

FCC Radio Test Report

FCC ID: YXK-S400

Original Grant

Report No. : TB-FCC145536
Applicant : Shenzhen Huaruian Technology Co.,Ltd
Equipment Under Test (EUT)
EUT Name : Mobile phone
Model No. : S400
Series No. : N/A
Brand Name : N/A
Receipt Date : 2015-09-21
Test Date : 2015-09-22 to 2015-10-12
Issue Date : 2015-10-13
Standards : FCC Part 15, Subpart C (15.247:2015)
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 requirements

Test/Witness Engineer :

WANG SU

Approved& Authorized :

Regis



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1. General Information about EUT

1.1 Client Information

Applicant : Shenzhen Huaruian Technology Co.,Ltd
Address : 4th Floor of Yuxing, Sanwei Science and Technology,
Park, Hangcheng Road, Bao'an District, Shenzhen, China
Manufacturer : Shenzhen Huaruian Technology Co.,Ltd
Address : 4th Floor of Yuxing, Sanwei Science and Technology,
Park, Hangcheng Road, Bao'an District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Mobile phone	
Models No.	:	S400	
Model Difference	:	N/A	
Product Description	:	Operation Frequency: BT: 2402MHz~2480MHz BLE: 2402MHz~2480MHz ₍₂₎ WIFI: 2412~2462 MHz ₍₂₎	
		Number of Channel:	Bluetooth:79 Channels see note (3)
		Max Peak Output Power:	GFSK: 4.537 dBm
		Antenna Gain:	1.39 dBi FPC Antenna
		Modulation Type:	GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps) 8-DPSK(3 Mbps)
Power Supply	:	DC Voltage supplied from AC/DC adapter DC power by Li-ion Battery	
Power Rating	:	Input: AC 100~240V 50/60Hz 0.3A Output: 5V/1A DC 3.7V from 2600mA Li-ion battery	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

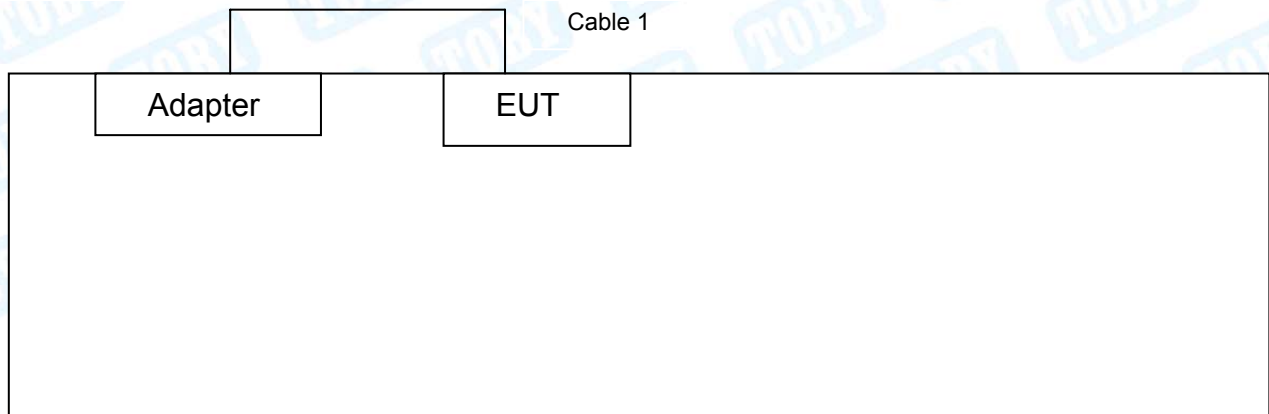
- (1) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705..
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. The EUT has also been tested and complied the FCC 15C for BLE and WIFI function, and recorded in the separate test report.
- (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	NO	1.0M	Accessory

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 Conducted Test	
Final Test Mode	Description
Mode 1	AC Charging with TX GFSK Mode

For Radiated Test

Final Test Mode	Description
Mode 1	AC Charging with TX GFSK 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 C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:
TX Mode: GFSK (1 Mbps)
TX Mode: 8-DPSK (3 Mbps)
- (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 Z-plane as the normal use. Therefore only the test data of this Z-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	RF KPI Test		
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
$\pi/4$ -DQPSK	DEF	DEF	DEF
8-DPSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.42 dB ±3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

May 22, 2014 certificated by TUV Rheinland(China) Co., Ltd. with TUV certificate No.: UA 50282953 0001 and report No.: 17026822 002. The certificate is valid until the next scheduled audit or up to 18 months, at the discretion of TUV Rhineland.

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1				
Standard Section		Test Item	Judgment	Remark
FCC	IC			
15.203		Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.2	Conducted Emission	PASS	N/A
15.205	RSS-Gen 7.2.3	Restricted Bands	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (2)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	RSS 247 5.1 (4)	Dwell Time	PASS	N/A
15.247(b)(1)	RSS 247 5.4 (2)	Peak Output Power	PASS	N/A
15.247(b)(1)	RSS 247 5.1 (4)	Number of Hopping Frequency	PASS	N/A
15.247(c)	RSS 247 5.5	Radiated Spurious Emission	PASS	N/A
15.247(a)	RSS 247 5.1 (1)	99% Occupied Bandwidth & 20dB Bandwidth	PASS	99%OBW GFSK:898.0739kHz π /4-DQPSK: 1345.20kHz 8-DPSK:1353.40kHz
Note: N/A is an abbreviation for Not Applicable.				

3. Test Equipment

AC Main Conducted Emission

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 07, 2015	Aug. 06, 2016
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 07, 2015	Aug. 06, 2016
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015	Aug. 06, 2016
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 07, 2015	Aug. 06, 2016

Radiation Spurious Emission

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 28, 2015	Mar. 27, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	Sonoma	310N	185903	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 28, 2015	Mar. 27, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 28, 2015	Mar. 27, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

Antenna Conducted Emission

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 29, 2015	Aug. 28, 2016
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016

4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard
FCC 15.207

4.1.2 Test Limit

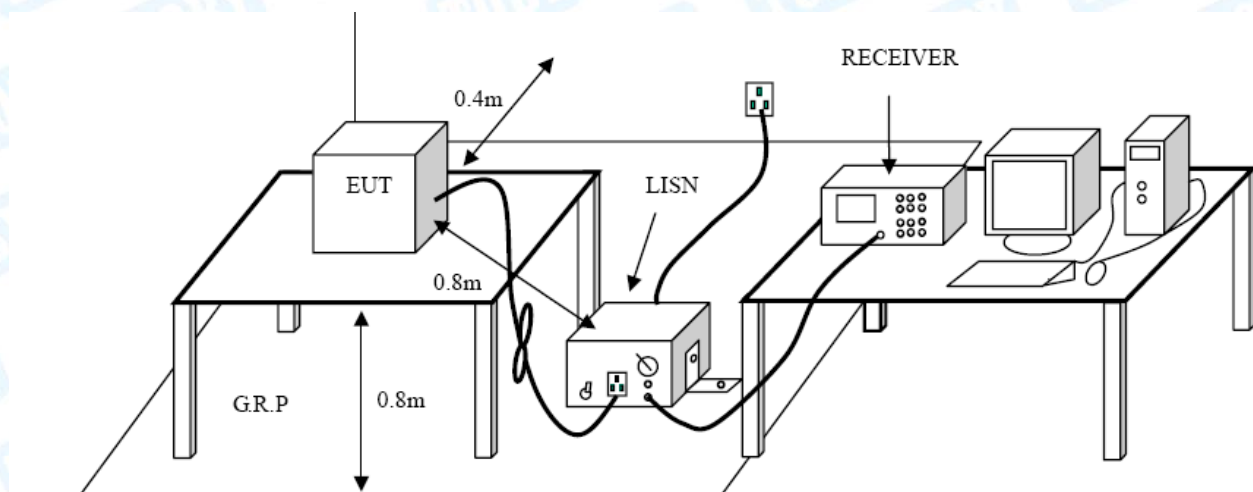
Conducted Emission Test Limit

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.

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.

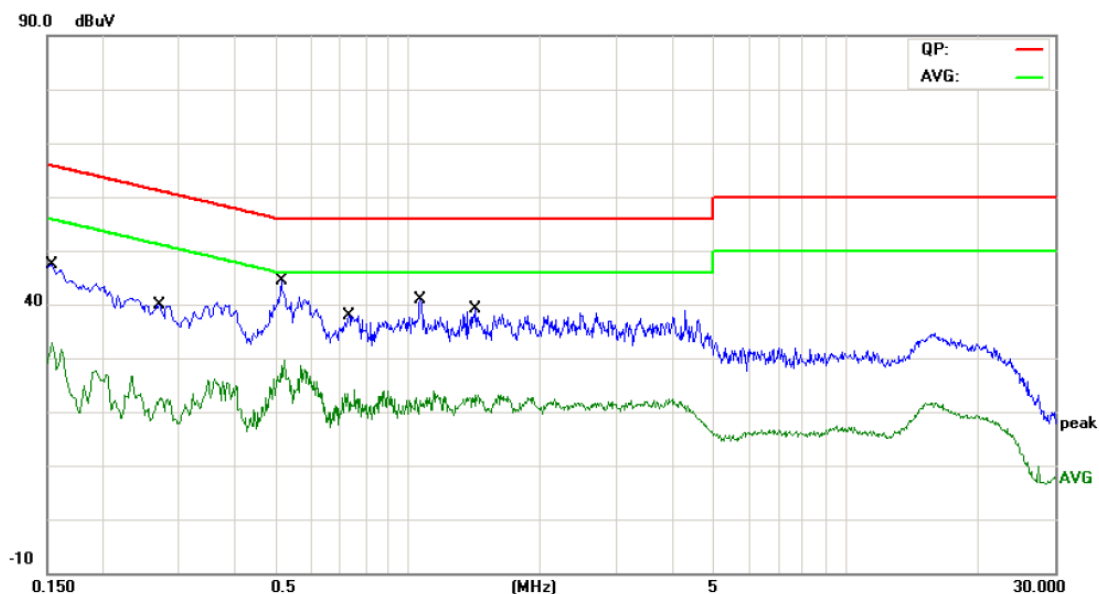
4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

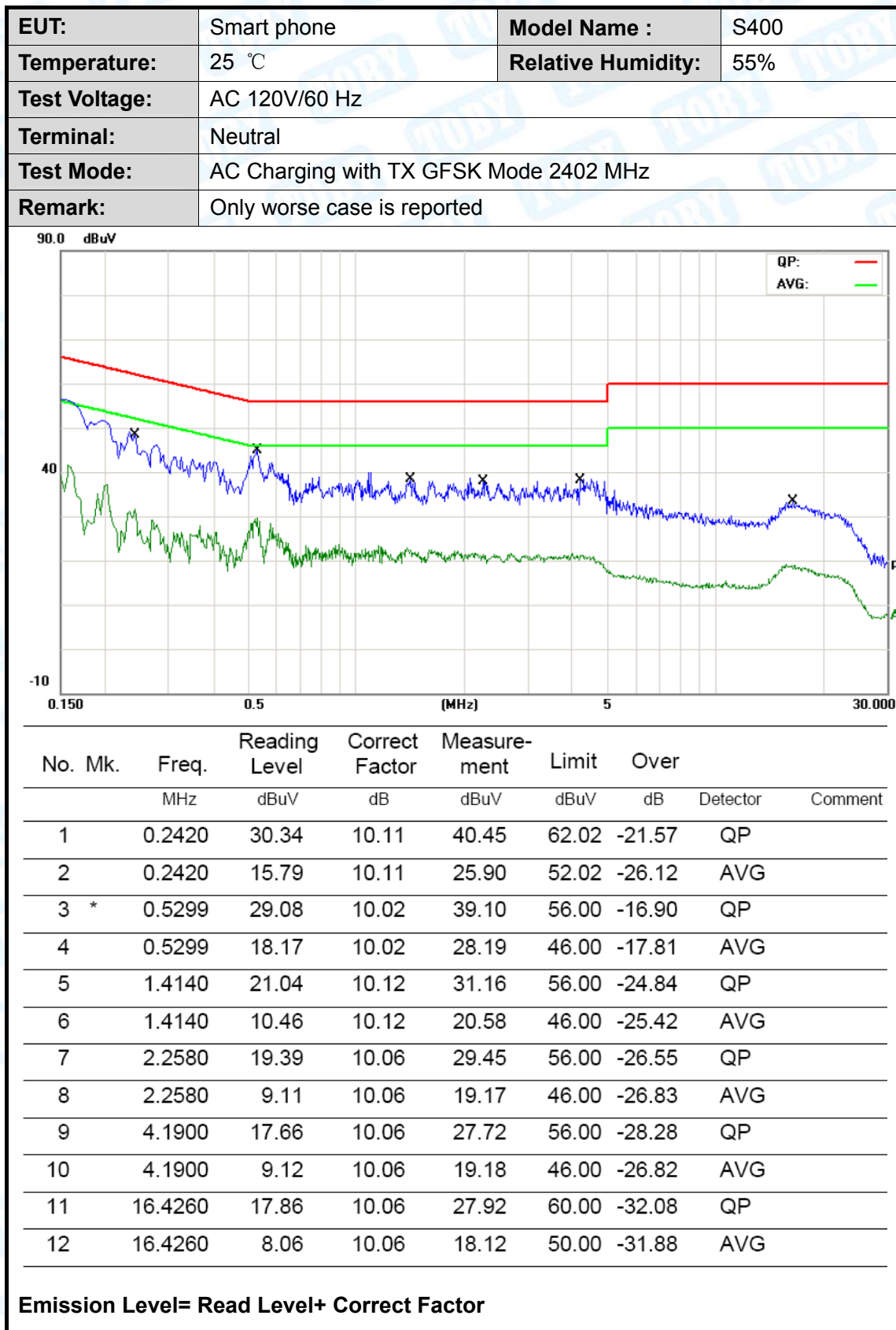
Please see the next page.

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	AC Charging with TX GFSK Mode 2402 MHz		
Remark:	Only worse case is reported		

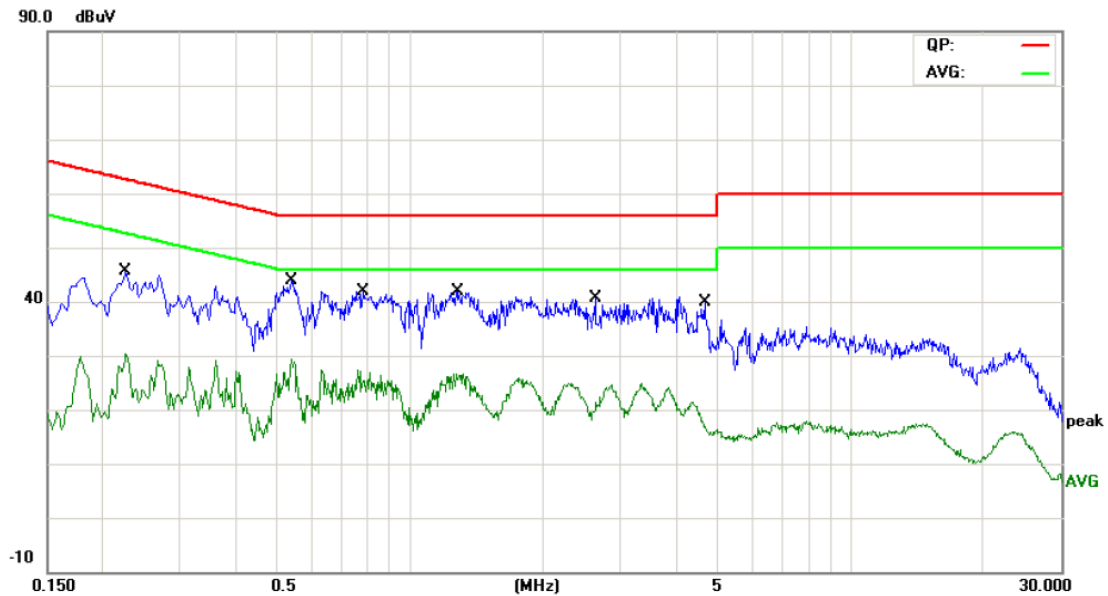


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1539	34.81	9.93	44.74	65.78	-21.04	QP	
2		0.1539	20.15	9.93	30.08	55.78	-25.70	AVG	
3		0.2700	25.31	10.02	35.33	61.12	-25.79	QP	
4		0.2700	10.60	10.02	20.62	51.12	-30.50	AVG	
5	*	0.5140	30.72	10.03	40.75	56.00	-15.25	QP	
6		0.5140	20.22	10.03	30.25	46.00	-15.75	AVG	
7		0.7339	21.70	10.11	31.81	56.00	-24.19	QP	
8		0.7339	11.00	10.11	21.11	46.00	-24.89	AVG	
9		1.0660	21.27	10.06	31.33	56.00	-24.67	QP	
10		1.0660	10.76	10.06	20.82	46.00	-25.18	AVG	
11		1.4259	21.33	10.06	31.39	56.00	-24.61	QP	
12		1.4259	10.91	10.06	20.97	46.00	-25.03	AVG	

Emission Level= Read Level+ Correct Factor



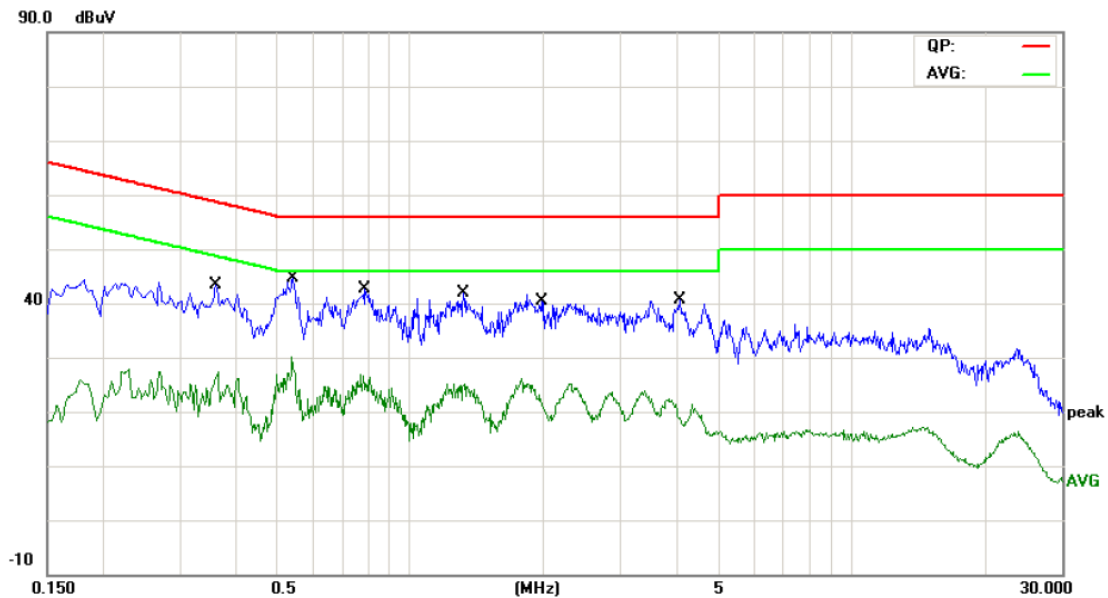
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Line		
Test Mode:	AC Charging with TX GFSK Mode 2402 MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2260	33.09	10.02	43.11	62.59	-19.48	QP	
2		0.2260	19.97	10.02	29.99	52.59	-22.60	AVG	
3	*	0.5380	32.76	10.04	42.80	56.00	-13.20	QP	
4		0.5380	21.31	10.04	31.35	46.00	-14.65	AVG	
5		0.7820	26.59	10.10	36.69	56.00	-19.31	QP	
6		0.7820	14.66	10.10	24.76	46.00	-21.24	AVG	
7		1.2860	25.47	10.06	35.53	56.00	-20.47	QP	
8		1.2860	14.08	10.06	24.14	46.00	-21.86	AVG	
9		2.6300	20.90	10.04	30.94	56.00	-25.06	QP	
10		2.6300	9.27	10.04	19.31	46.00	-26.69	AVG	
11		4.6540	19.22	9.97	29.19	56.00	-26.81	QP	
12		4.6540	5.38	9.97	15.35	46.00	-30.65	AVG	

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 240V/60 Hz		
Terminal:	Neutral		
Test Mode:	AC Charging with TX GFSK Mode 2402 MHz		
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		0.1539	34.81	9.93	44.74	65.78	-21.04	QP	
2		0.1539	20.15	9.93	30.08	55.78	-25.70	AVG	
3		0.2700	25.31	10.02	35.33	61.12	-25.79	QP	
4		0.2700	10.60	10.02	20.62	51.12	-30.50	AVG	
5	*	0.5140	30.72	10.03	40.75	56.00	-15.25	QP	
6		0.5140	20.22	10.03	30.25	46.00	-15.75	AVG	
7		0.7339	21.70	10.11	31.81	56.00	-24.19	QP	
8		0.7339	11.00	10.11	21.11	46.00	-24.89	AVG	
9		1.0660	21.27	10.06	31.33	56.00	-24.67	QP	
10		1.0660	10.76	10.06	20.82	46.00	-25.18	AVG	
11		1.4259	21.33	10.06	31.39	56.00	-24.61	QP	
12		1.4259	10.91	10.06	20.97	46.00	-25.03	AVG	

Emission Level= Read Level+ Correct Factor

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC 15.209

5.1.2 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)	(dBuV/m)(at 3m)	
	Peak	Average
Above 1000	74	54

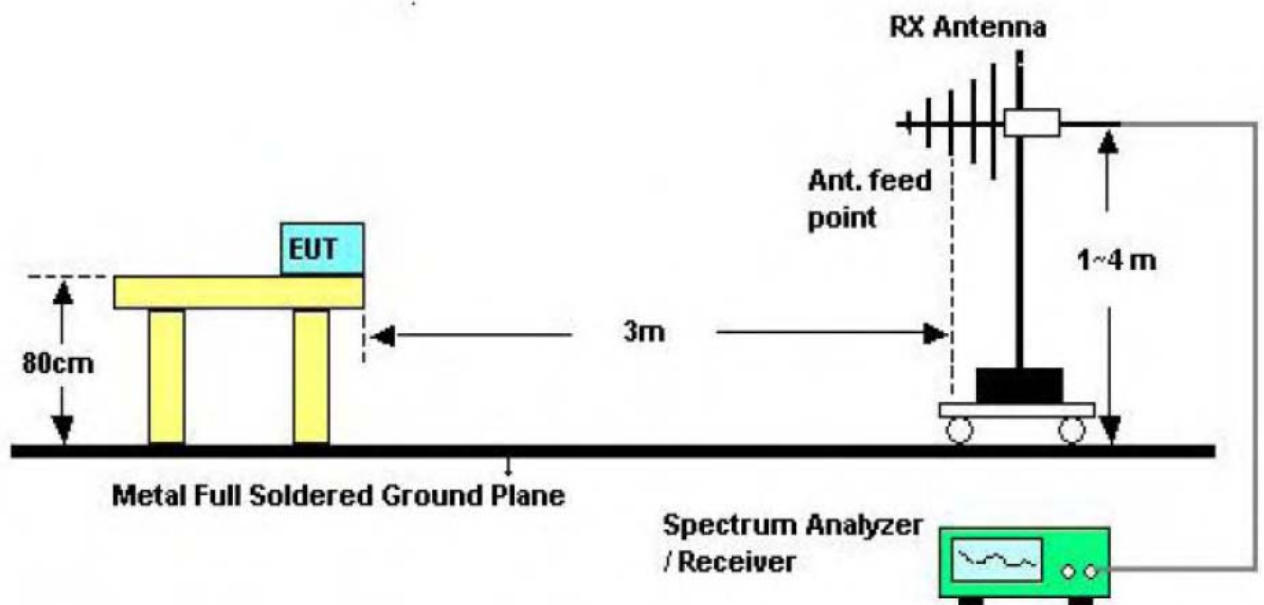
Note:

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

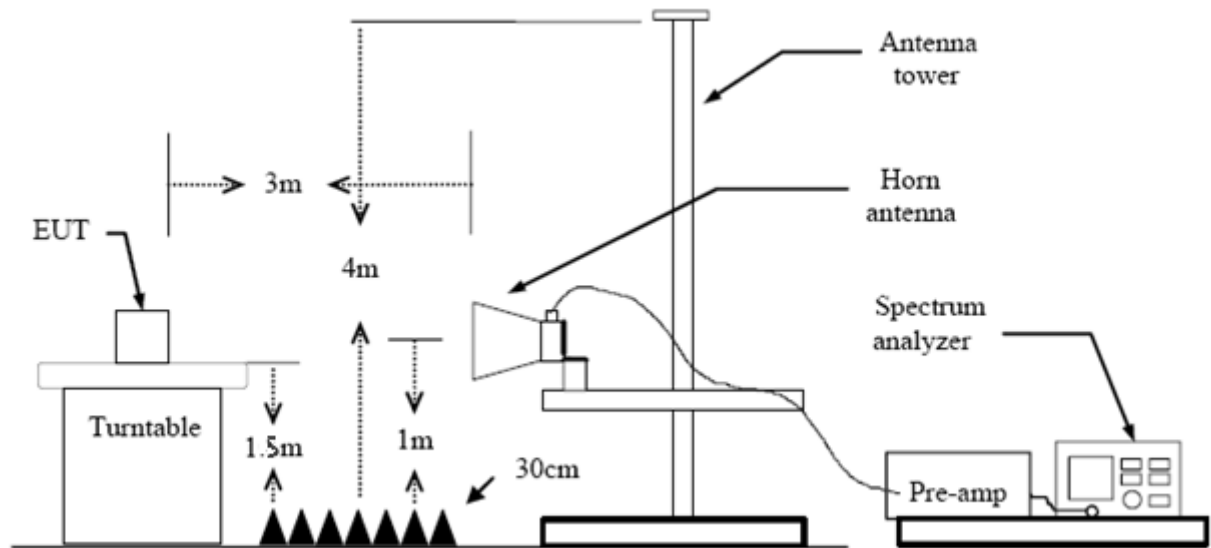
5.2 Test Setup



Bellow 30MHz 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. 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) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) 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.
- (5) 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.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) 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.
- (8) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

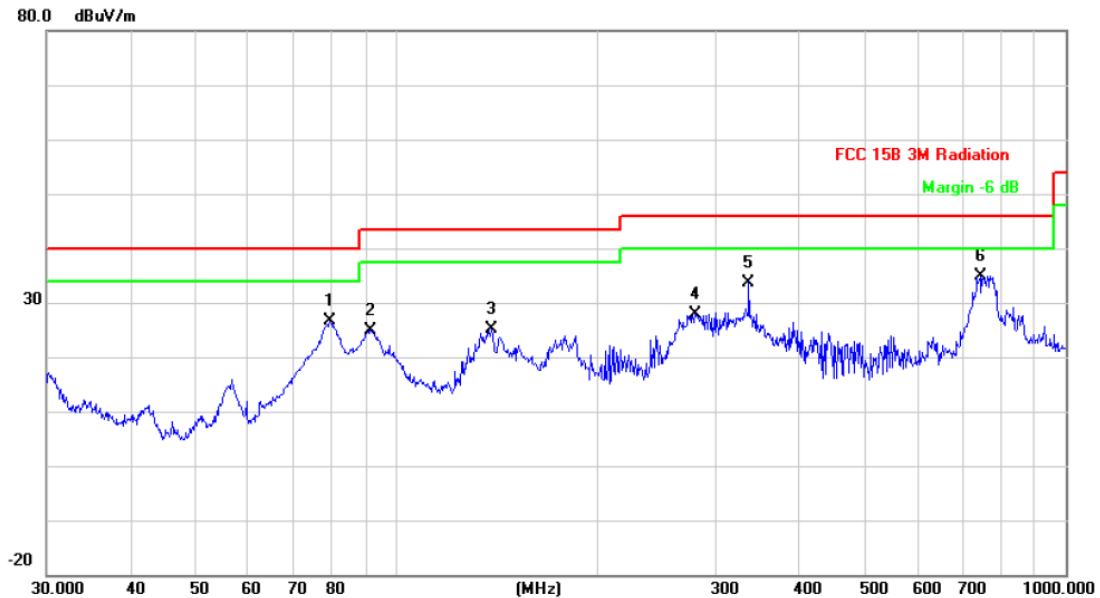
The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.

5.5 Test Data

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=1 KHz with Peak Detector for Average Values.

Test data please refer the following pages.

