.60	400	PASS	
GFSK Hopping Mode DH5						

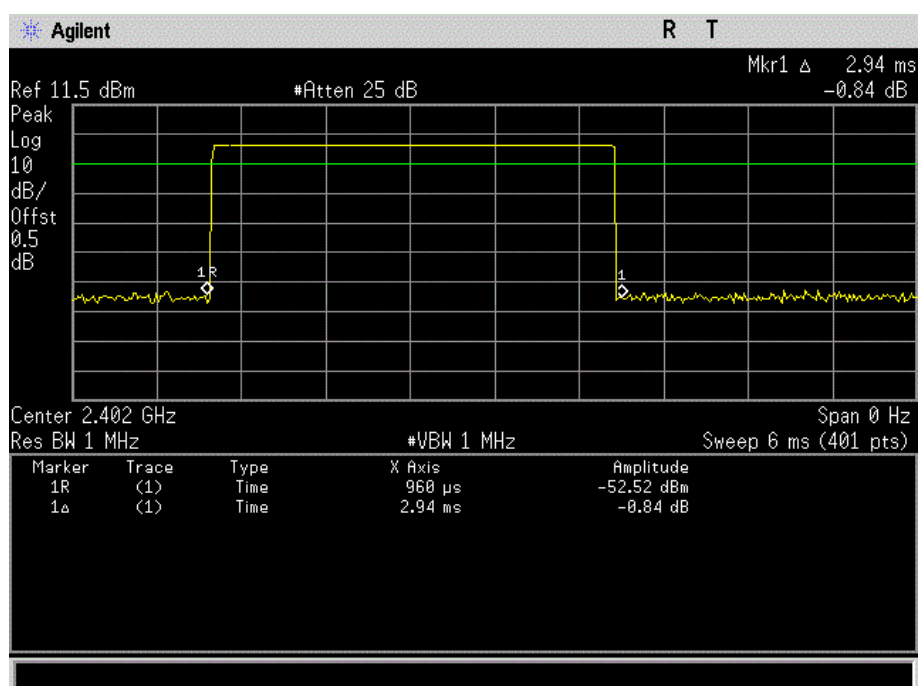


EUT:		Pos terminal		Model Name :		IDT800
Temperature:		25 °C		Relative Humidity:		55%
Test Voltage:		AC 120V/60HZ				
Test Mode:		Hopping Mode (π/4-DQPSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result	
2402	2.94	313.6	31.60	400	PASS	
π/4-DQPSK Hopping Mode DH5						



EUT:	Pos terminal	Model Name :	IDT800		
Temperature:	25 °C	Relative Humidity:	55%		
Test Voltage:	AC 120V/60HZ				
Test Mode:	Hopping Mode (8-DPSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	2.94	313.6	31.60	400	PASS

8-DPSK Hopping Mode DH5



9. Channel Separation and Bandwidth Test

8.1 Test Standard and Limit

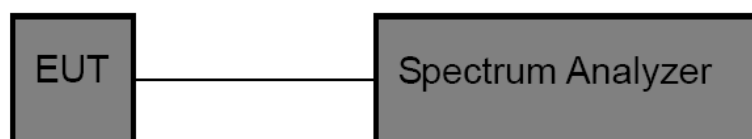
8.1.1 Test Standard

FCC Part 15.247

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	≤ 1 MHz (20dB bandwidth)	2400~2483.5
Channel Separation	>25 KHz or $>$ two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

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:
Channel Separation: RBW=30 kHz, VBW=100 kHz.
Bandwidth: RBW=30 kHz, VBW=100 kHz.
- (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. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

8.4 EUT Operating Condition

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

transmitting for the Bandwidth Test.

8.5 Test Data

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	99% OBW (MHz)	20dB Bandwidth (MHz)	20dB Bandwidth *2/3 (kHz)
2402	0.827	0.804	0.536
2441	0.827	0.809	0.539
2480	0.826	0.809	0.539

GFSK TX Mode			
2402 MHz			

Agilent R T

Ref 11.5 dBm #Atten 25 dB

#Peak
Log
10 dB/Offst
0.5 dB

Center 2.402 GHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 20.72 ms (401 pts)