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

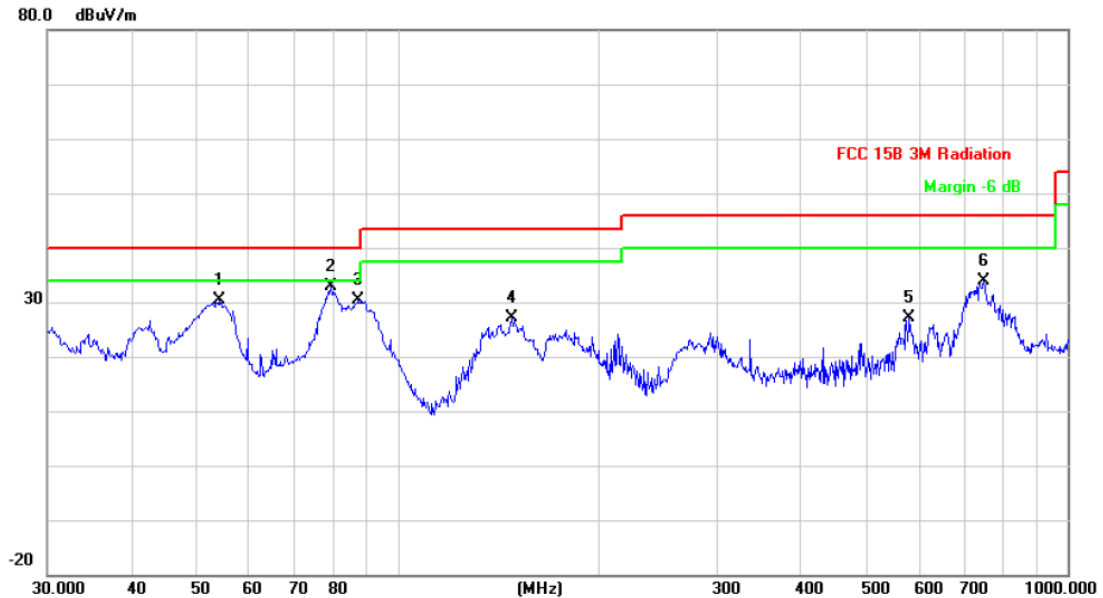


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		79.5209	49.81	-23.30	26.51	40.00	-13.49	peak
2		91.4949	47.49	-22.56	24.93	43.50	-18.57	peak
3		138.3873	47.21	-22.02	25.19	43.50	-18.31	peak
4		279.0436	45.43	-17.49	27.94	46.00	-18.06	peak
5		336.0352	49.12	-15.46	33.66	46.00	-12.34	peak
6	*	744.8661	41.96	-7.09	34.87	46.00	-11.13	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

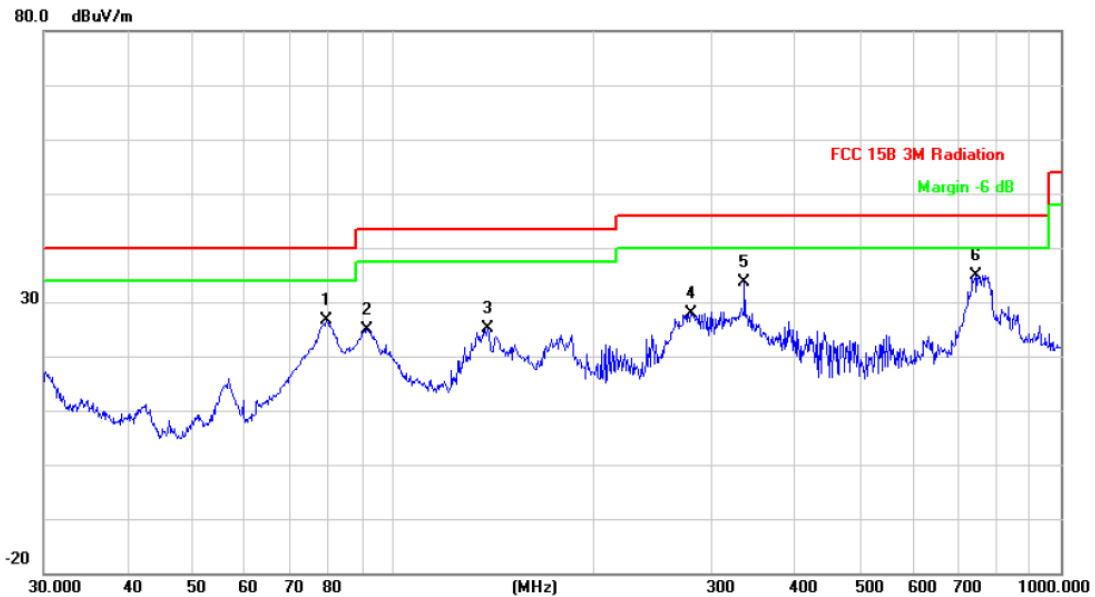


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		54.0711	54.85	-24.45	30.40	40.00	-9.60	peak
2	*	79.5209	56.12	-23.30	32.82	40.00	-7.18	peak
3		87.4177	53.29	-22.84	30.45	40.00	-9.55	peak
4		147.9214	48.51	-21.34	27.17	43.50	-16.33	peak
5		580.7026	37.02	-9.98	27.04	46.00	-18.96	peak
6		750.1083	40.90	-7.08	33.82	46.00	-12.18	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX π /4-DQPSK Mode 2402MHz		
Remark:	Only worse case is reported		

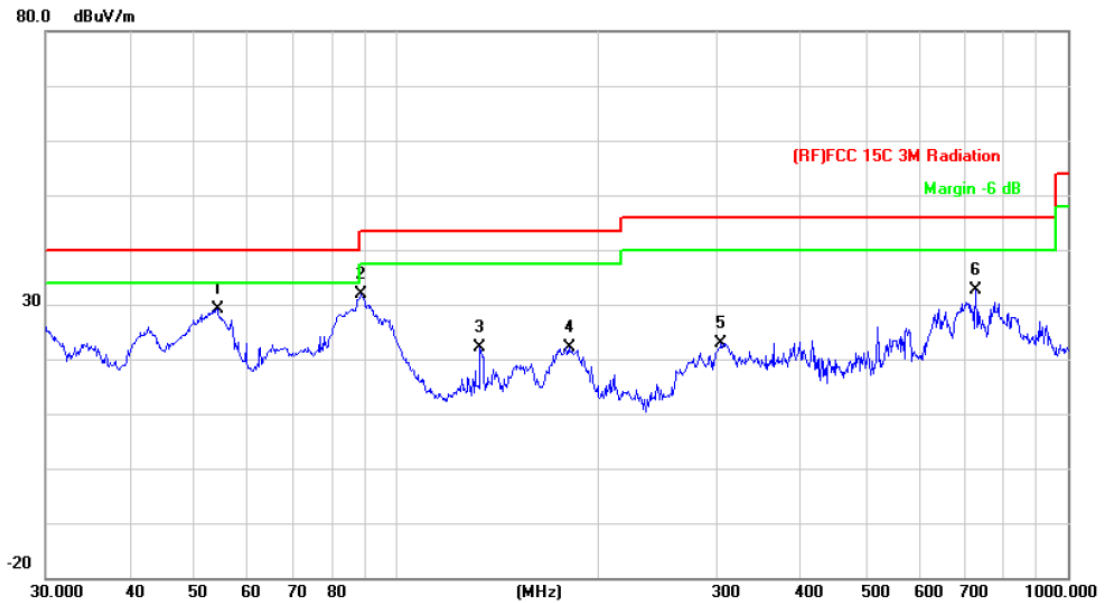


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		79.5209	49.81	-23.30	26.51	40.00	-13.49	peak
2		91.4949	47.49	-22.56	24.93	43.50	-18.57	peak
3		138.3873	47.21	-22.02	25.19	43.50	-18.31	peak
4		279.0436	45.43	-17.49	27.94	46.00	-18.06	peak
5		336.0352	49.12	-15.46	33.66	46.00	-12.34	peak
6	*	744.8661	41.96	-7.09	34.87	46.00	-11.13	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX π /4-DQPSK Mode 2402MHz		
Remark:	Only worse case is reported		

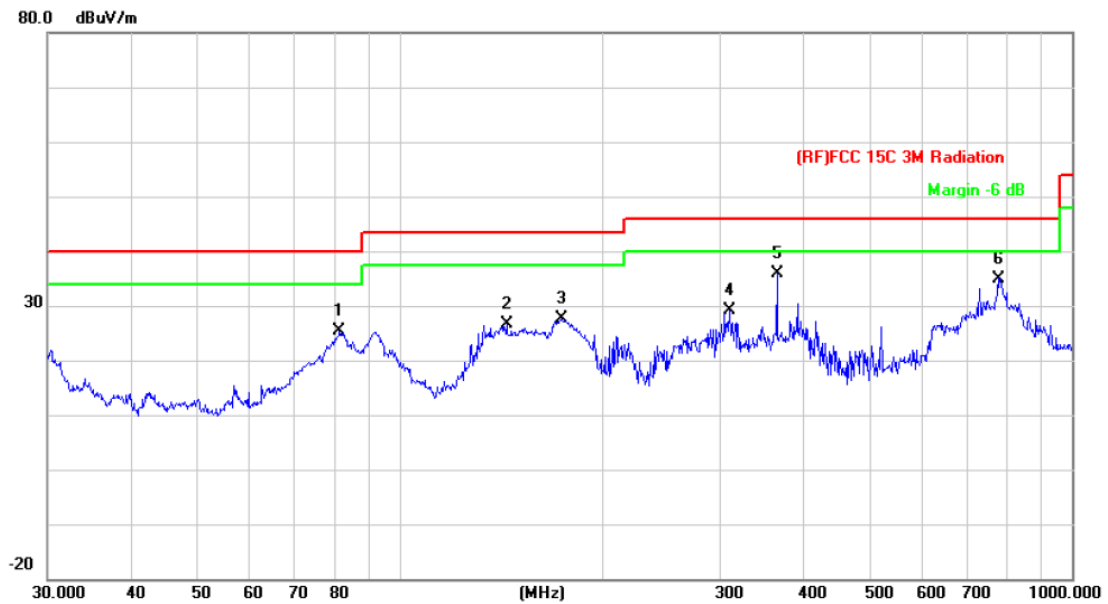


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	54.0711	53.61	-24.45	29.16	40.00	-10.84	peak
2		88.6524	54.76	-22.77	31.99	43.50	-11.51	peak
3		133.1511	44.17	-22.12	22.05	43.50	-21.45	peak
4		180.6486	42.84	-20.59	22.25	43.50	-21.25	peak
5		304.6099	39.76	-16.91	22.85	46.00	-23.15	peak
6		729.3582	39.83	-7.13	32.70	46.00	-13.30	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	Only worse case is reported		

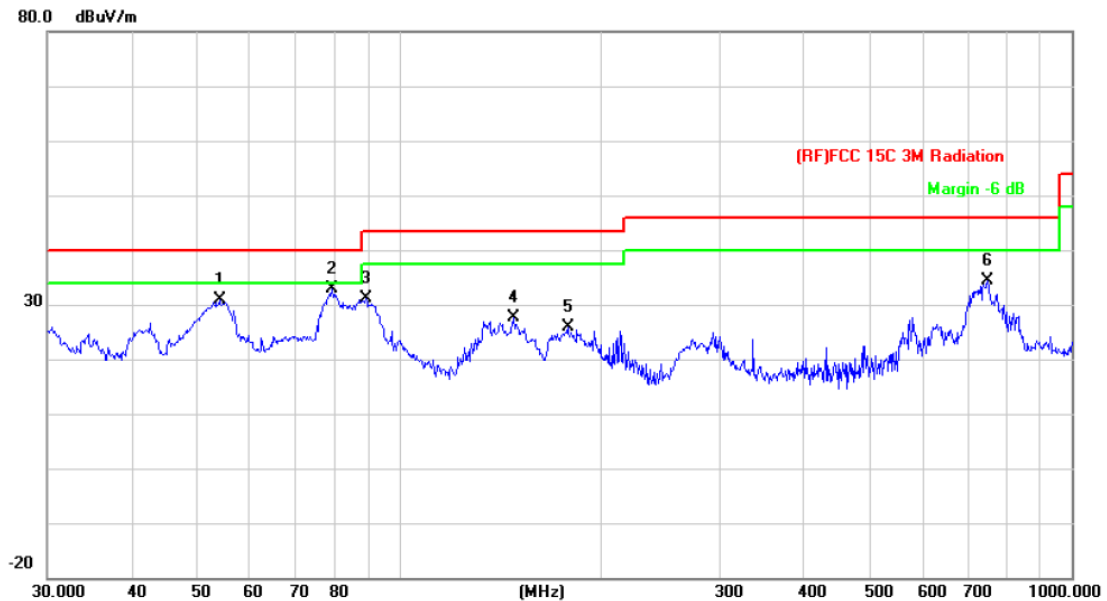


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		81.4968	48.53	-23.20	25.33	40.00	-14.67 peak
2		144.3348	48.33	-21.63	26.70	43.50	-16.80 peak
3		174.4241	48.44	-20.91	27.53	43.50	-15.97 peak
4		309.9977	45.93	-16.70	29.23	46.00	-16.77 peak
5	*	364.2595	50.31	-14.52	35.79	46.00	-10.21 peak
6		776.8777	41.72	-6.72	35.00	46.00	-11.00 peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	Only worse case is reported		

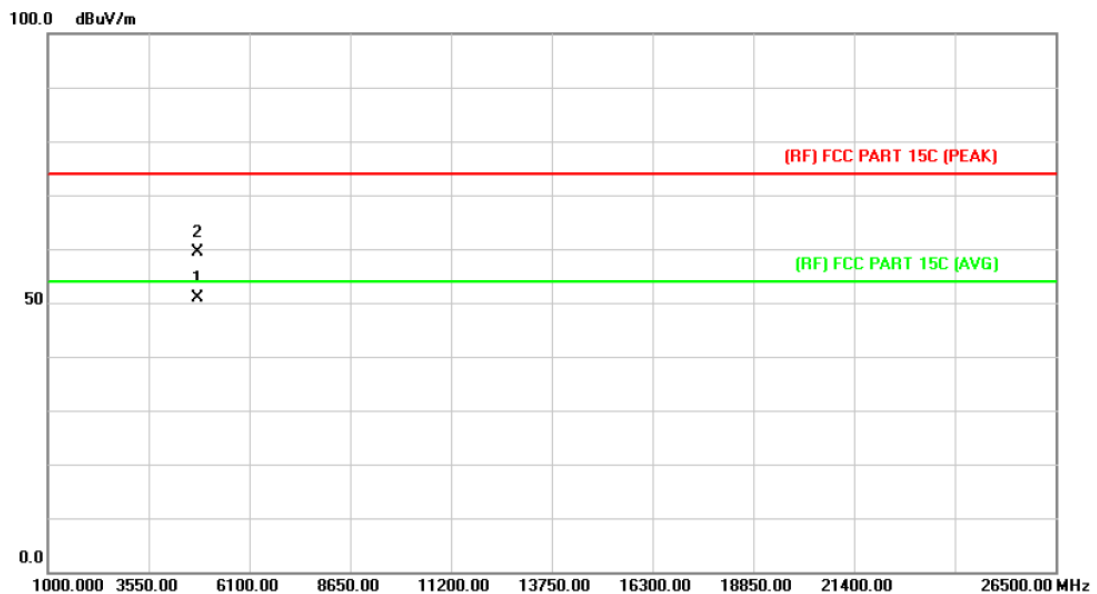


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		54.0711	55.35	-24.45	30.90	40.00	-9.10 peak
2	*	79.5207	56.12	-23.30	32.82	40.00	-7.18 peak
3		89.2762	53.85	-22.74	31.11	43.50	-12.39 peak
4		147.9214	49.01	-21.34	27.67	43.50	-15.83 peak
5		178.1325	46.67	-20.69	25.98	43.50	-17.52 peak
6		750.1082	41.40	-7.08	34.32	46.00	-11.68 peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

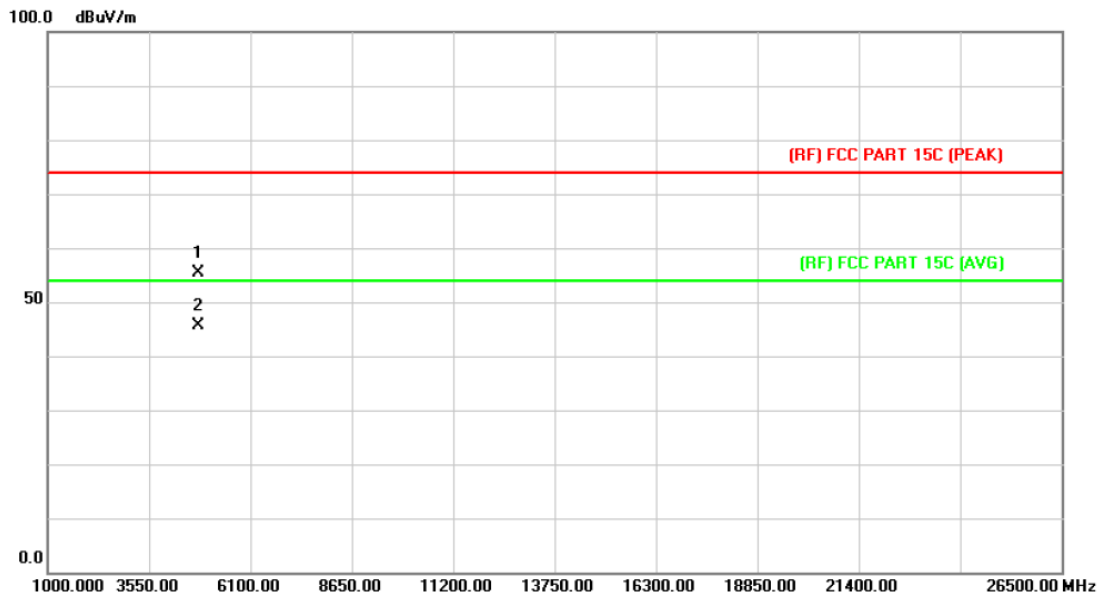
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4804.274	41.65	13.44	55.09	74.00	-18.91	peak
2	*	4804.651	31.87	13.44	45.31	54.00	-8.69	AVG

Emission Level= Read Level+ Correct Factor

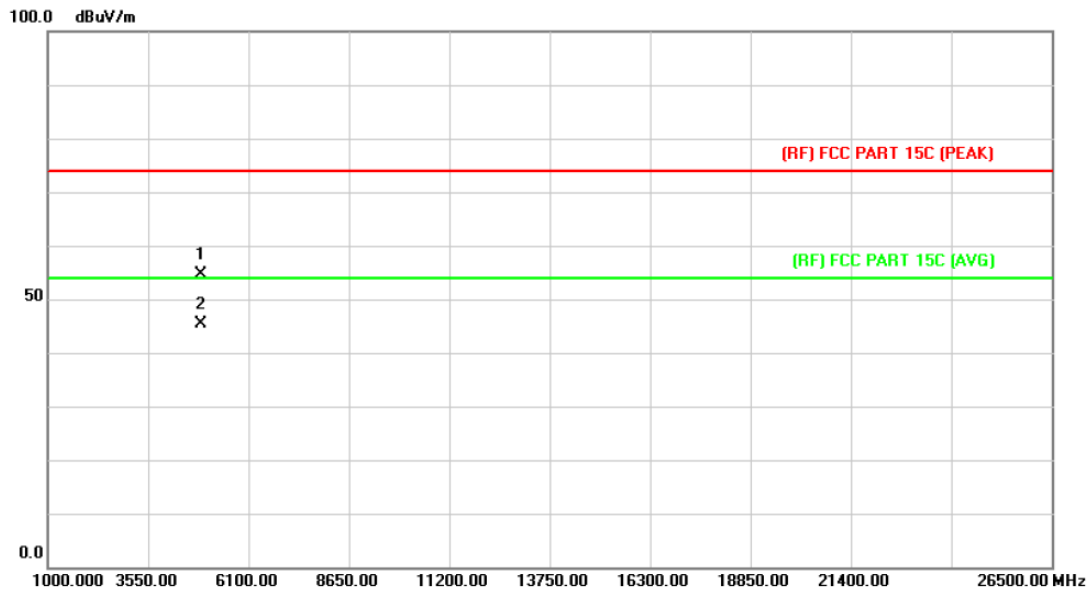
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4803.957	41.83	13.44	55.27	74.00	-18.73	peak
2	*	4804.684	32.17	13.44	45.61	54.00	-8.39	AVG

Emission Level= Read Level+ Correct Factor

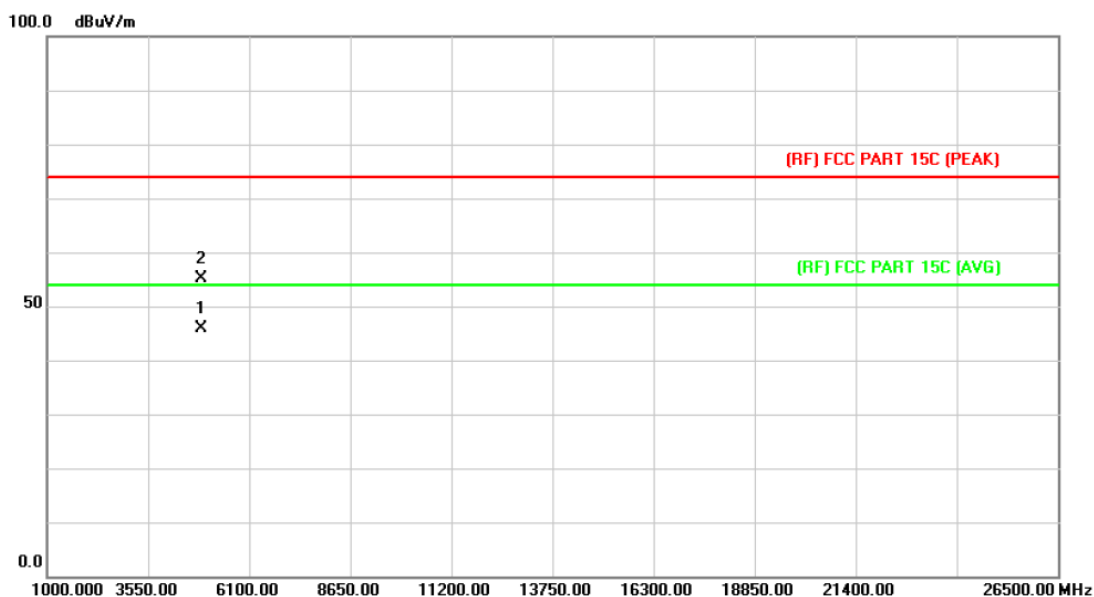
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4881.814	40.77	13.90	54.67	74.00	-19.33	peak
2	*	4882.624	31.43	13.90	45.33	54.00	-8.67	AVG

Emission Level= Read Level+ Correct Factor

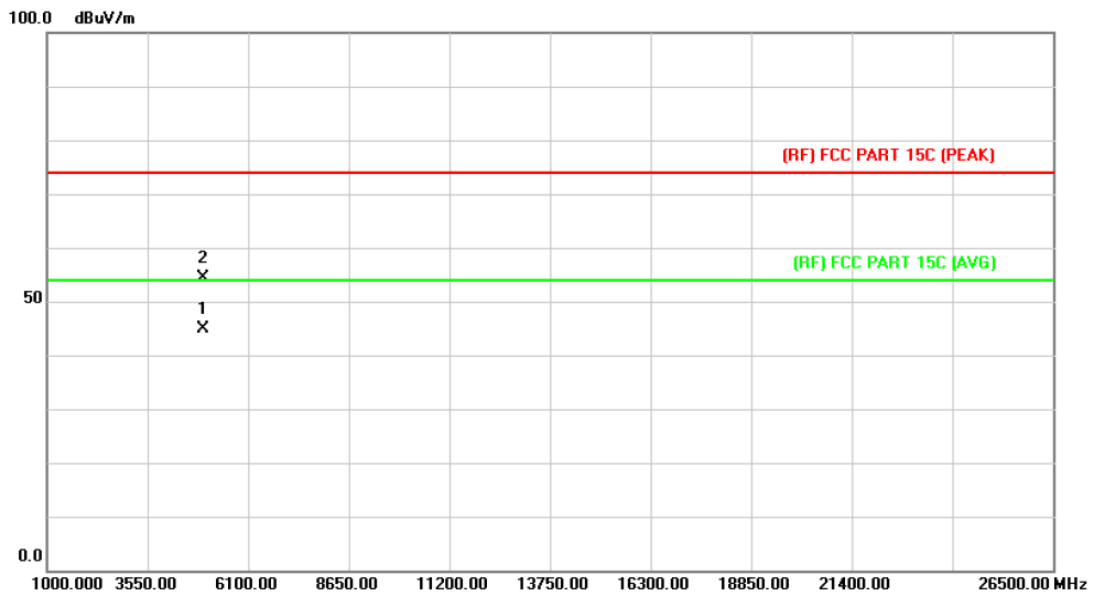
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4882.564	31.94	13.90	45.84	54.00	-8.16	AVG
2		4882.651	41.22	13.90	55.12	74.00	-18.88	peak

Emission Level= Read Level+ Correct Factor

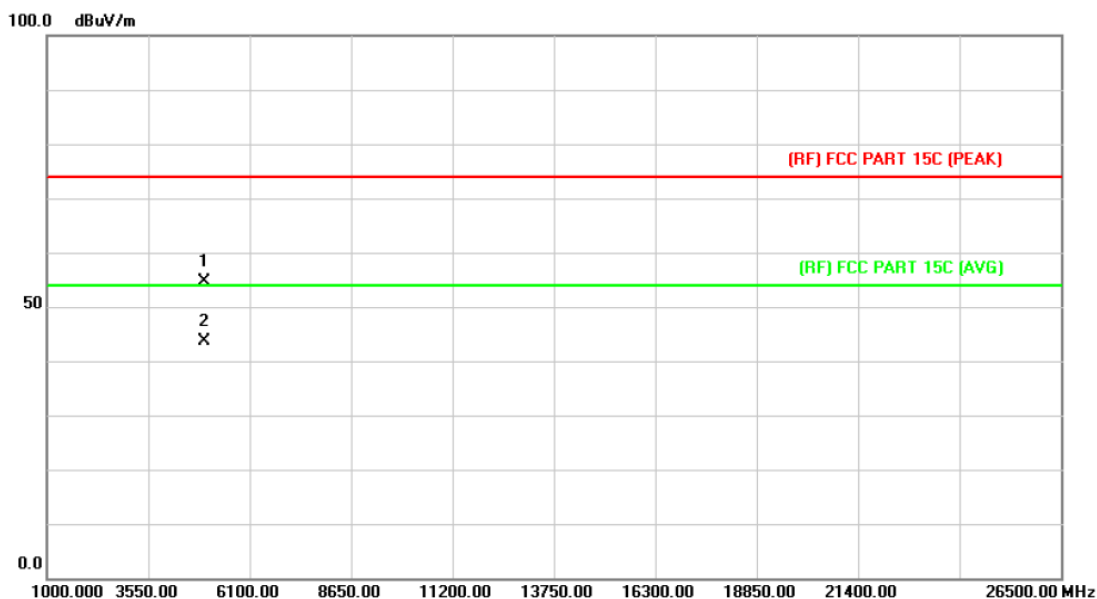
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.631	30.49	14.36	44.85	54.00	-9.15	AVG
2		4960.178	39.93	14.36	54.29	74.00	-19.71	peak

Emission Level= Read Level+ Correct Factor

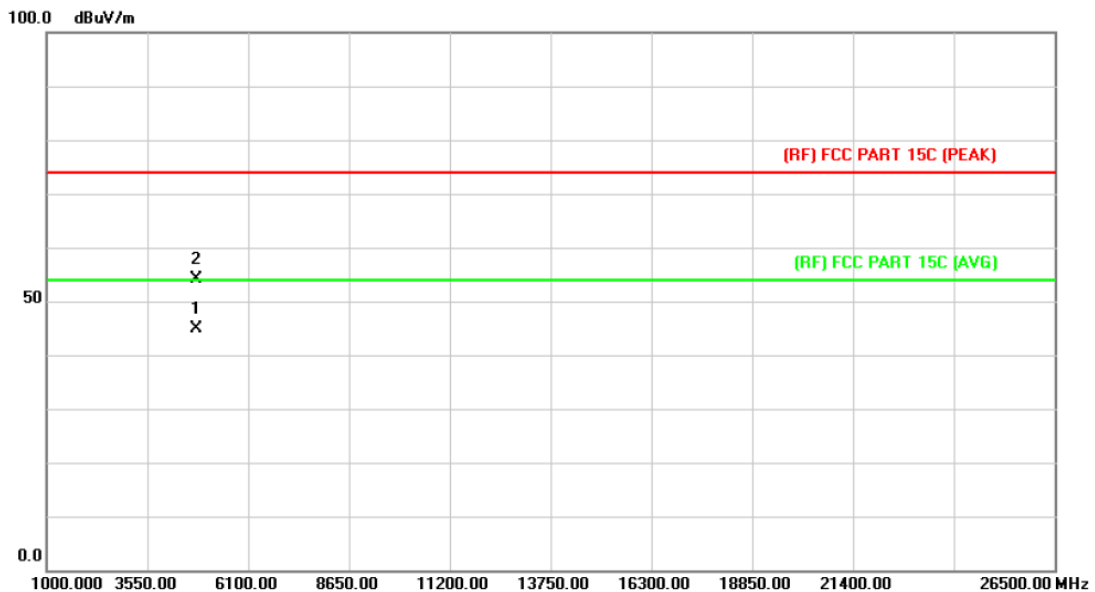
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4959.714	40.25	14.36	54.61	74.00	-19.39	peak
2	*	4959.925	29.16	14.36	43.52	54.00	-10.48	AVG

Emission Level= Read Level+ Correct Factor

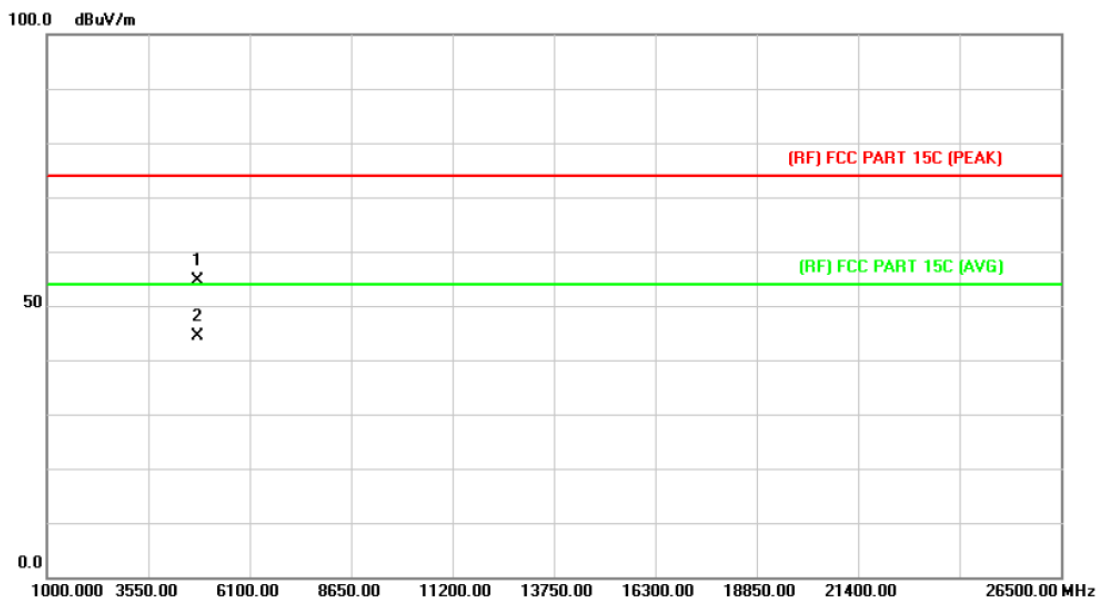
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4804.680	31.37	13.44	44.81	54.00	-9.19	AVG
2		4804.847	40.69	13.44	54.13	74.00	-19.87	peak

Emission Level= Read Level+ Correct Factor

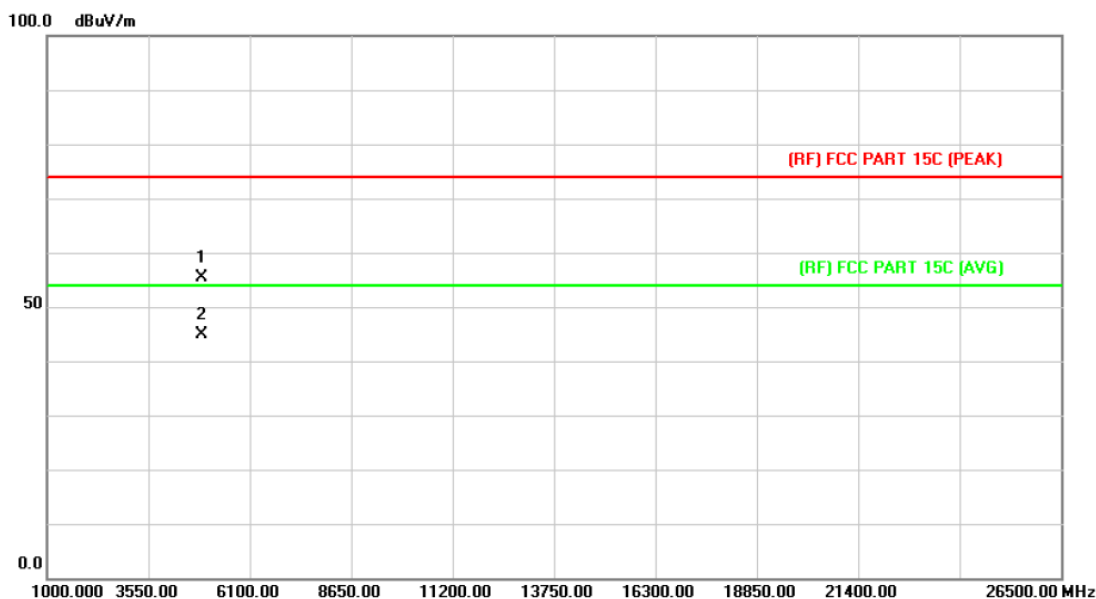
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4804.328	41.13	13.44	54.57	74.00	-19.43	peak
2	*	4804.811	30.84	13.44	44.28	54.00	-9.72	AVG

Emission Level= Read Level+ Correct Factor

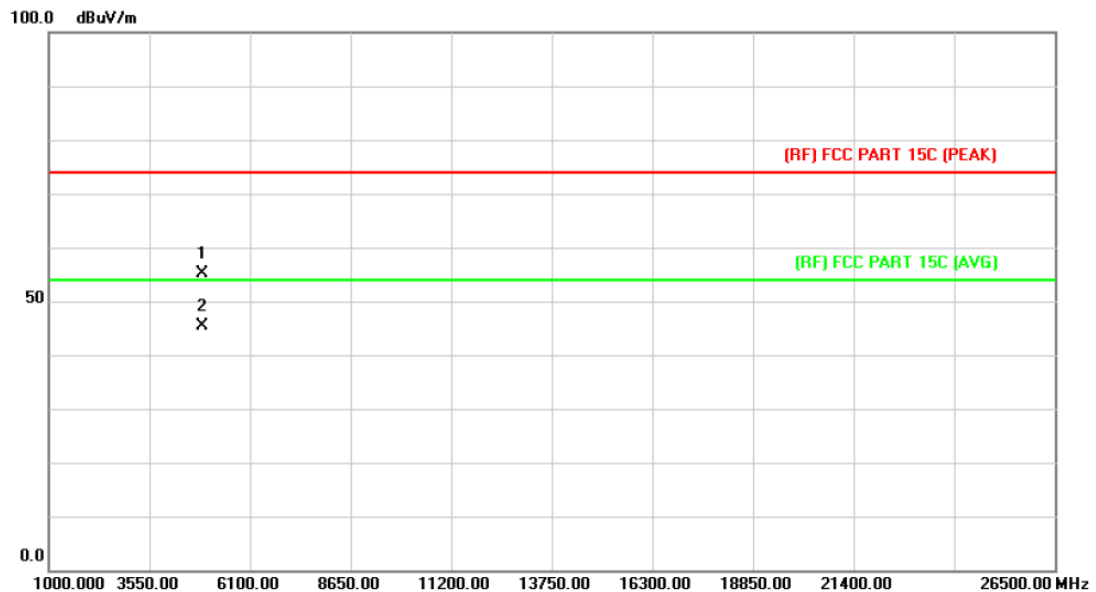
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.178	41.46	13.90	55.36	74.00	-18.64	peak
2	*	4882.327	30.97	13.90	44.87	54.00	-9.13	AVG

Emission Level= Read Level+ Correct Factor

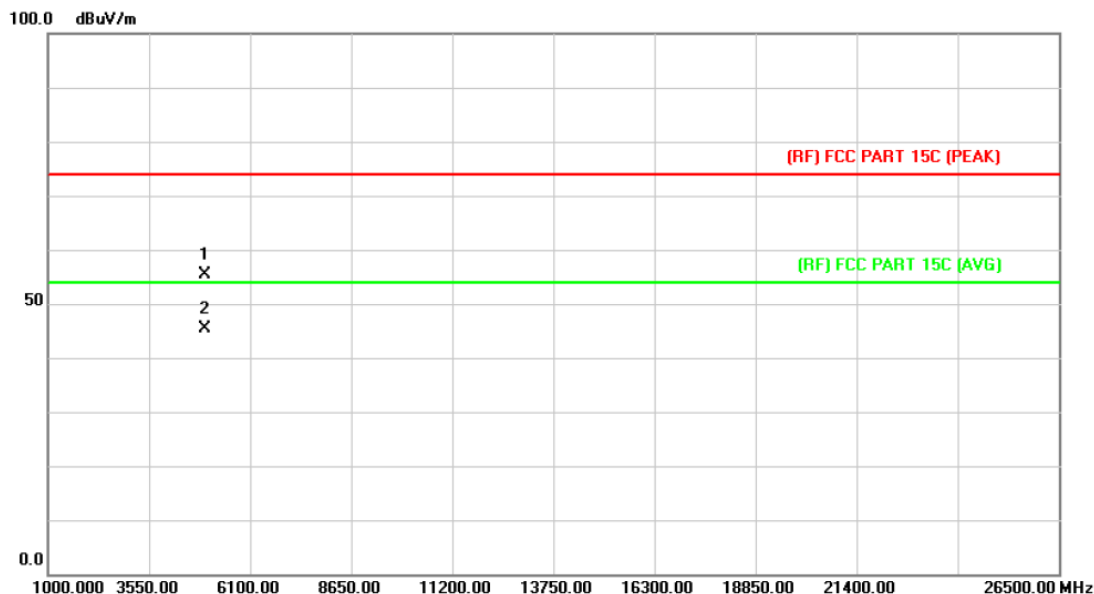
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4881.326	41.34	13.90	55.24	74.00	-18.76	peak
2	*	4882.568	31.43	13.90	45.33	54.00	-8.67	AVG

Emission Level= Read Level+ Correct Factor

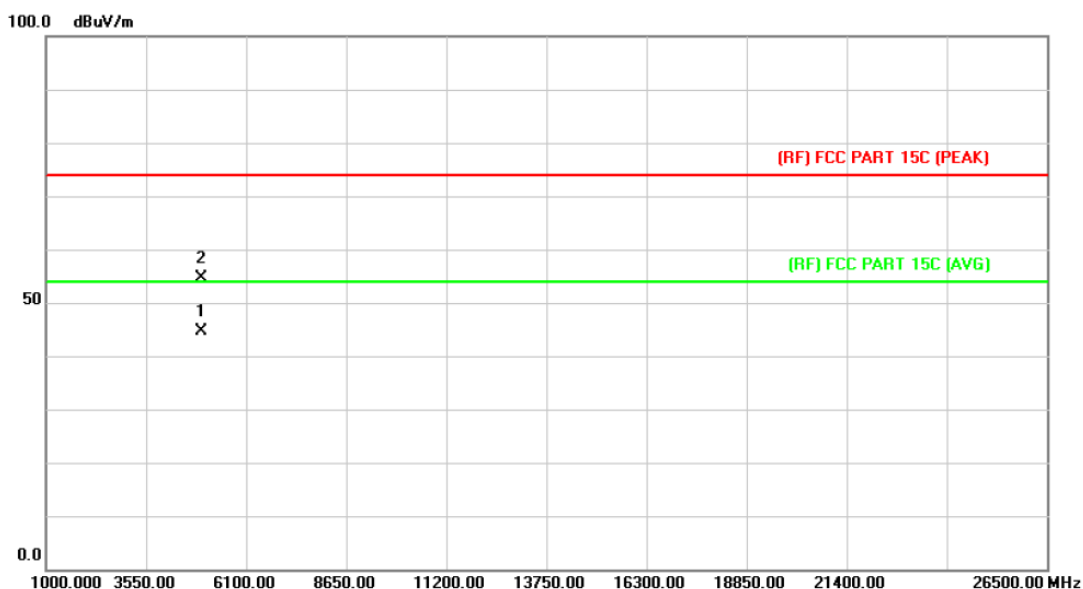
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		4960.355	41.11	14.36	55.47	74.00	-18.53	peak
2	*	4960.658	31.00	14.36	45.36	54.00	-8.64	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
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.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.653	30.38	14.36	44.74	54.00	-9.26	AVG
2		4960.517	40.31	14.36	54.67	74.00	-19.33	peak

Emission Level= Read Level+ Correct Factor

6. Restricted Bands Requirement

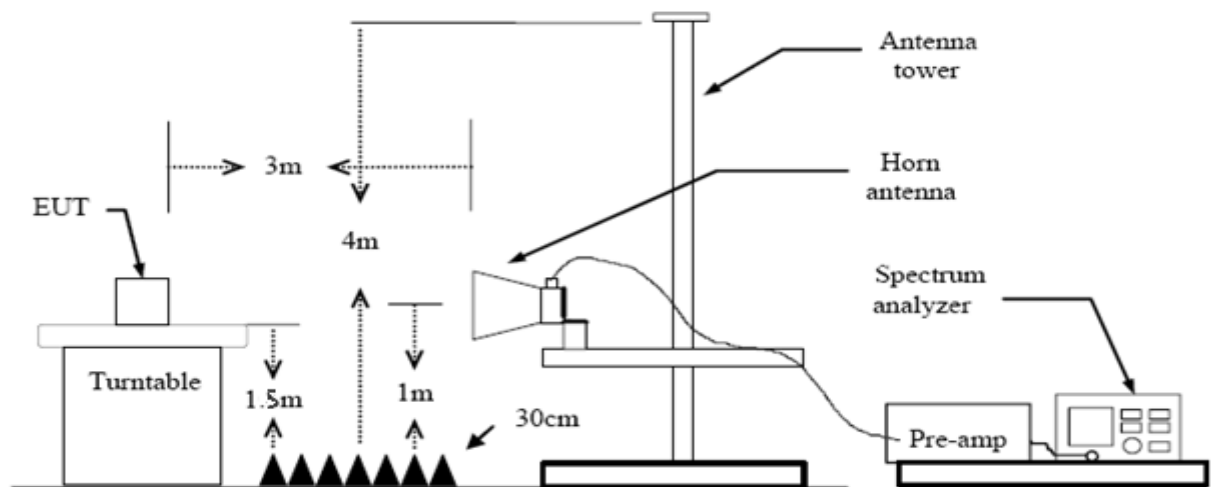
6.1 Test Standard and Limit

- 6.1.1 Test Standard
FCC Part 15.209
FCC Part 15.205
- 6.1.2 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.

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. 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) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

-
- (4) 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.
 - (5) 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.
 - (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
 - (7) 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.
 - (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

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

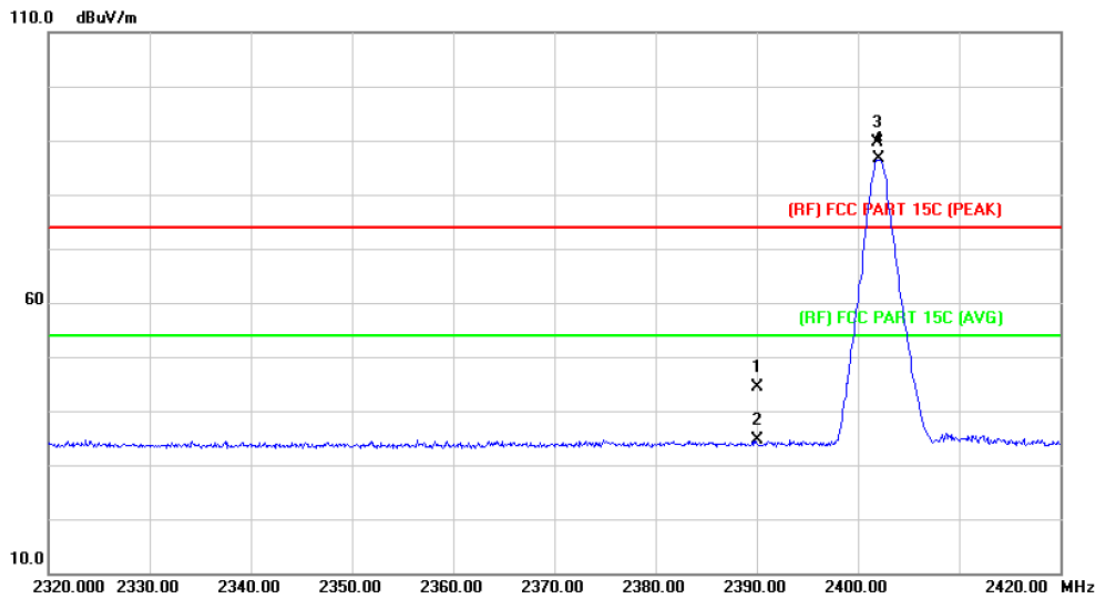
6.5 Test Data

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=1 KHz with Peak Detector for Average Values.

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

(1) Radiation Test

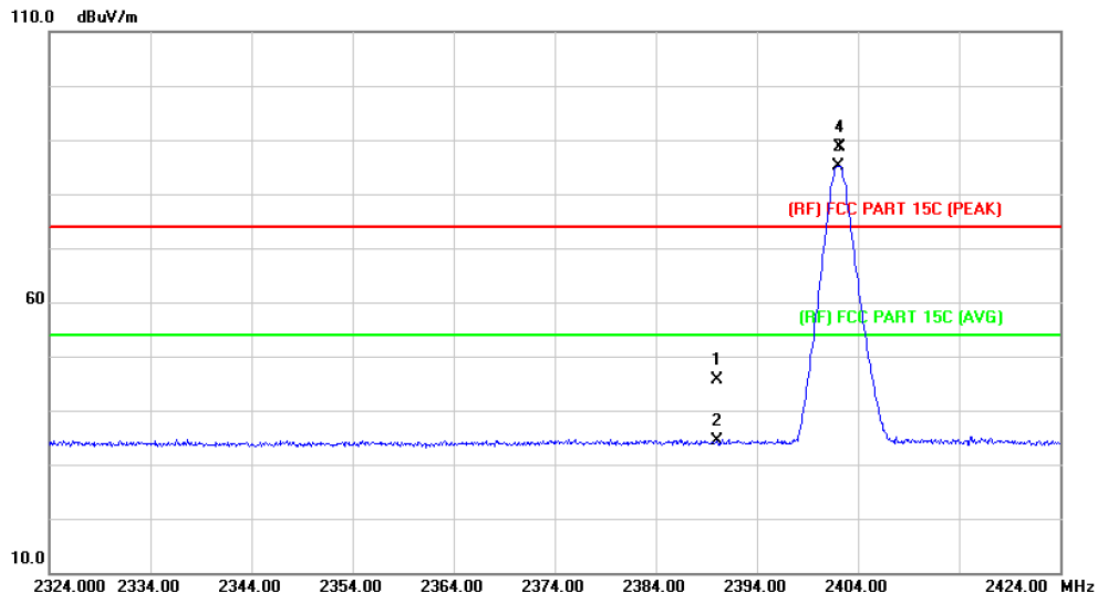
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	43.62	0.77	44.39	74.00	-29.61	peak
2		2390.000	33.87	0.77	34.64	54.00	-19.36	AVG
3	X	2401.900	88.75	0.82	89.57	Fundamental Frequency		peak
4	*	2402.100	85.79	0.82	86.61	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

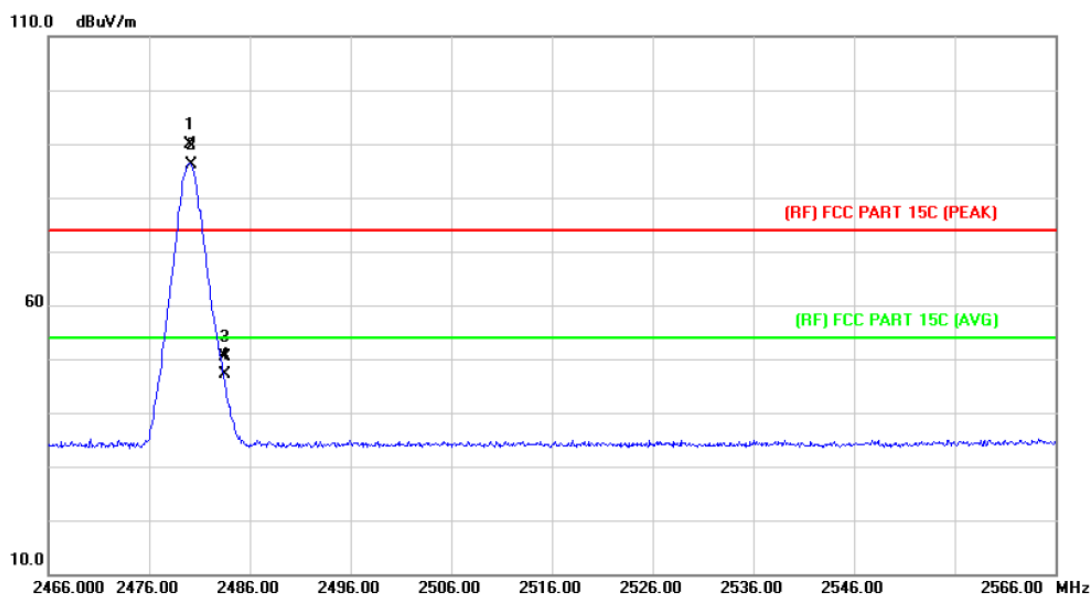
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	44.90	0.77	45.67	74.00	-28.33 peak
2		2390.000	33.51	0.77	34.28	54.00	-19.72 AVG
3	*	2402.100	84.38	0.82	85.20	Fundamental Frequency AVG	
4	X	2402.200	87.85	0.82	88.67	Fundamental Frequency peak	

Emission Level= Read Level+ Correct Factor

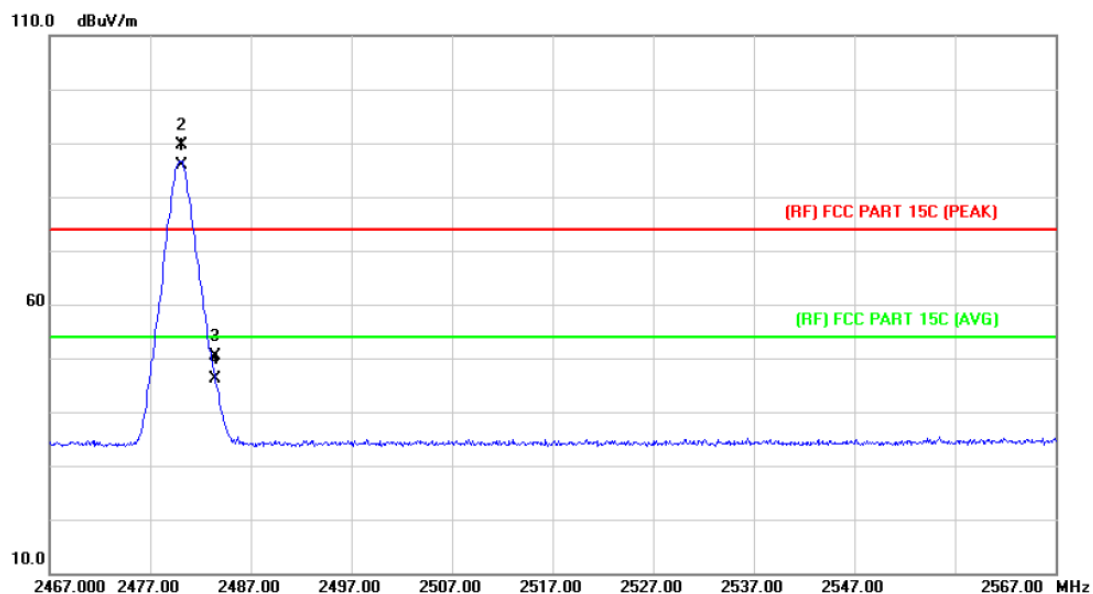
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2480.100	88.66	1.15	89.81	Fundamental Frequency		peak
2	*	2480.200	84.97	1.15	86.12	Fundamental Frequency		AVG
3		2483.500	49.13	1.17	50.30	74.00	-23.70	peak
4		2483.500	46.04	1.17	47.21	54.00	-6.79	AVG

Emission Level= Read Level+ Correct Factor

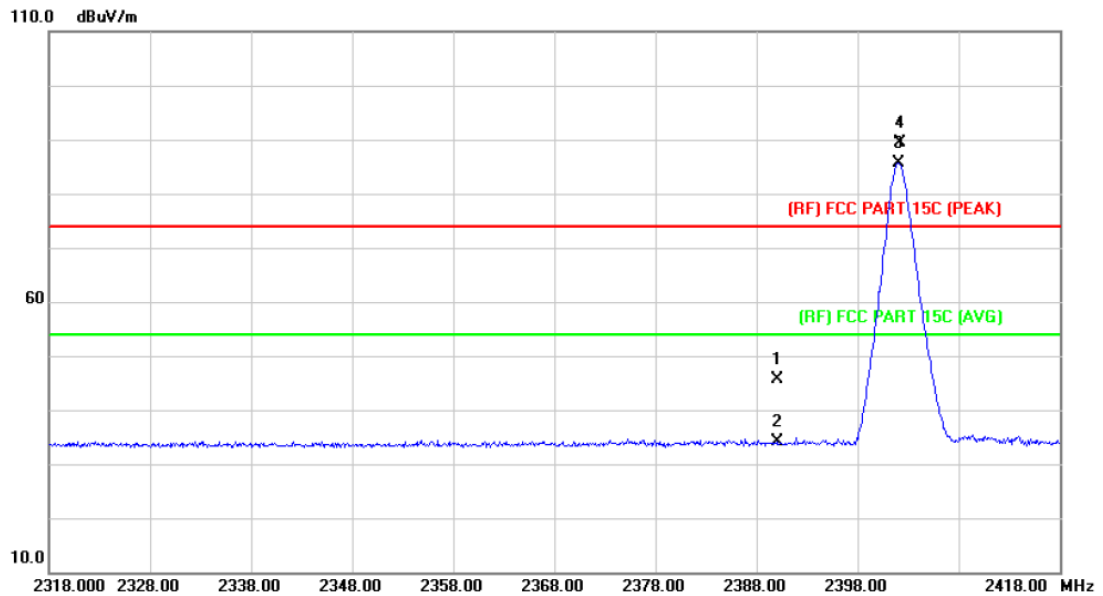
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	2480.100	84.79	1.15	85.94	Fundamental Frequency		AVG
2	X	2480.200	88.54	1.15	89.69	Fundamental Frequency		peak
3		2483.500	49.14	1.17	50.31	74.00	-23.69	peak
4		2483.500	45.07	1.17	46.24	54.00	-7.76	AVG

Emission Level= Read Level+ Correct Factor

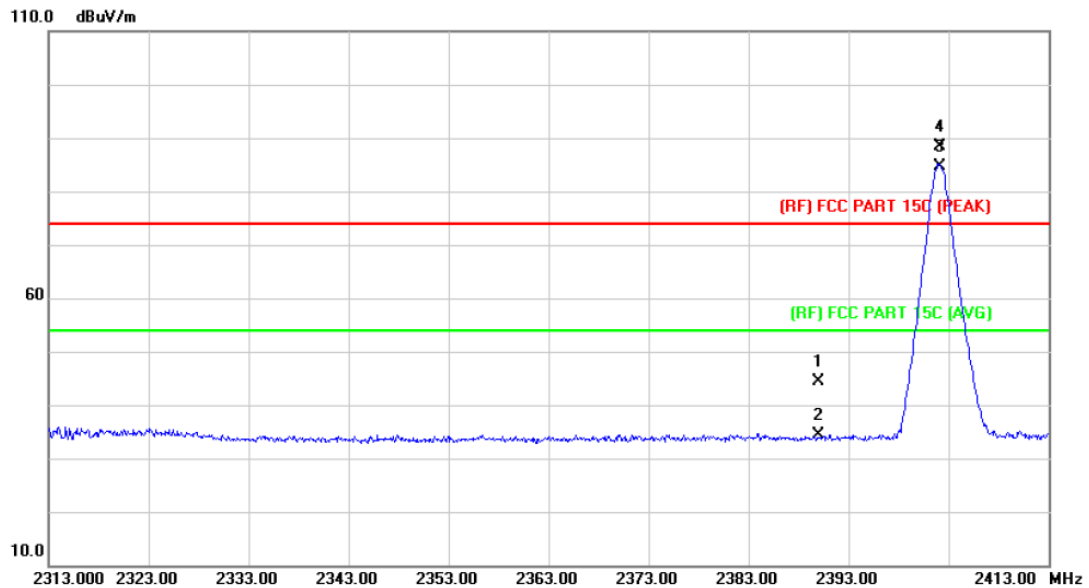
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	44.74	0.77	45.51	74.00	-28.49	peak
2		2390.000	33.44	0.77	34.21	54.00	-19.79	AVG
3	*	2402.100	84.72	0.82	85.54	Fundamental Frequency		AVG
4	X	2402.200	88.49	0.82	89.31	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

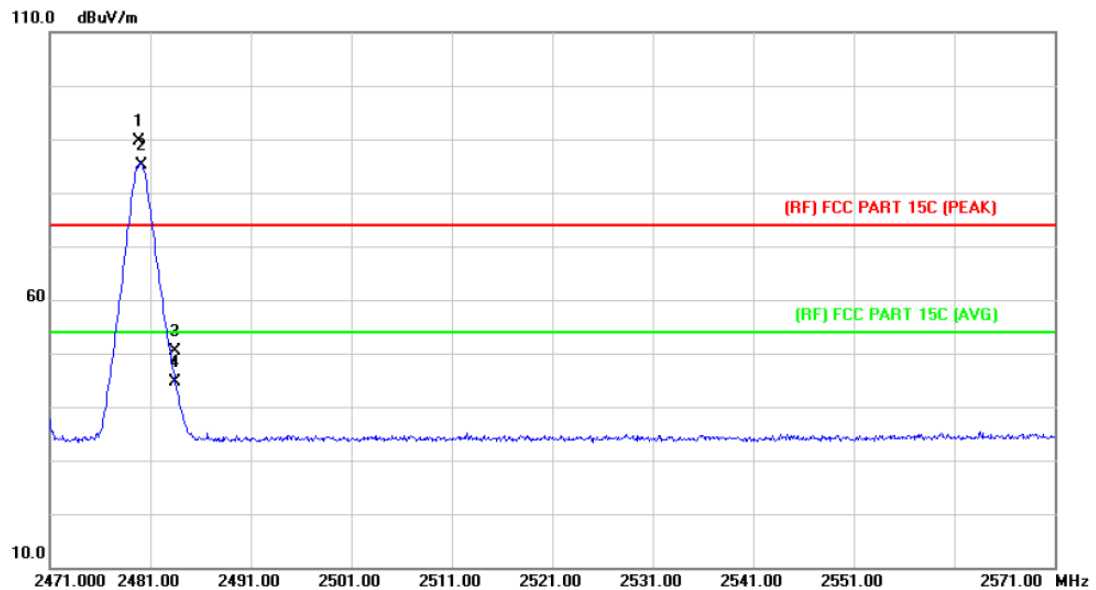
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	43.55	0.77	44.32	74.00	-29.68	peak
2		2390.000	33.50	0.77	34.27	54.00	-19.73	AVG
3	*	2402.100	83.87	0.82	84.69	Fundamental Frequency		AVG
4	X	2402.200	87.52	0.82	88.34	Fundamental Frequency		peak

Emission Level= Read Level+ Correct Factor

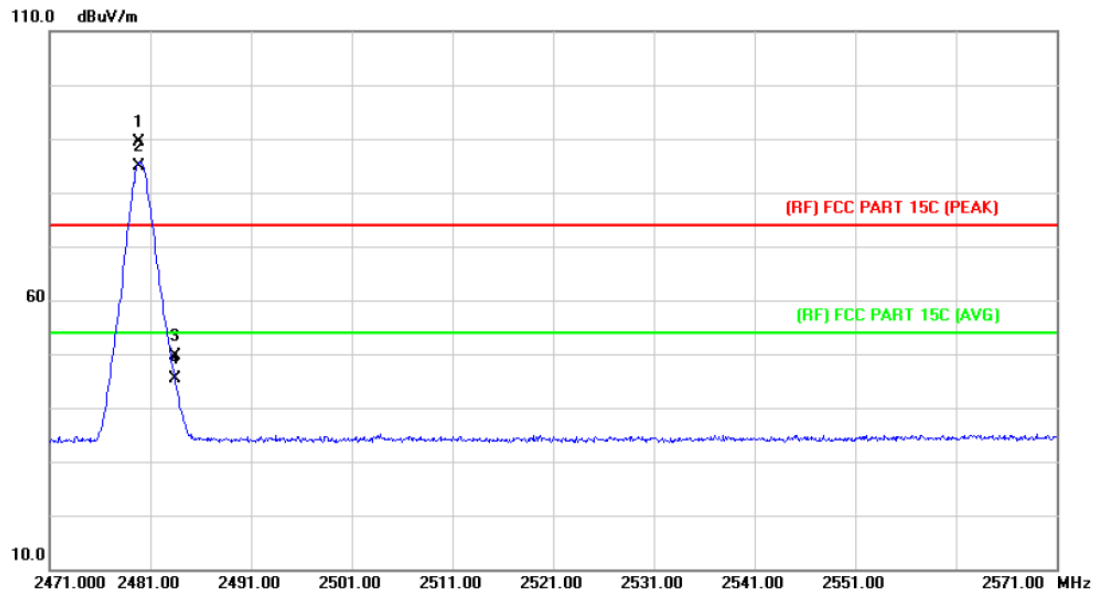
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2479.900	88.47	1.15	89.62	Fundamental Frequency		peak
2	*	2480.100	83.97	1.15	85.12	Fundamental Frequency		AVG
3		2483.500	49.16	1.17	50.33	74.00	-23.67	peak
4		2483.500	43.47	1.17	44.64	54.00	-9.36	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 8-DPSK Mode 2480MHz		
Remark:	N/A		