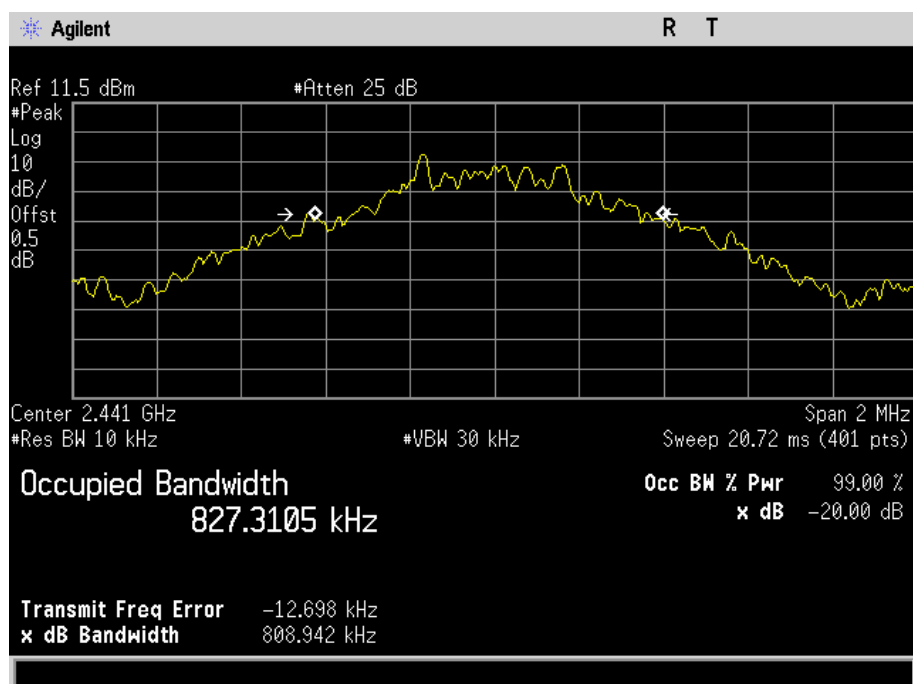
Occupied Bandwidth 827.0279 kHz

Occ BW % Pwr 99.00 %
x dB -20.00 dB

Transmit Freq Error -12.941 kHz
x dB Bandwidth 804.049 kHz

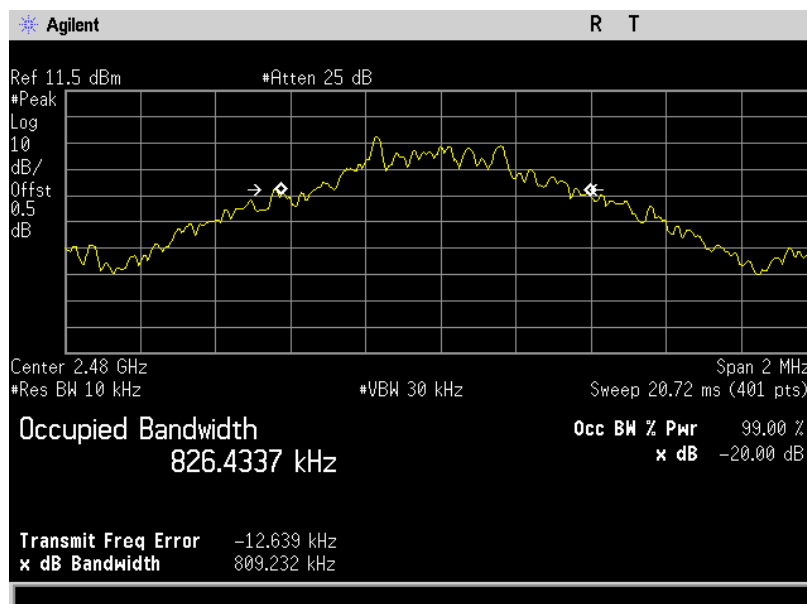
GFSK TX Mode

2441 MHz



GFSK TX Mode

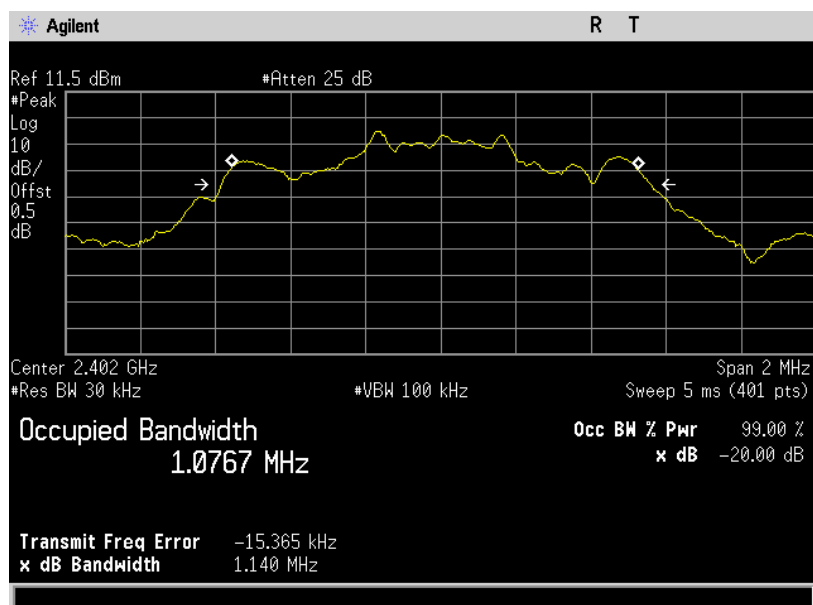
2480 MHz



EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode ($\pi/4$ -DQPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1.0767	1.14	0.76
2441	1.077	1.143	0.762
2480	1.0766	1.141	0.761

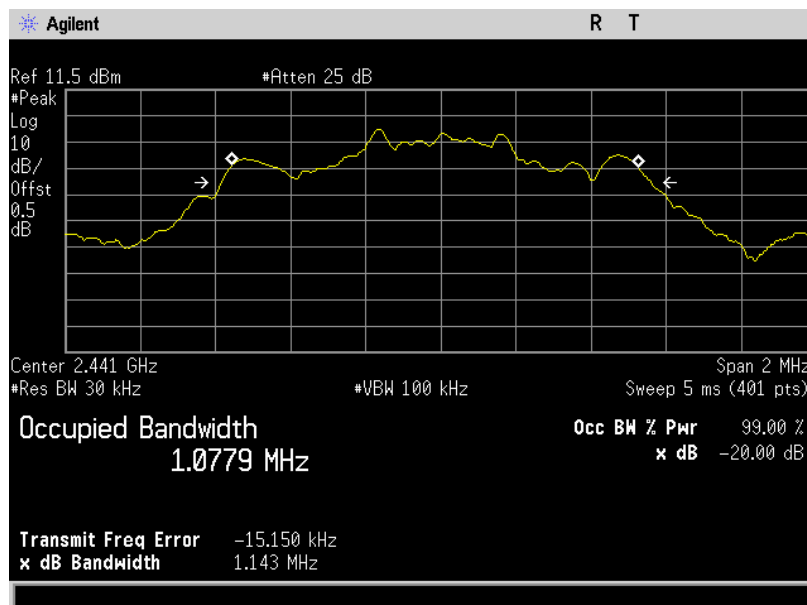
 $\pi/4$ -DQPSK TX Mode

2402 MHz

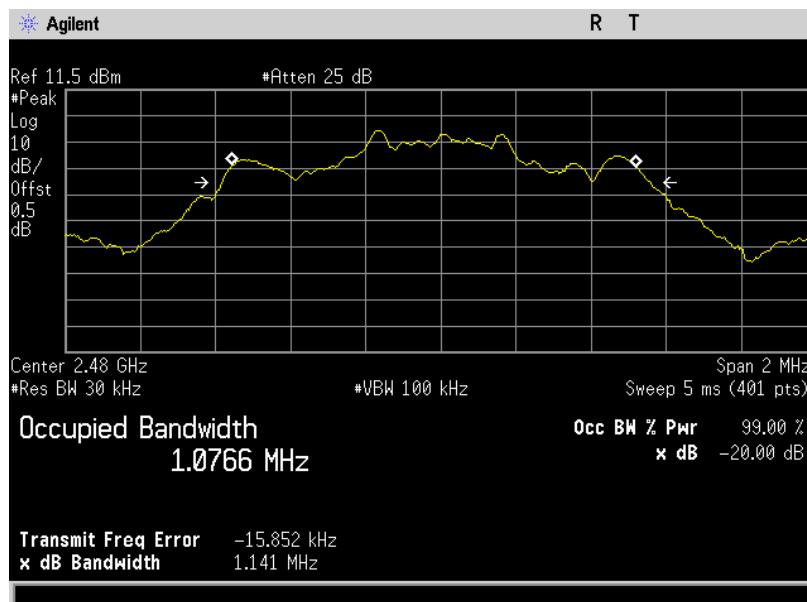


$\pi/4$ -DQPSK TX Mode

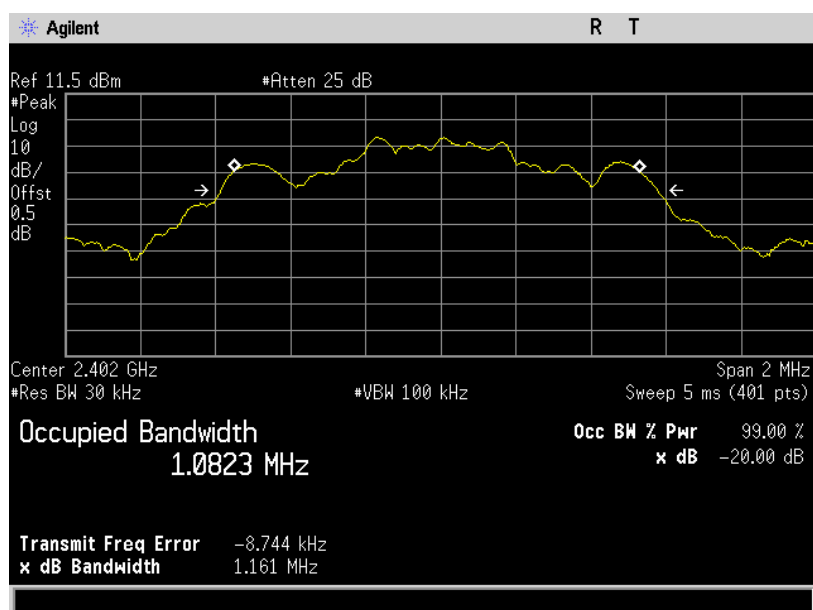
2441 MHz

 $\pi/4$ -DQPSK TX Mode

2480 MHz

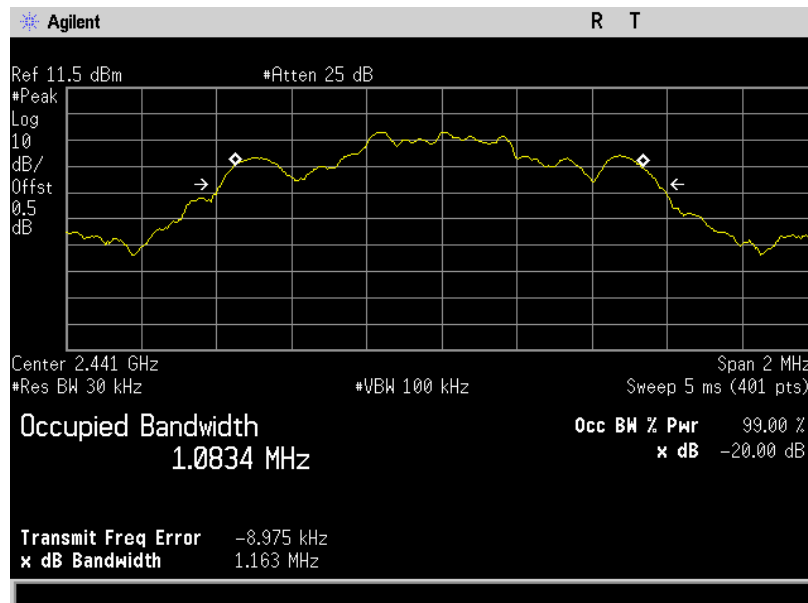


EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode (8-DPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1.0823	1.161	0.774
2441	1.0834	1.163	0.775
2480	1.0827	1.164	0.776