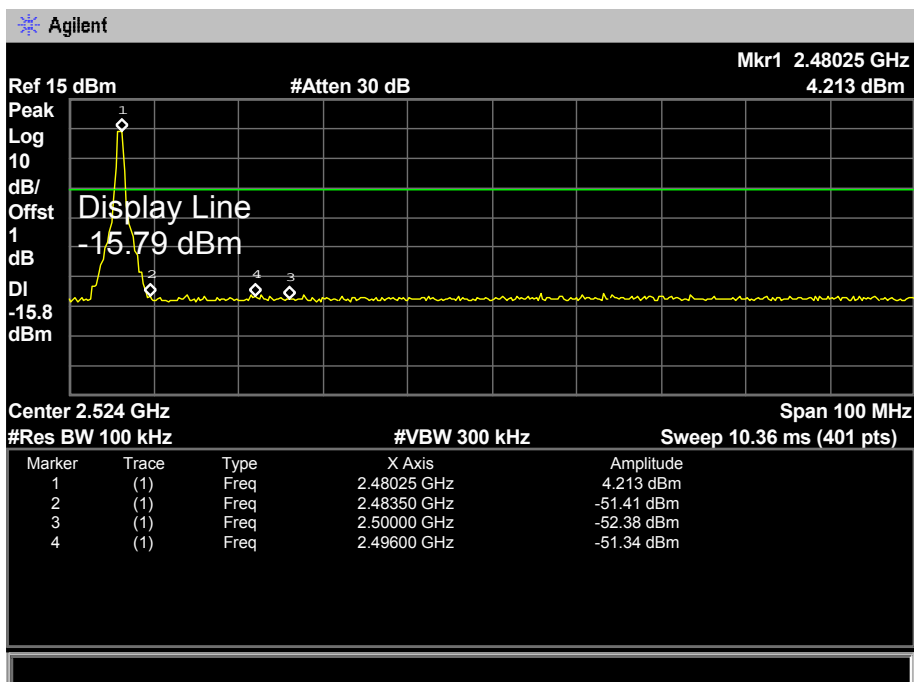
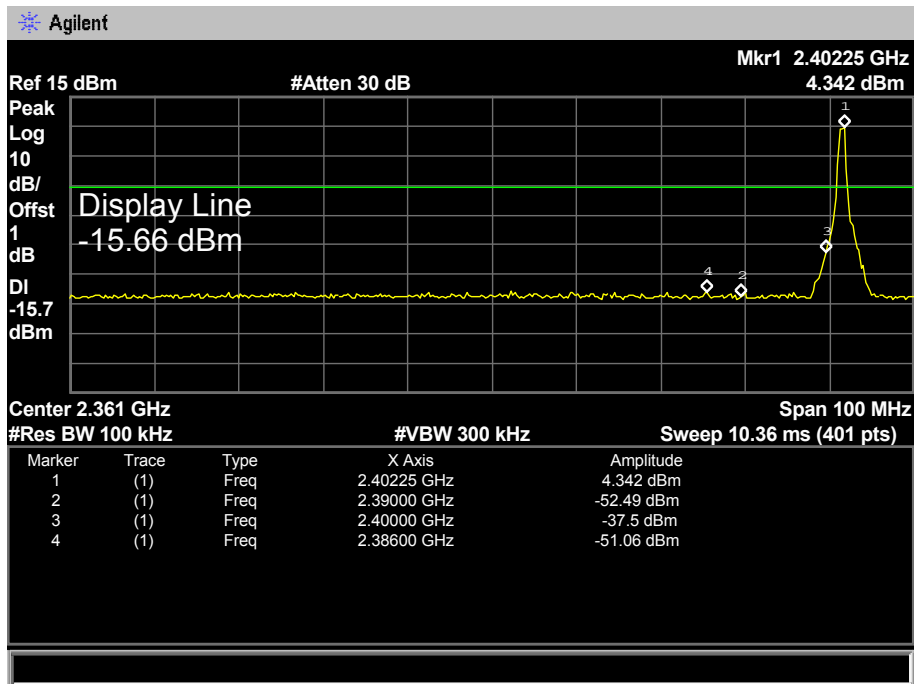


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2479.900	88.22	1.15	89.37	Fundamental Frequency		peak
2	*	2479.900	83.70	1.15	84.85	Fundamental Frequency		AVG
3		2483.500	48.52	1.17	49.69	74.00	-24.31	peak
4		2483.500	44.14	1.17	45.31	54.00	-8.69	AVG

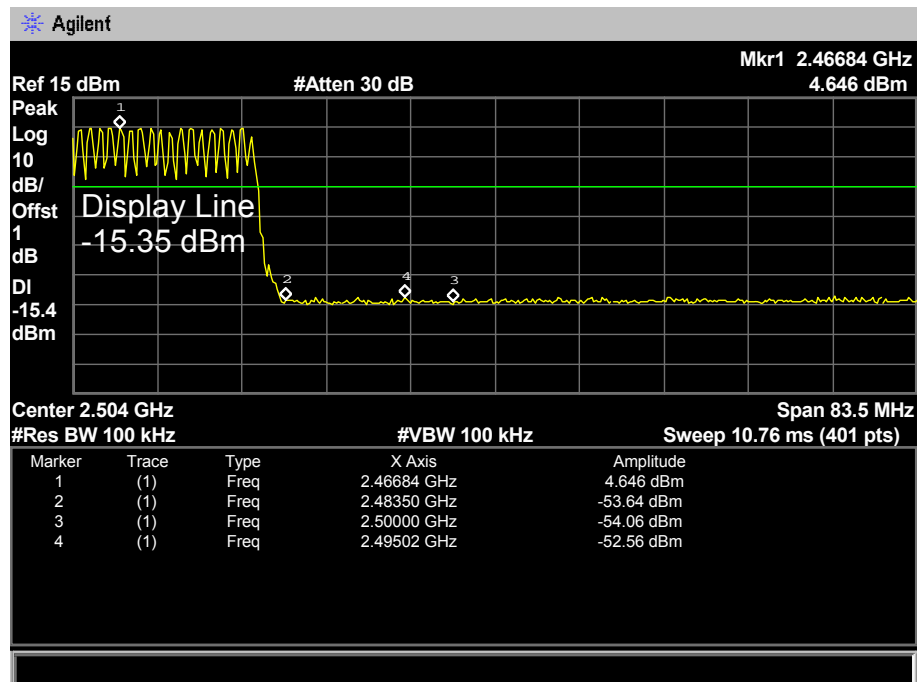
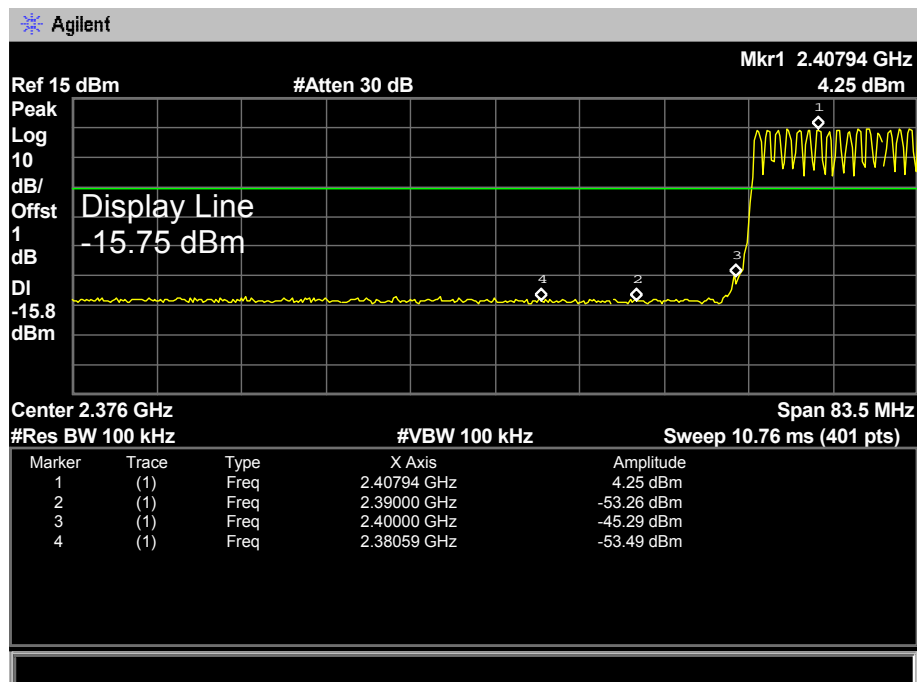
Emission Level= Read Level+ Correct Factor

(2) Conducted Test

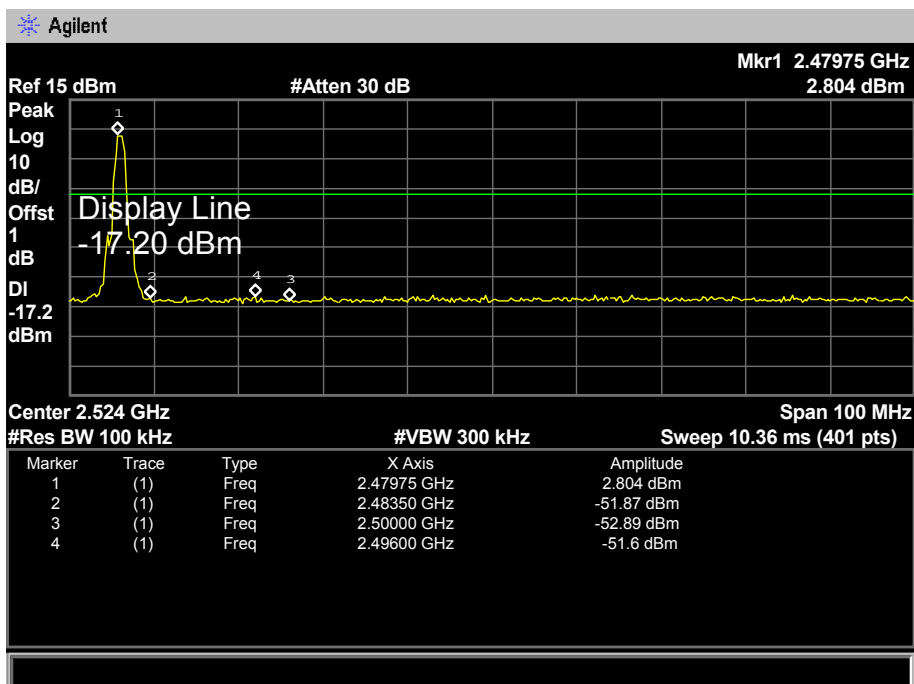
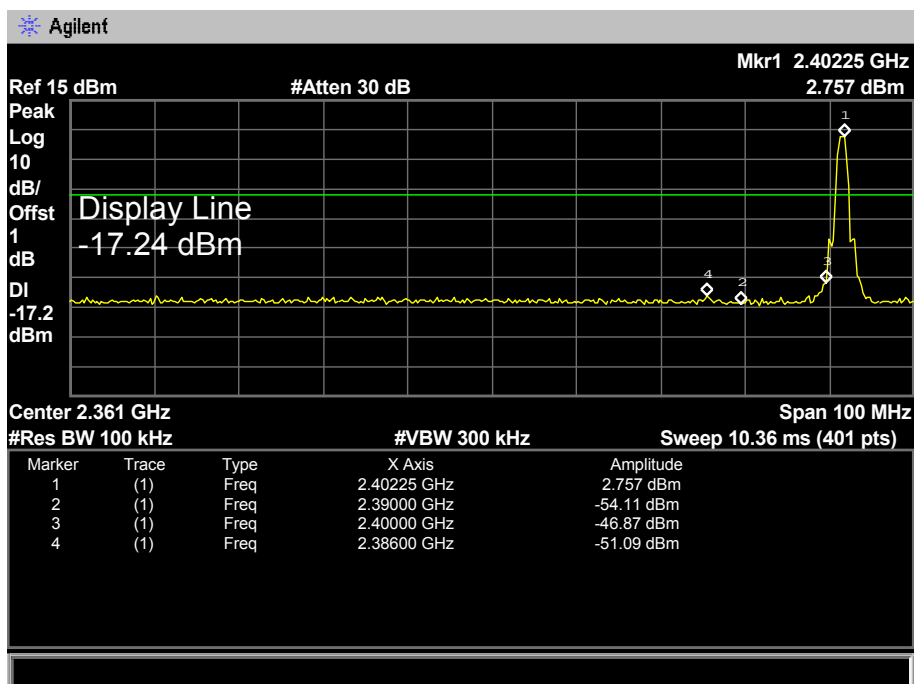
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



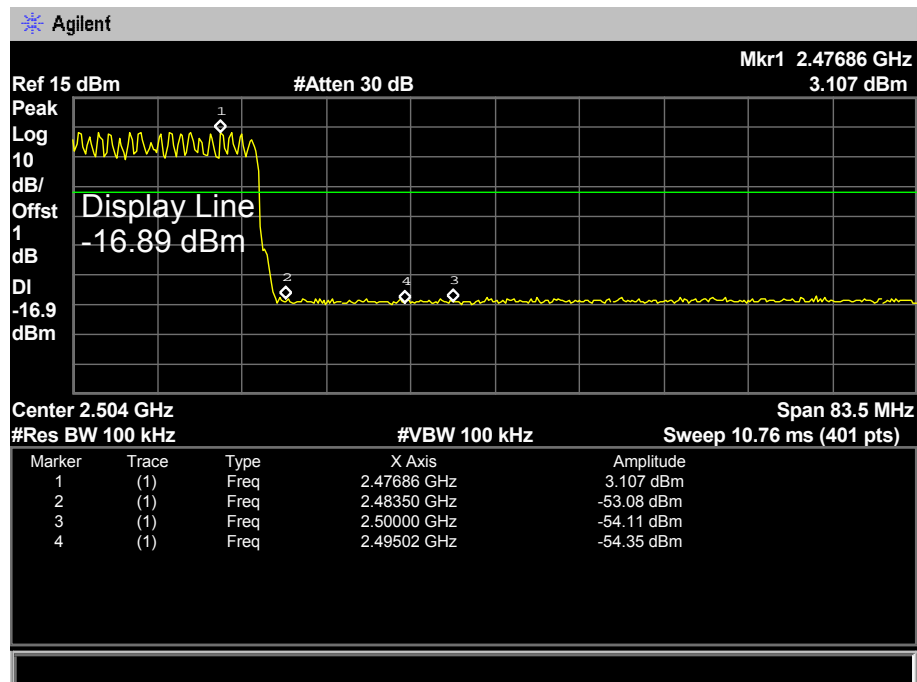
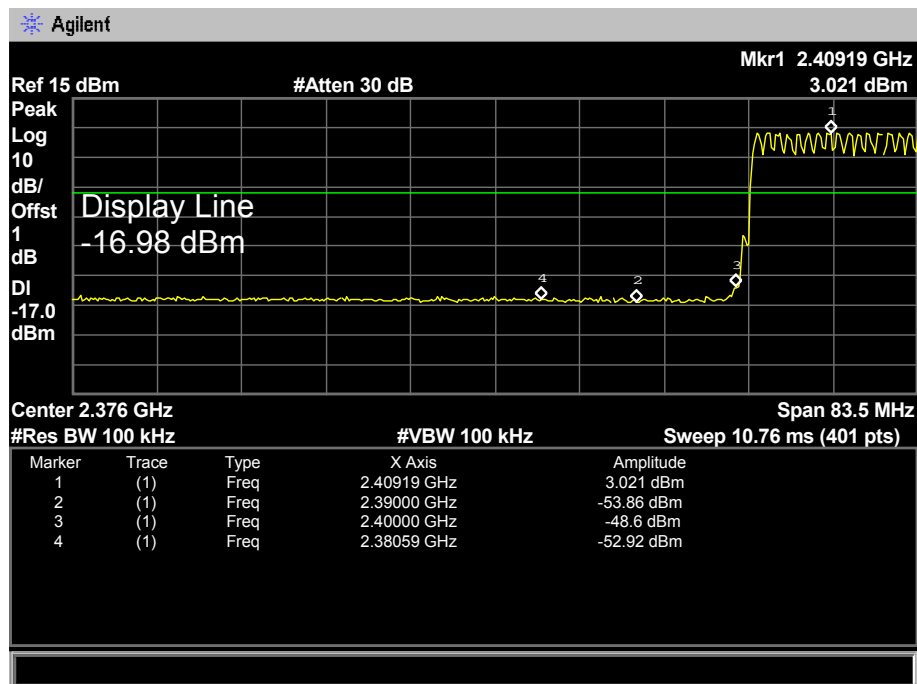
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	GFSK Hopping Mode		
Remark:	N/A		



EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX 8-DPSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	8-DPSK Hopping Mode		
Remark:	N/A		



7. Number of Hopping Channel

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC Part 15.247 (a)(1)

7.1.2 Test 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=100 KHz, Sweep time= Auto.

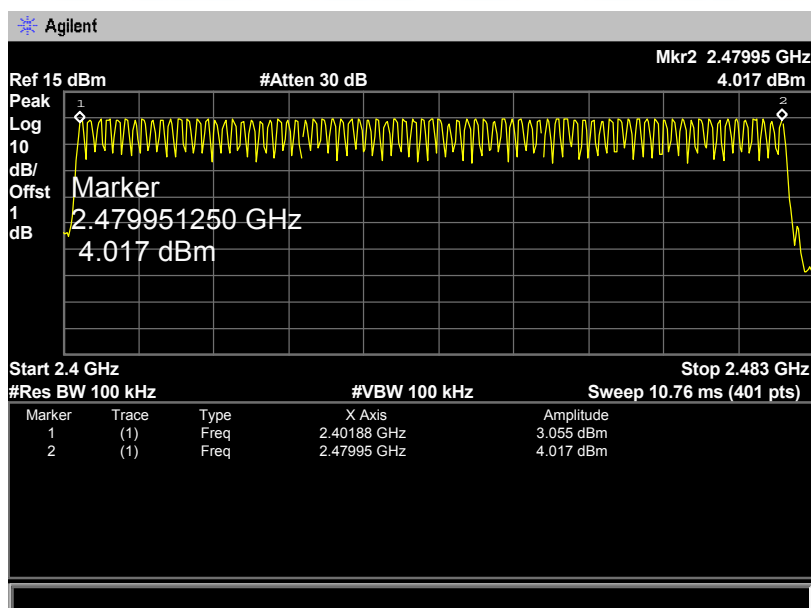
7.4 EUT Operating Condition

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

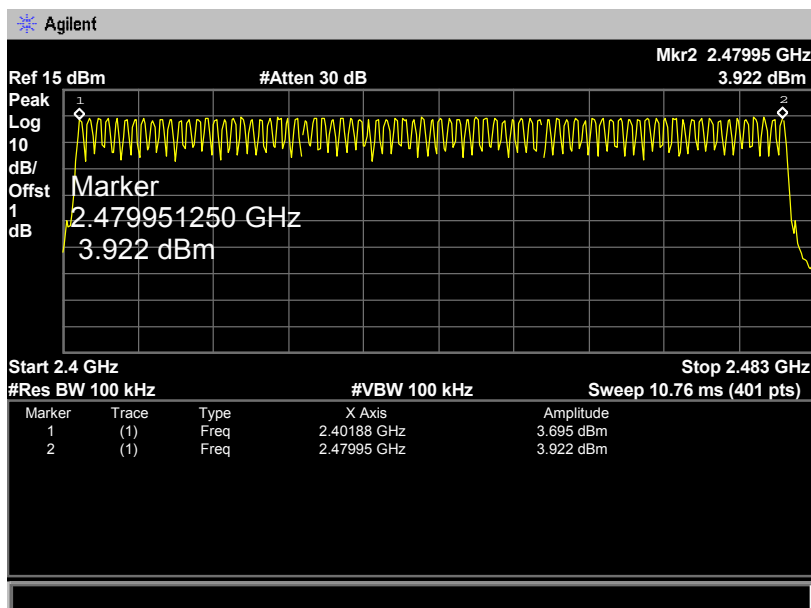
7.5 Test Data

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	Hopping Mode (GFSK/ 8-DPSK)		
Frequency Range	Quantity of Hopping Channel	Limit	
2402MHz~2480MHz	79	>15	
	79		

GFSK Mode



8-DPSK Mode



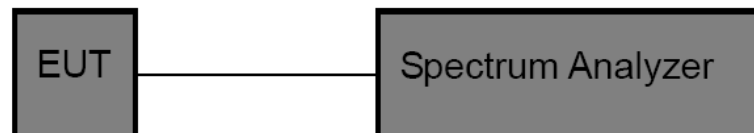
8. Average Time of Occupancy

8.1 Test Standard and Limit

- 8.1.1 Test Standard
FCC Part 15.247 (a)(1)
- 8.1.2 Test Limit

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

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

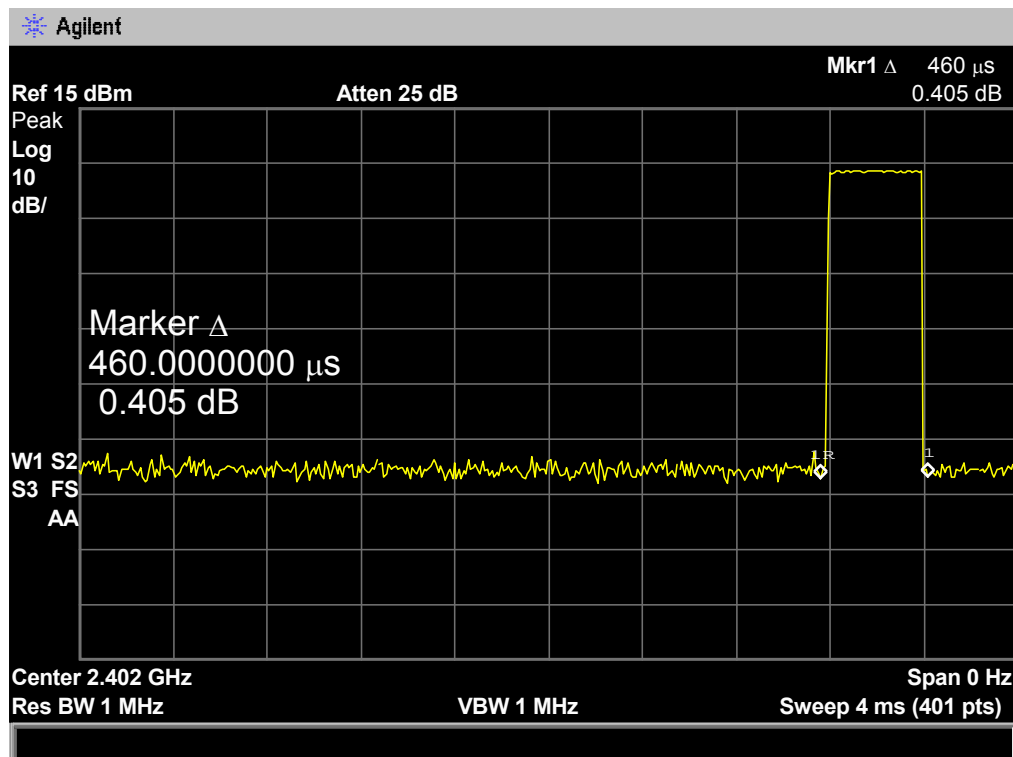
The EUT was set to the Hopping Mode by the Customer.

8.5 Test Data

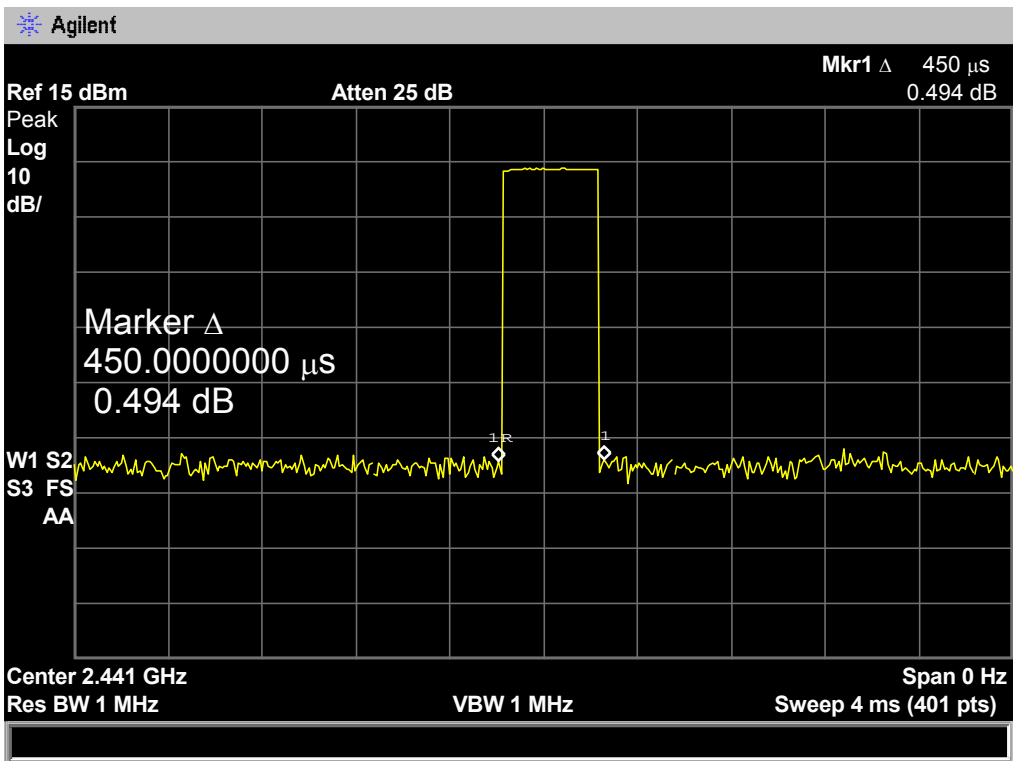
EUT:		Smart phone		Model Name :		S400	
Temperature:		25 °C		Relative Humidity:		55%	
Test Voltage:		AC 120V/60 Hz					
Test Mode:		Hopping Mode (GFSK DH1)					
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result		
2402	0.460	147.20	31.60	400	PASS		
2441	0.450	144.00					
2480	0.440	140.80					

GFSK Hopping Mode DH1

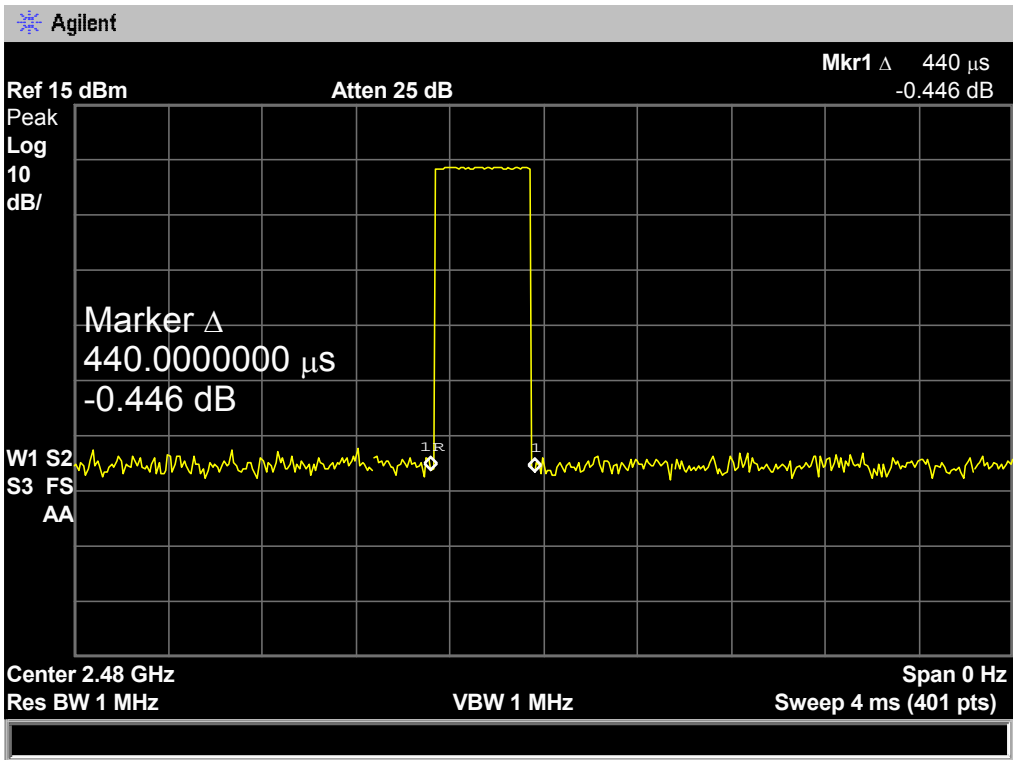
2402 MHz



GFSK Hopping Mode DH1
 2441 MHz



GFSK Hopping Mode DH1
 2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (GFSK DH3)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	1.720	257.20	31.60	400	PASS
2441	1.700	272.00			
2480	1.740	278.40			
GFSK Hopping Mode DH3					
2402 MHz					

Agilent

Ref 15 dBm

Peak

Log

10

dB/

Atten 25 dB

Marker Δ

1.72000000 ms

-0.903 dB

Mkr1 Δ

1.72 ms

-0.903 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

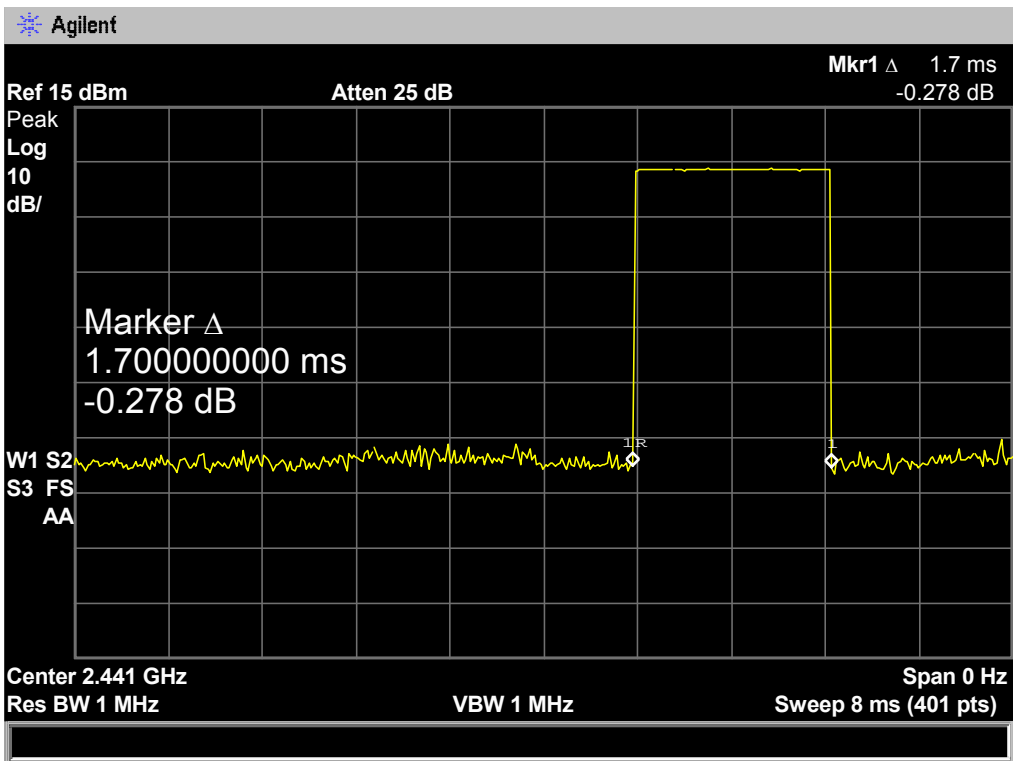
Res BW 1 MHz

VBW 1 MHz

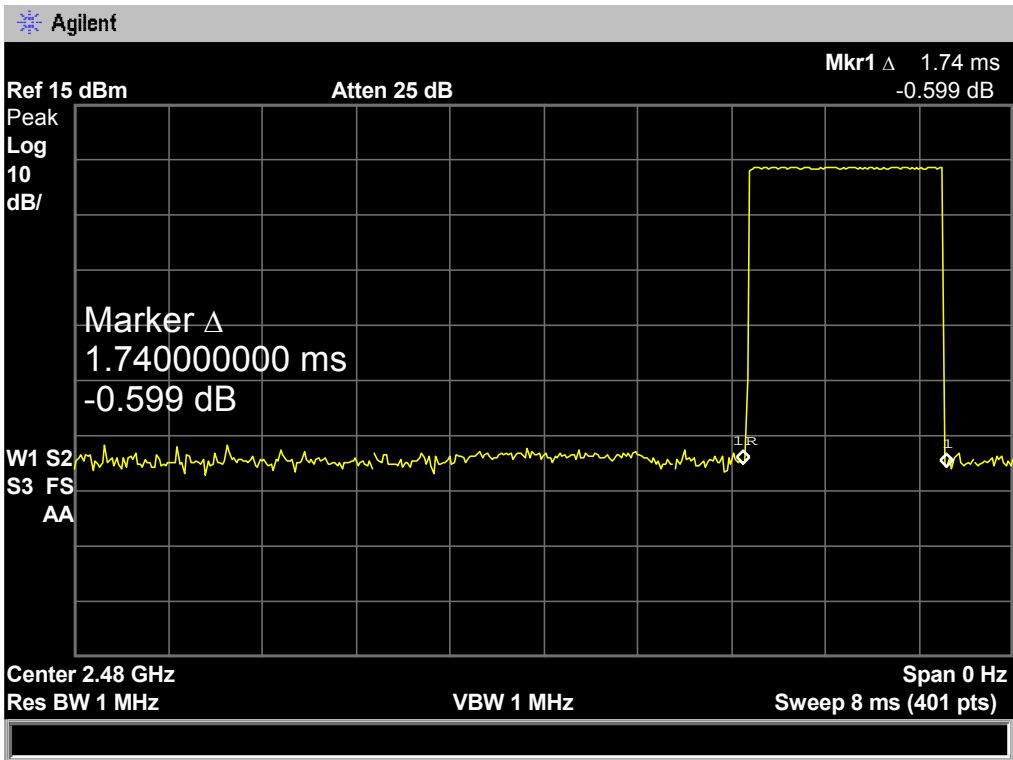
Span 0 Hz

Sweep 8 ms (401 pts)

GFSK Hopping Mode DH3
2441 MHz



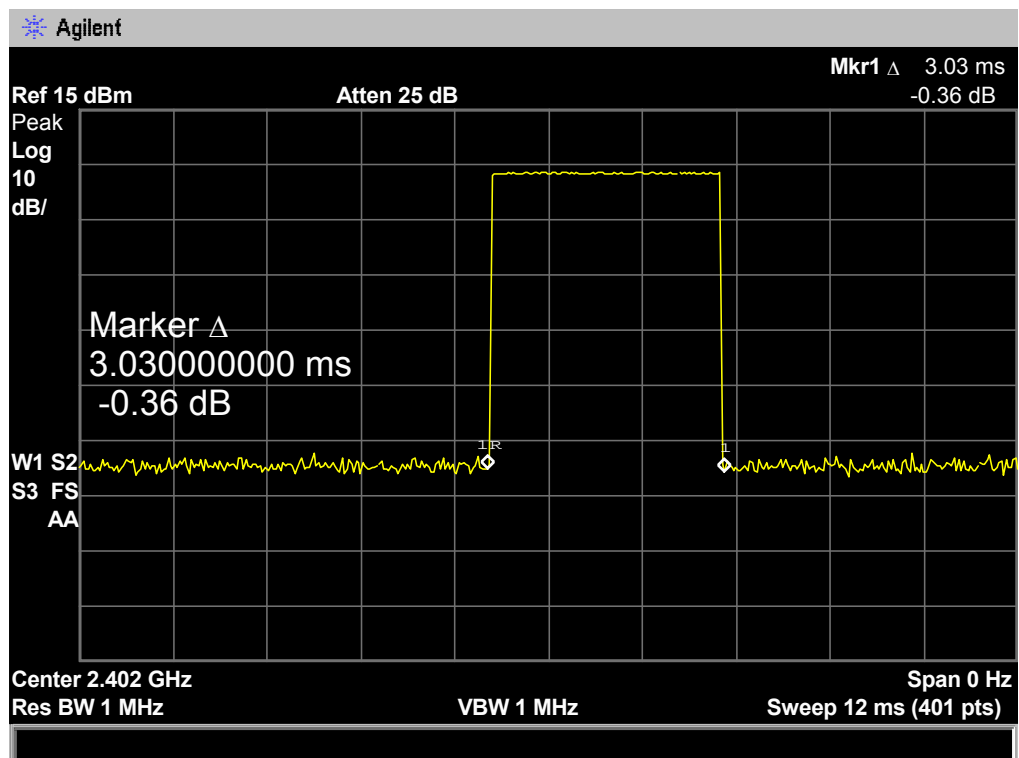
GFSK Hopping Mode DH3
2480 MHz



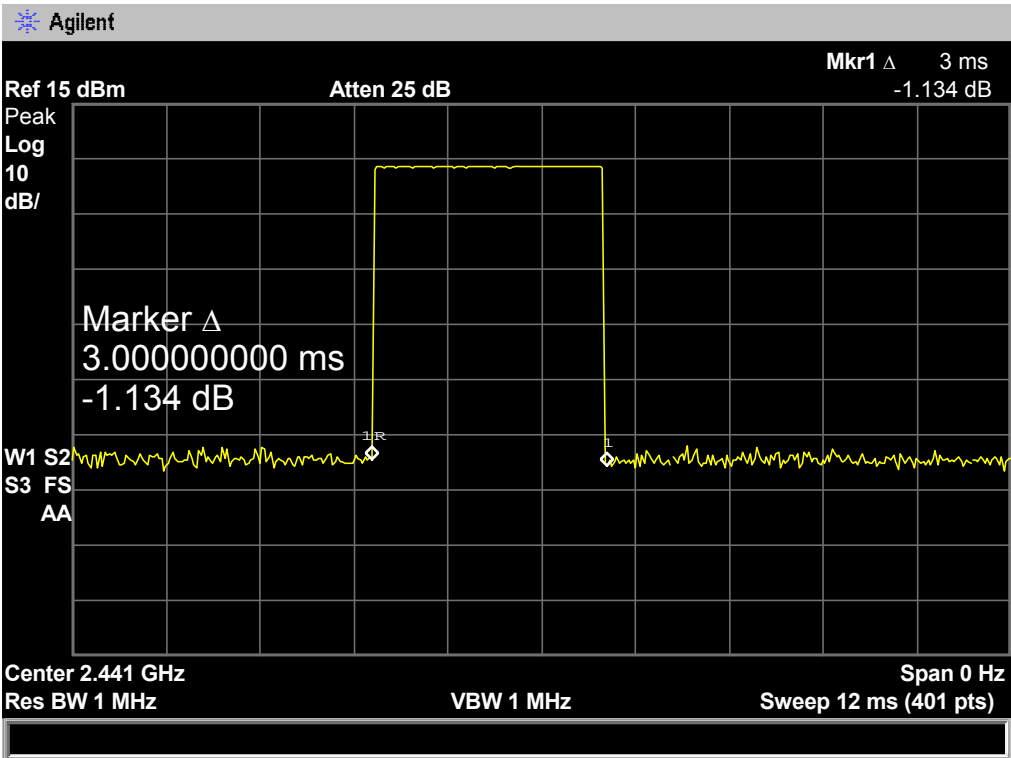
EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (GFSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	3.030	323.20	31.60	400	PASS
2441	3.000	320.00			
2480	2.970	316.80			

GFSK Hopping Mode DH5

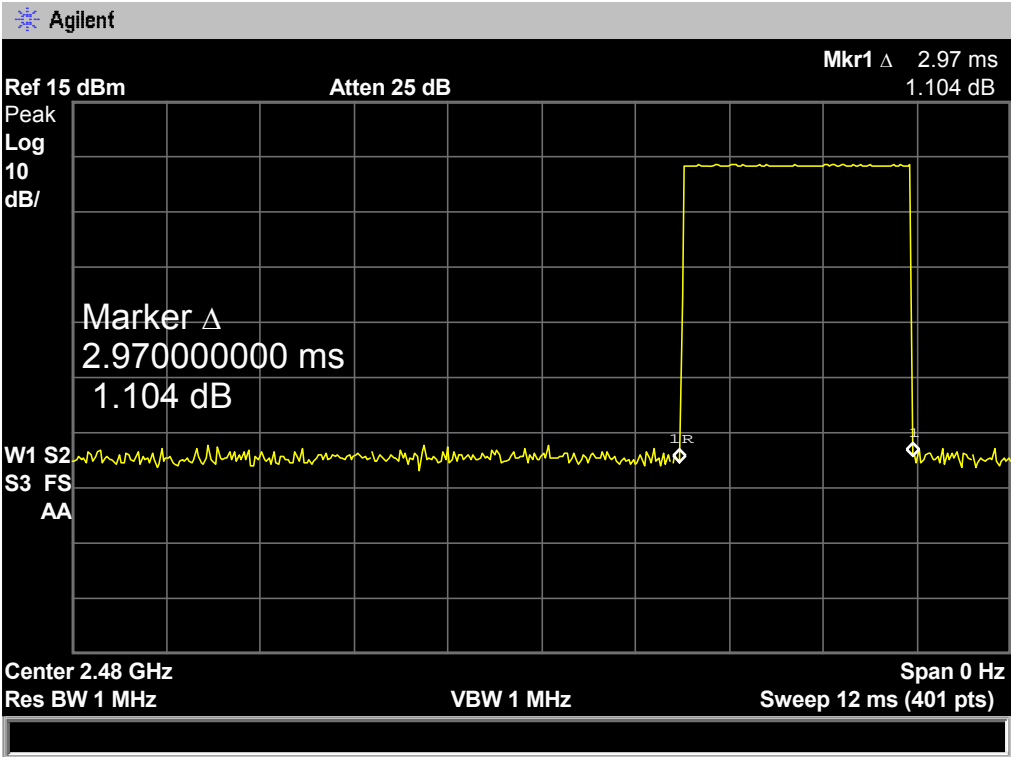
2402 MHz



GFSK Hopping Mode DH5
 2441 MHz



GFSK Hopping Mode DH5
 2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (π /4-DQPSK DH1)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	0.440	140.80	31.60	400	PASS
2441	0.450	144.00			
2480	0.440	140.80			
π /4-DQPSK Hopping Mode DH1					
2402 MHz					

Agilent

Ref 15 dBm

Atten 25 dB

Mkr1 Δ 440 μ s
-0.319 dB

Peak

Log

10

dB/

Marker Δ 440.000000 μ s
-0.319 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

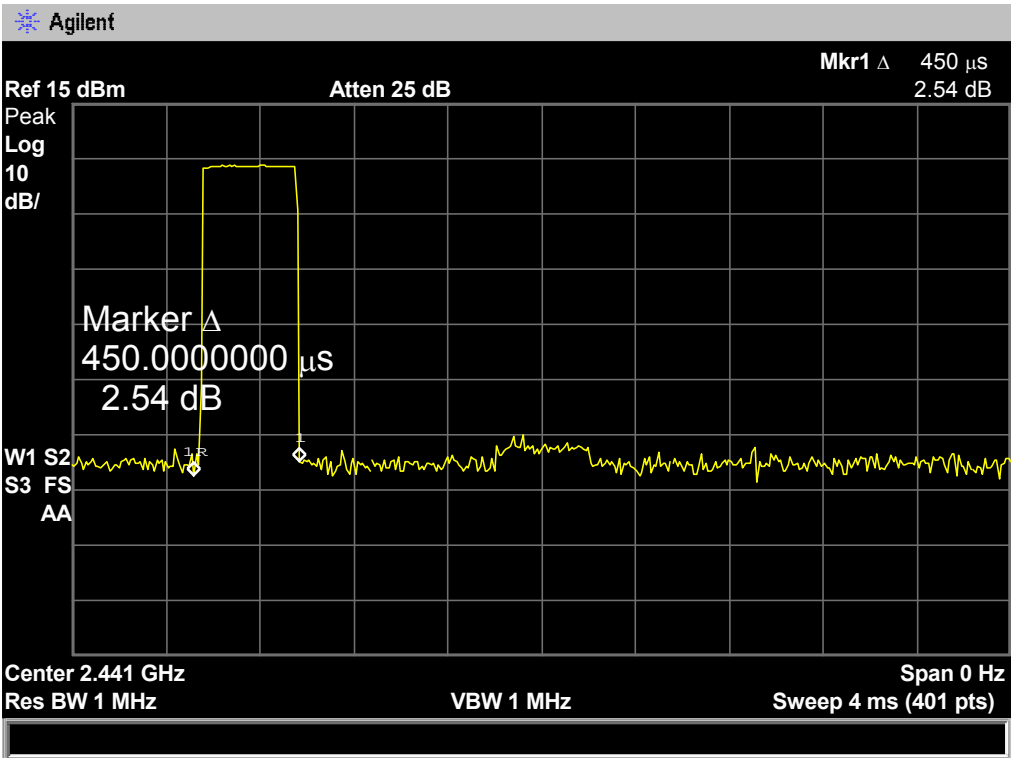
Res BW 1 MHz

VBW 1 MHz

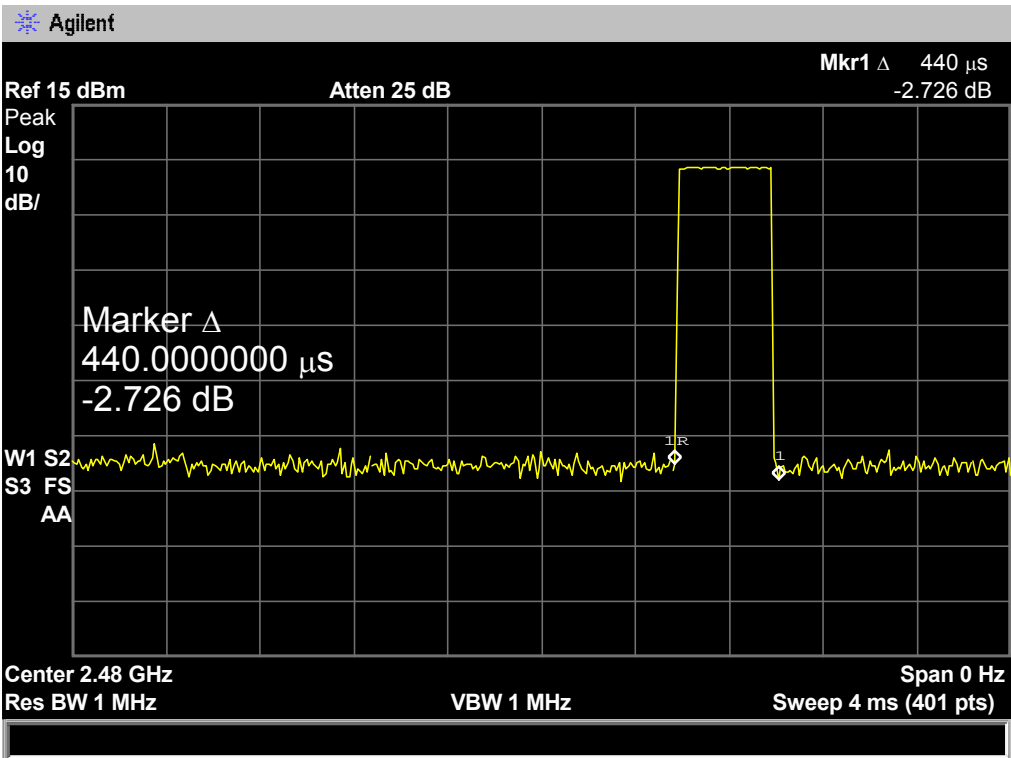
Sweep 4 ms (401 pts)

Span 0 Hz

π /4-DQPSK Hopping Mode DH1
 2441 MHz



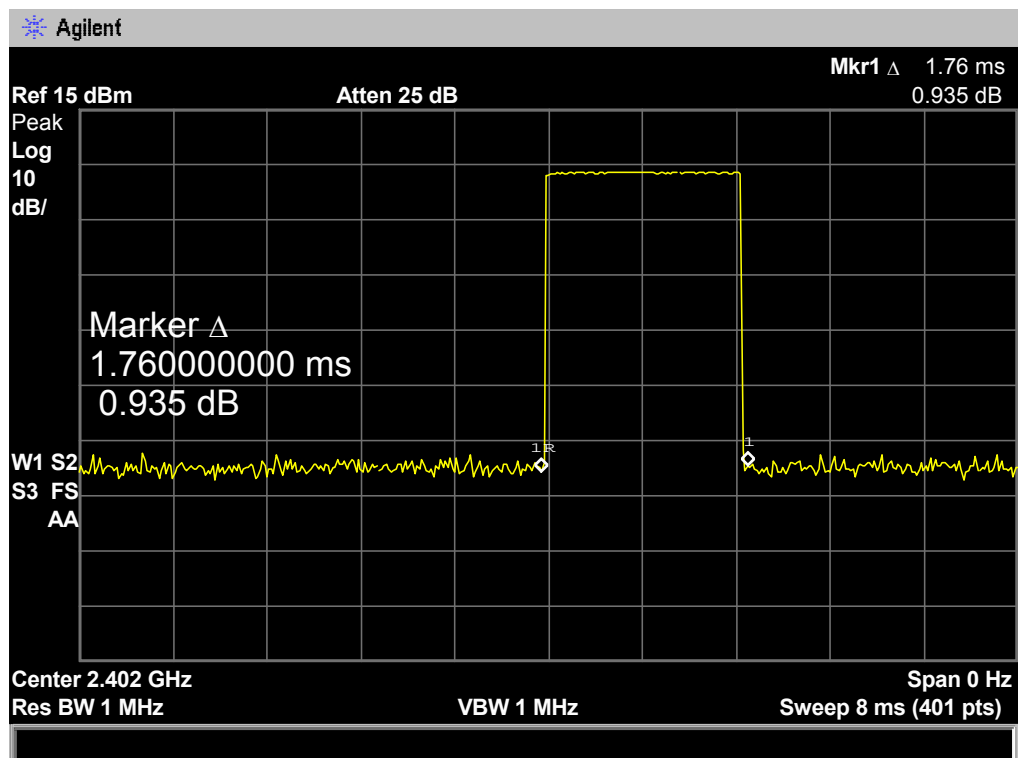
π /4-DQPSK Hopping Mode DH1
 2480 MHz



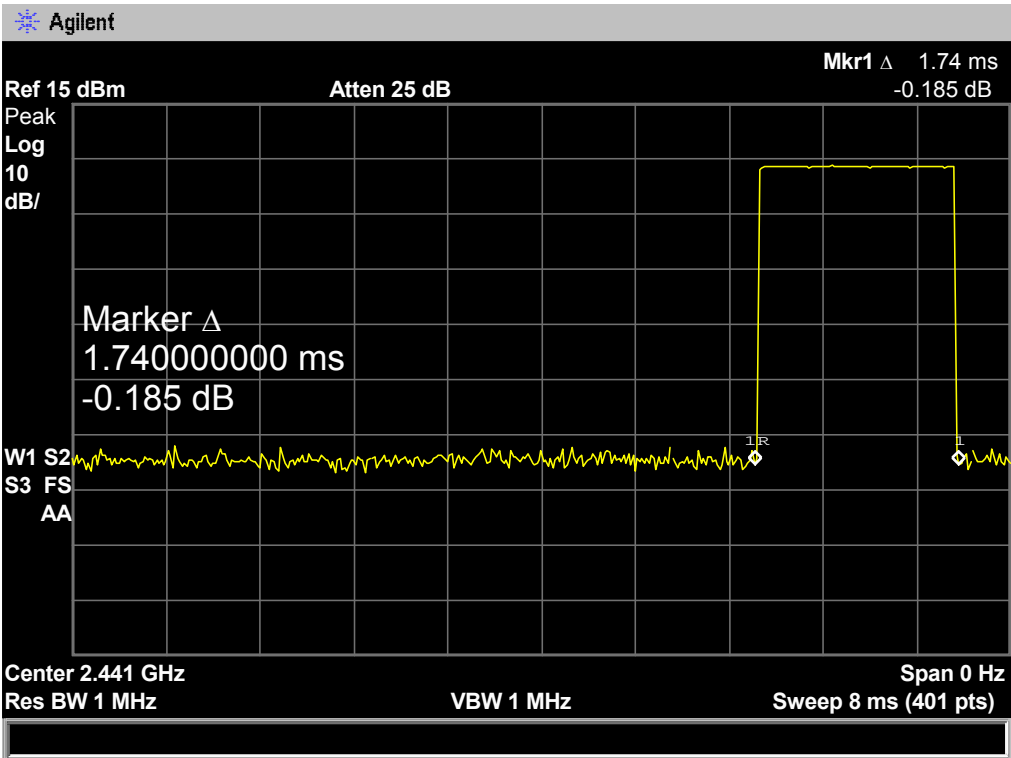
EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (π /4-DQPSK DH3)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	1.760	281.60	31.60	400	PASS
2441	1.740	278.40			
2480	1.700	272.00			

π /4-DQPSK Hopping Mode DH3

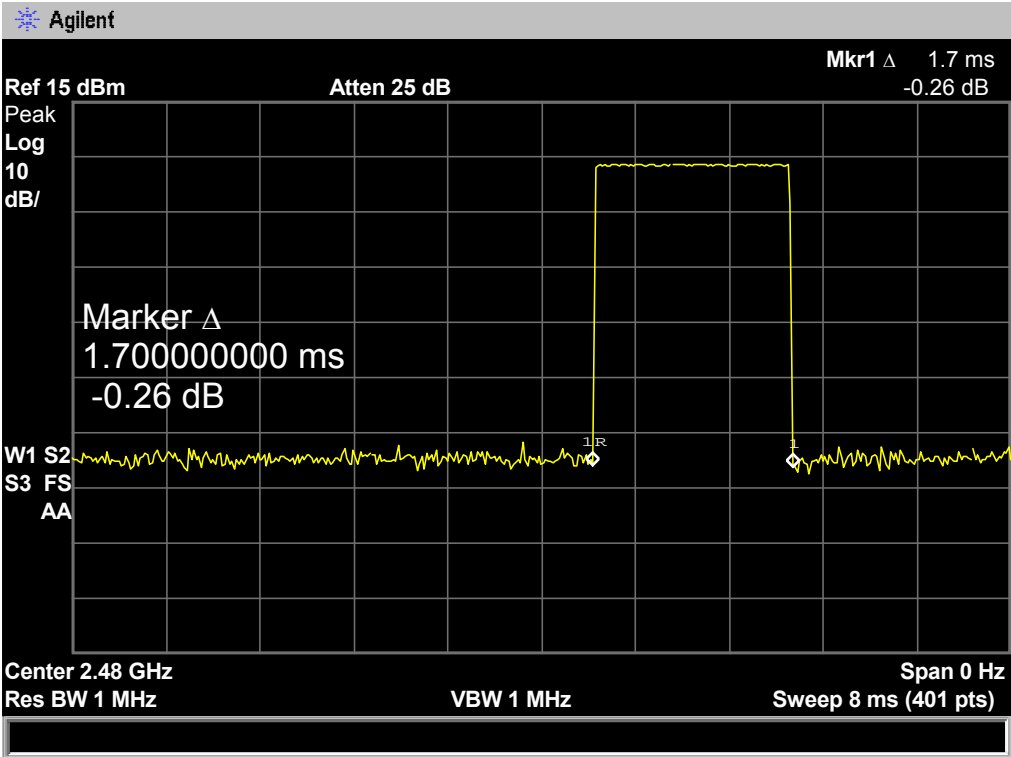
2402 MHz



π /4-DQPSK Hopping Mode DH3
 2441 MHz



π /4-DQPSK Hopping Mode DH3
 2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (π /4-DQPSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	2.970	316.80	31.60	400	PASS
2441	3.030	323.20			
2480	3.030	323.20			
π /4-DQPSK Hopping Mode DH5					
2402 MHz					

Agilent

Ref 15 dBm

Atten 25 dB

Mkr1 Δ 2.97 ms
-0.546 dB

Peak Log 10 dB/

Marker Δ 2.970000000 ms
-0.546 dB

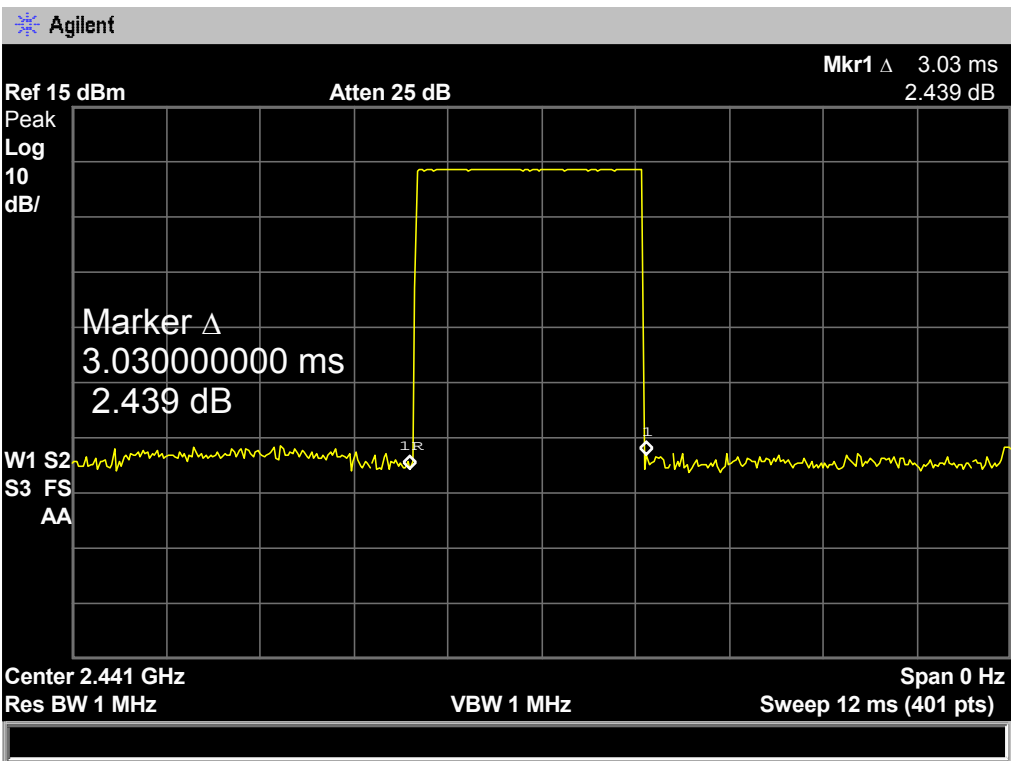
W1 S2
S3 FS
AA

Center 2.402 GHz
Res BW 1 MHz

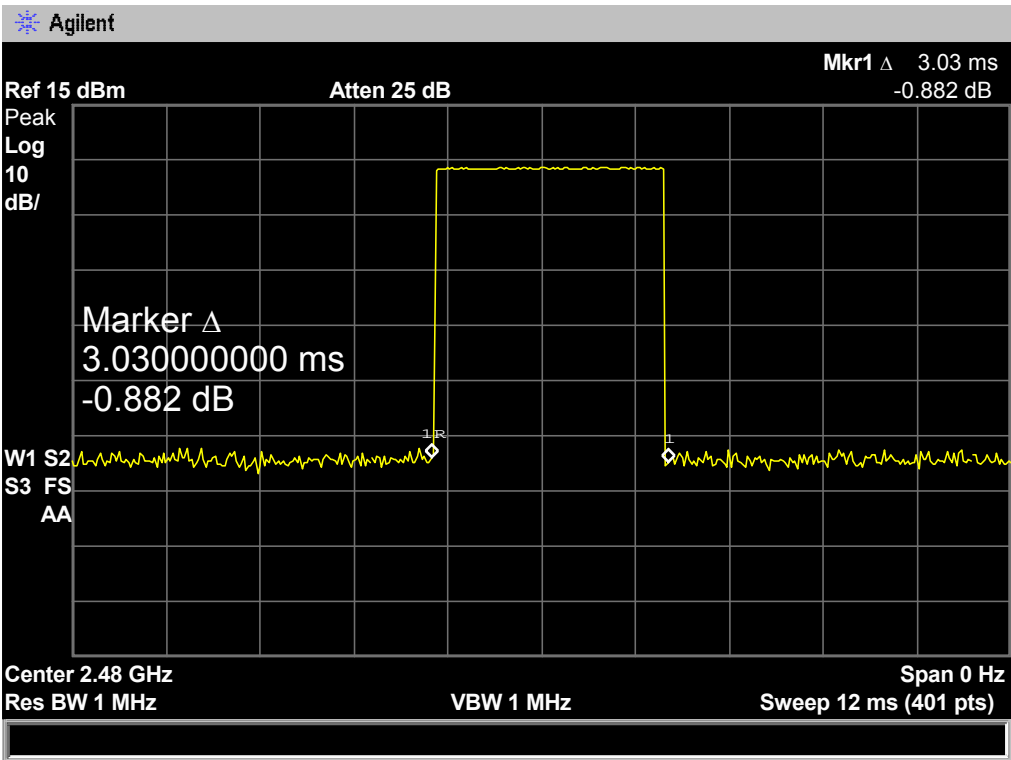
VBW 1 MHz

Span 0 Hz
Sweep 12 ms (401 pts)

π /4-DQPSK Hopping Mode DH5
 2441 MHz



π /4-DQPSK Hopping Mode DH5
 2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (8-DPSK DH1)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	0.450	144.00	31.60	400	PASS
2441	0.440	140.80			
2480	0.450	144.00			
8-DPSK Hopping Mode DH1					
2402 MHz					