8-DPSK TX Mode**2402 MHz**

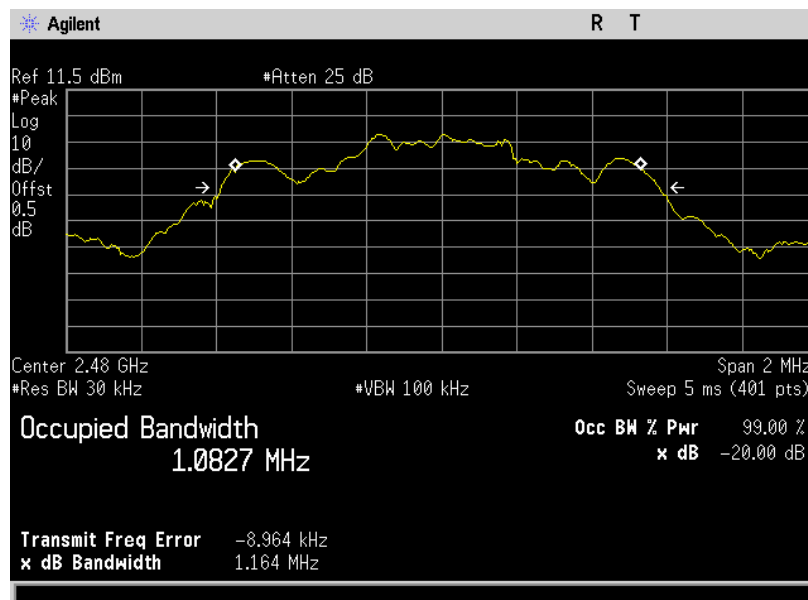
8-DPSK TX Mode

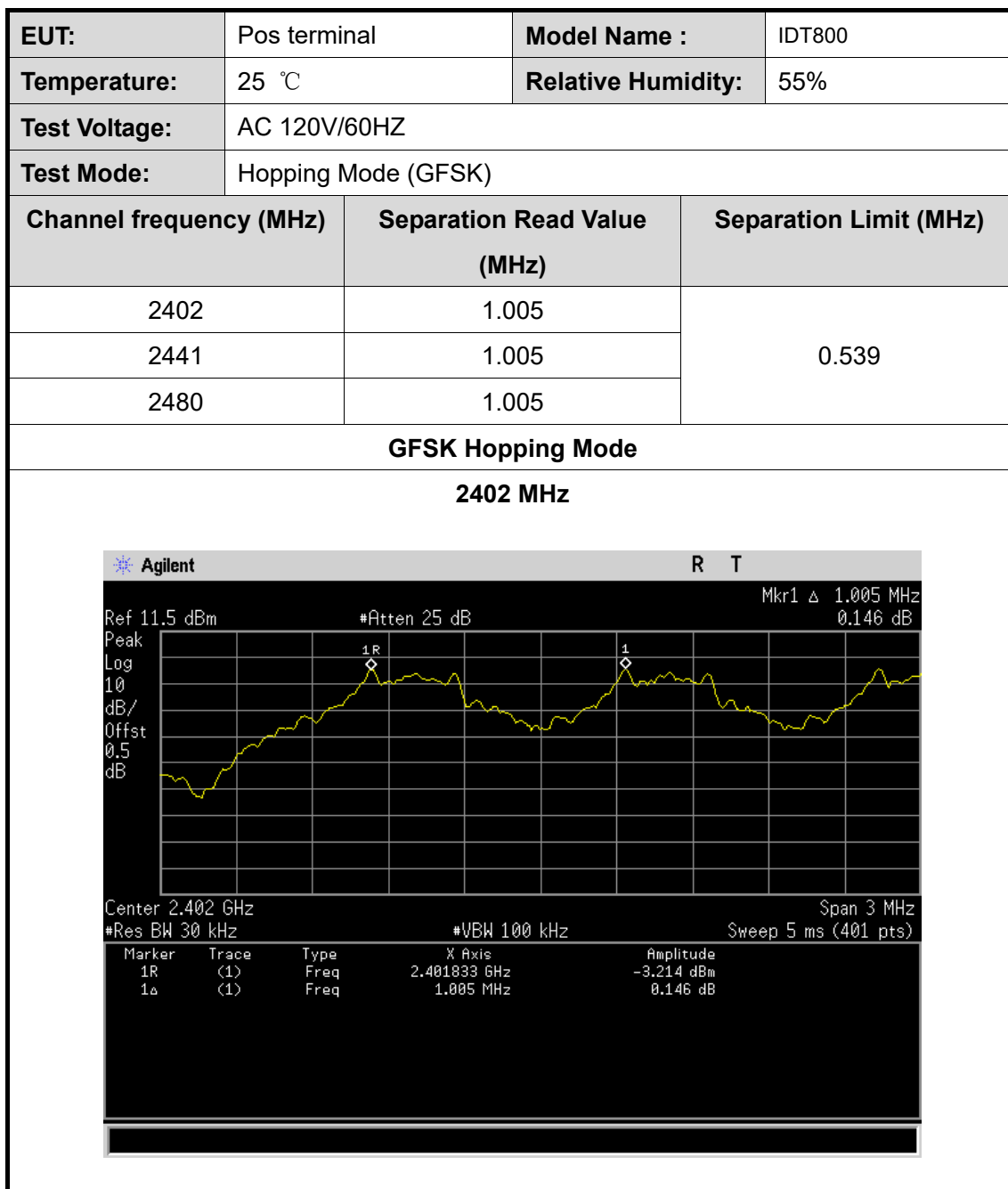
2441 MHz



8-DPSK TX Mode

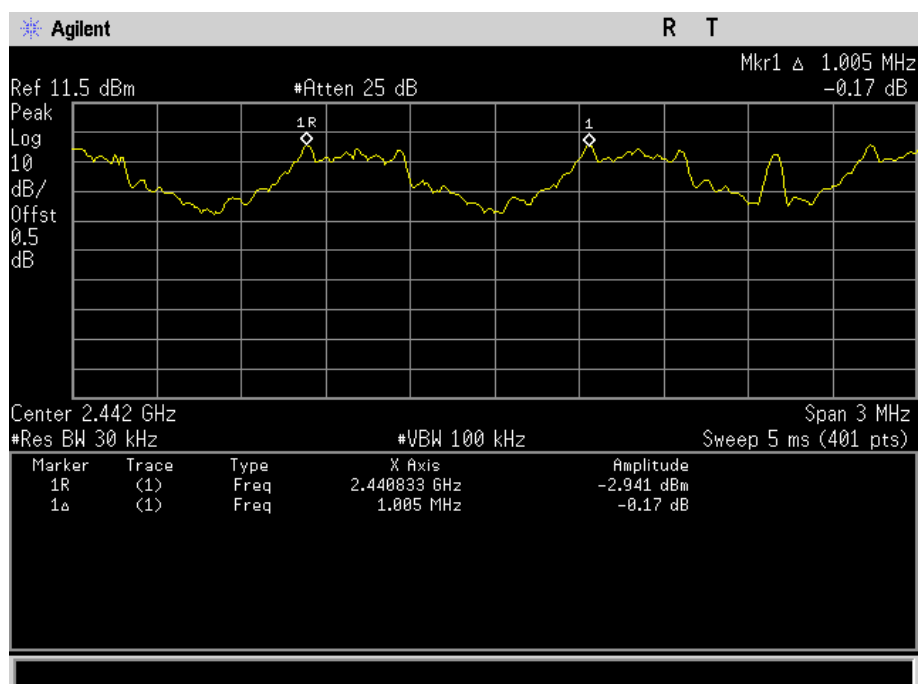
2480 MHz





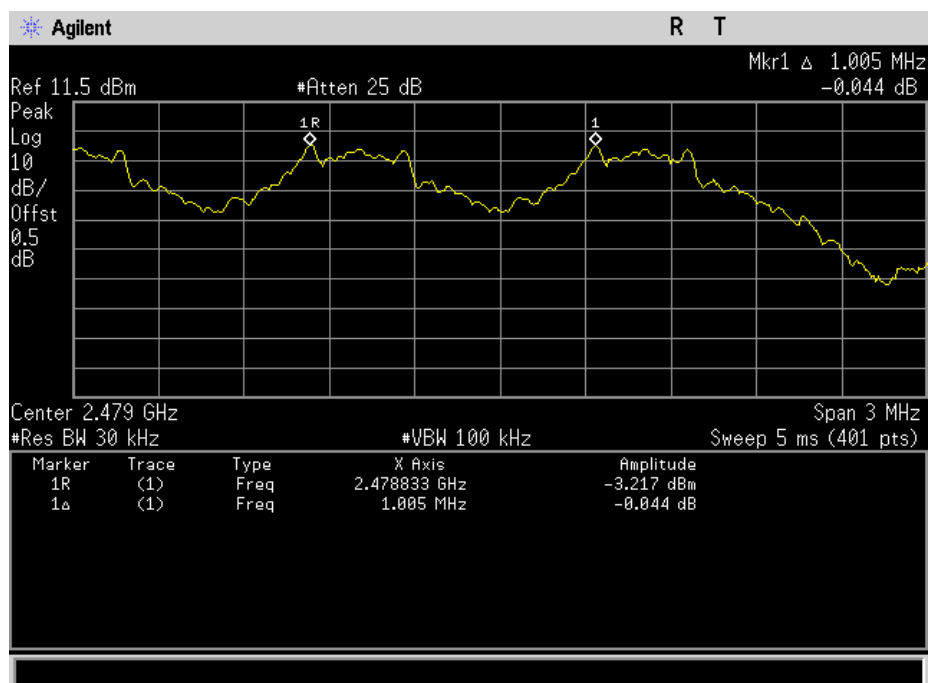
GFSK Hopping Mode

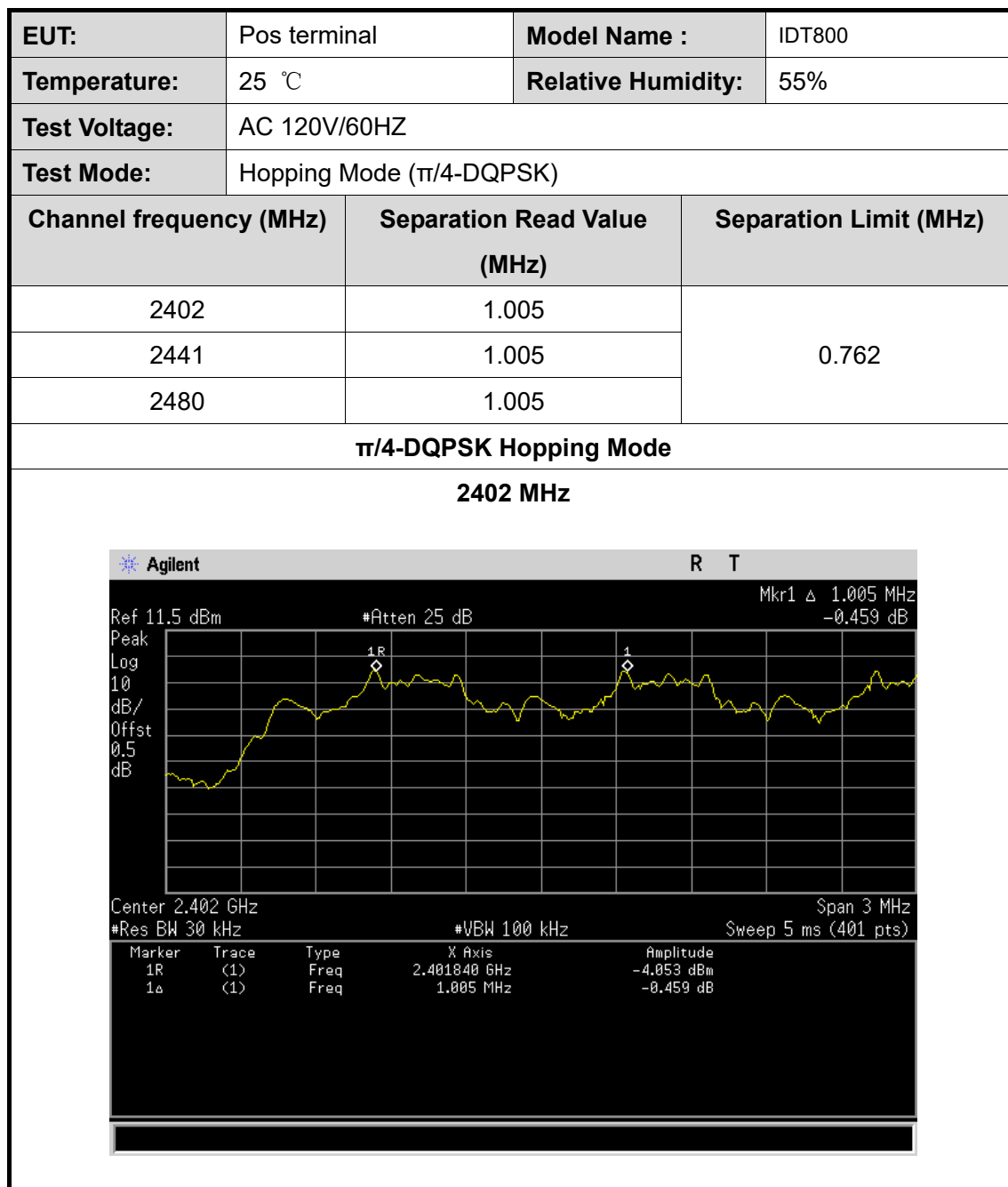