Agilent

Ref 15 dBm

Atten 25 dB

Mkr1 Δ 450 μs
0.702 dB

Peak Log 10 dB/

Marker Δ 450.0000000 μs
0.702 dB

W1 S2
S3 FS
AA

Center 2.402 GHz
Res BW 1 MHz

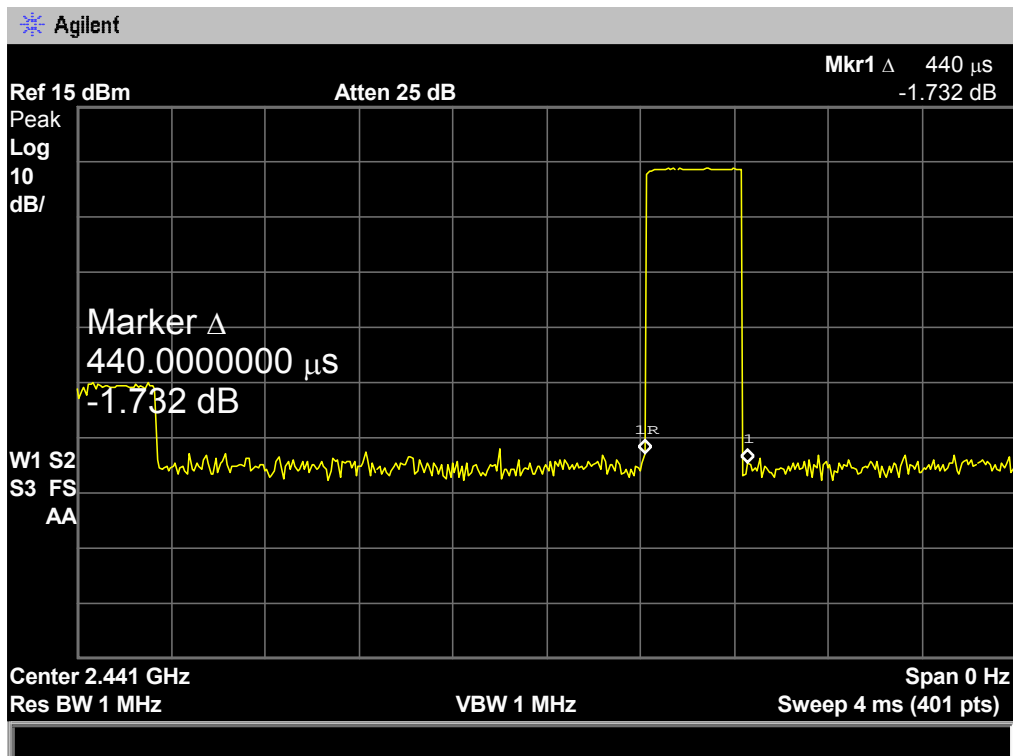
VBW 1 MHz

Sweep 4 ms (401 pts)

Span 0 Hz

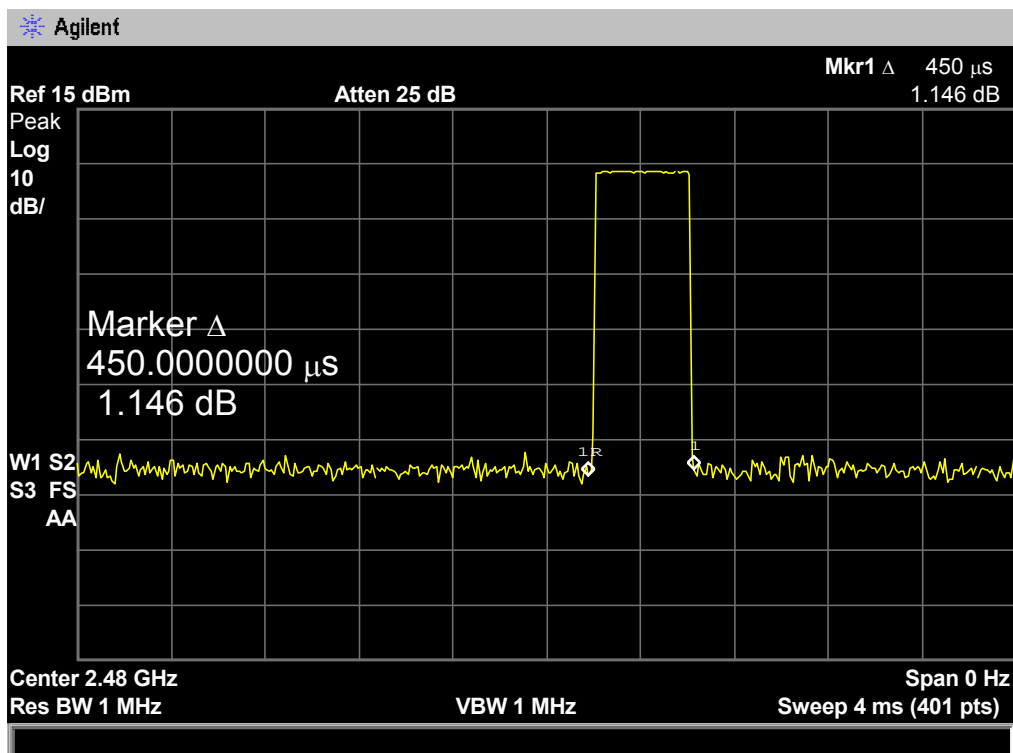
8-DPSK Hopping Mode DH1

2441 MHz



8-DPSK Hopping Mode DH1

2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (8-DPSK DH3)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	1.700	272.00	31.60	400	PASS
2441	1.740	278.40			
2480	1.740	278.40			
8-DPSK Hopping Mode DH3					
2402 MHz					

Agilent

Ref 15 dBm

Peak

Log

10

dB/

Atten 25 dB

Mkr1 Δ 1.7 ms

-1.553 dB

Marker Δ

1.700000000 ms

-1.553 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

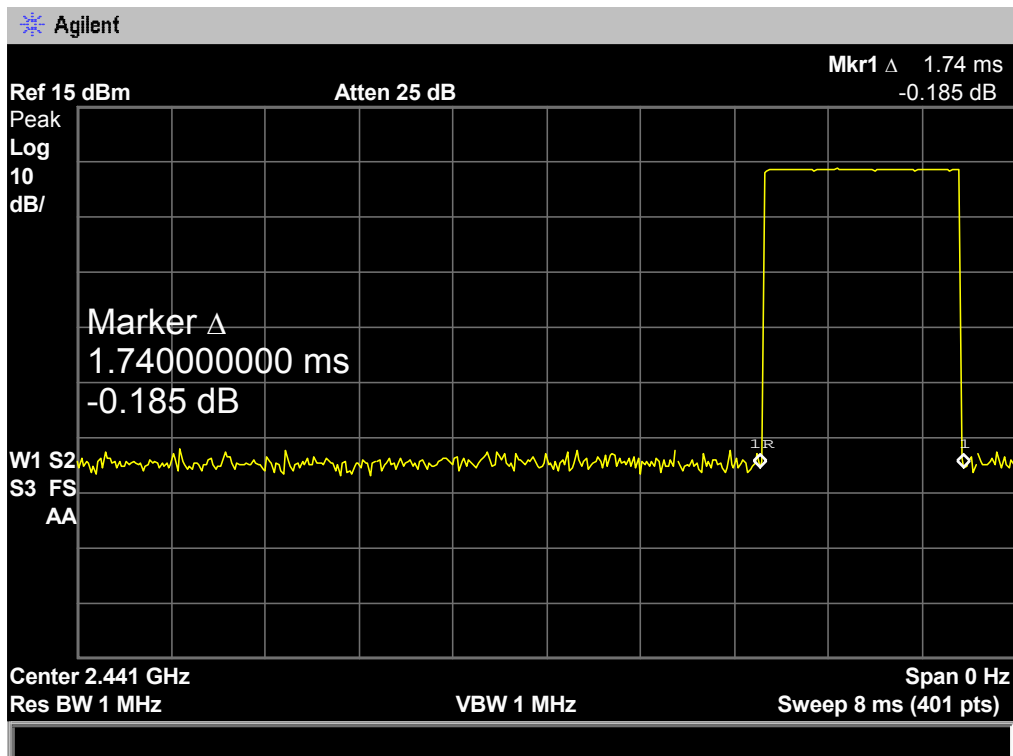
VBW 1 MHz

Span 0 Hz

Sweep 8 ms (401 pts)

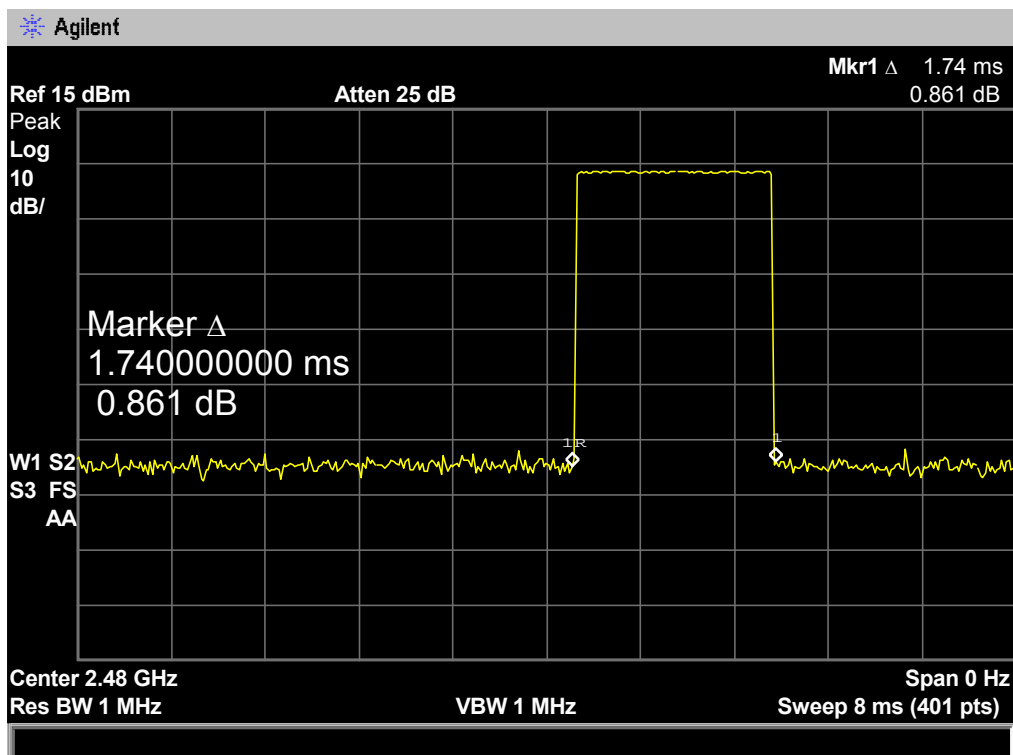
8-DPSK Hopping Mode DH3

2441 MHz



8-DPSK Hopping Mode DH3

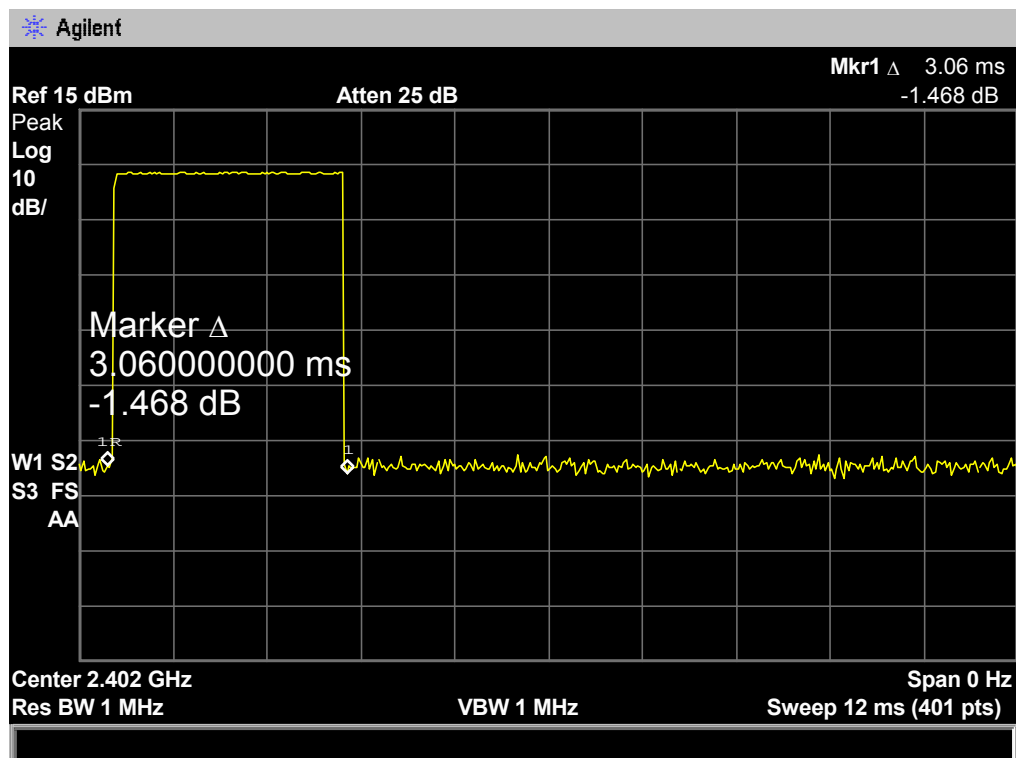
2480 MHz



EUT:	Smart phone		Model Name :	S400	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz				
Test Mode:	Hopping Mode (8-DPSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	3.060	326.40	31.60	400	PASS
2441	3.000	320.00			
2480	3.030	323.20			

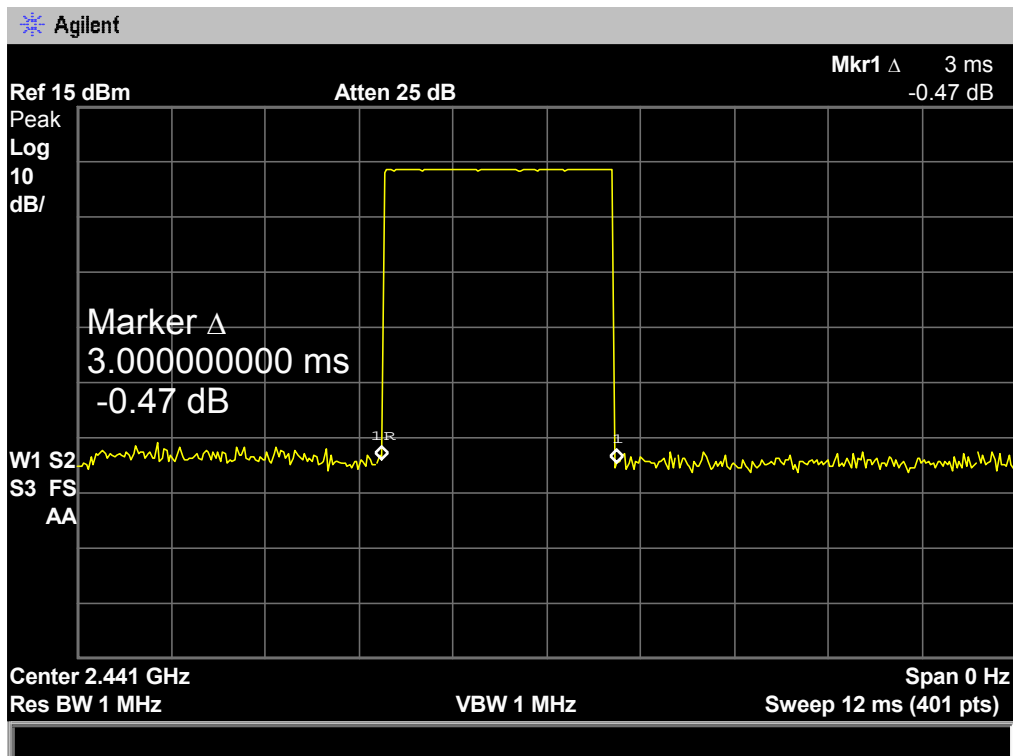
8-DPSK Hopping Mode DH5

2402 MHz



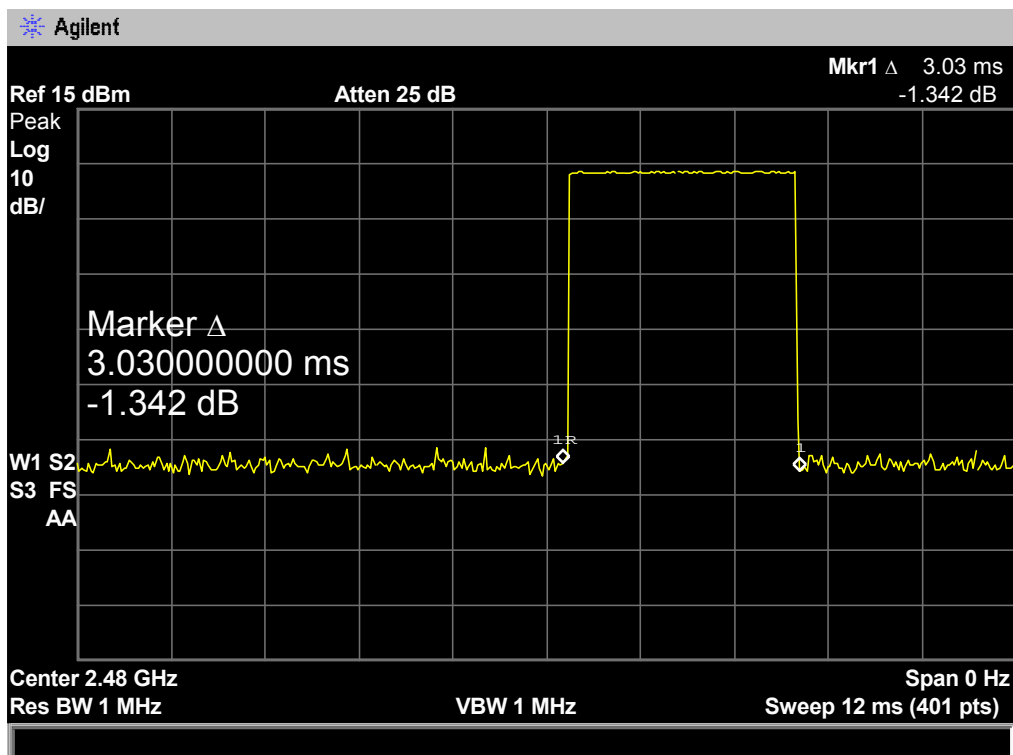
8-DPSK Hopping Mode DH5

2441 MHz



8-DPSK Hopping Mode DH5

2480 MHz



9. Channel Separation and Bandwidth Test

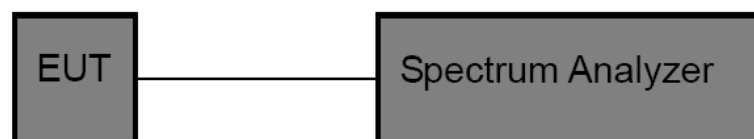
9.1 Test Standard and Limit

9.1.1 Test Standard
FCC Part 15.247

9.1.2 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

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:
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.

9.4 EUT Operating Condition

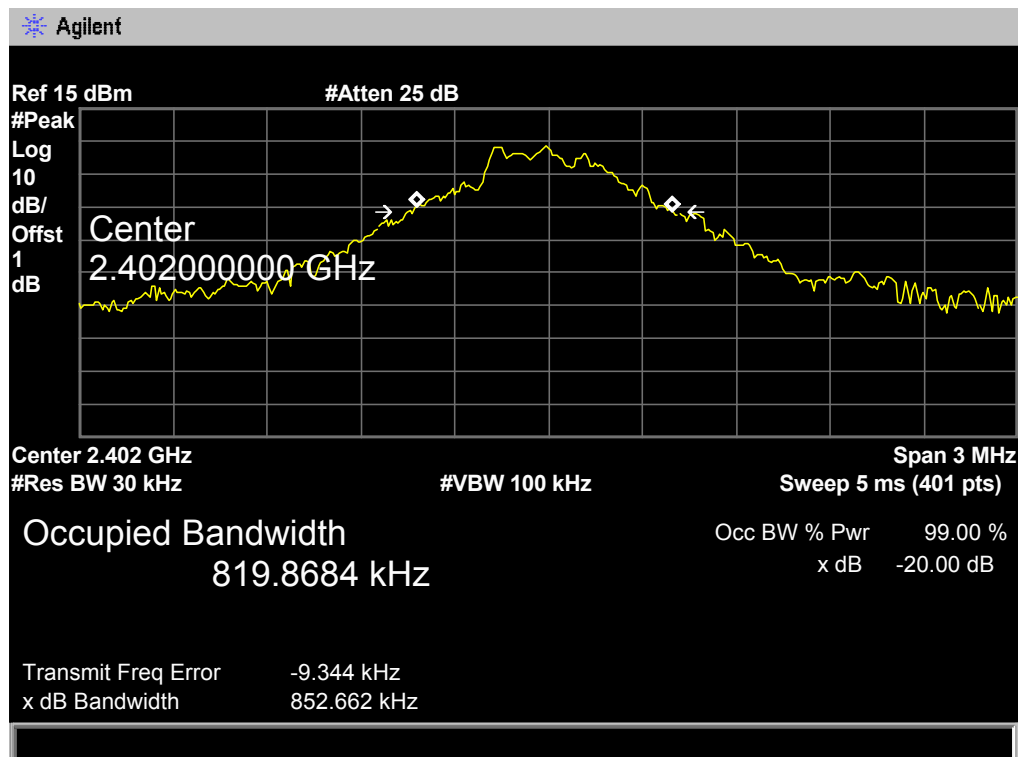
The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

9.5 Test Data

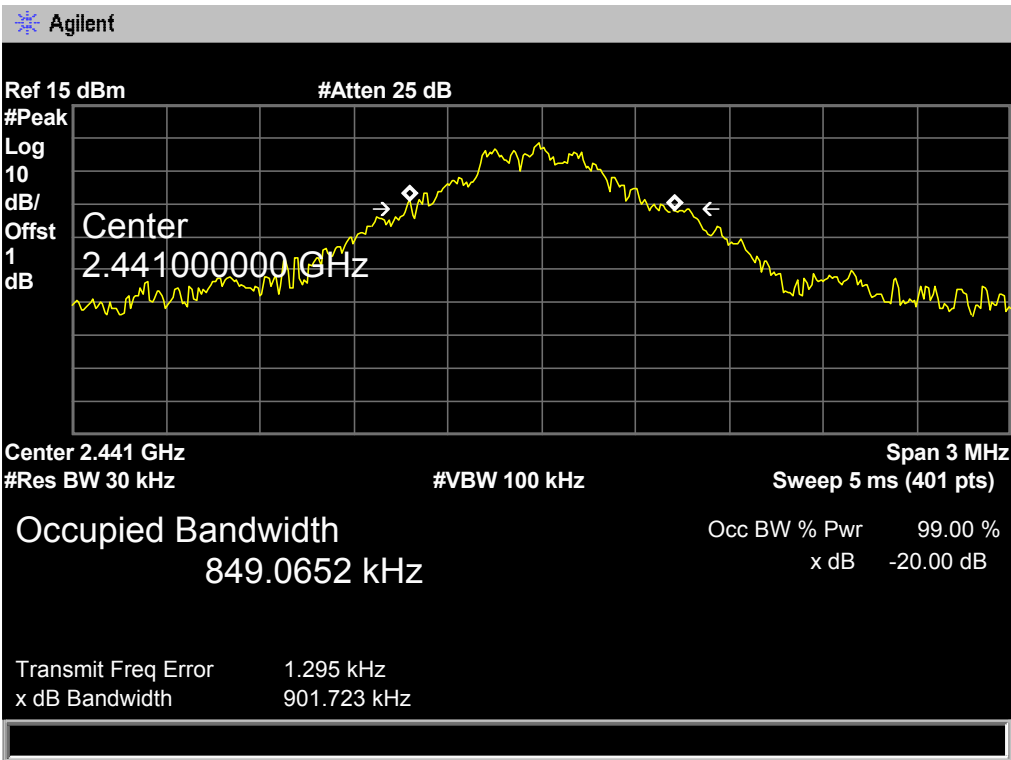
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	819.8684	852.662	
2441	849.0652	901.723	
2480	837.3228	851.701	

GFSK TX Mode

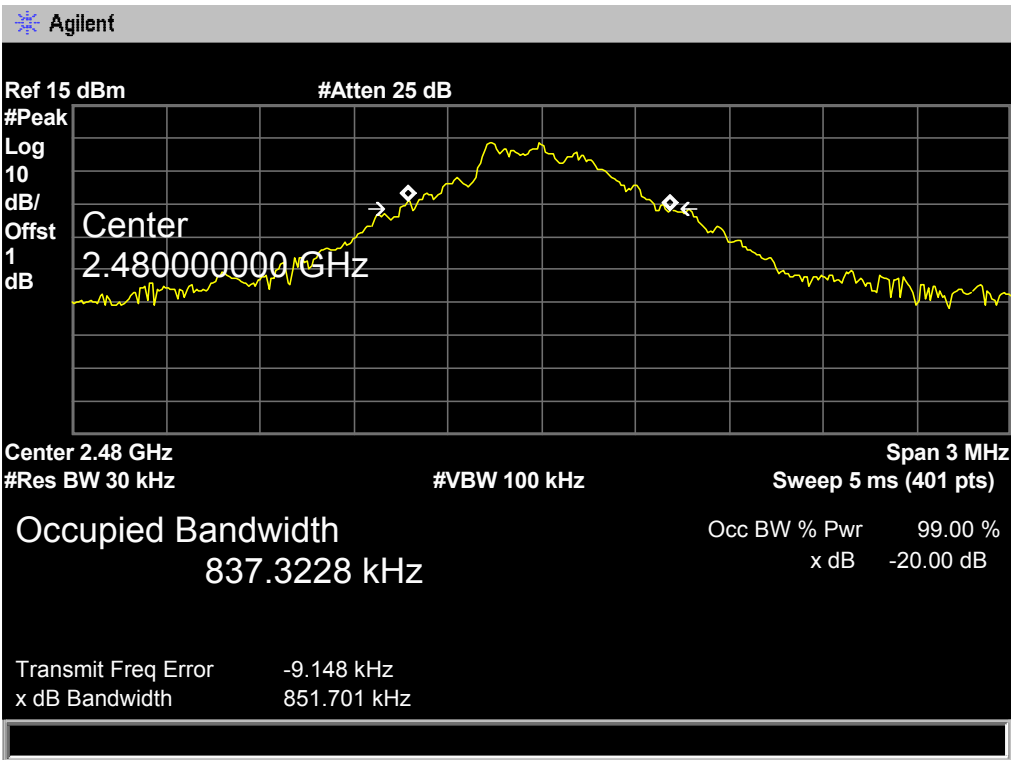
2402 MHz



GFSK TX Mode
2441 MHz

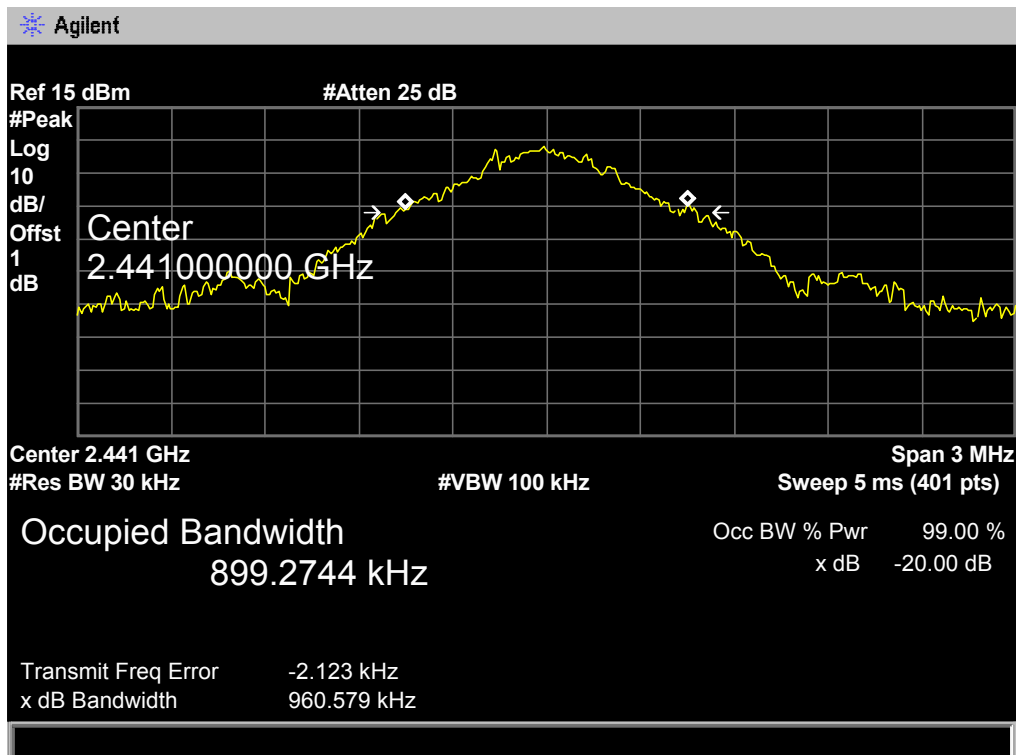


GFSK TX Mode
2480 MHz



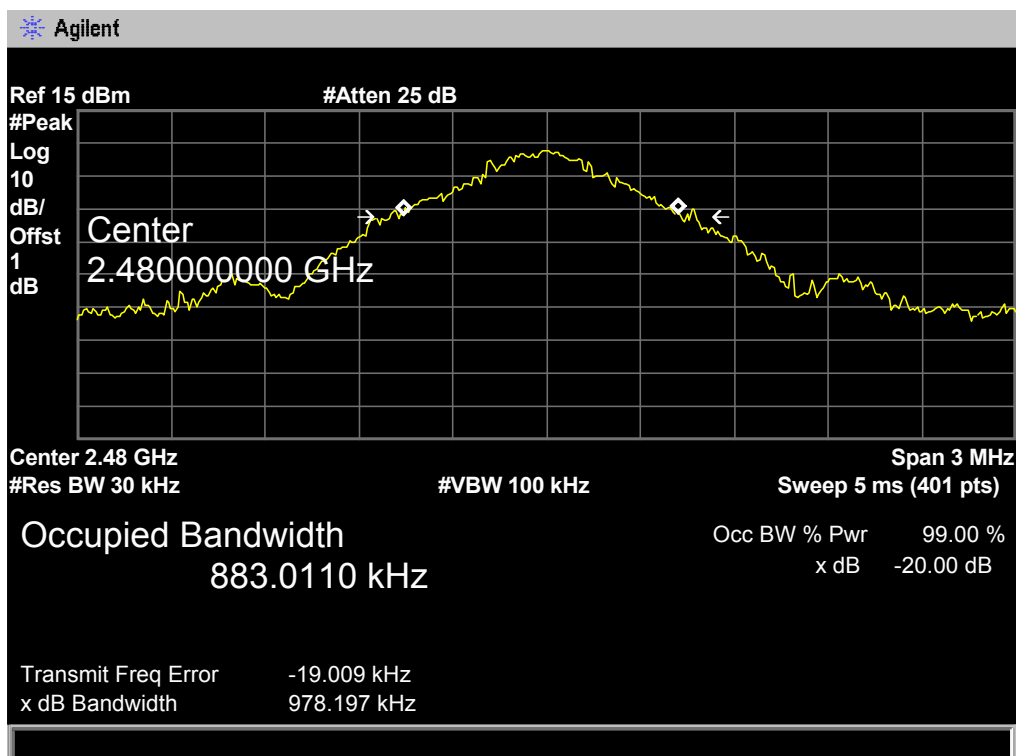
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX Mode (π /4-DQPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	897.2350	984.136	
2441	899.2744	960.579	
2480	883.0110	978.197	
π /4-DQPSK TX Mode			
2402 MHz			
<div> <div>Agilent</div> <div> <div>Ref 15 dBm</div> <div>#Atten 25 dB</div> <div> <div>#Peak</div> <div>Log</div> <div>10</div> <div>dB/</div> <div>Offst</div> <div>1</div> <div>dB</div> </div> <div>Center 2.402000000 GHz</div> </div> <div> <div>Center 2.402 GHz</div> <div>#Res BW 30 kHz</div> <div>#VBW 100 kHz</div> <div>Span 3 MHz</div> <div>Sweep 5 ms (401 pts)</div> </div> <div> <div>Occupied Bandwidth</div> <div>897.2350 kHz</div> <div>Occ BW % Pwr 99.00 %</div> <div>x dB -20.00 dB</div> </div> <div> <div>Transmit Freq Error -9.137 kHz</div> <div>x dB Bandwidth 984.136 kHz</div> </div> </div>			

2441 MHz



$\pi/4$ -DQPSK TX Mode

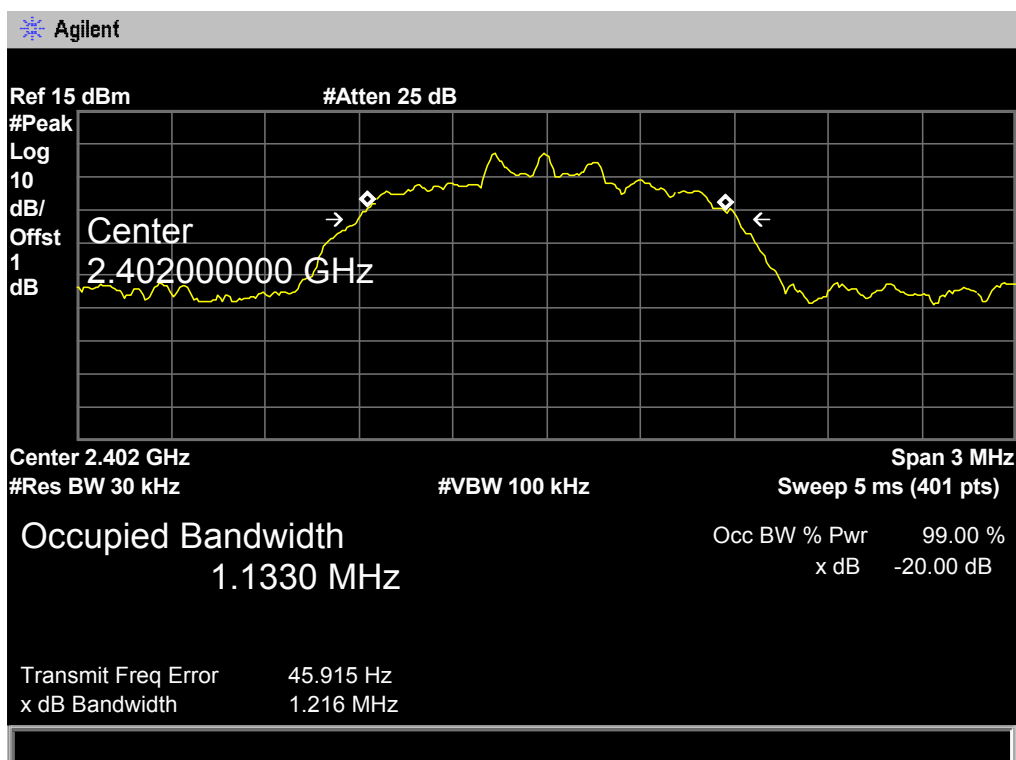
2480 MHz



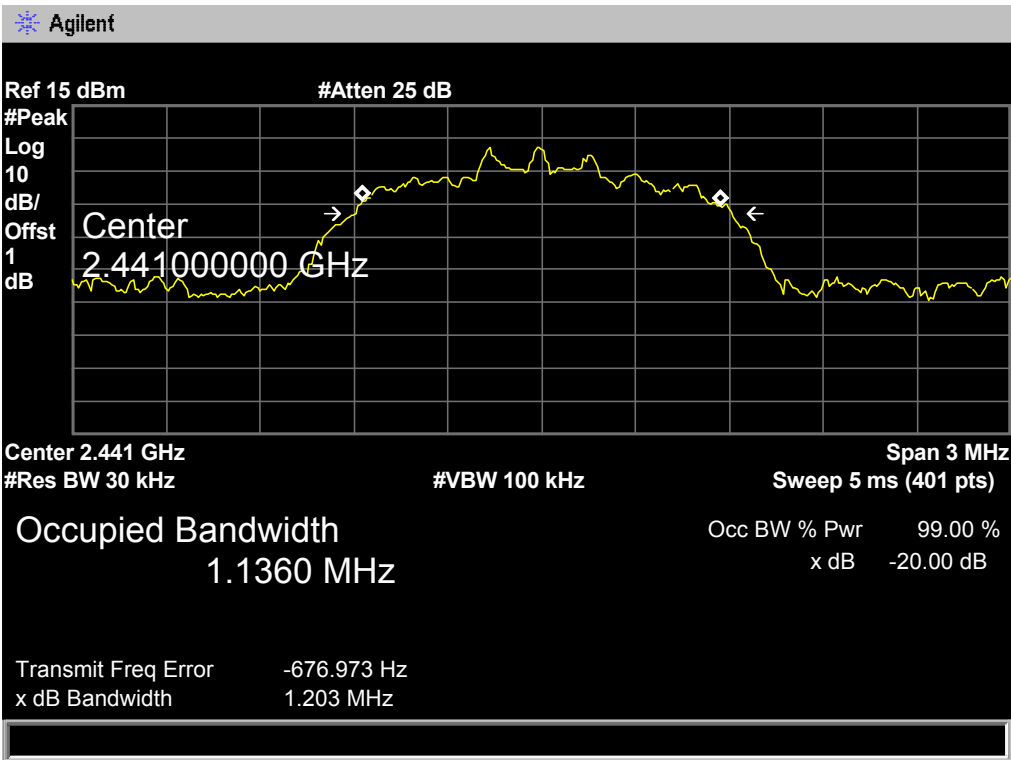
EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX Mode (8-DPSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	1133.00	1216.00	810.67
2441	1136.00	1203.00	802.00
2480	1134.30	1215.00	810.00