2441 MHz



GFSK Hopping Mode

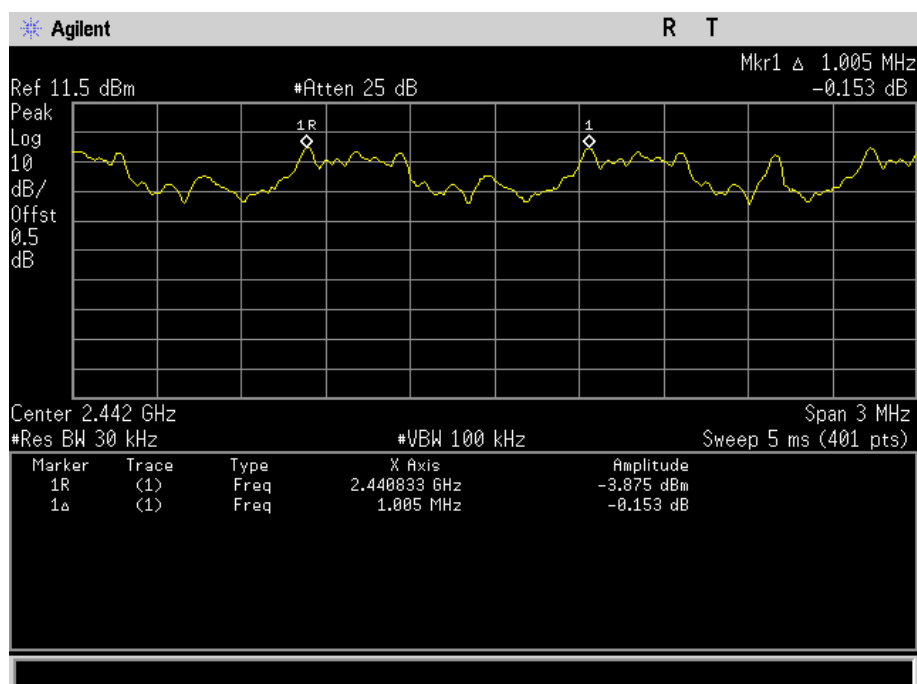
2480 MHz



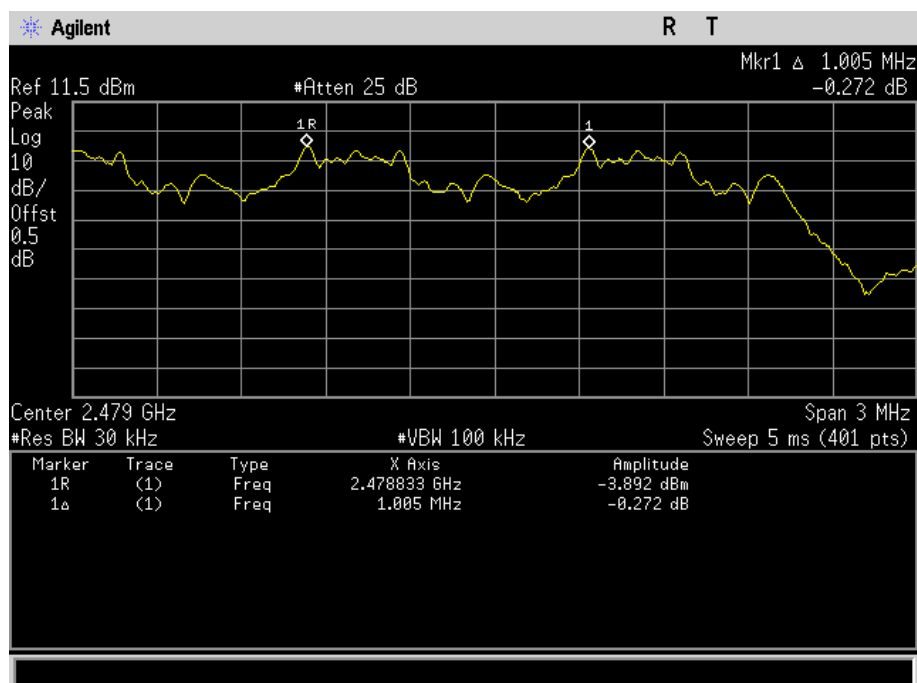


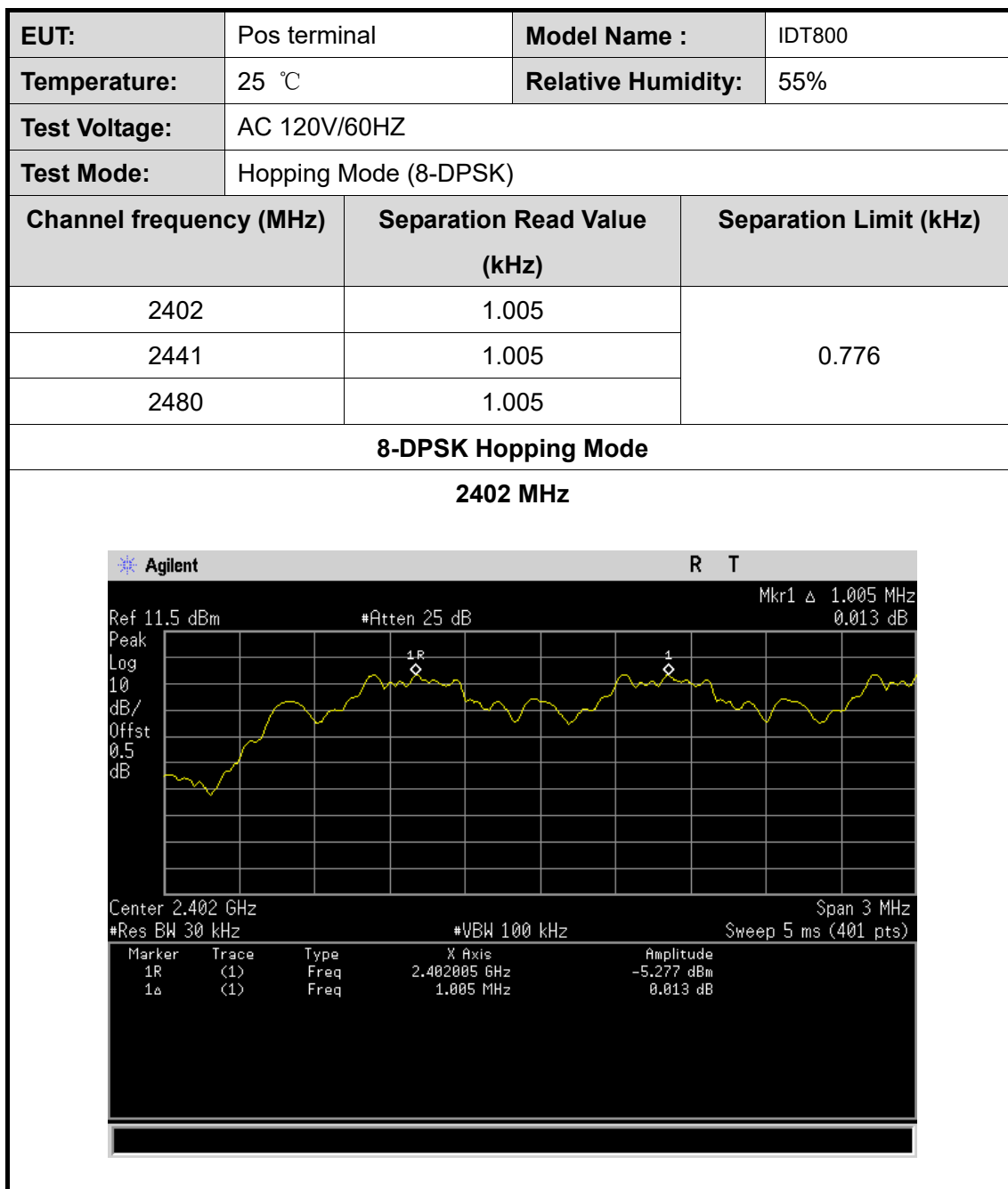
$\pi/4$ -DQPSK Hopping Mode

2441 MHz

 $\pi/4$ -DQPSK Hopping Mode

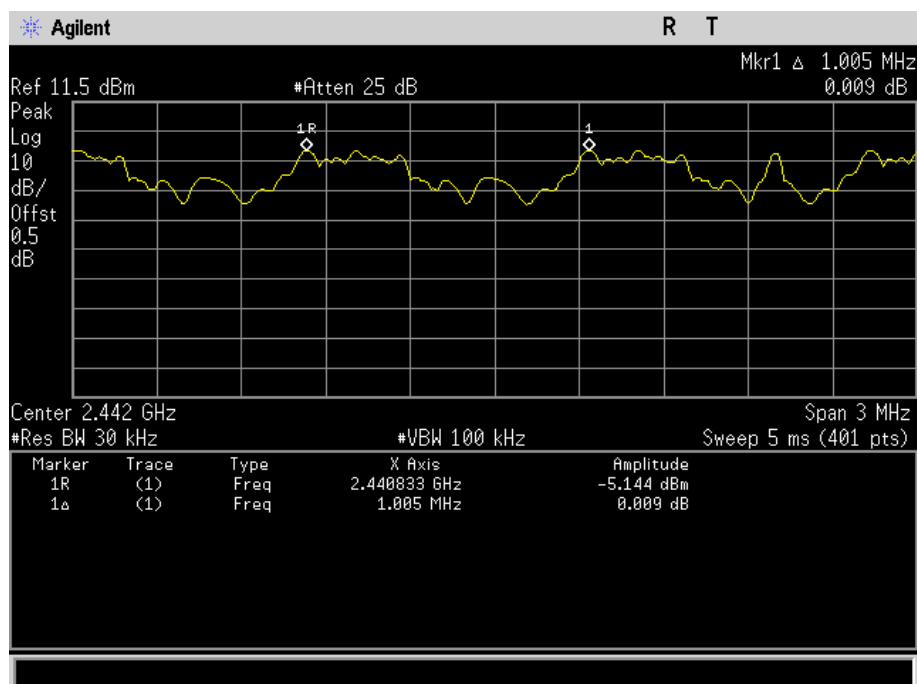
2480 MHz





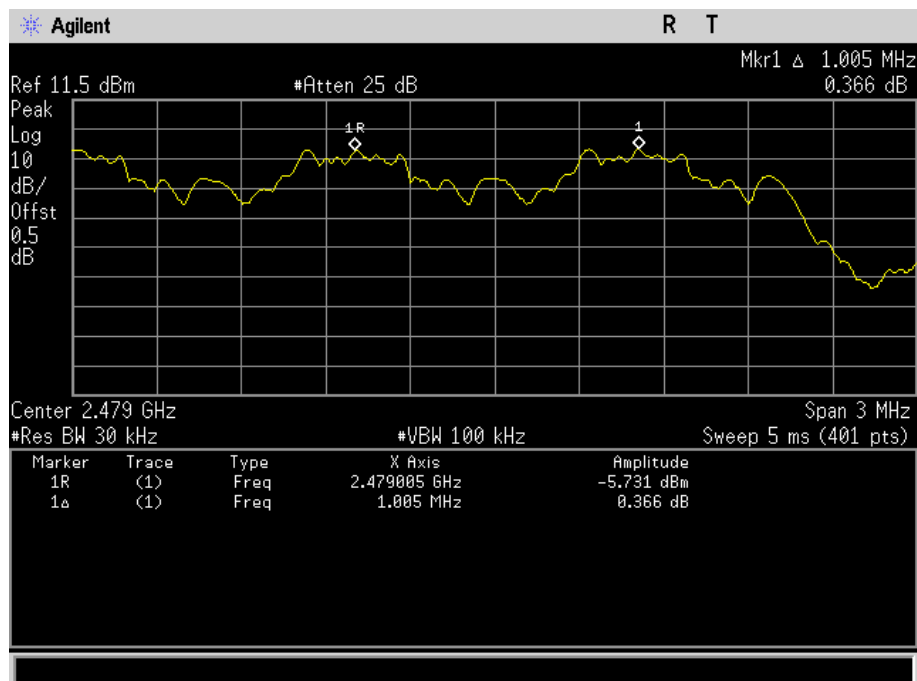
8-DPSK Hopping Mode

2441 MHz



8-DPSK Hopping Mode

2480 MHz



10. Peak Output Power Test

9.1 Test Standard and Limit

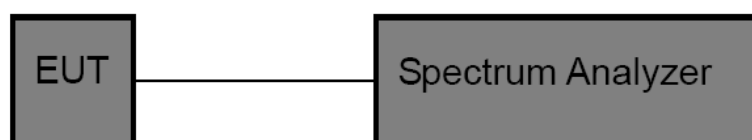
9.1.1 Test Standard

FCC Part 15.247 (b) (1)

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	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:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.

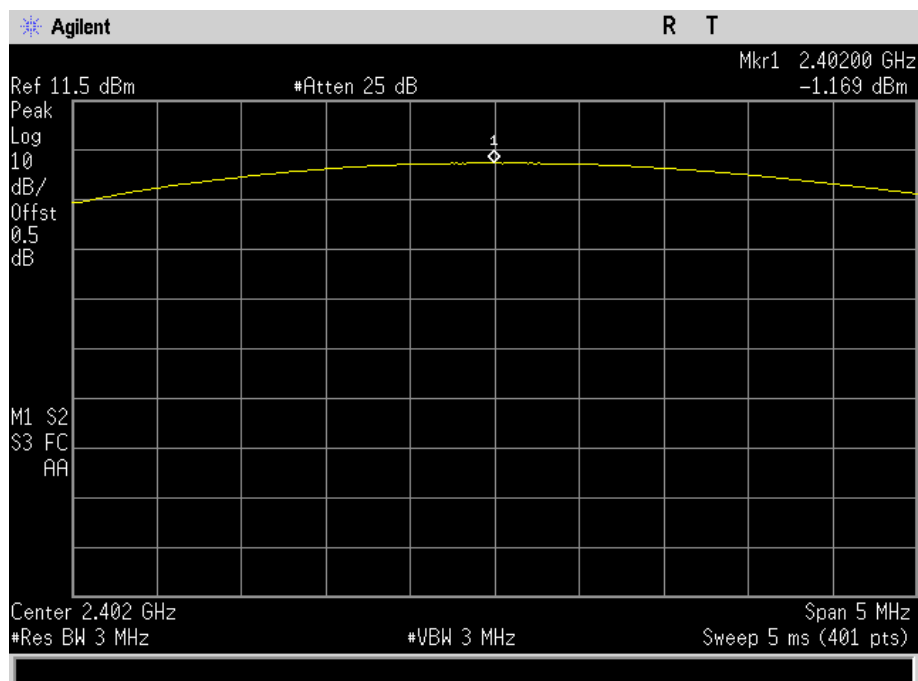
RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

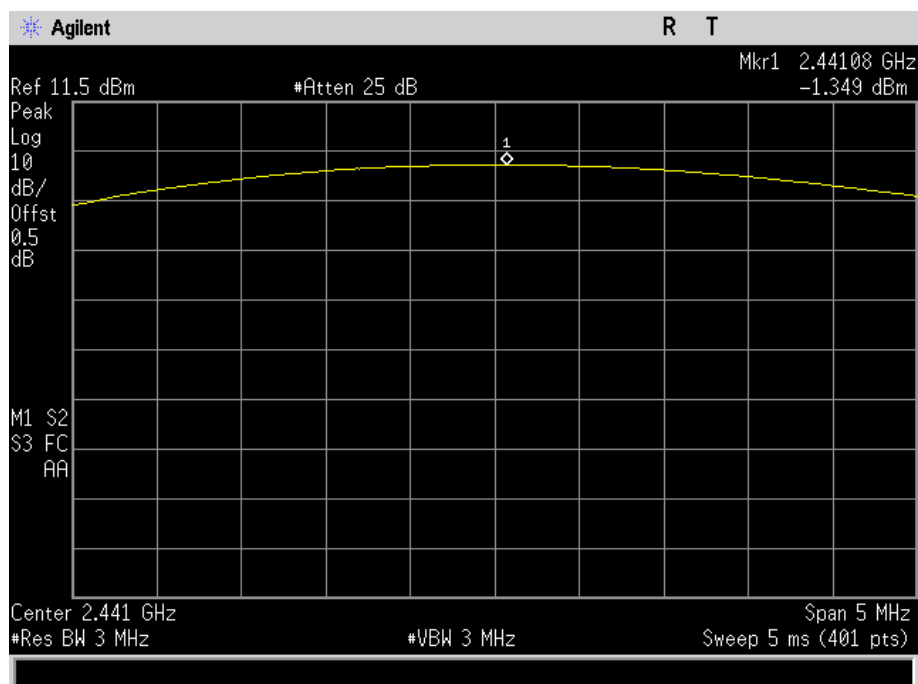
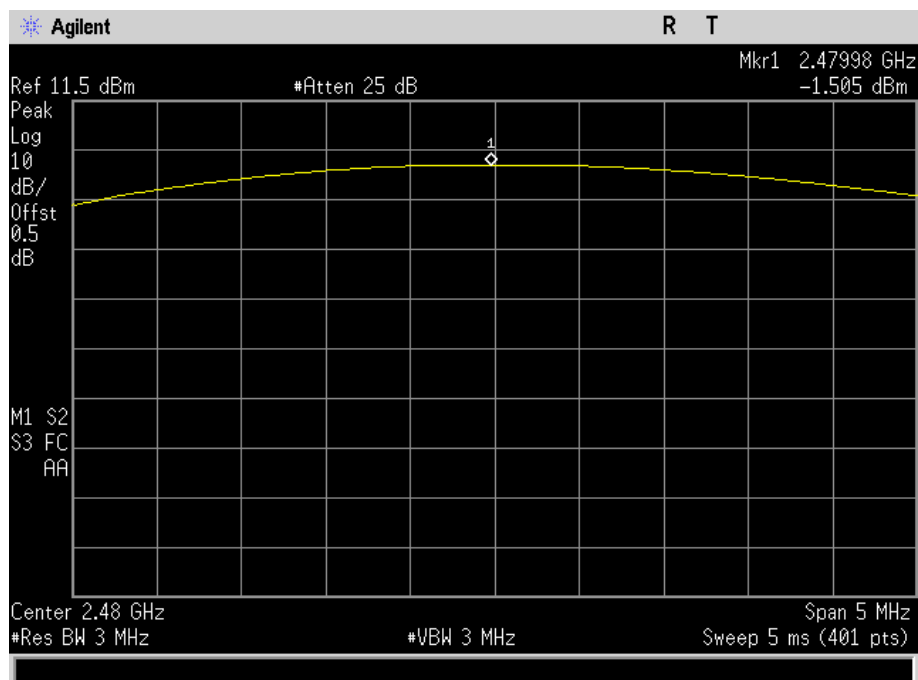
9.4 EUT Operating Condition

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

9.5 Test Data

EUT:	Pos terminal	Model Name :	IDT800
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	-1.169	21	
2441	-1.349		
2480	-1.505		

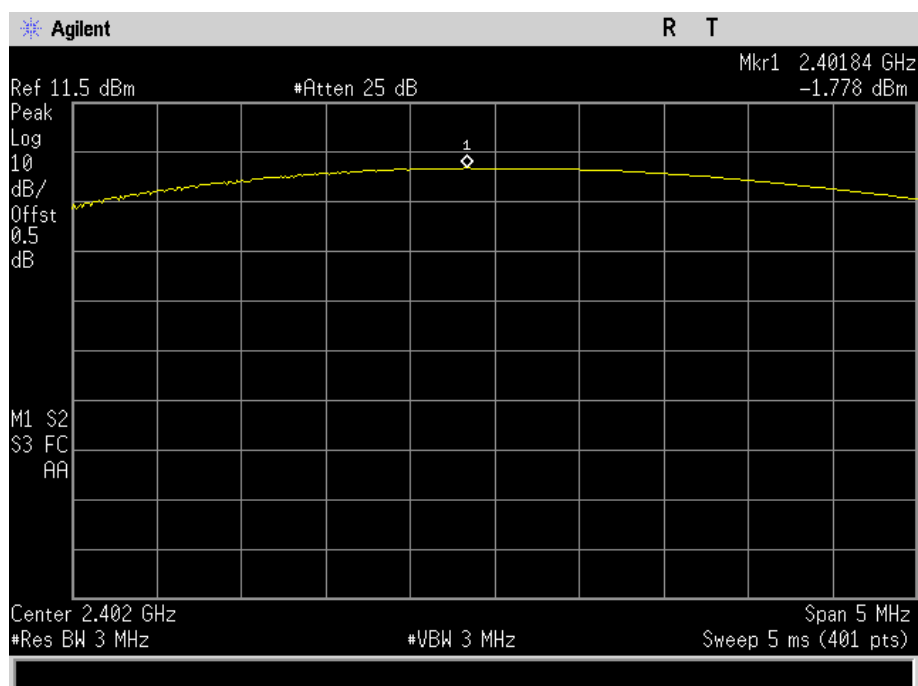
GFSK TX Mode**2402 MHz**

GFSK TX Mode**2441 MHz****GFSK TX Mode****2480 MHz**

EUT:	Pos terminal	Model Name :	IDT800
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60HZ		
Test Mode:	TX Mode ($\pi/4$ -DQPSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	1.778	21	
2441	-1.886		
2480	-2.075		

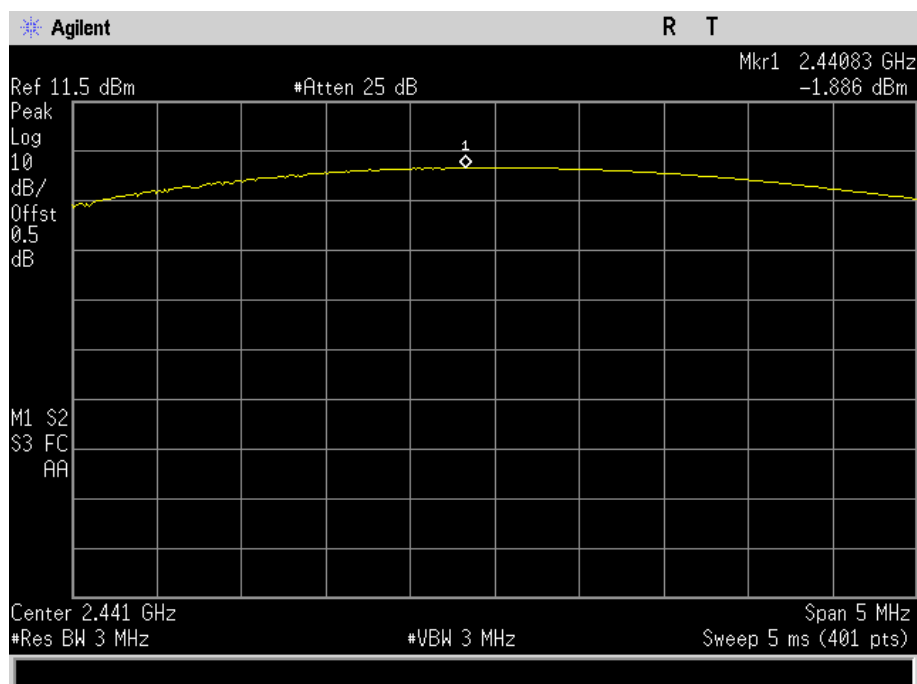
 $\pi/4$ -DQPSK TX Mode

2402 MHz

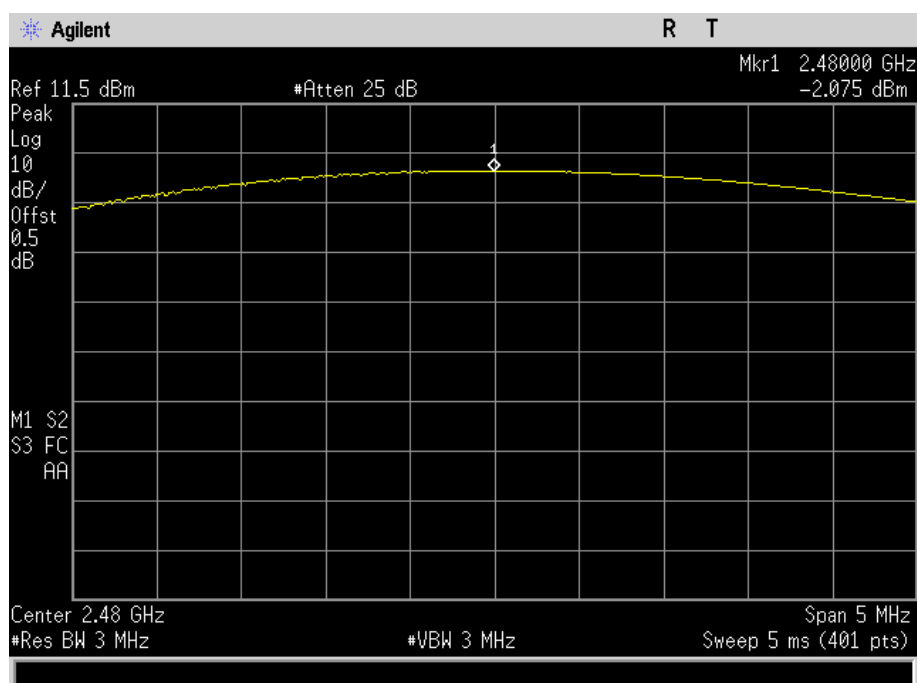


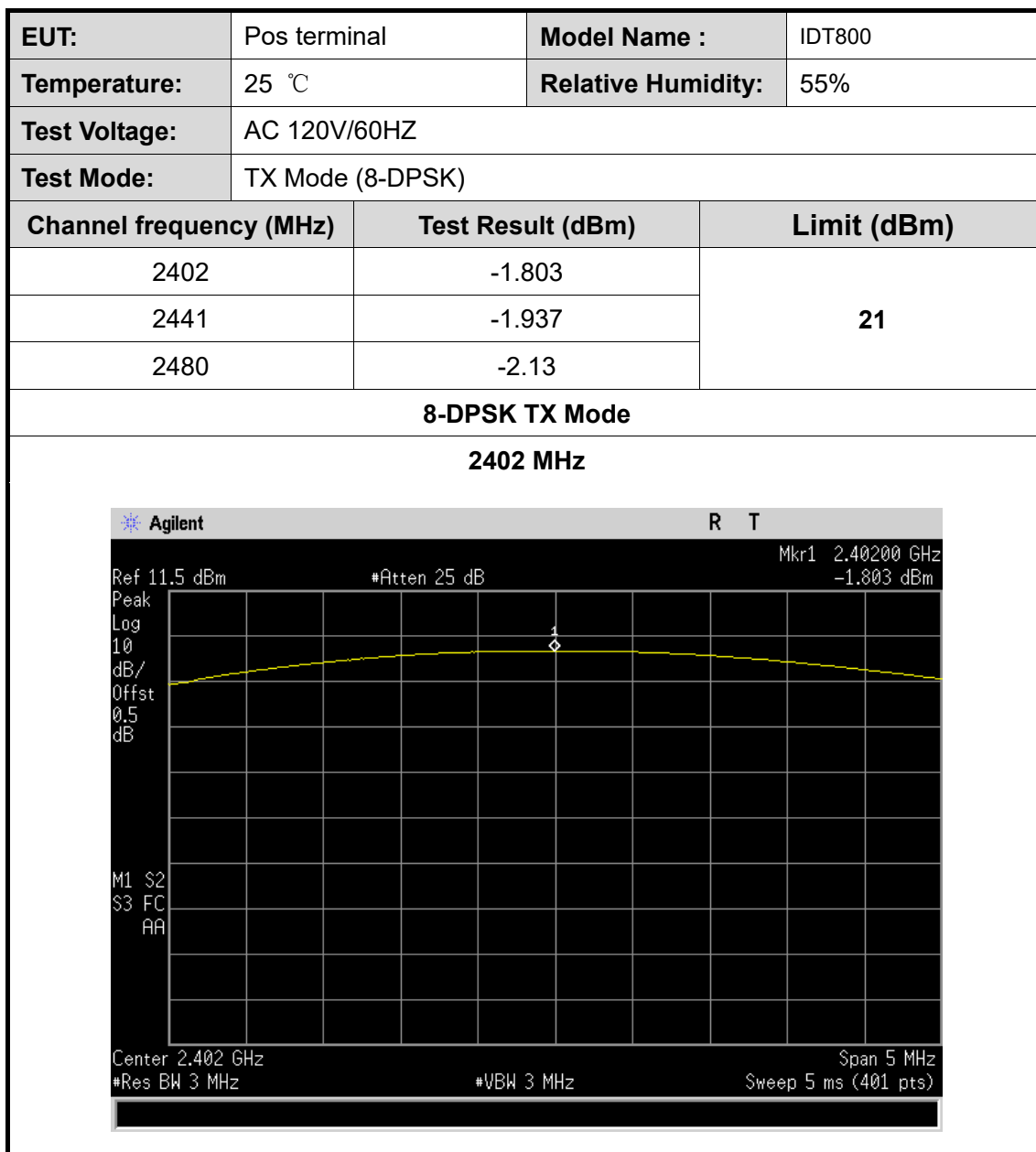
$\pi/4$ -DQPSK TX Mode

2441 MHz

 $\pi/4$ -DQPSK TX Mode

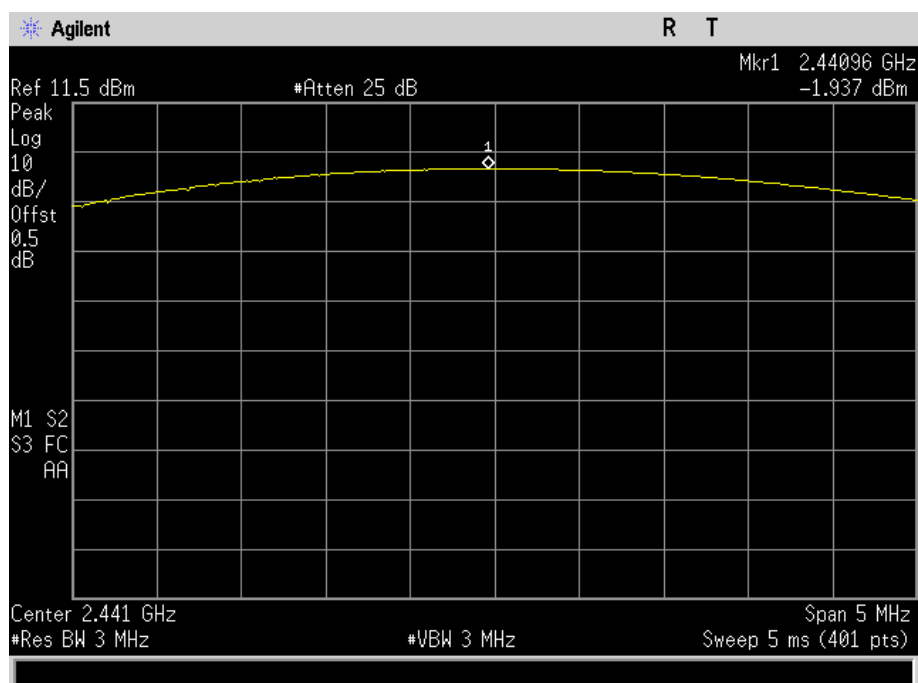
2480 MHz





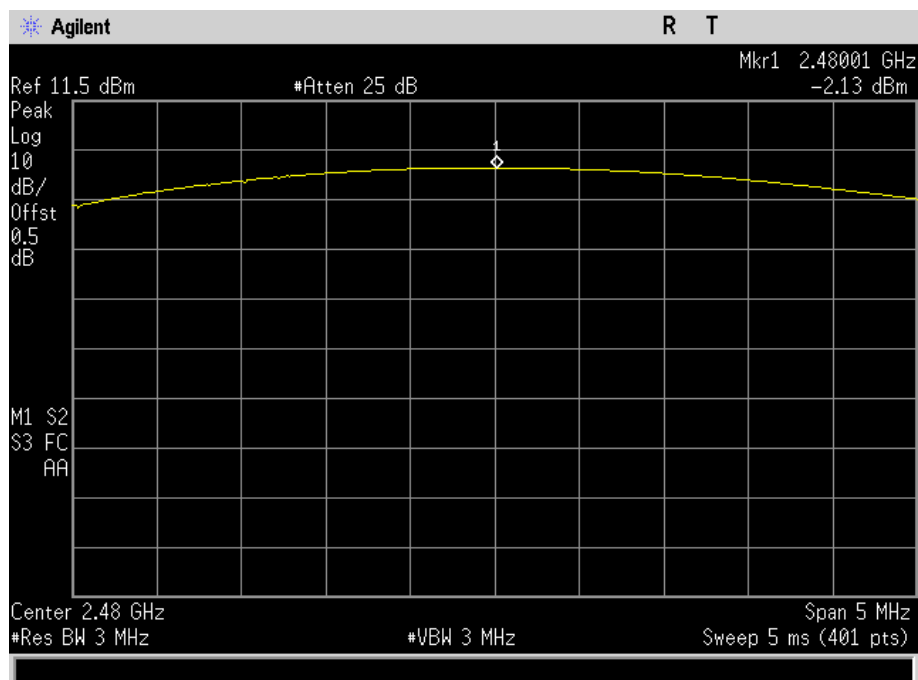
8-DPSK TX Mode

2441 MHz



8-DPSK TX Mode

2480 MHz



11. Antenna Requirement

10.1 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.

10.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 2 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

10.2 Result

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