8-DPSK TX Mode

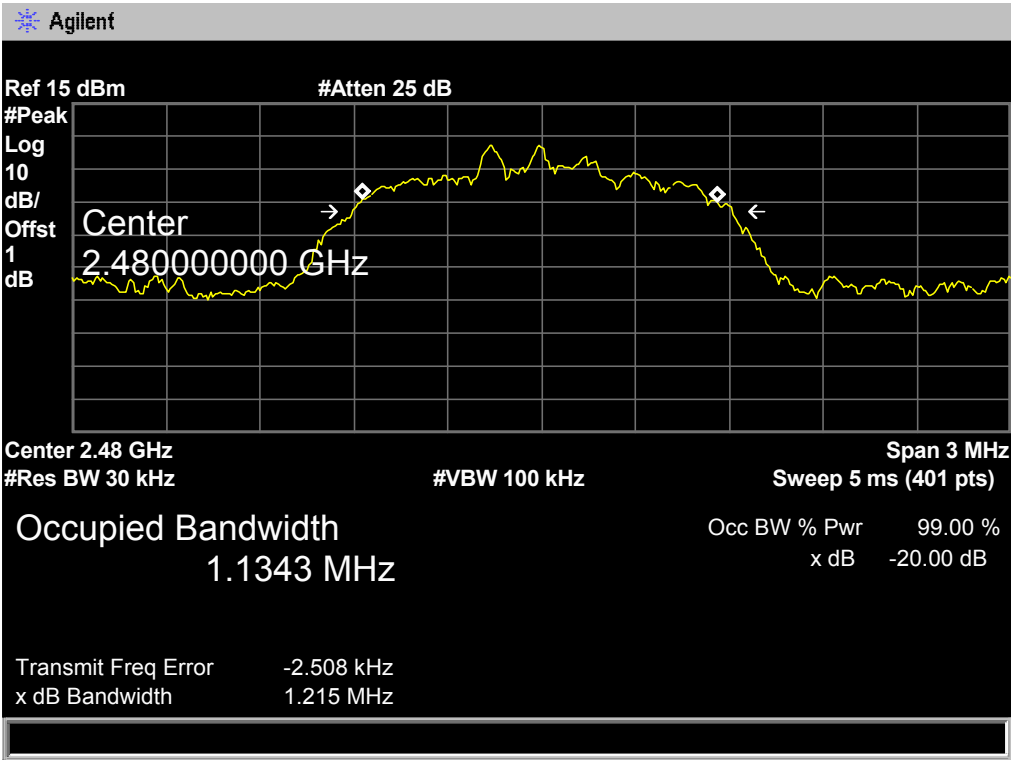
2402 MHz

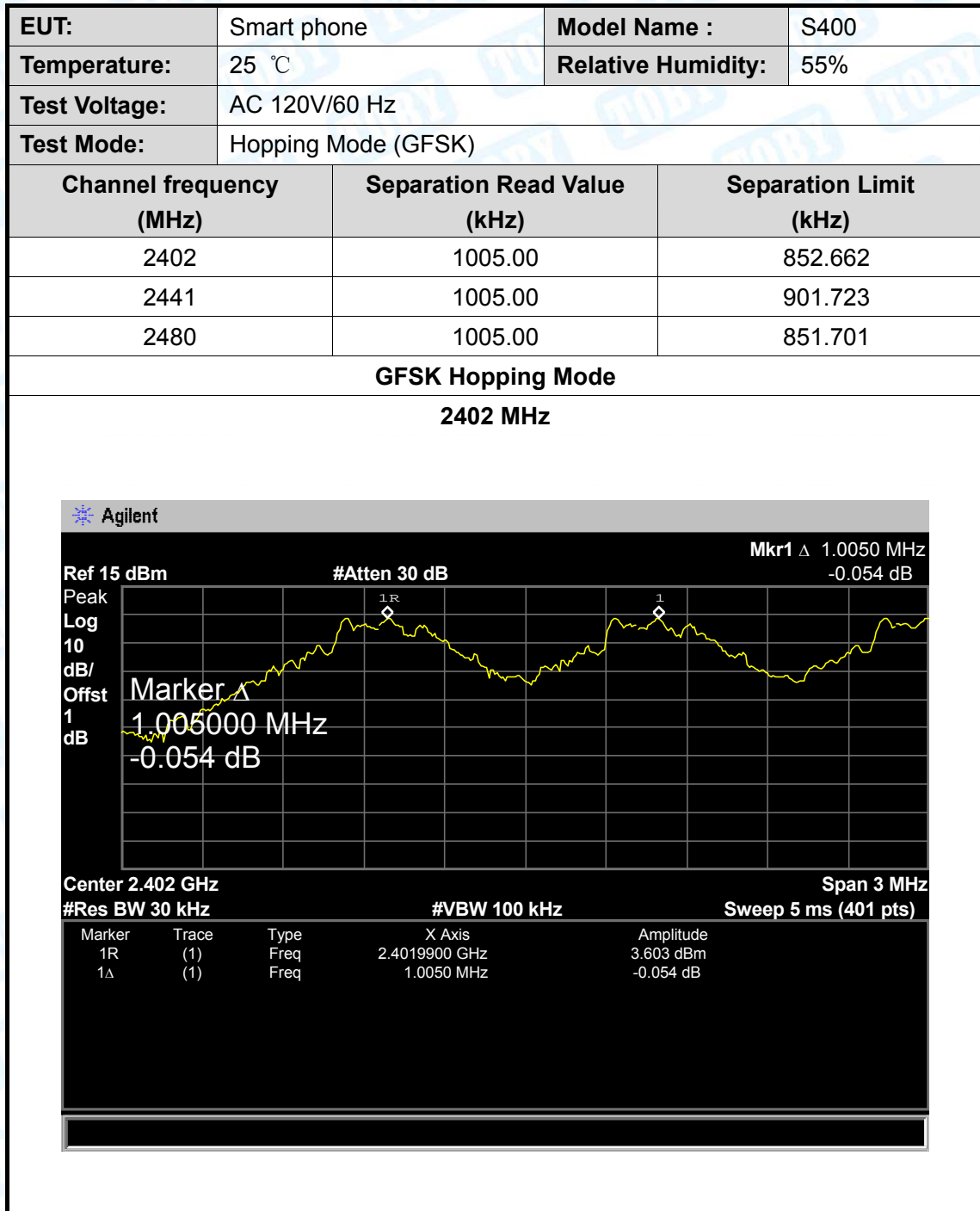


8-DPSK TX Mode
 2441 MHz



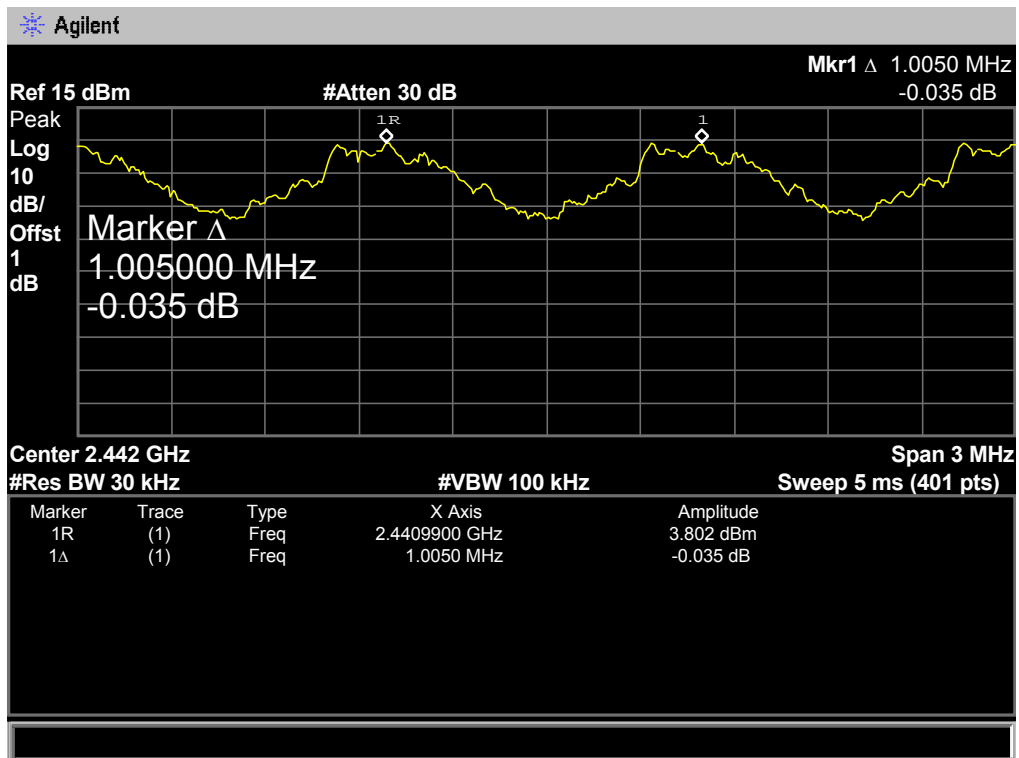
8-DPSK TX Mode
 2480 MHz





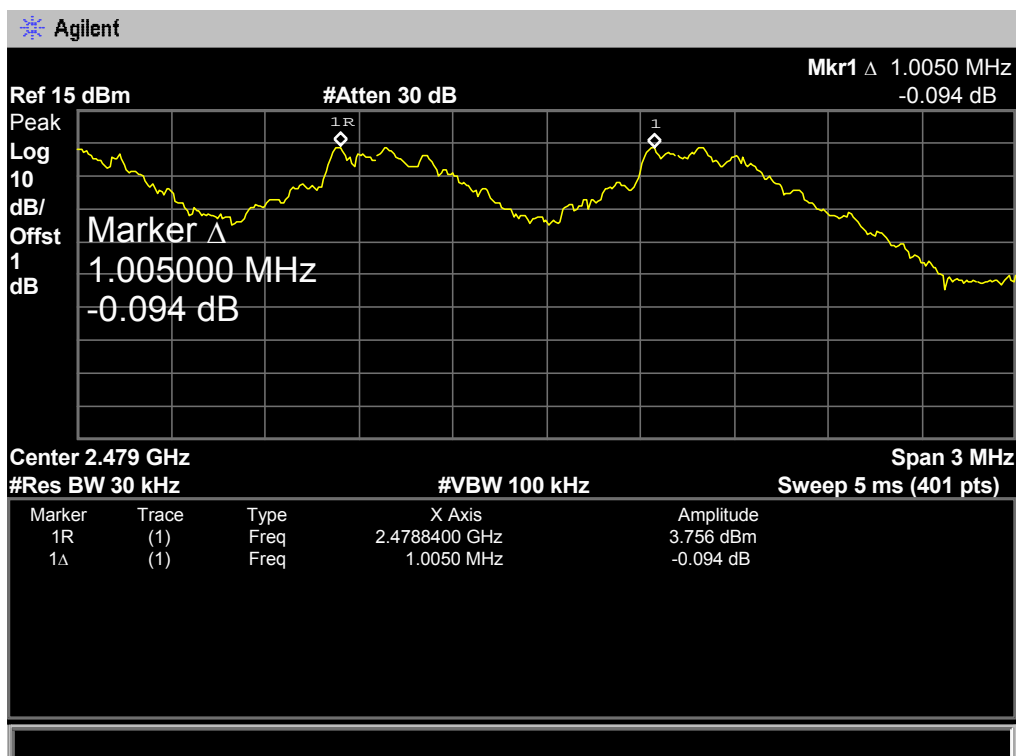
GFSK Hopping Mode

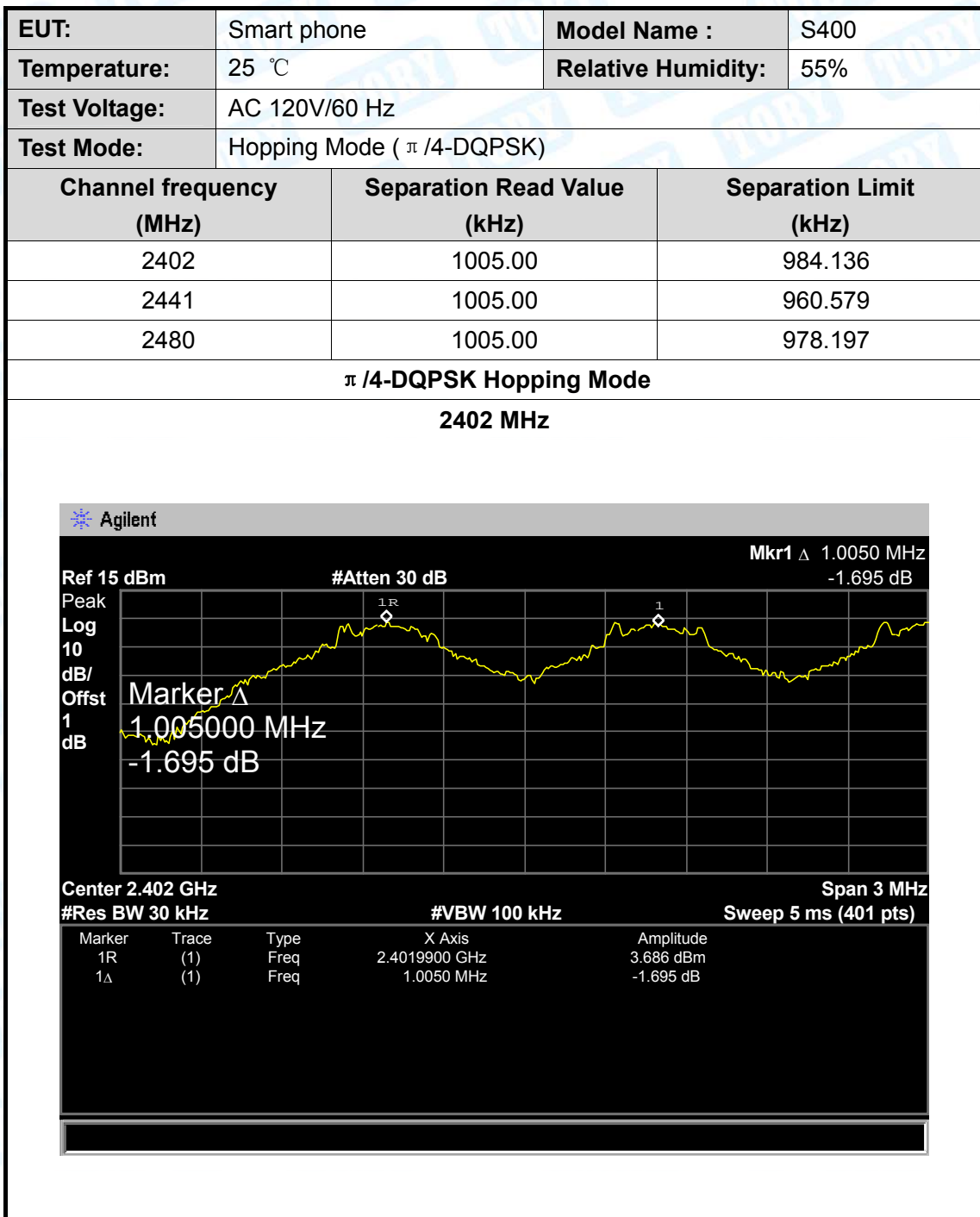
2441 MHz



GFSK Hopping Mode

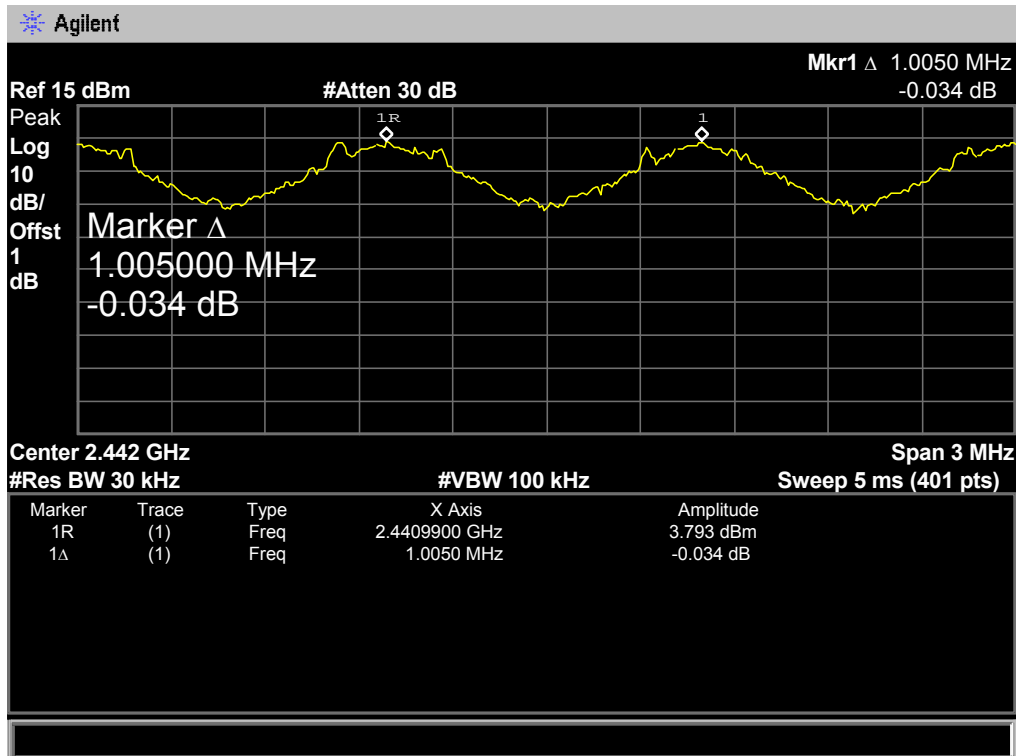
2480 MHz





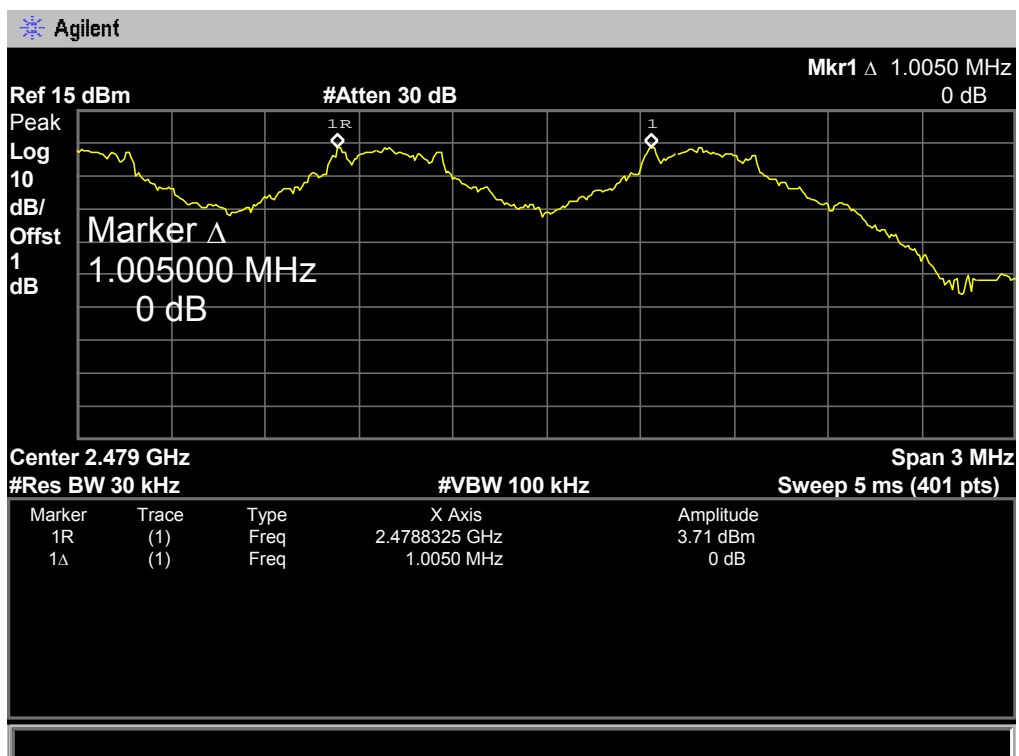
$\pi/4$ -DQPSK Hopping Mode

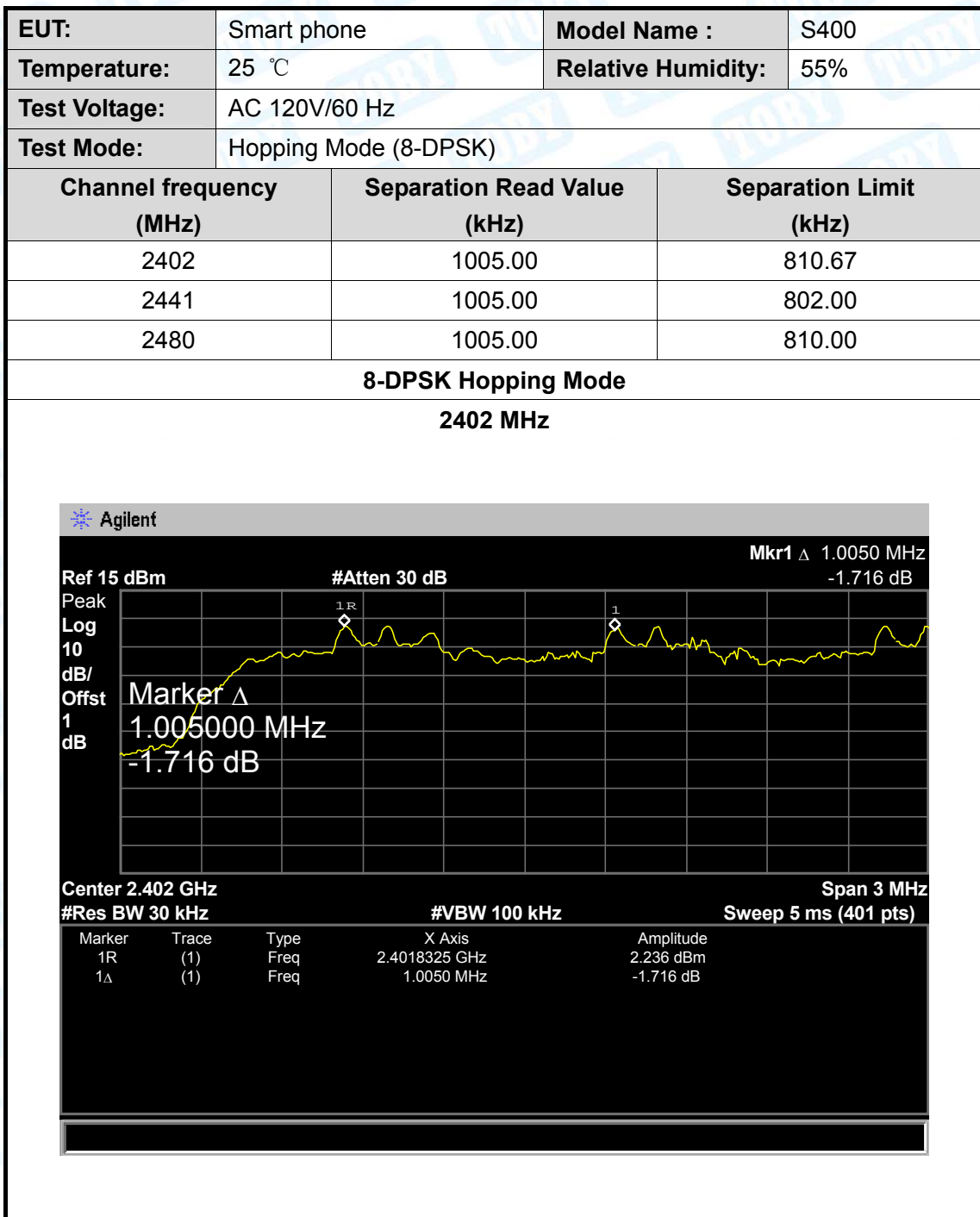
2441 MHz



$\pi/4$ -DQPSK Hopping Mode

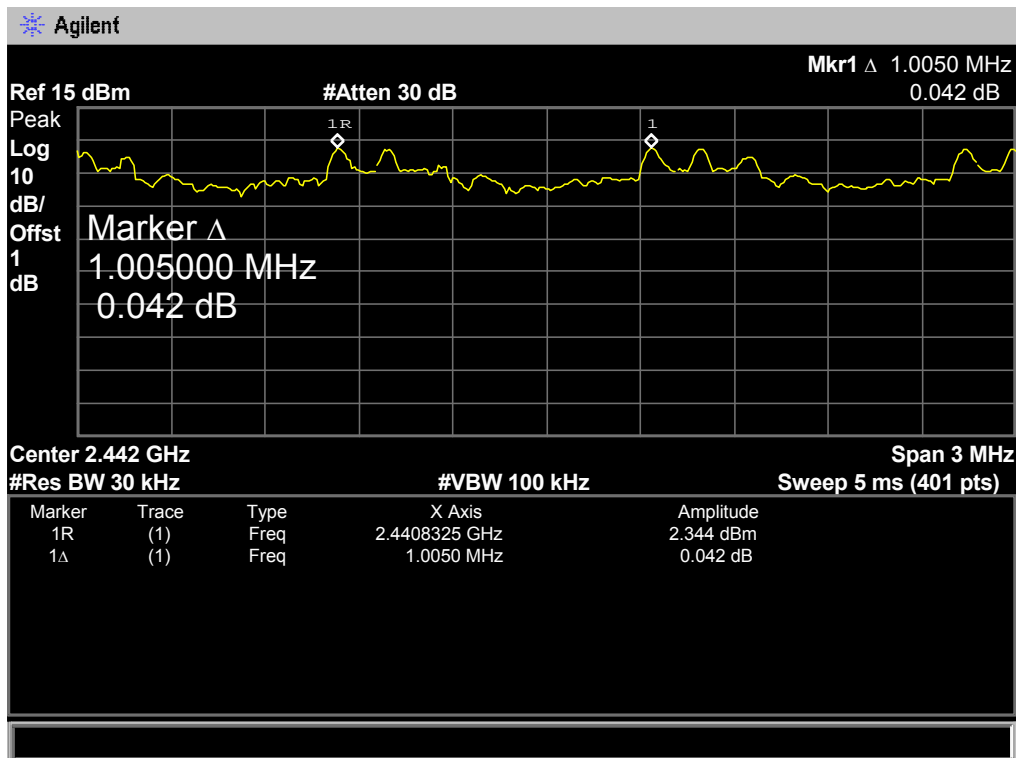
2480 MHz





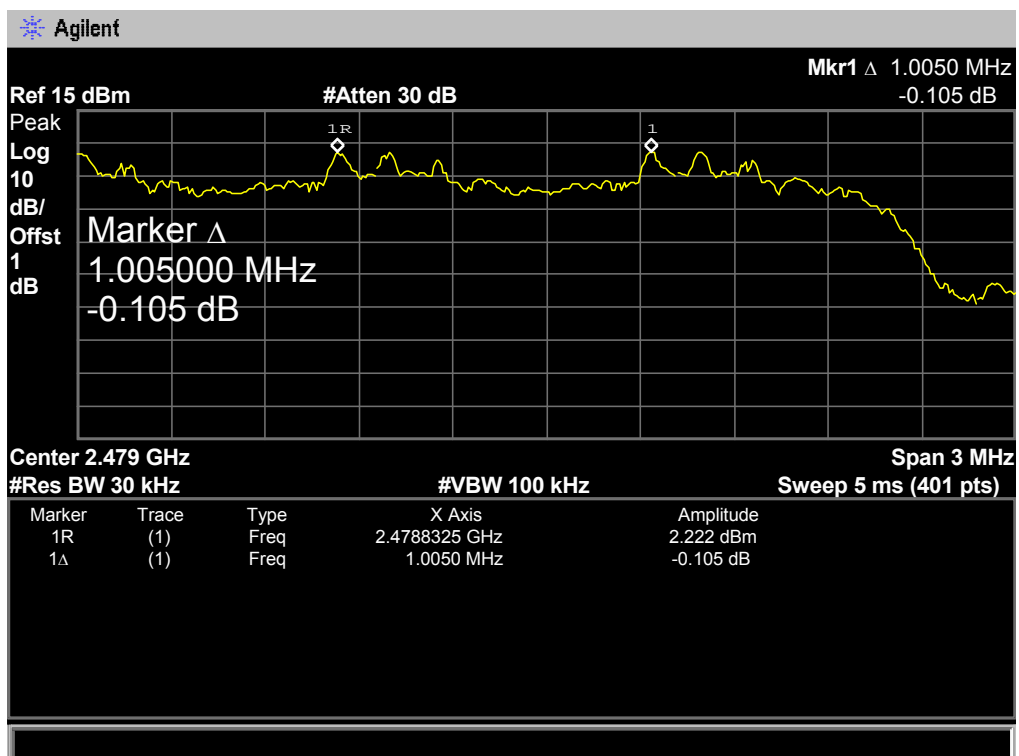
8-DPSK Hopping Mode

2441 MHz



8-DPSK Hopping Mode

2480 MHz



10. Peak Output Power Test

10.1 Test Standard and Limit

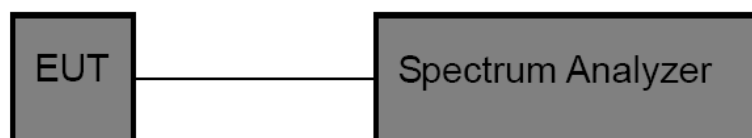
10.1.1 Test Standard

FCC Part 15.247 (b) (1)

10.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	2400~2483.5

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=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.

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

10.4 EUT Operating Condition

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

10.5 Test Data

EUT:	Smart phone	Model Name :	S400
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	4.471	30	
2441	4.537		
2480	4.431		
GFSK TX Mode			
2402 MHz			

Agilent

Ref 15 dBm

#Atten 30 dB

Mkr1 2.4021575 GHz
4.471 dBm

Peak

Log

10

dB/

Offst

1

dB

Marker

2.402157500 GHz

4.471 dBm

M1 S2

S3 FC

AA

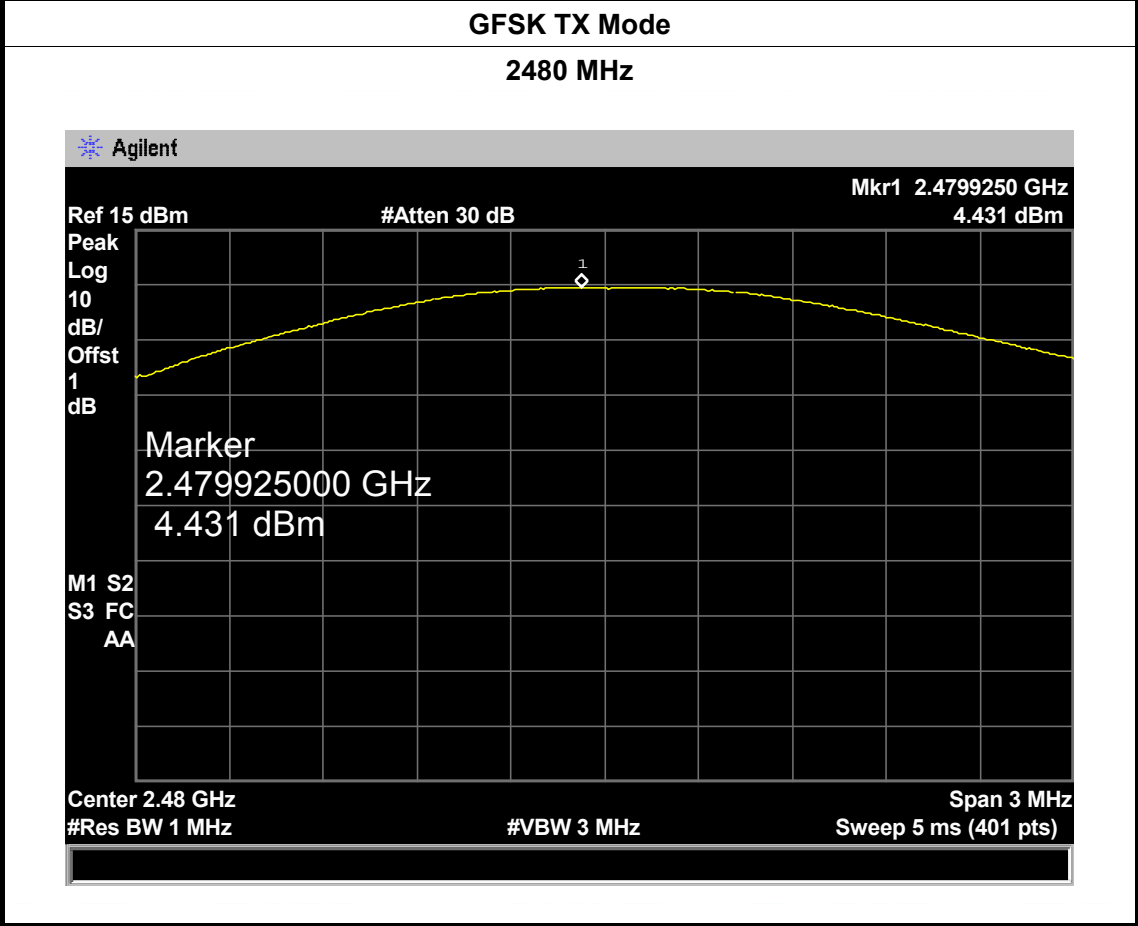
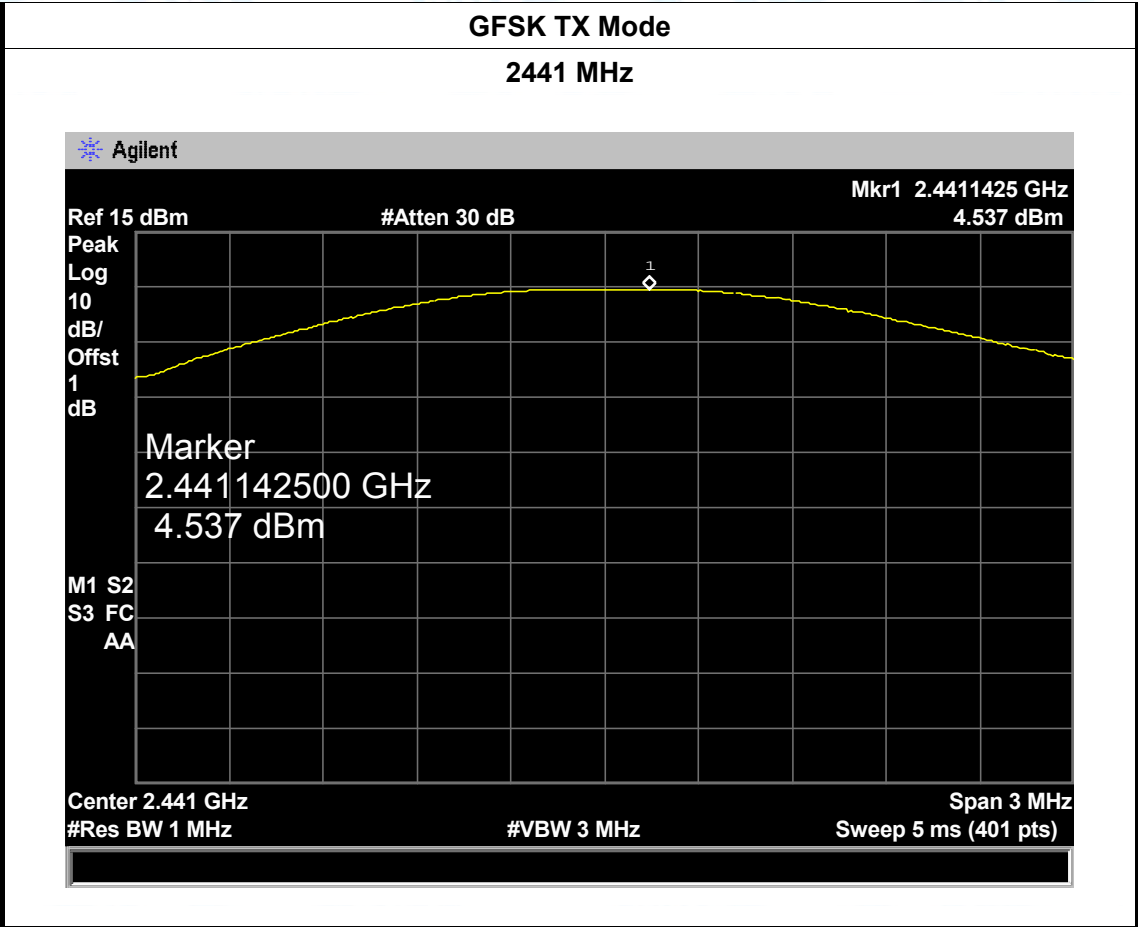
Center 2.402 GHz

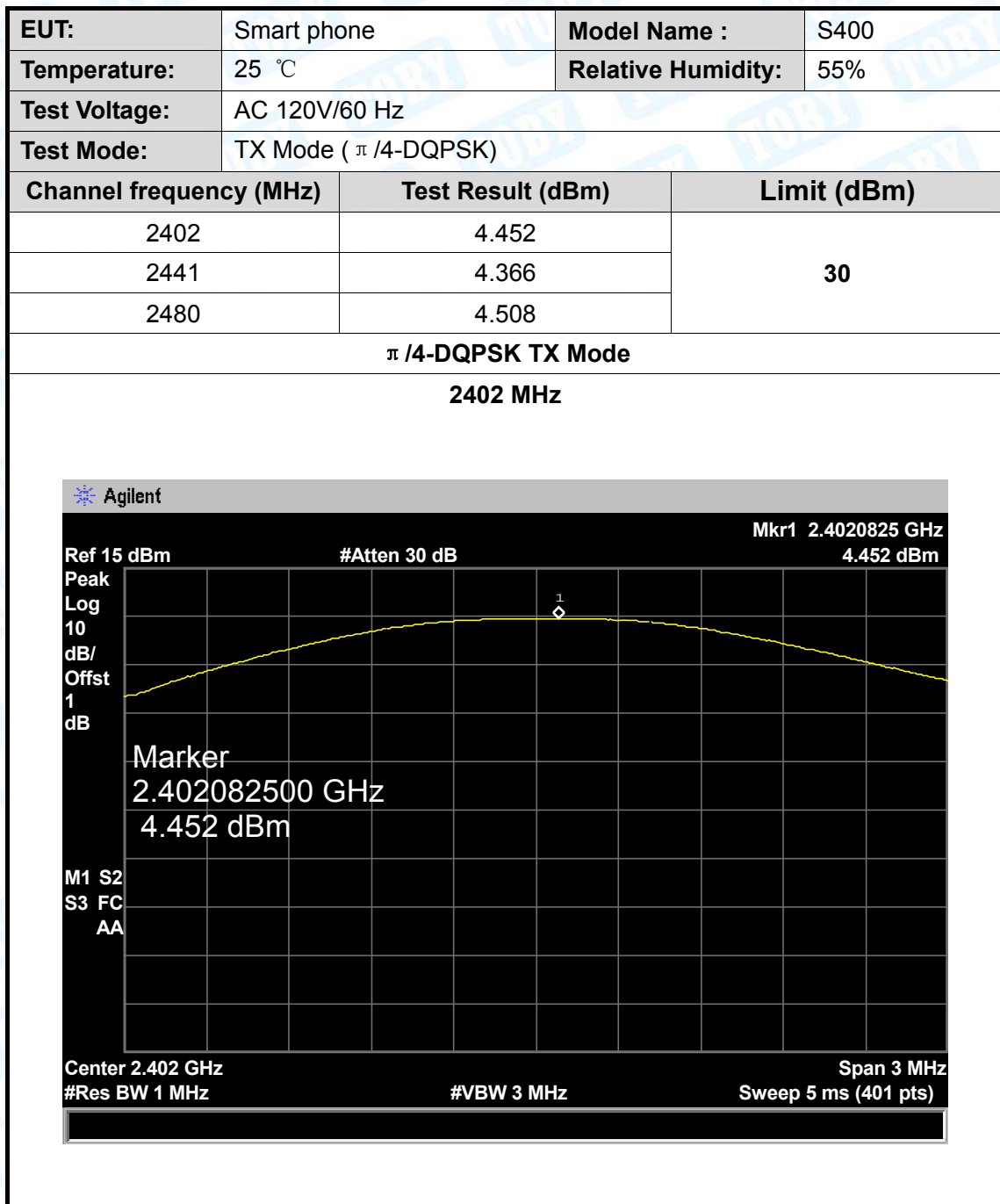
#Res BW 1 MHz

#VBW 3 MHz

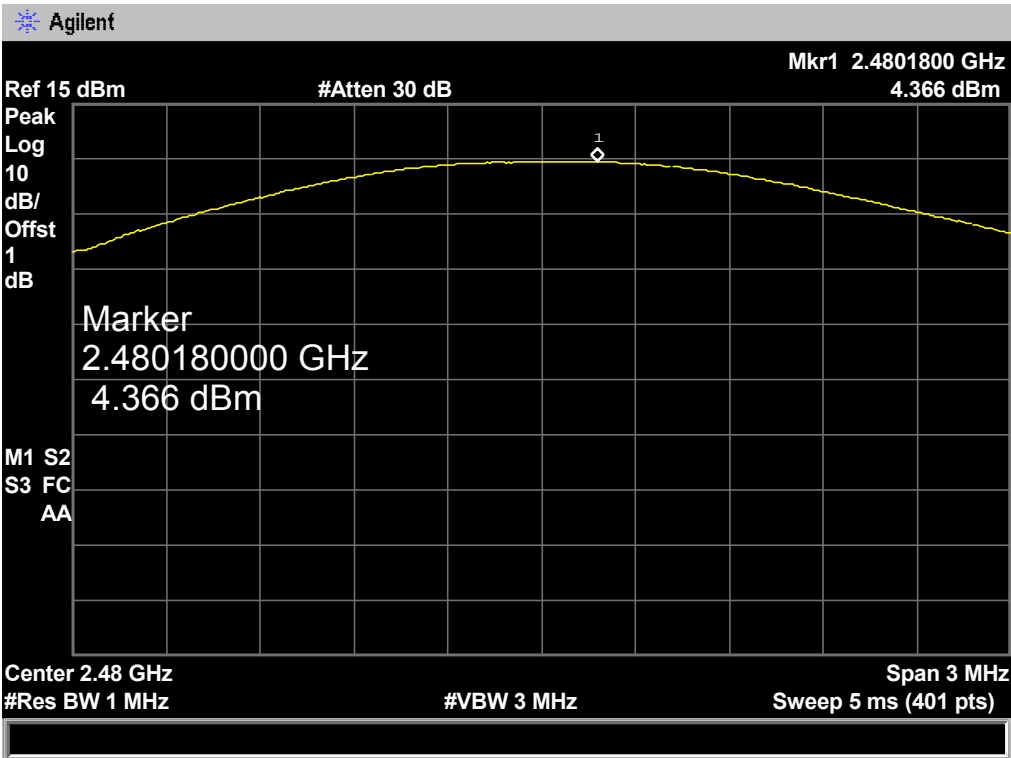
Span 3 MHz

Sweep 5 ms (401 pts)

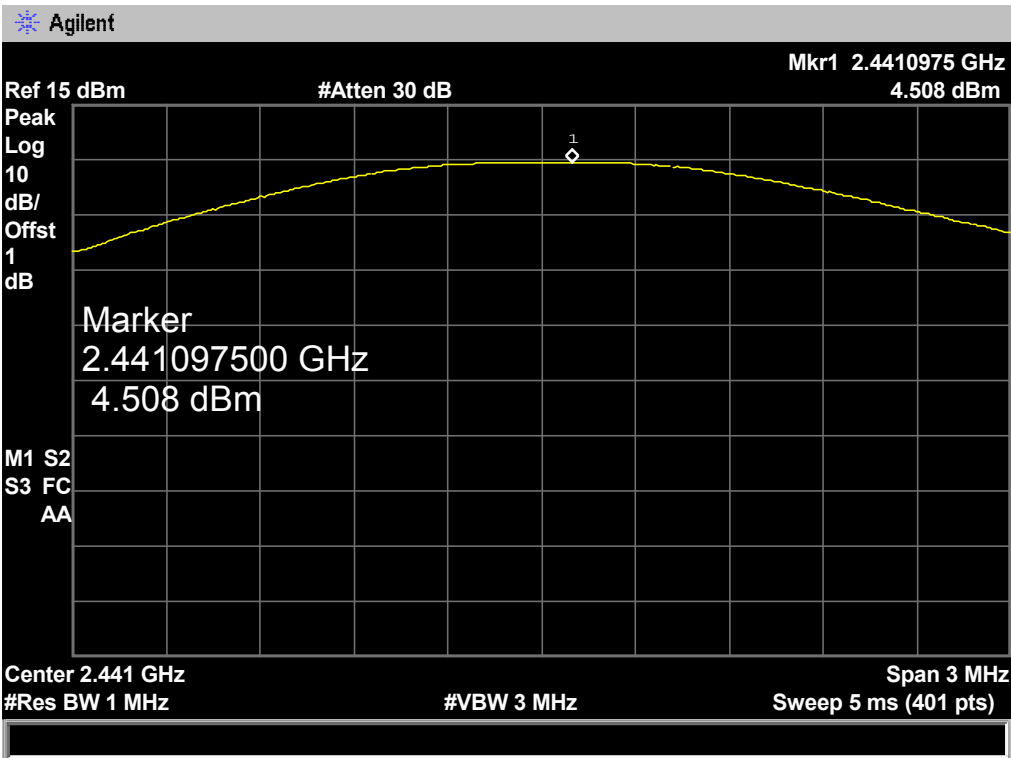


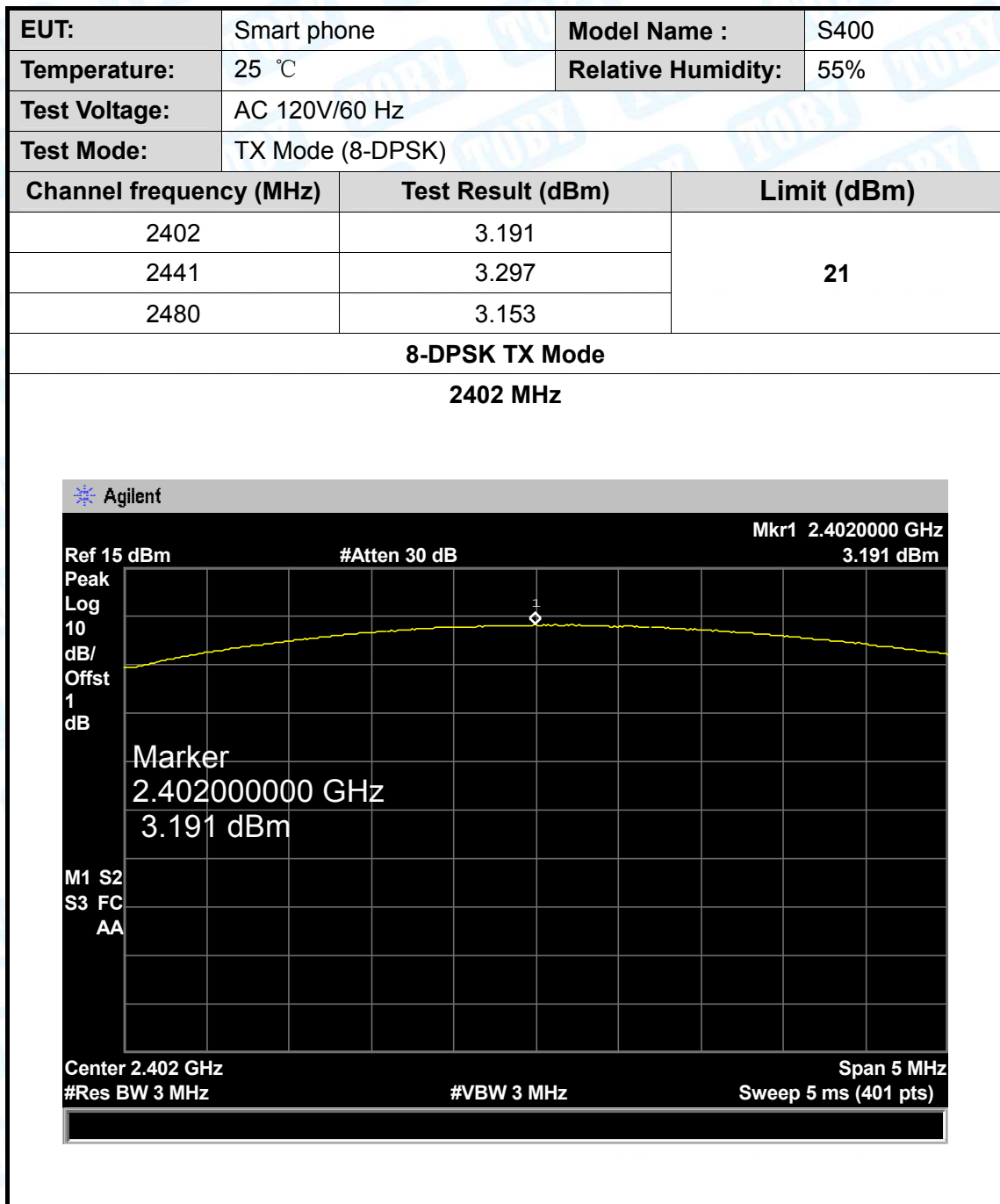


π /4-DQPSK TX Mode
 2441 MHz

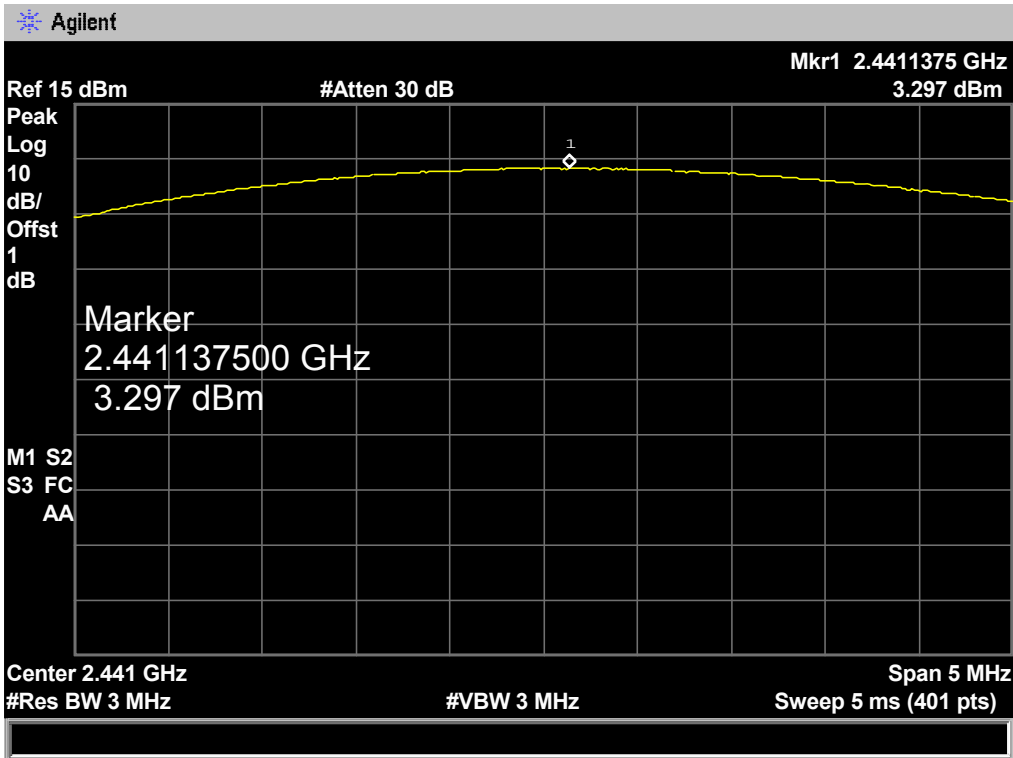


π /4-DQPSK TX Mode
 2480 MHz

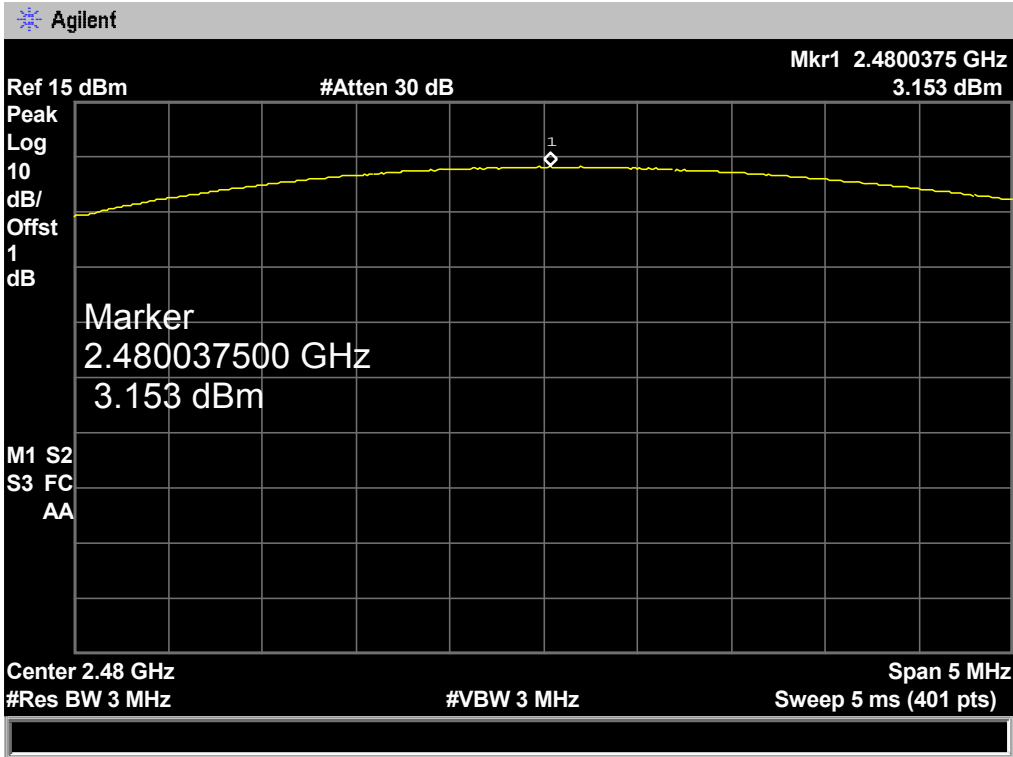




8-DPSK TX Mode
 2441 MHz



8-DPSK TX Mode
 2480 MHz



11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard

FCC Part 15.203

11.1.2 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 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 1.39 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

Result

The EUT antenna is an FPC Antenna. It complies with the standard requirement.

Antenna Type
<input checked="" type="checkbox"/> Permanent attached antenna
<input type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna