

Test Report for FCC & ISCED

FCC ID : ZNFTONETF8Q
 IC ID : 2703C-TONETF8Q

Report Number		ESTRFC2206-001		
Applicant	Company name	LG Electronics Inc.		
	Address	222 LG-ro Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea		
	Telephone	+82-10-9193-9881		
	Contact person	Sung-Won, Kim		
Product	Product name	LG TONE FREE		
	Factory address1	222 LG-ro Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea		
	Model No.	TONE-TF8Q	Manufacturer	LG Electronics Inc.
	Serial No.	NONE	Country of origin	KOREA
Test date	26-May-22 ~ 13-Jun-22		Date of issue	13-Jun-22
Testing location	140-16, Eongmalli-ro, Majang-myeon, Icheon-si, Gyeonggi-do, Korea			
Standard	FCC PART 15 Subpart C (15.247), ANSI C 63.10(2013), RSS-247 (2017)			
Measurement facility registration number		FCC : 659627 , ISCED : 4475A		
Tested by	Senior Engineer H.G. Lee		(Signature)	
Reviewed by	Engineering Manager I.K. Hong		(Signature)	
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned - This test report is not related to KOLAS accreditation - additional model name : TONE-UTF8Q (korea,UK,Australia) / TONE-DTF8Q (Germany) only change model name.				

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian III , 123 Gasan Digital 2-ro, Geumcheon-gu,
Seoul 153-759, R.O. Korea

EMC/Telecom/Safety Test Lab : 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si,
Gyeonggi-do 467-811, R. O. Korea

1.3 Official Qualification(s)

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test (Bluetooth)

Modulation Type	: GFSK(FHSS) , 8DPSK
Transfer Rate	: BDR 1M ,EDR 2M
Number of Channel	: 79
Channel Spacing	: 1 MHz
PEAK Output Power	: GFSK : 14.36 mW 8DPSK : 14.03 mW
Rating	: Earbud: 5 Vd.c.; 136 mA; Class III; Lithium ion coin battery of earbud: 3,7 Vd.c.; 68 mAh;
Receipt Date	: 19-May-22
X-tal list(s) or Frequencies generated	The highest operating frequency is 2480 MHz(Bluetooth) Bluetooth : 2.4 GHz

2.2 General descriptions of EUT

Category	Specification		
Device Type	Bluetooth Earbud		
Operating Frequency	2 402 MHz ~ 2 480 MHz		
RF Peak Power	Left earbud	GFSK	14.36 dBm
		8DPSK	13.83 dBm
	Right earbud	GFSK	14.20 dBm
		8DPSK	14.03 dBm
Number of Channel	79		
Antenna Type	Left earbud	Internal Antenna	
	Right earbud	Internal Antenna	
Antenna Gain	Left earbud	-4.98 dBi	
	Right earbud	-4.86 dBi	
Rating Supply Voltage	Earbud: 5 Vd.c.; 136 mA; Class III; Lithium ion coin battery of earbud: 3,7 Vd.c.; 68 mAh;		
HVIN	TONE-TF8Q,TONE-UTF8Q,TONE-DTF8Q		
FVIN	1.0		

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247)& RSS-247

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.10 (2013)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

Summary of Test Results

Applied Standard : 47 CFR Part 15 Subpart C & RSS-247				remark
FCC & IC Standard	Test Type	Result	Remark	Limit
15.207 & RSS-GEN	AC Power Conducted Emission	Pass		
15.205 & 15.209 & RSS-247	Intentional Radiated Emission	Pass	Meet the requirement	
15.247(a)(1) & RSS-GEN & RSS-247	Carrier Frequency Separation & 20 Bandwidth ,99% Bandwidth	Pass	Meet the requirement	>25 kHz
15.247(b) & RSS-247	Maximum Peak output power	Pass	Meet the requirement	30dBm(1W)
15.247(a)(1)(ii) & RSS-247	Number of Hopping Frequency	Pass	Meet the requirement	>75
15.209 & RSS-247	Transmitter Radiated Emission	Pass	Meet the requirement	
15.247(a)(1)(iii) & RSS-247	Time of Occupancy (Dwell Time)	Pass	Meet the requirement	<400ms
15.247(d) & RSS-247	Band Edge Measurement	Pass	Meet the requirement	

4. Measurement Condition

4.1 EUT Operation

a. Channel

Ch.	Frequency	Ch.	Frequency
0	2402 MHz	40	2442 MHz
1	2403 MHz	41	2443 MHz
2	2404 MHz	42	2444 MHz
3	2405 MHz	43	2445 MHz
4	2406 MHz	...	...
...	...	78	2480 MHz
38	2440 MHz		

b. Measurement Channel : Low (2402 MHz), Middle (2440 MHz), High (2480 MHz)

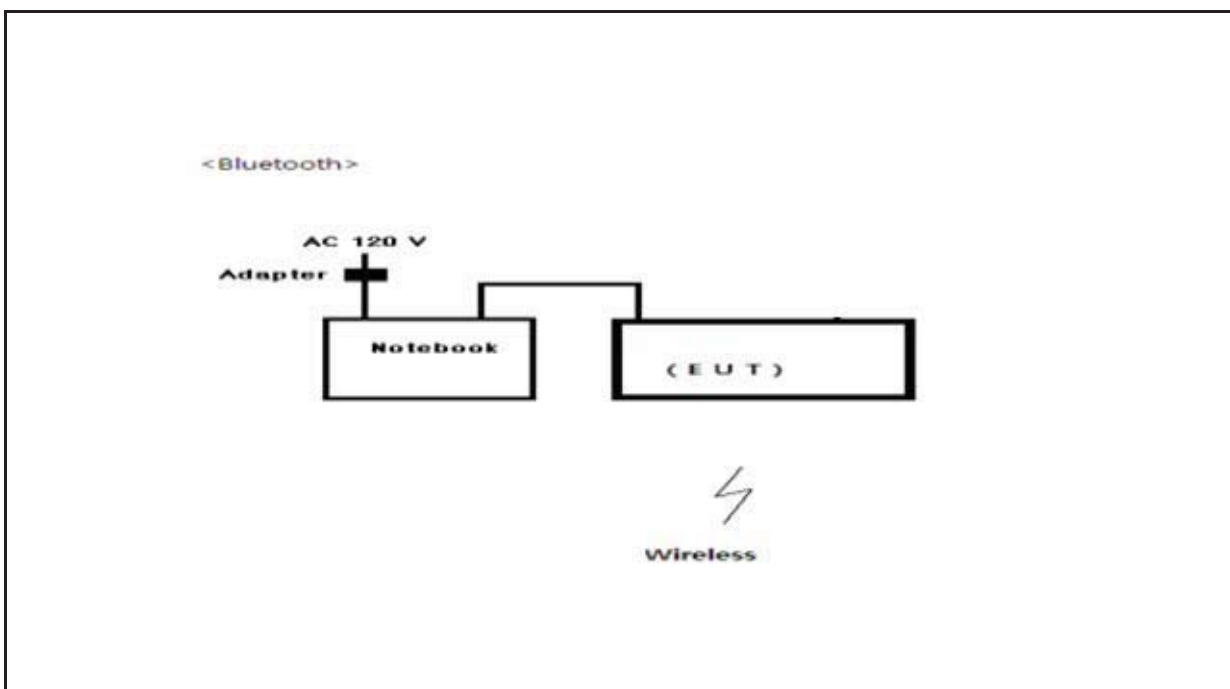
c. Test Mode : 8DPSK, GFSK (worst case)

d. Test rate : 3 Mbps

4.2 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to emission
- * Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- * Transmit mode was each test. Each channel (low, middle, high), also set the test after
- * The EUT was measured up to tenth harmonic or 40 GHz of the highest operating frequencies.

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
LG TONE FREE	TONE-TF8Q	NONE	LG Electronics Inc.	EUT

4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Notebook	Power	Adapter	–	0.5	Unshielded	

5. Carrier Frequency Separation

5.1 Test procedure

According to §15.247(a)(1), & RSS-247 & RSS-GEN Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

5.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 30 KHz
- . VBW= 300 KHz
- . Span= 3 MHz
- . Sweep= suitable duration based on the EUT specification.

20dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2022-11-29
-Spectrum Analyzer <=> EUT	Loss: 1 dB	—	

5.3 Measurement results

EUT	LG TONE FREE	MODEL	TONE-TF8Q
MODE	GFSK,8DPSK	ENVIRONMENTAL CONDITION	23 °C, 40 % R.H .
INPUT POWER	DC 3.7 V		

Left_ (GFSK)

CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (kHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	882	962	1000	641	PASS
38	2440	878	955	1000	637	PASS
78	2480	882	963	1000	642	PASS

Left_(8DPSK)

CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (MHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	1.204	1301	1000	867	PASS
38	2440	1.190	1309	1000	873	PASS
78	2480	1.201	1330	1000	887	PASS

Right_(GFSK)

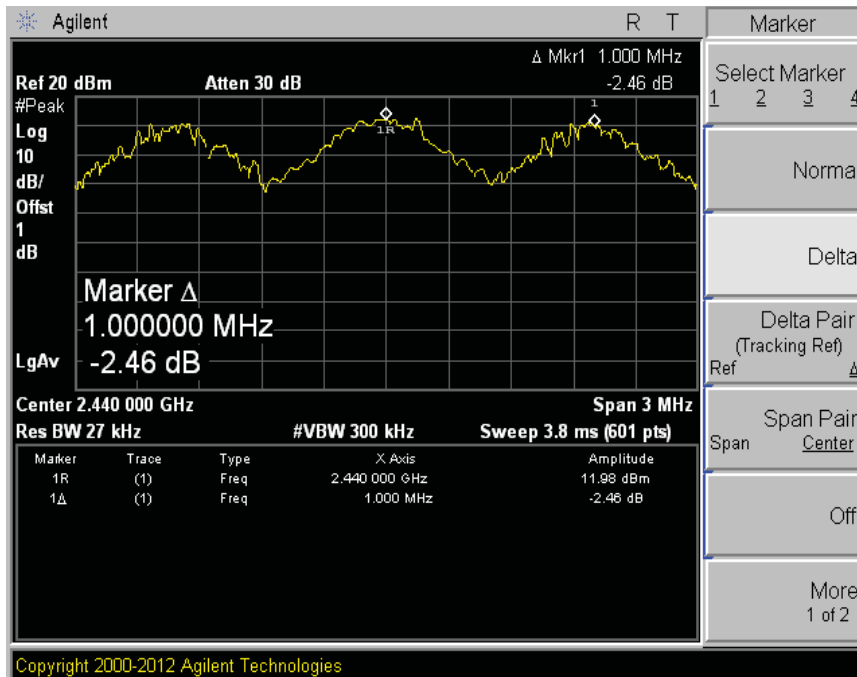
CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (kHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	864	941	1000	627	PASS
38	2440	885	974	1000	650	PASS
78	2480	874	960	1000	640	PASS

Right_(8DPSK)

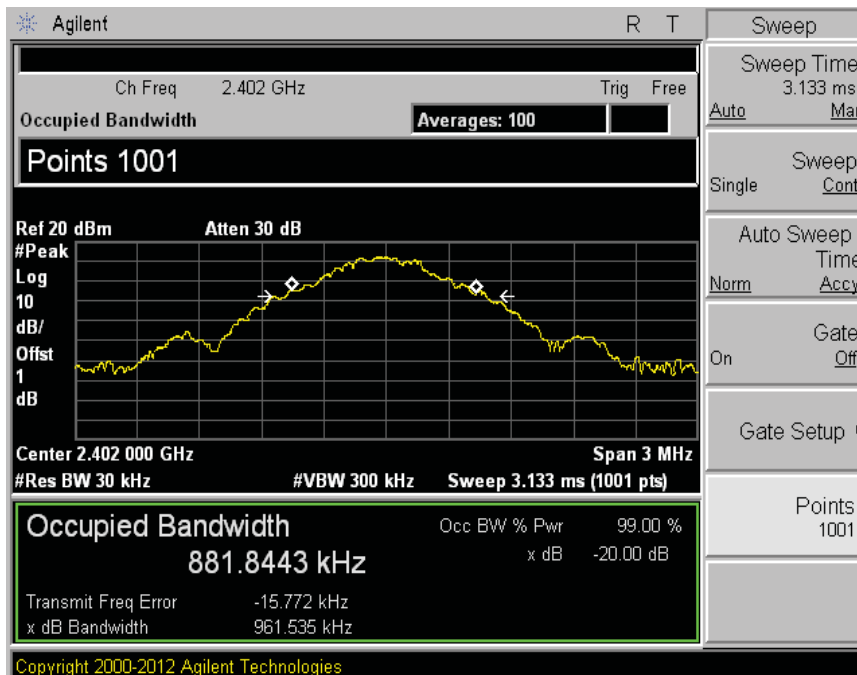
CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (MHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	1.182	1300	1000	867	PASS
38	2440	1.195	1313	1000	875	PASS
78	2480	1.185	1317	1000	878	PASS

5.4 Trace data Left_ (GFSK)

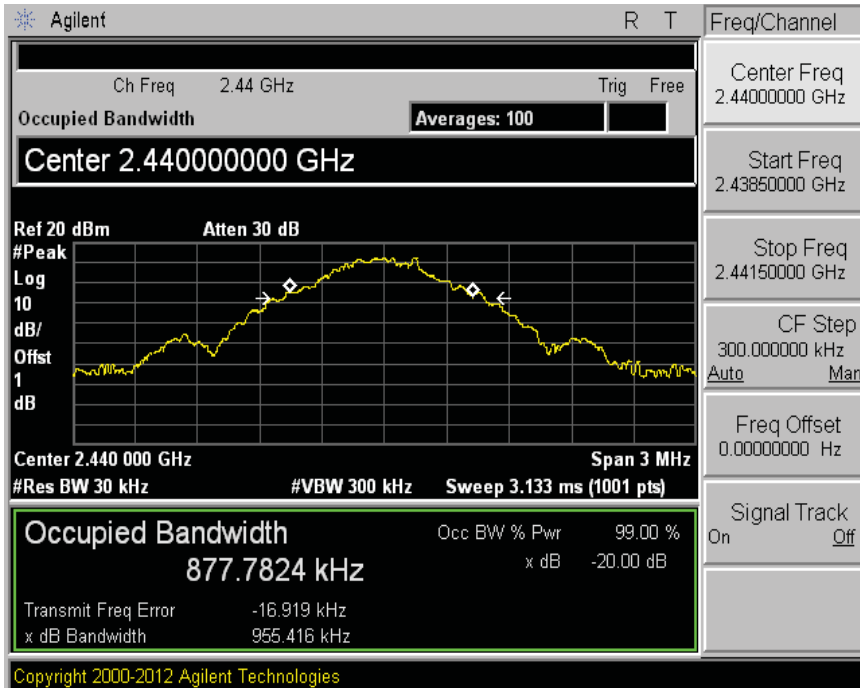
Channel Separation



20dB bandwidth(Ch 0)



20dB bandwidth(CH 38)

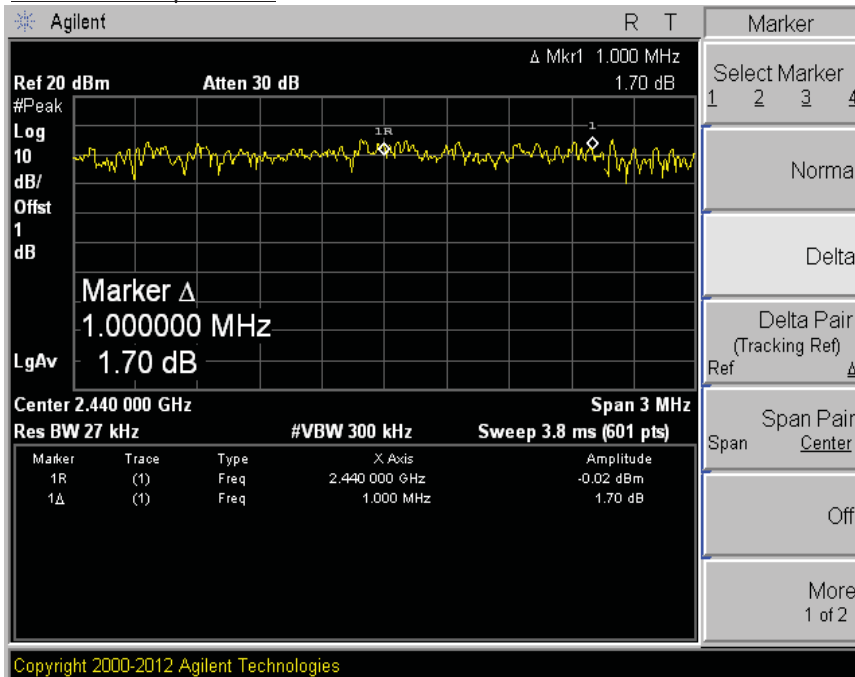


20dB bandwidth(CH 78)

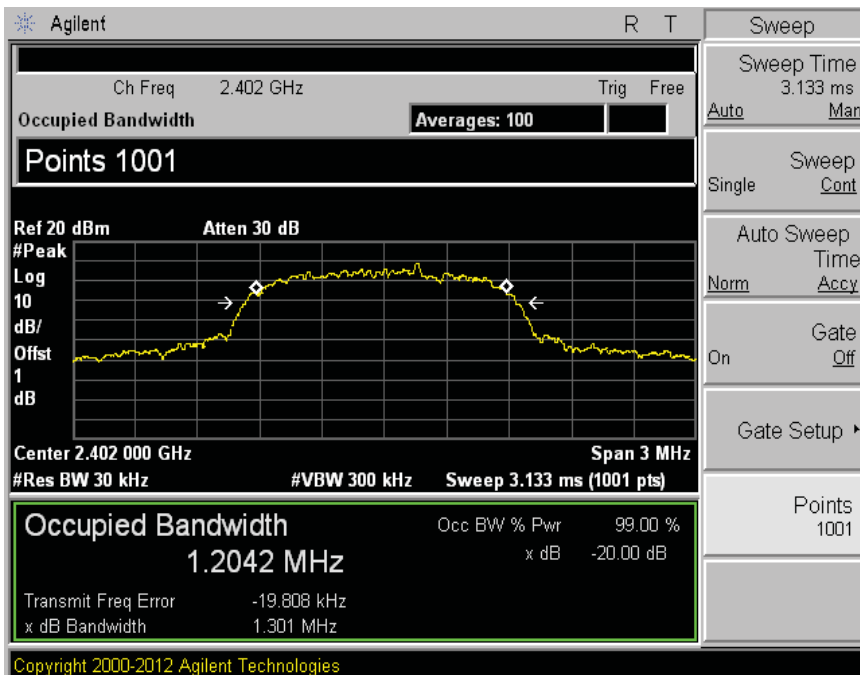


Left_ (8DPSK)

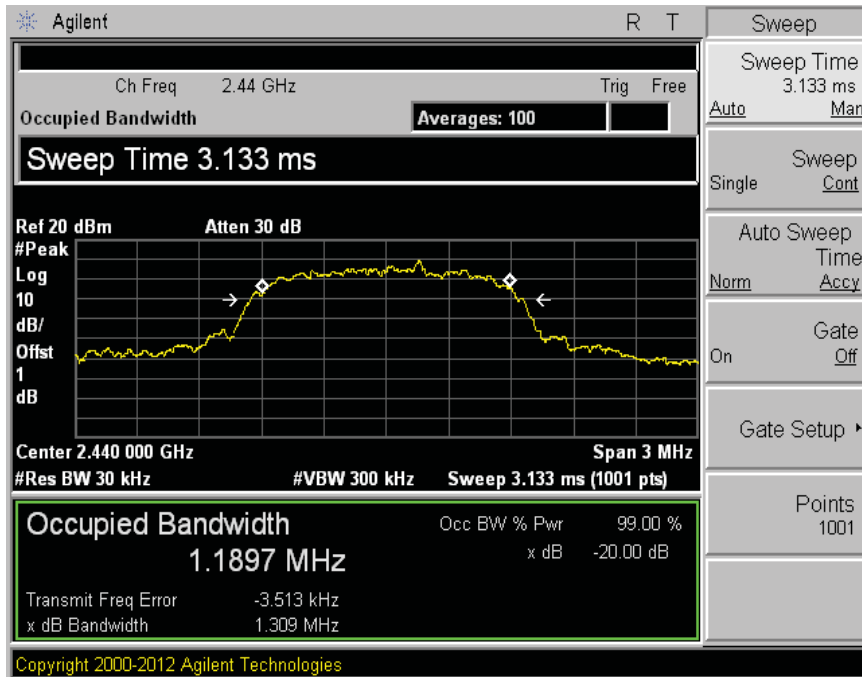
Channel Separation



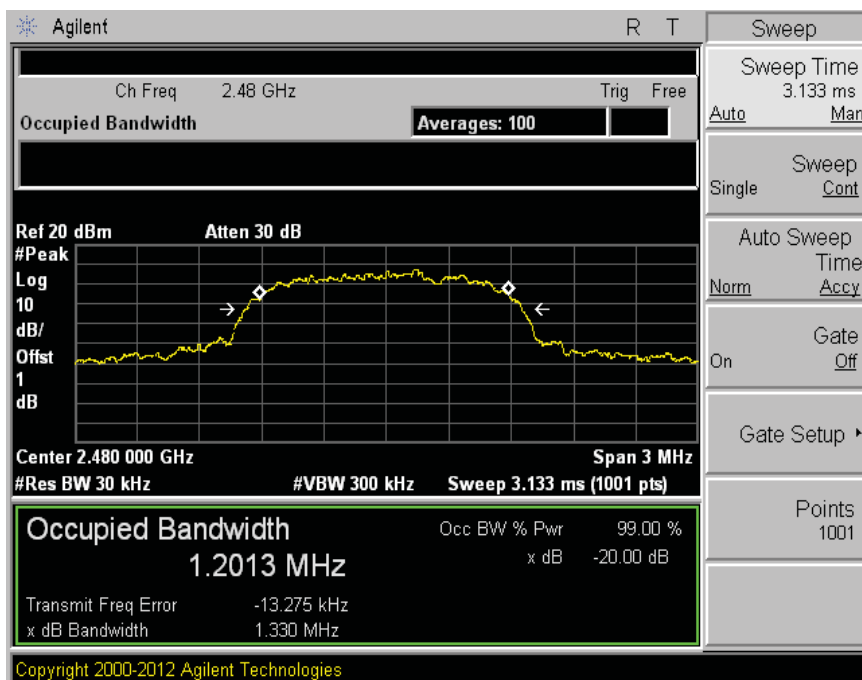
20dB bandwidth(Ch 0)



20dB bandwidth(CH 38)

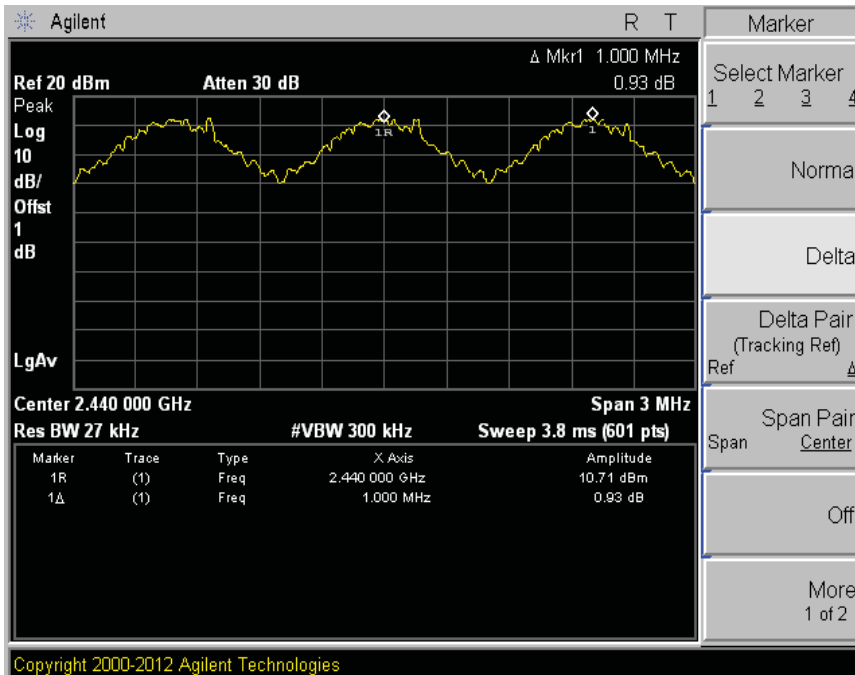


20dB bandwidth(CH 78)

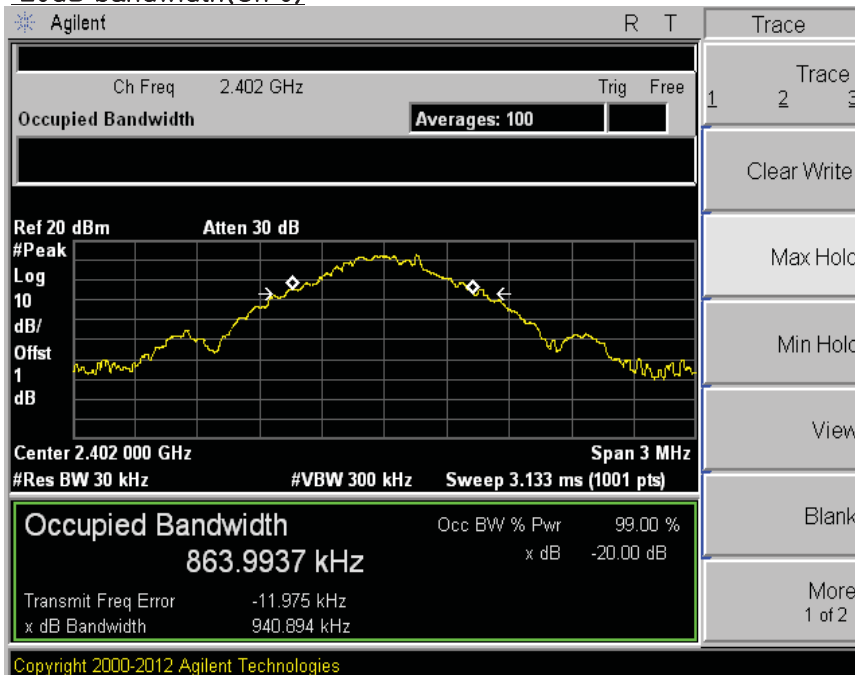


Trace data Right_(GFSK)

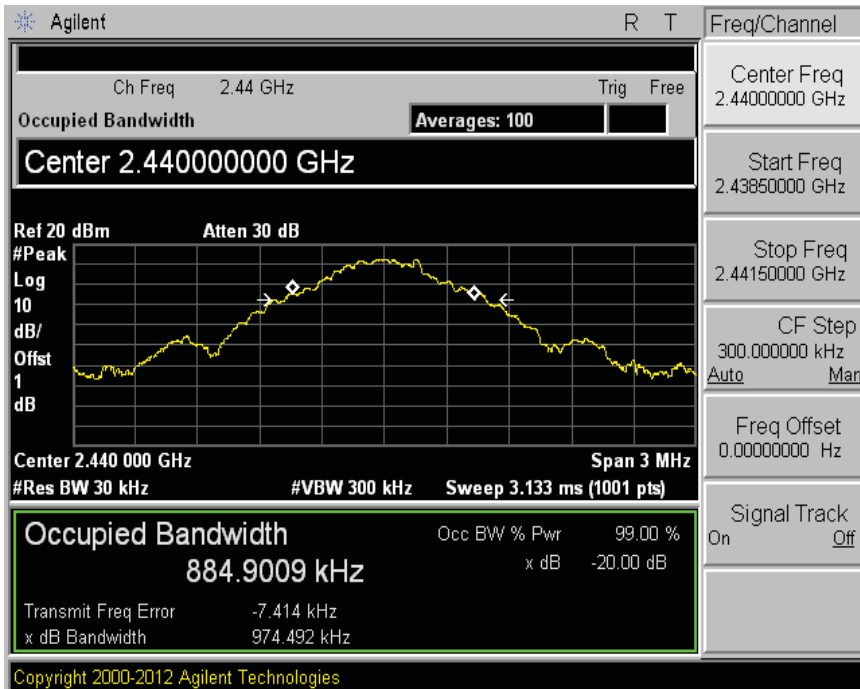
Channel Separation



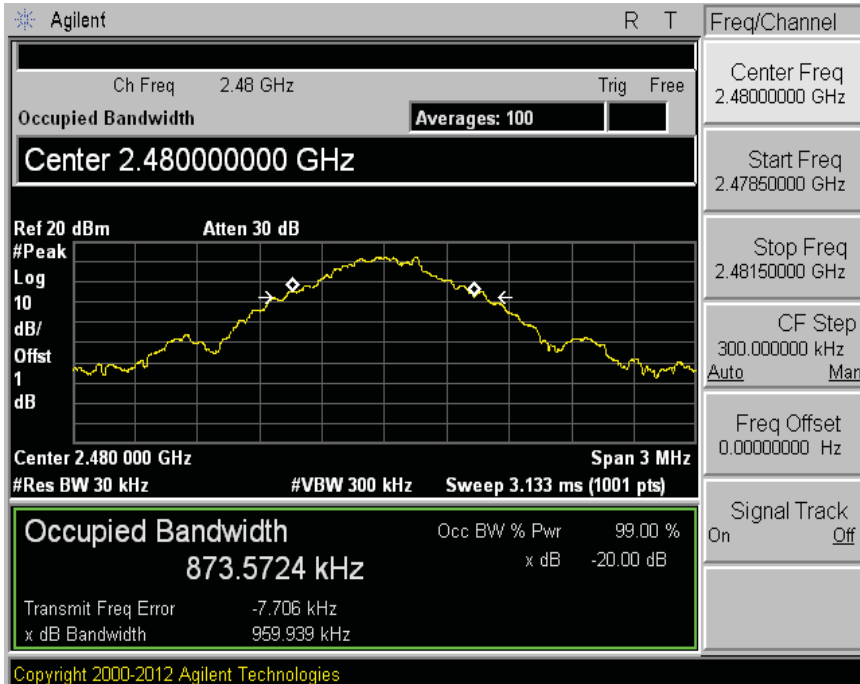
20dB bandwidth(Ch 0)



20dB bandwidth(CH 38)

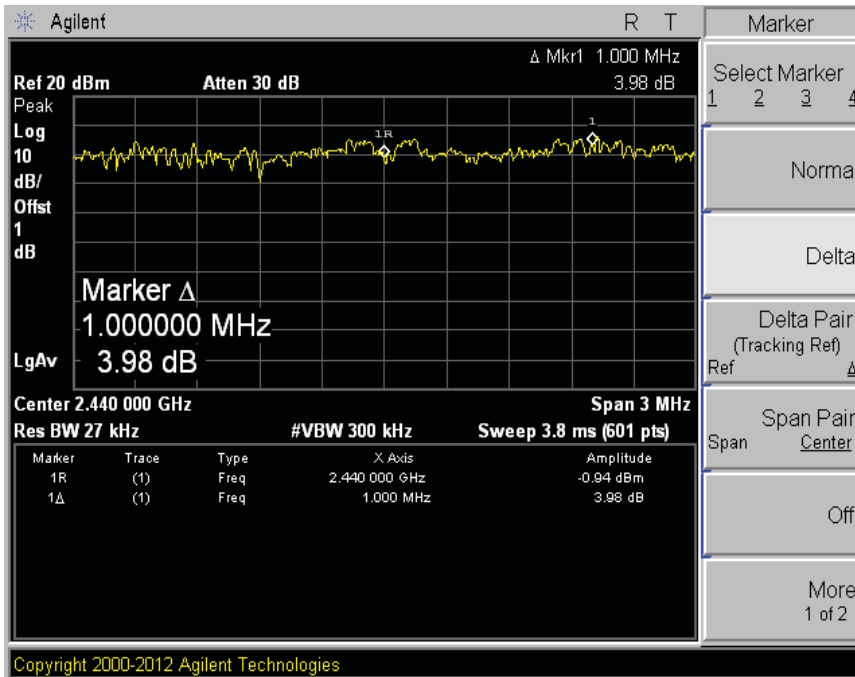


20dB bandwidth(CH 78)

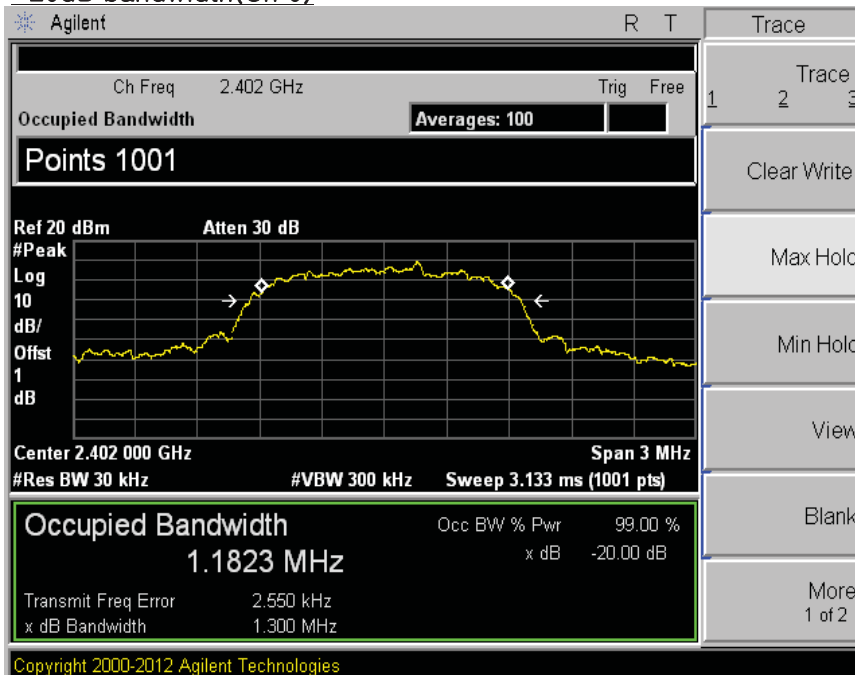


Right_ (8DPSK)

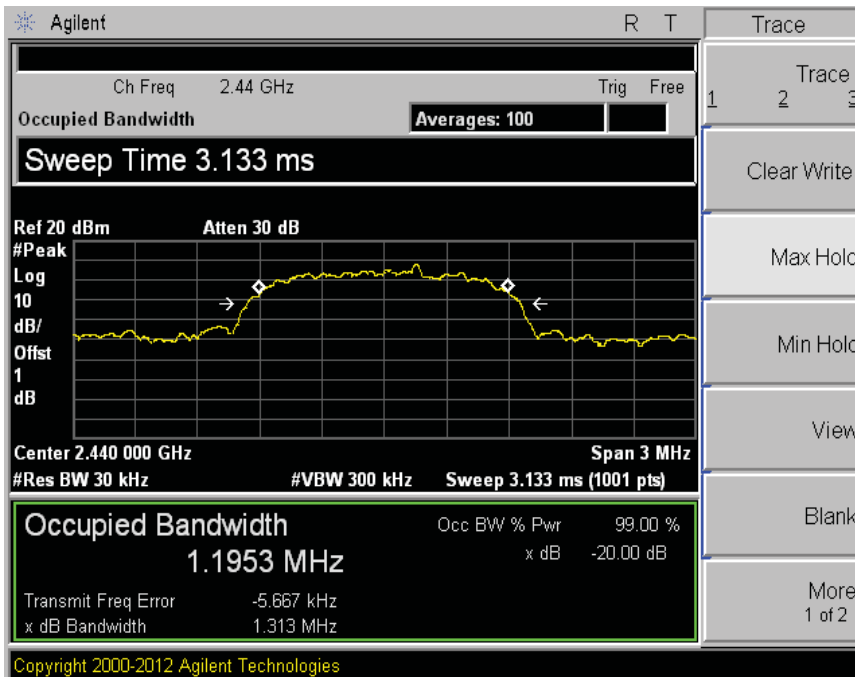
Channel Separation



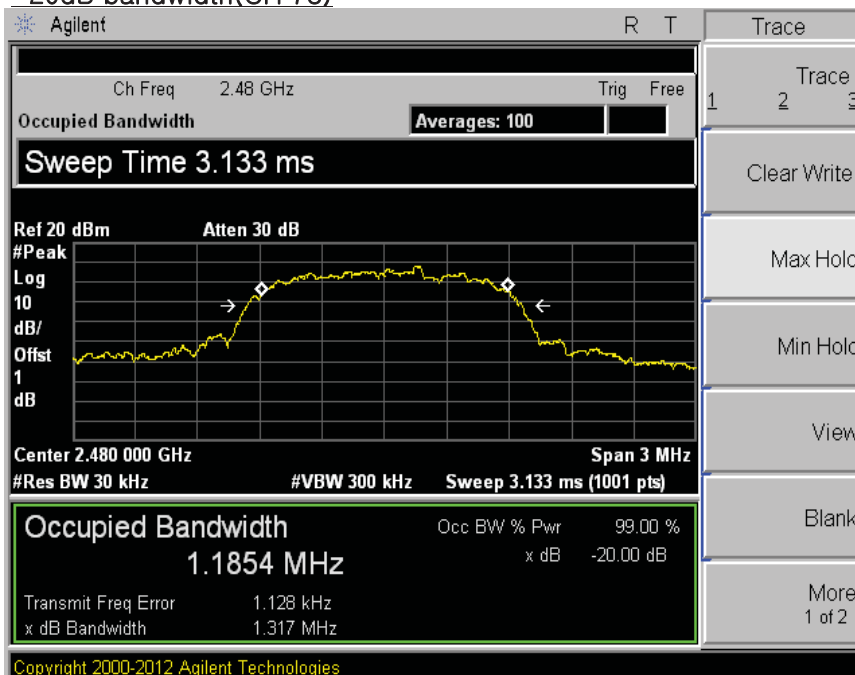
20dB bandwidth(Ch 0)



20dB bandwidth(CH 38)



20dB bandwidth(CH 78)



6. MAXIMUM PEAK OUTPUT POWER

6.1 Test procedure

The transmitter antenna terminal is connected to the input of a Power Sensor. Measurement is made while EUT is operating in transmission mode at the appropriate center frequency. The maximum peak output power measurement is 30 dBm.

Limits : FCC§15.247 & RSS 247 section 5.4 d

Description	Model	Serial Number	Cal. Due Date
Power Meter	N1921A	MY45100570	2022-12-02
Power Sensor	N1921A	MY45240427	2022-12-02
Power Meter <=> EUT	Loss: 1 dB	–	

6.2 Measurement results

EUT	LG TONE FREE	MODEL	TONE-TF8Q
MODE	GFSK,8DPSK	ENVIRONMENTAL CONDITION	23 °C, 41 % R.H.
INPUT POWER	DC 3.7 V		

Left_GFSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/ FAIL
		(dBm)	(mW)		
0	2402	14.36	27.29	125	PASS
38	2440	14.13	25.88	125	PASS
78	2480	14.27	26.73	125	PASS

Left_8DPSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/ FAIL
		(dBm)	(mW)		
0	2402	13.83	24.15	125	PASS
38	2440	13.61	22.96	125	PASS
78	2480	13.72	23.55	125	PASS



Left_GFSK

CHANNEL	Channel Frequency (MHz)	Average Power Output(dBm)			Limit[mW]	PASS/FAIL
		(dBm)	(mW)	factor		
0	2402	14.14	25.94	1.04	125	PASS
38	2440	13.94	24.77	1.04	125	PASS
78	2480	14.04	25.35	1.04	125	PASS

Left_8DPSK

CHANNEL	Channel Frequency (MHz)	Average Power Output(dBm)			Limit[mW]	PASS/FAIL
		(dBm)	(mW)	factor		
0	2402	9.70	9.33	1.73	125	PASS
38	2440	9.48	8.87	1.73	125	PASS
78	2480	9.48	8.87	1.73	125	PASS

Right_GFSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/FAIL
		(dBm)	(mW)		
0	2402	14.20	26.30	125	PASS
38	2440	14.11	25.76	125	PASS
78	2480	14.09	25.64	125	PASS

Right_8DPSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/FAIL
		(dBm)	(mW)		
0	2402	14.03	25.29	125	PASS
38	2440	13.94	24.77	125	PASS
78	2480	13.94	24.77	125	PASS

Note : 8DPSK mode is max power in three different modulations.



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Right_GFSK

CHANNEL	Channel Frequency (MHz)	Average Power Output(dBm)			Limit[mW]	PASS/FAIL
		(dBm)	(mW)	factor		
0	2402	12.97	25.18	1.04	125	PASS
38	2440	12.86	24.55	1.04	125	PASS
78	2480	12.85	24.49	1.04	125	PASS

Right_8DPSK

CHANNEL	Channel Frequency (MHz)	Average Power Output(dBm)			Limit[mW]	PASS/FAIL
		(dBm)	(mW)	factor		
0	2402	8.16	8.36	1.06	125	PASS
38	2440	8.05	8.15	1.06	125	PASS
78	2480	8.01	8.08	1.06	125	PASS

Note : 8DPSK mode is max power in three different modulations.

7. Number of Hopping Frequency

7.1 Test procedure

According to §15.247(a)(1)(ii), & RSS-247 Frequency hopping systems operating in the 2 400 MHz – 2 483.5 MHz bands shall use at least 15 hopping frequencies.

7.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100 KHz
- . VBW= 100 KHz
- . Span= the frequency band of operation
- . Sweep= suitable duration based on the EUT specification.

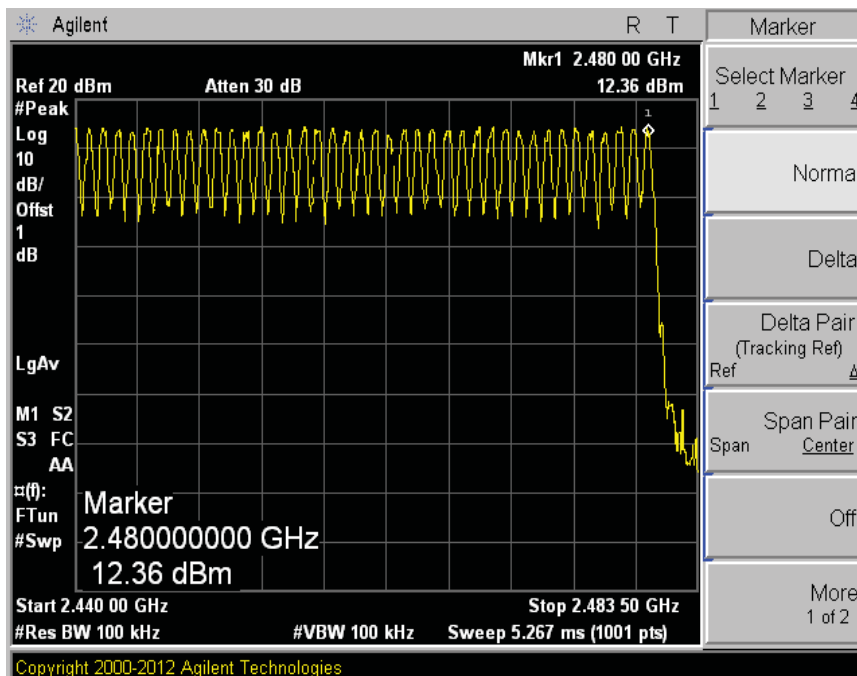
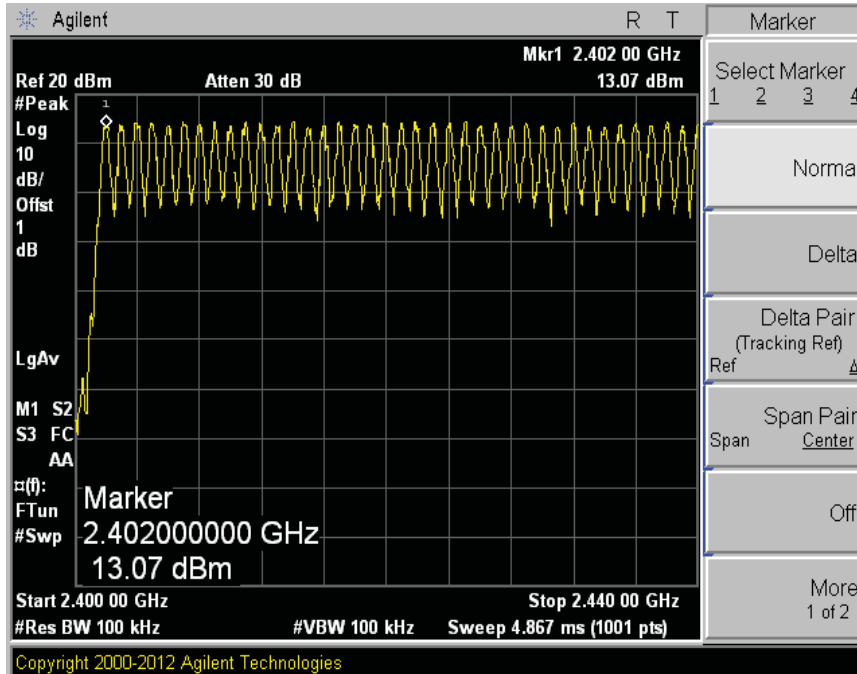
The Number of Hopping Frequency Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2022-11-29
-Spectrum Analyzer <=> EUT	Loss: 1 dB		

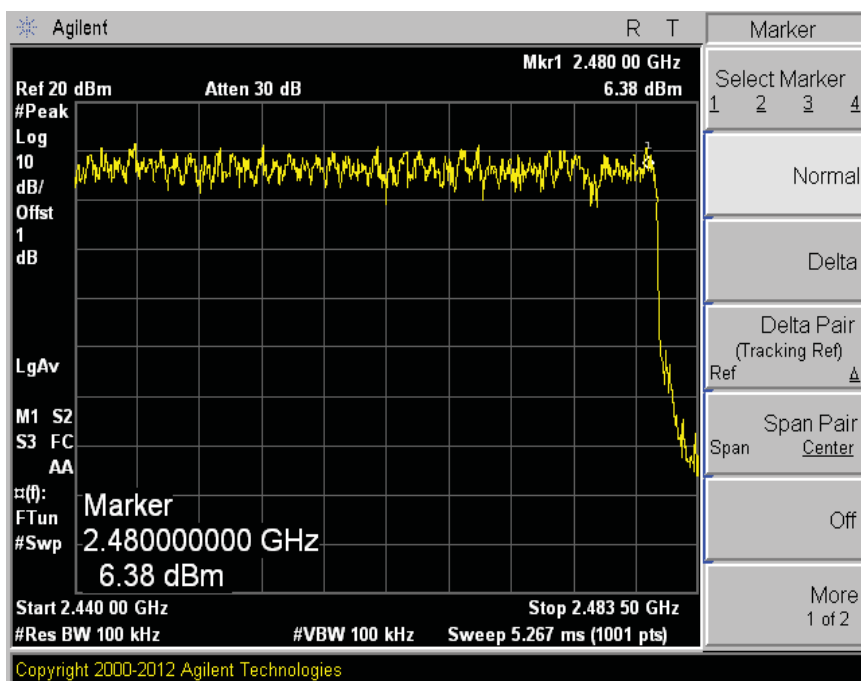
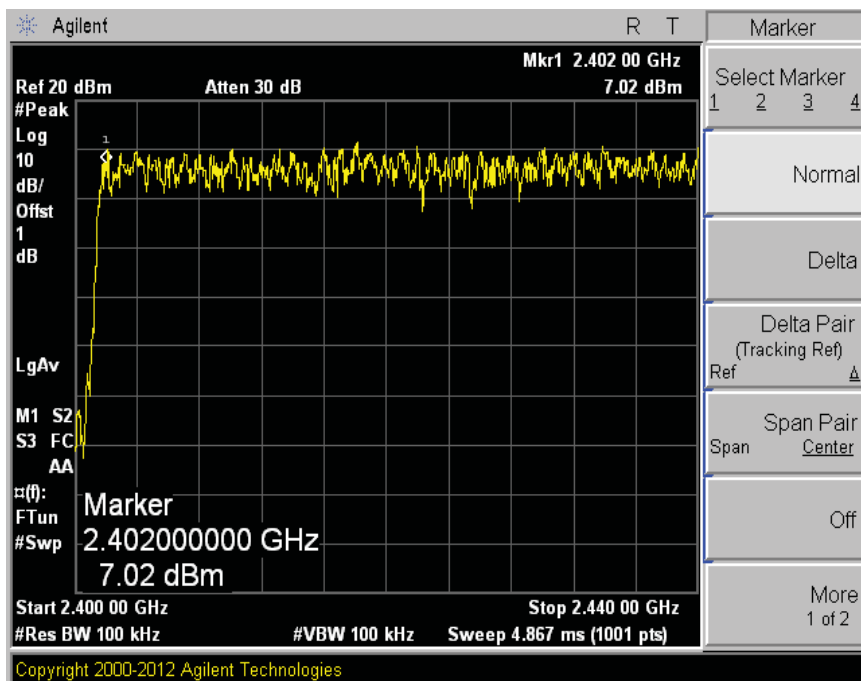
7.3 Measurement results

EUT	LG TONE FREE	MODEL	TONE-TF8Q
MODE	GFSK,8DPSK	ENVIRONMENTAL CONDITION	23 °C, 42 % R.H.
INPUT POWER	DC 3.7 V		
Number of CH	Limit (Number of CH)	PASS/FAIL	
79	>15	PASS	

7.4 Trace data Left_(GFSK)



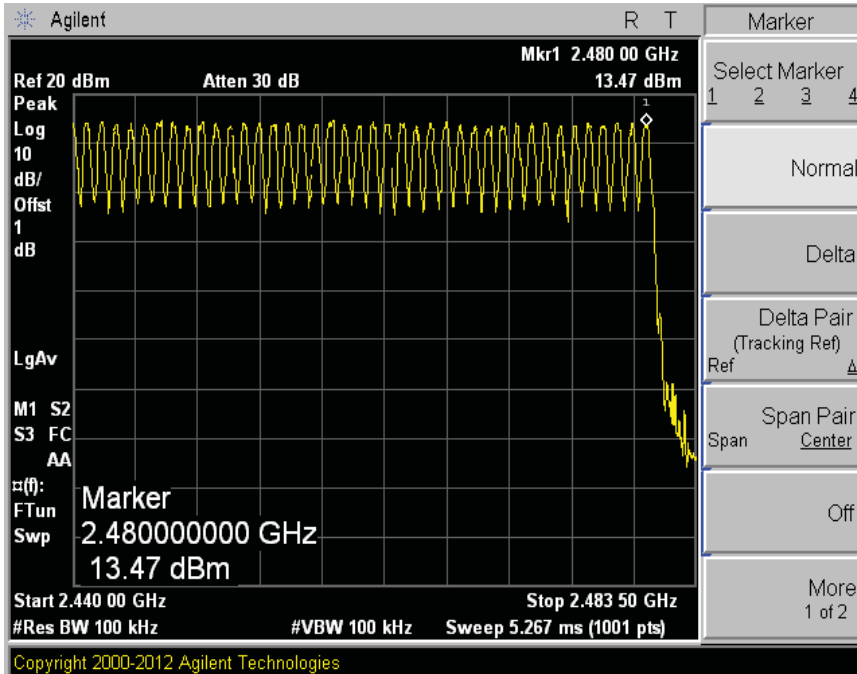
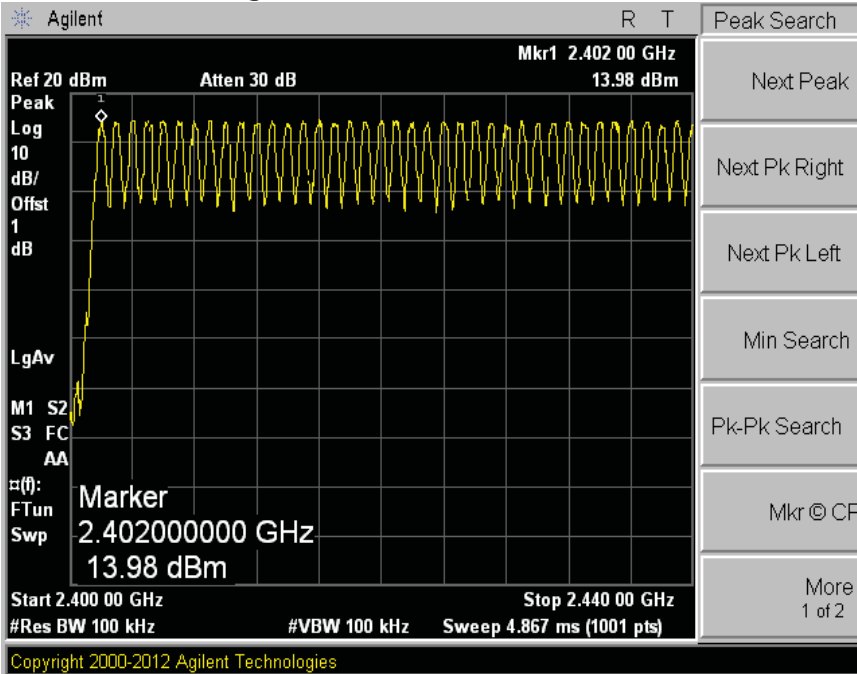
Trace data Left__(8DPSK)



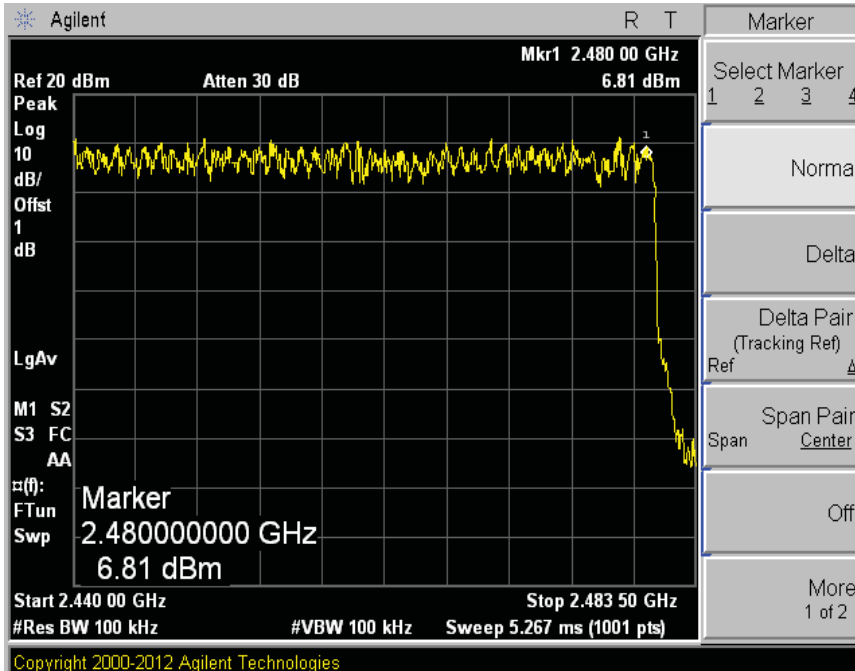
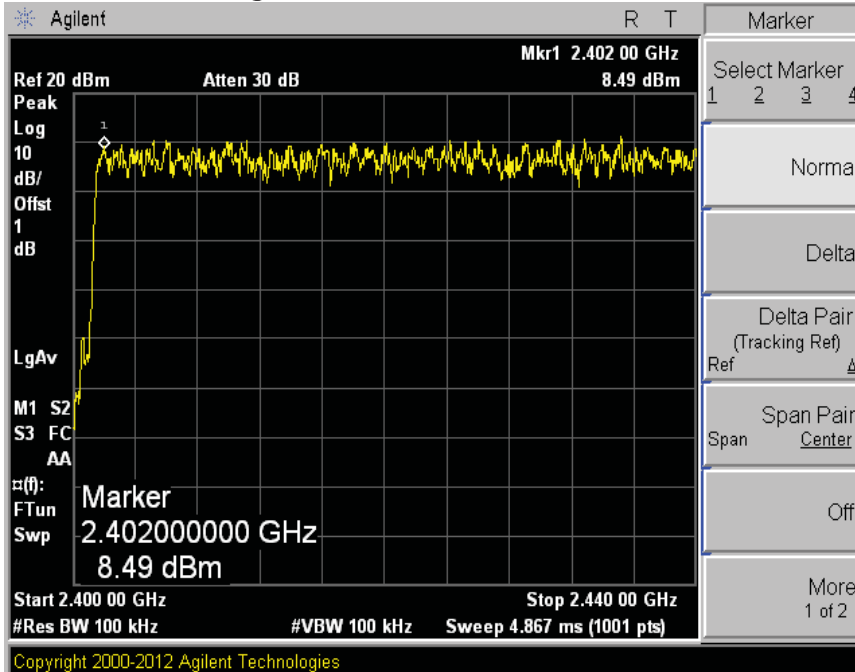


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Trace data Right_(GFSK)



Trace data Right_(8DPSK)



8. Time of Occupancy (Dwell Time)

8.1 Test procedure

According to §15.247(a)(1)(iii), & RSS-247 Frequency hopping systems operating in the 2 400 MHz – 2 483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

8.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 1 MHz
- . VBW= 1 MHz
- . Span= zero span, centered on a hopping channel
- . Sweep = as necessary to capture the entire dwell time per hopping channel
- . Detector function = Peak
- . Trace = Max hold

The Time of Occupancy Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2022-11-29
-Spectrum Analyzer <=> EUT	Loss: 1 dB		

8.3 Measurement results

EUT	LG TONE FREE	MODEL	TONE-TF8Q
MODE	GFSK,8DPSK	ENVIRONMENTAL CONDITION	23 °C, 43 % R.H.
INPUT POWER	DC 3.7 V		

Left_GFSK

A. DH1 Mode

One period for each particular channel : $0.436 \text{ ms} \times 320.1 = 139.56 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	139.56	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH1 data rate operates on a one-slot transmission and one-slot receiving basis. Thus there are $1600/(1+1)=800$ transmissions per second. In one period for each particular channel there are $10.13 \times 31.6 = 320.1$ times of transmissions.

B. DH3 Mode

One period for each particular channel : $1.072 \text{ ms} \times 159.9 = 171.41 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	171.41	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH5 data rate operates on a five-slot transmission and one-slot receiving basis. Thus there are $1600/(3+1)=400$ transmissions per second. In one period for each particular channel there are $5.06 \times 31.6 = 159.9$ times of transmissions.

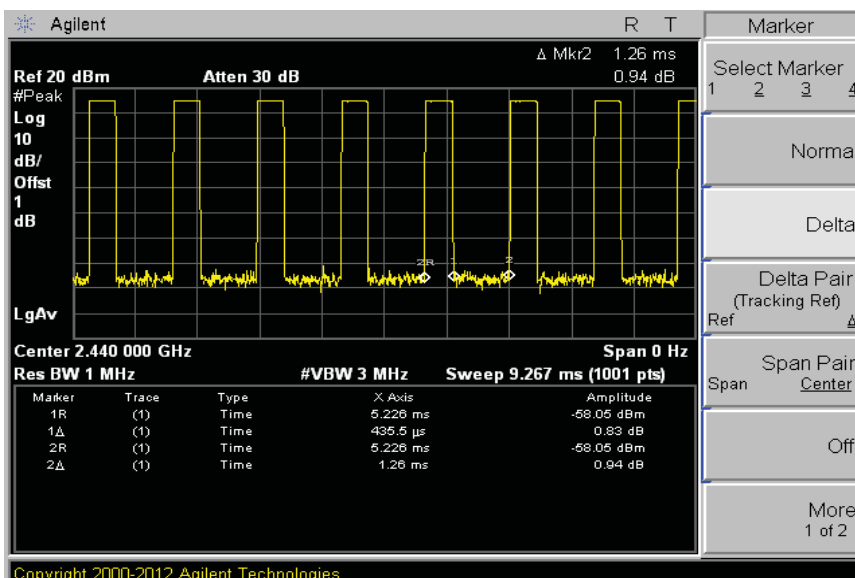
C. DH5 Mode

One period for each particular channel : $2.944 \text{ ms} \times 106.81 = 314.45 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	316.16	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH5 data rate operates on a five-slot transmission and one-slot receiving basis. Thus there are $1600/(5+1)=266.7$ transmissions per second. In one period for each particular channel there are $3.38 \times 31.6 = 106.81$ times of transmissions.

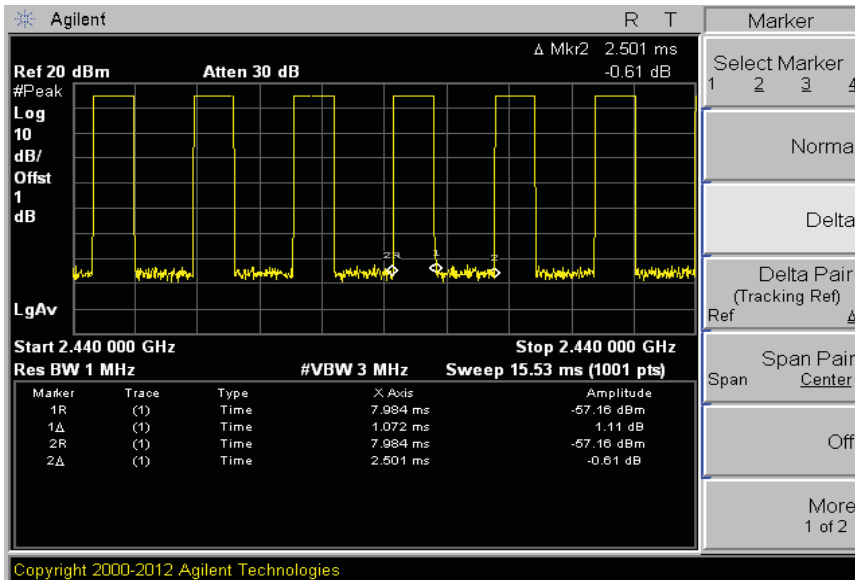
8.4 Trace data Left DH1



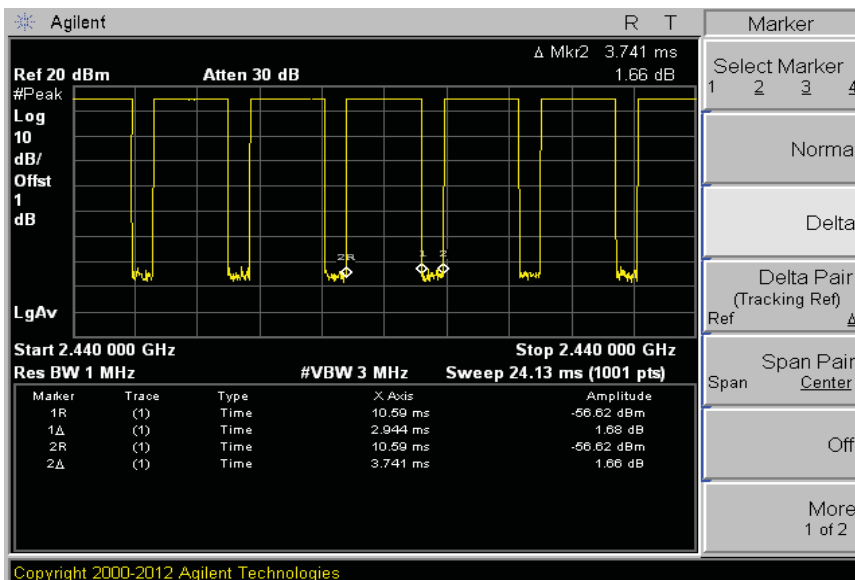


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DH3



DH5





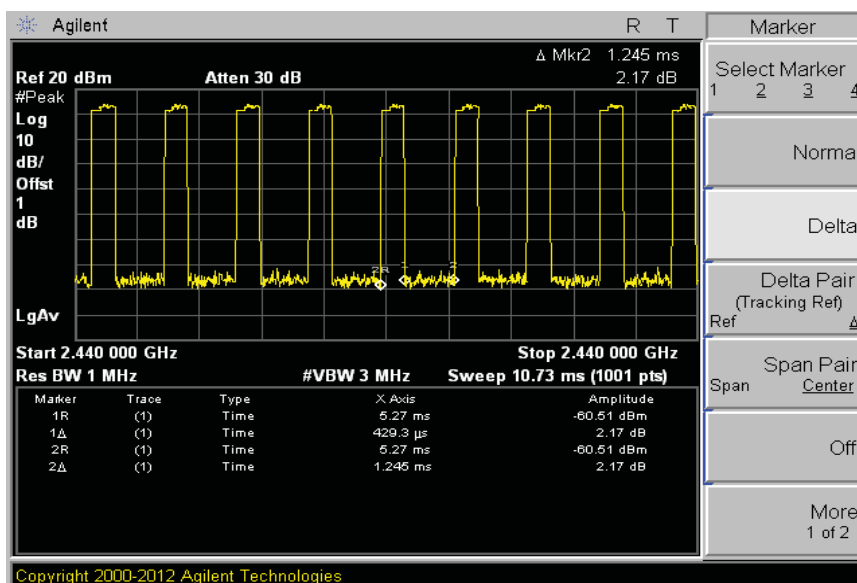
A. 3DH1 Mode

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	136.59	400	PASS

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	274.07	400	PASS

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	317.01	400	PASS

3DH1

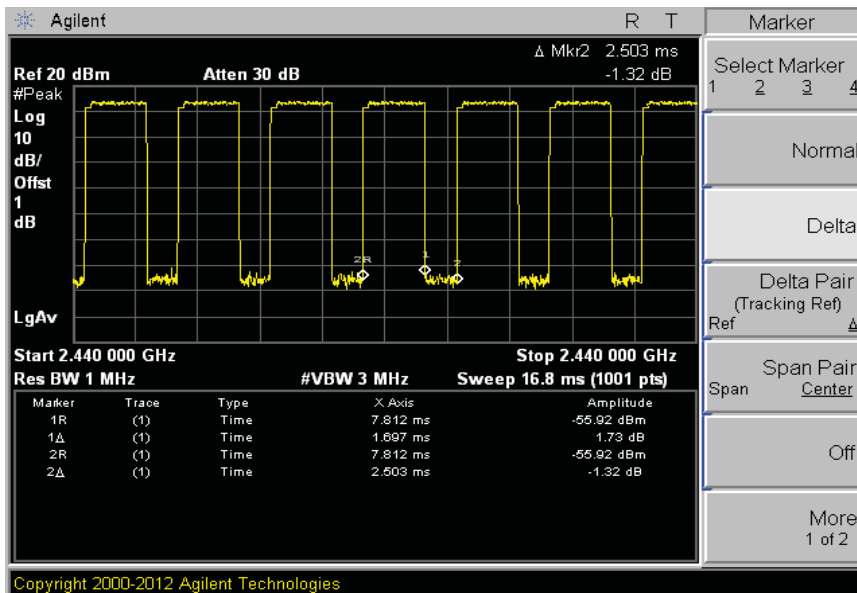




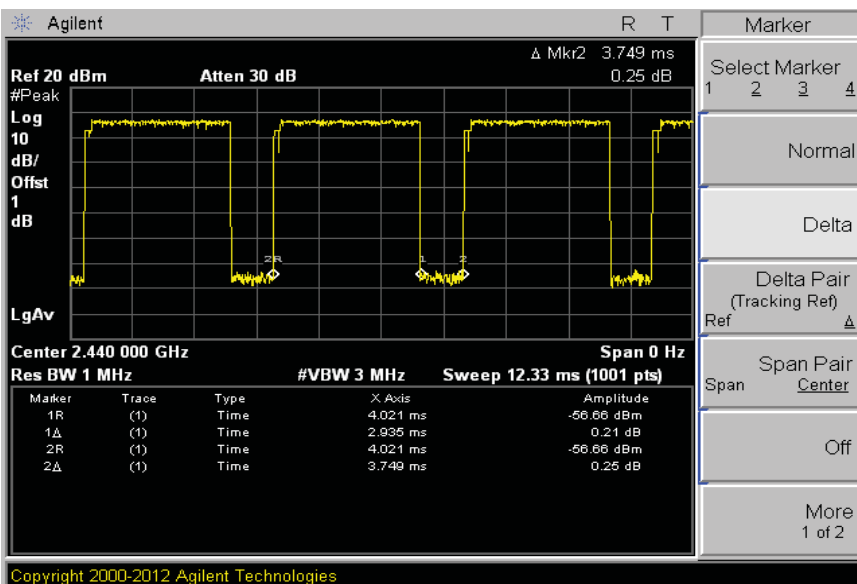
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8DPSK

3DH3



3DH5



Right_GFSK

A. DH1 Mode

One period for each particular channel : $0.436 \text{ ms} \times 320.1 = 139.56 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	139.56	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH1 data rate operates on a one-slot transmission and one-slot receiving basis. Thus there are $1600/(1+1)=800$ transmissions per second. In one period for each particular channel there are $10.13 \times 31.6 = 320.1$ times of transmissions.

B. DH3 Mode

One period for each particular channel : $1.072 \text{ ms} \times 159.9 = 171.41 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	171.41	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH5 data rate operates on a five-slot transmission and one-slot receiving basis. Thus there are $1600/(3+1)=400$ transmissions per second. In one period for each particular channel there are $5.06 \times 31.6 = 159.9$ times of transmissions.

C. DH5 Mode

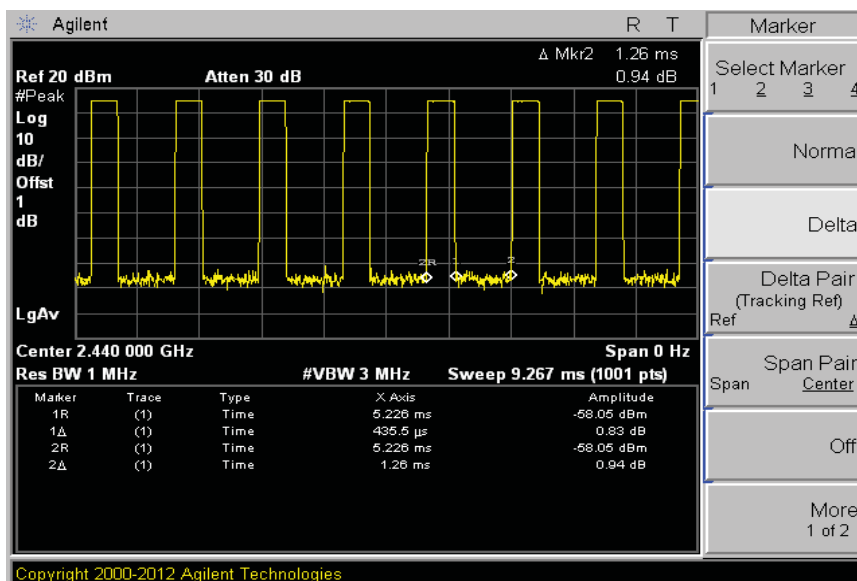
One period for each particular channel : $2.944 \text{ ms} \times 106.81 = 314.45 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
38	316.16	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH5 data rate operates on a five-slot transmission and one-slot receiving basis. Thus there are $1600/(5+1)=266.7$ transmissions per second. In one period for each particular channel there are $3.38 \times 31.6 = 106.81$ times of transmissions.

Trace data Left

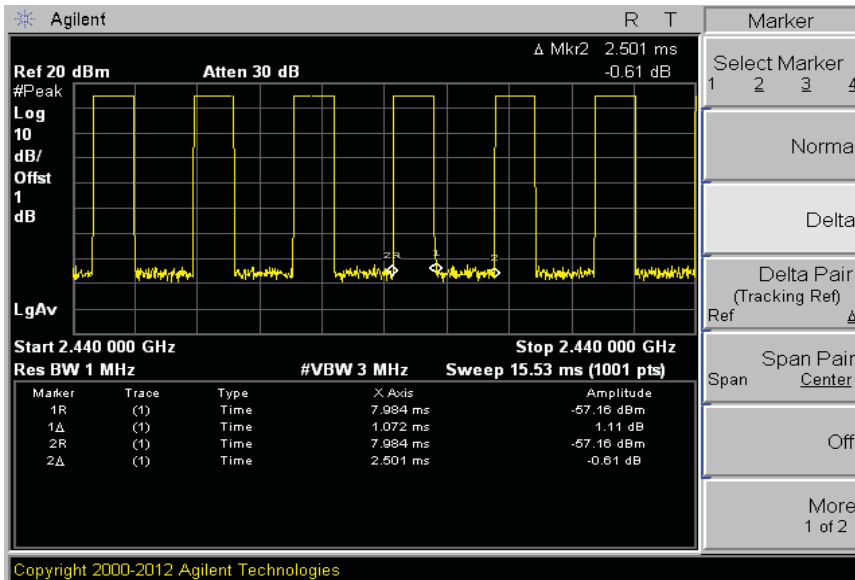
DH1



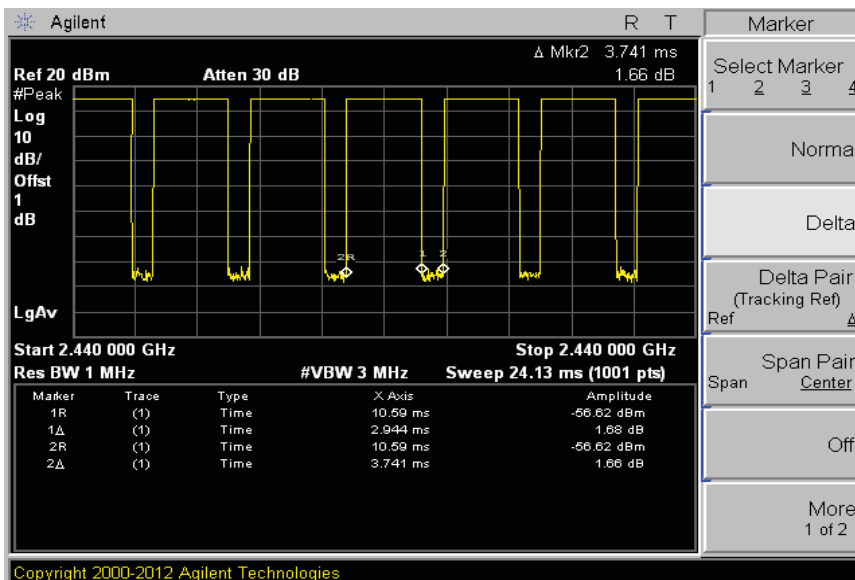


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DH3



DH5



Right_8DPSK

A. 3DH1 Mode

One period for each particular channel : $0.429 \text{ ms} \times 320.1 = 137.42 \text{ ms}$

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	136.59	400	PASS

B. 3DH3 Mode

One period for each particular channel : $1.697 \text{ ms} \times 159.9 = 271.35 \text{ ms}$

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	274.07	400	PASS

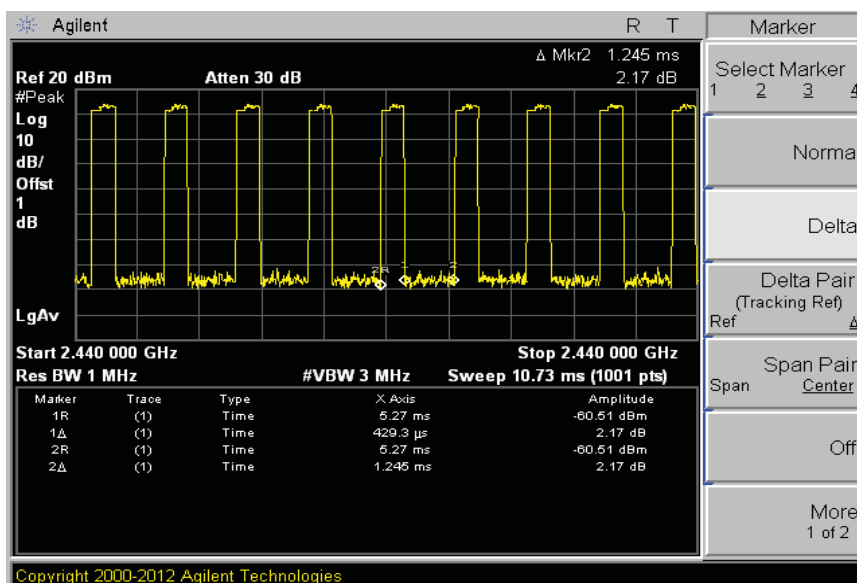
B. 3DH5 Mode

One period for each particular channel : $2.935 \text{ ms} \times 106.81 = 313.49 \text{ ms}$

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	317.01	400	PASS

Trace data

3DH1

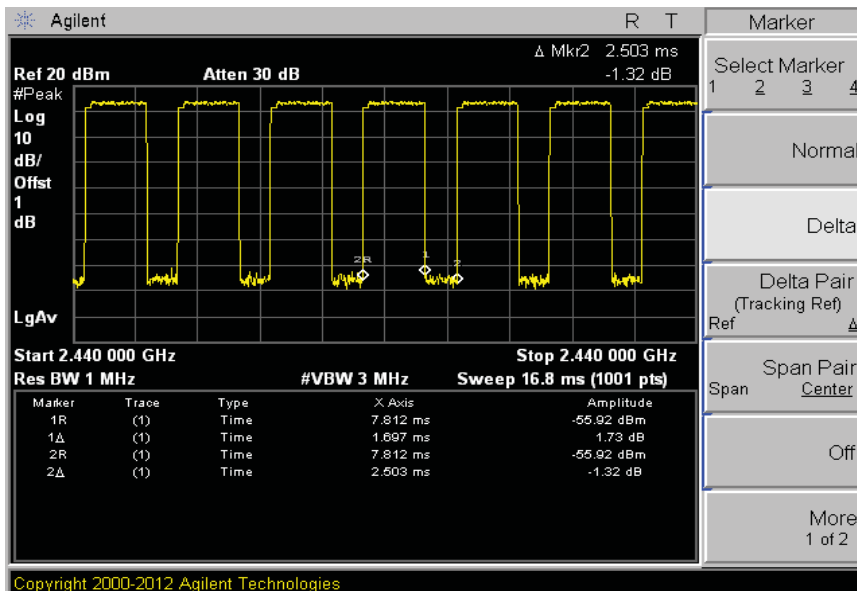




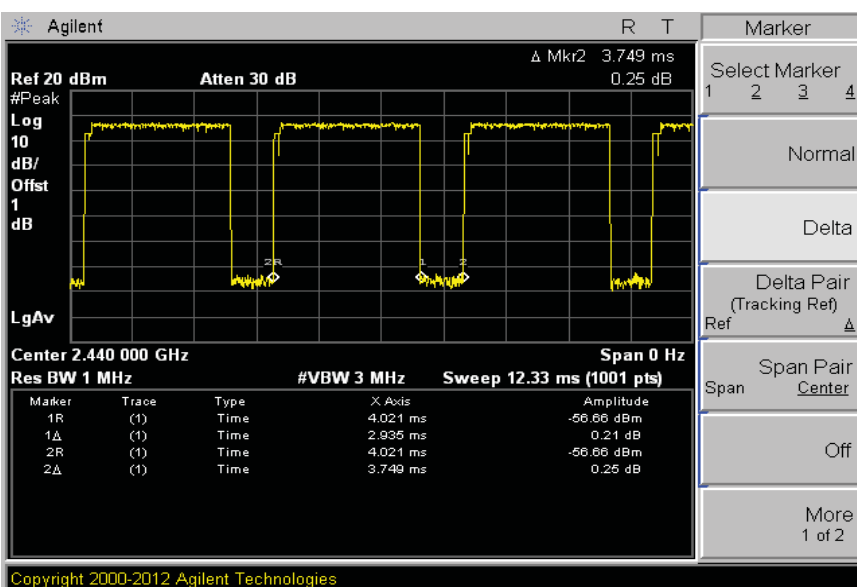
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8DPSK

3DH3



3DH5



9. band-edge and out of band emissions.

9.1 Test procedure

The radio frequency power at 20dB down from the highest inband power level is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The band edge&out of band emission shall be at least 20dB below of the highest inband power level.

Limit & RSS-247 section 5.5

9.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100 KHz
- . VBW= >100 KHz
- . Span= suitable frequency span
- . Sweep= suitable duration based on the EUT specification.

Band Edge&Out of Emission Test Instruments

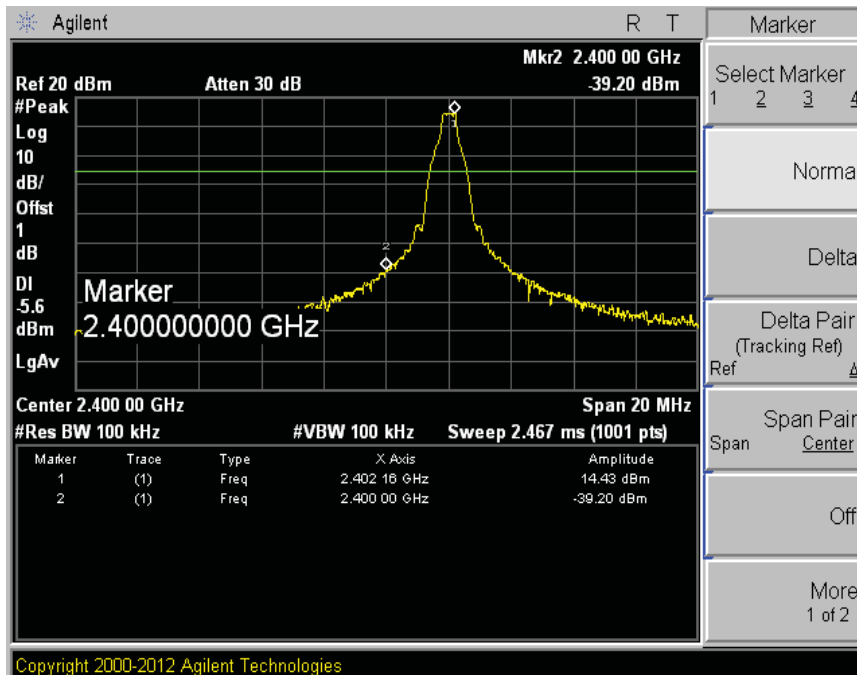
Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US42041291	2022-11-29
Spectrum Analyzer	FSV40	100939	2022-12-02
-Spectrum Analyzer <=> EUT	Loss: 1 dB		

9.3 Measurement results of band-edge & out of emission

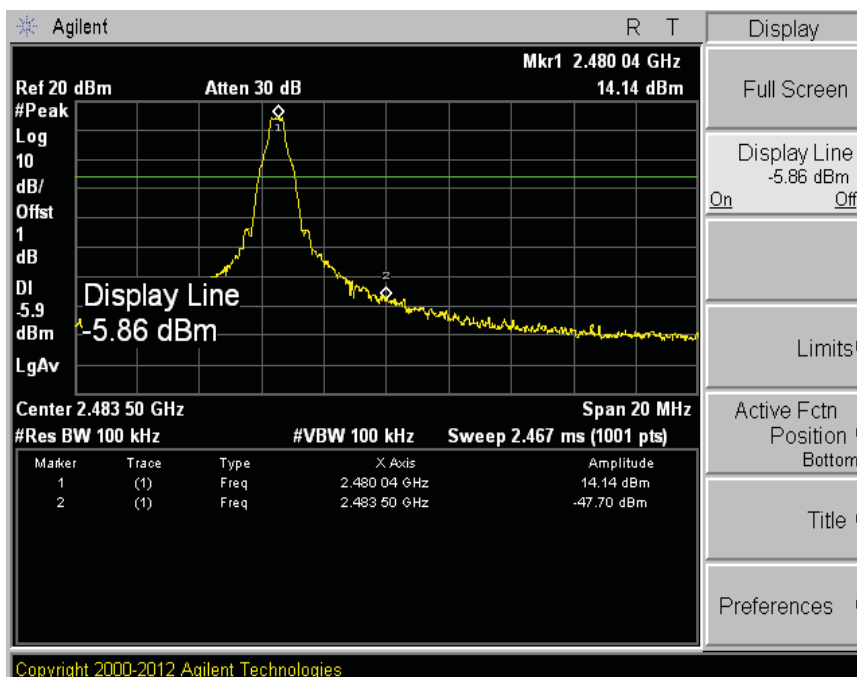
EUT	LG TONE FREE	MODEL	TONE-TF8Q
MODE	GFSK,8DPSK	ENVIRONMENTAL CONDITION	23 °C, 42 % R.H.
INPUT POWER	DC 3.7 V		

* Refer to attach spectrum analyzer data chart.

9.4 Trace data of band-edge & Out of Emission CH0 Left (GFSK)



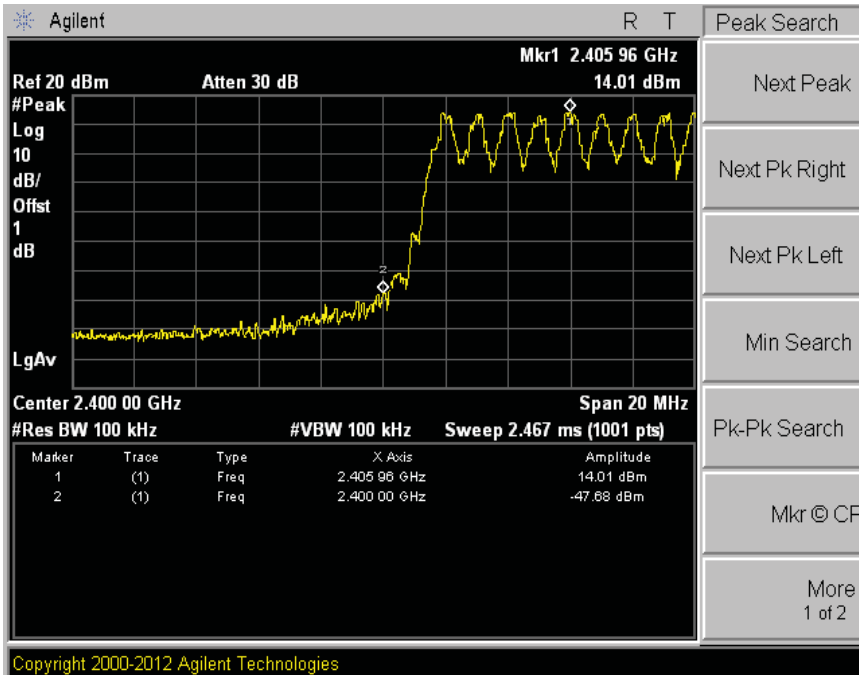
CH78



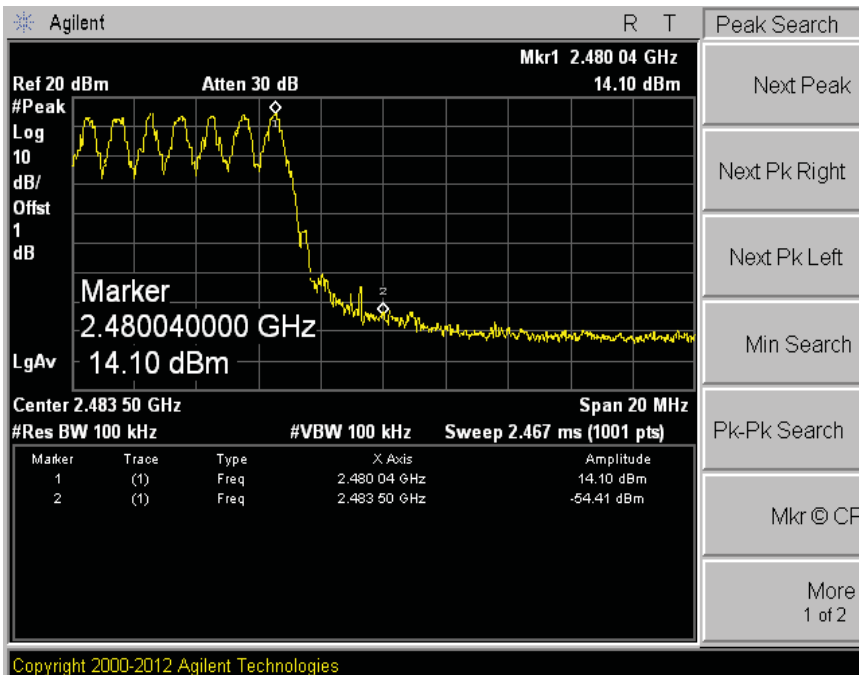


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CH0



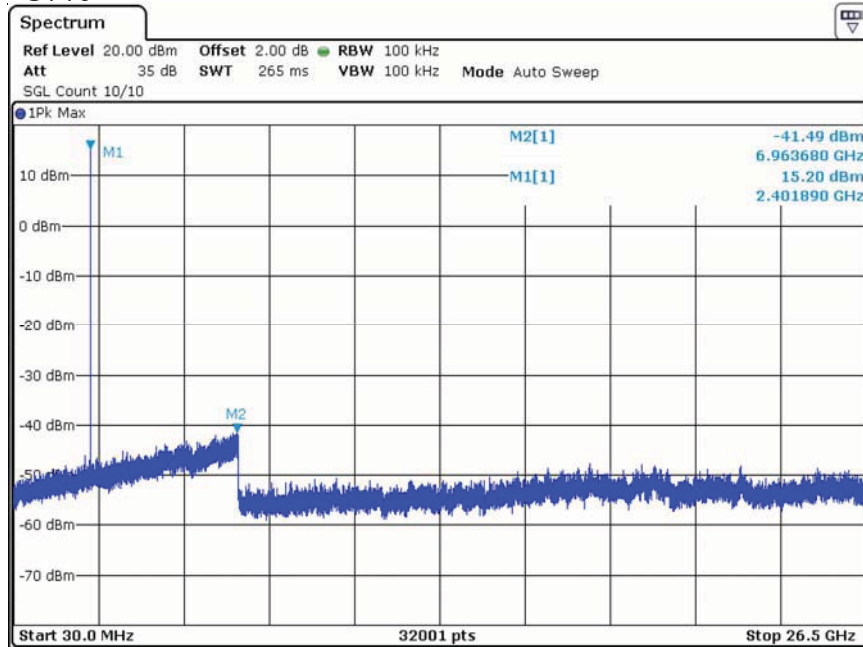
CH78



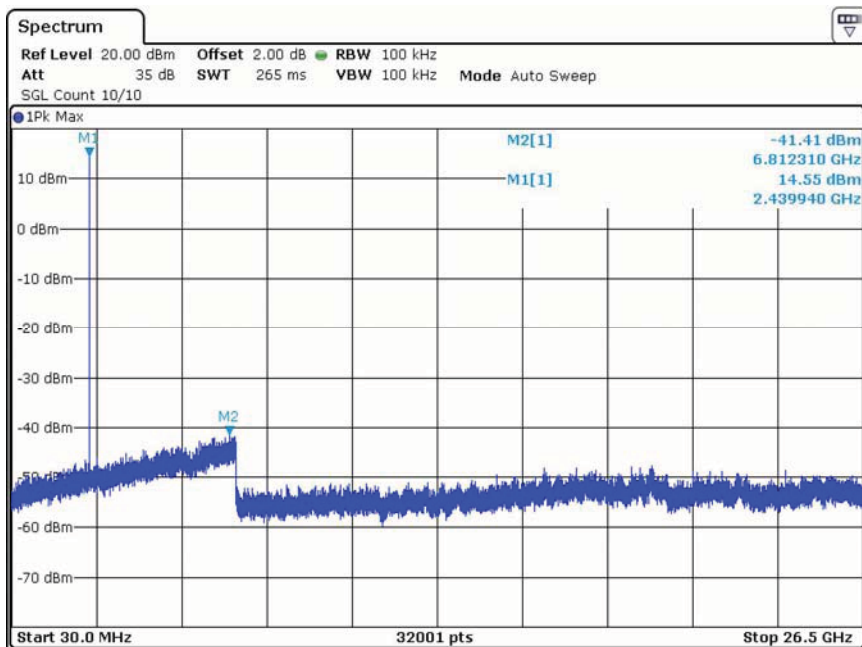


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CH0



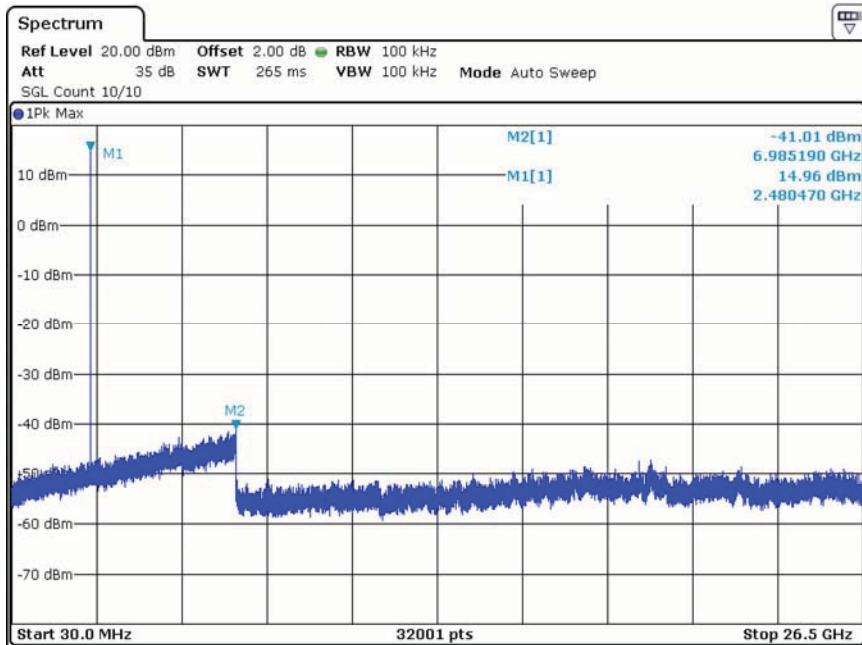
CH38





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CH78

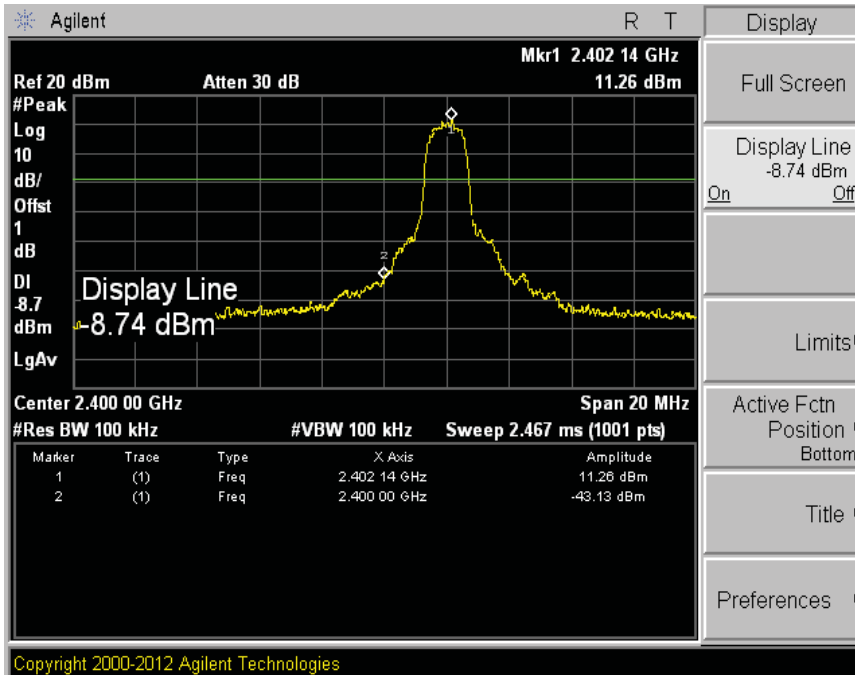




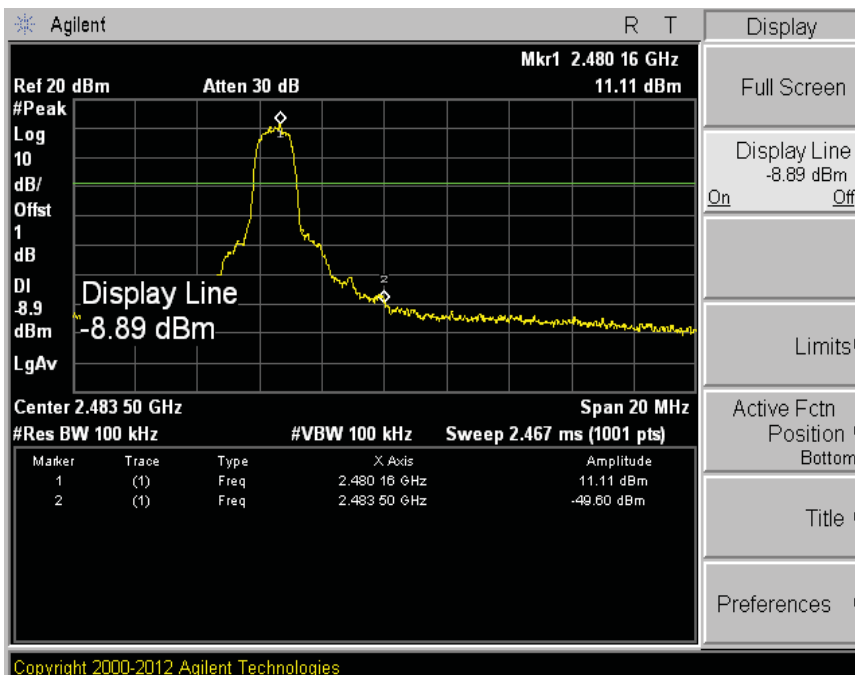
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Left_8DPSK

CH 0



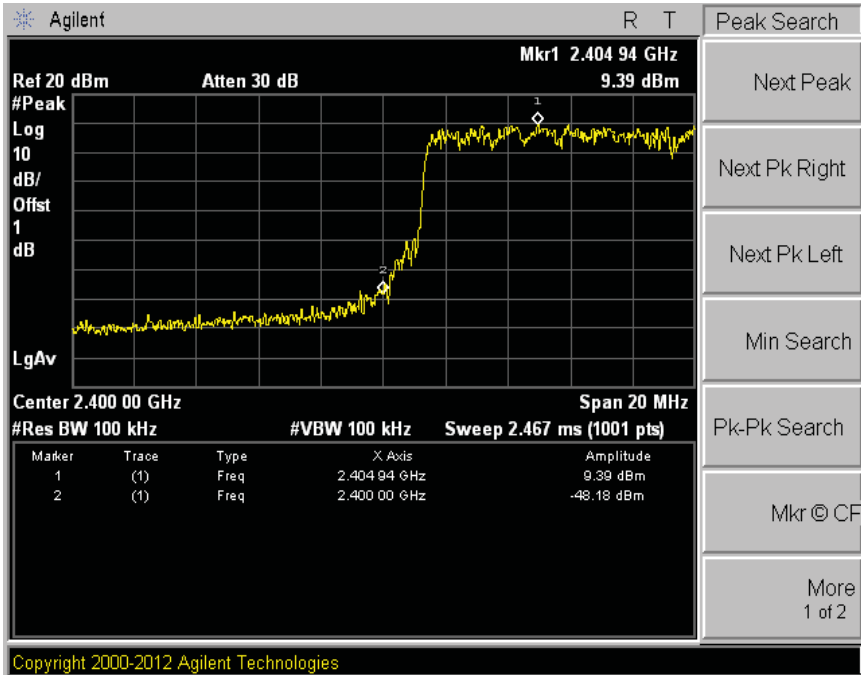
CH78



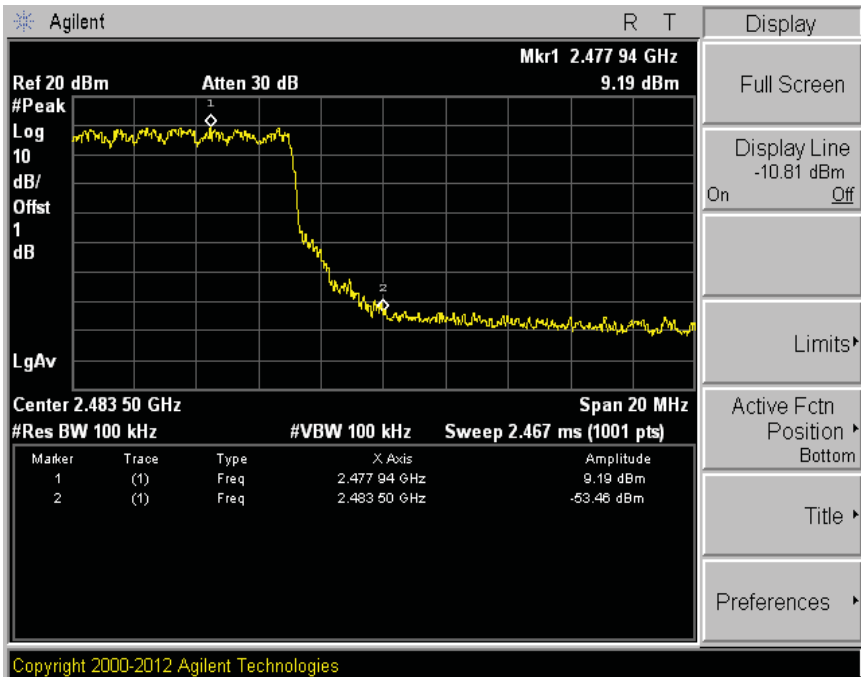


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CH 0



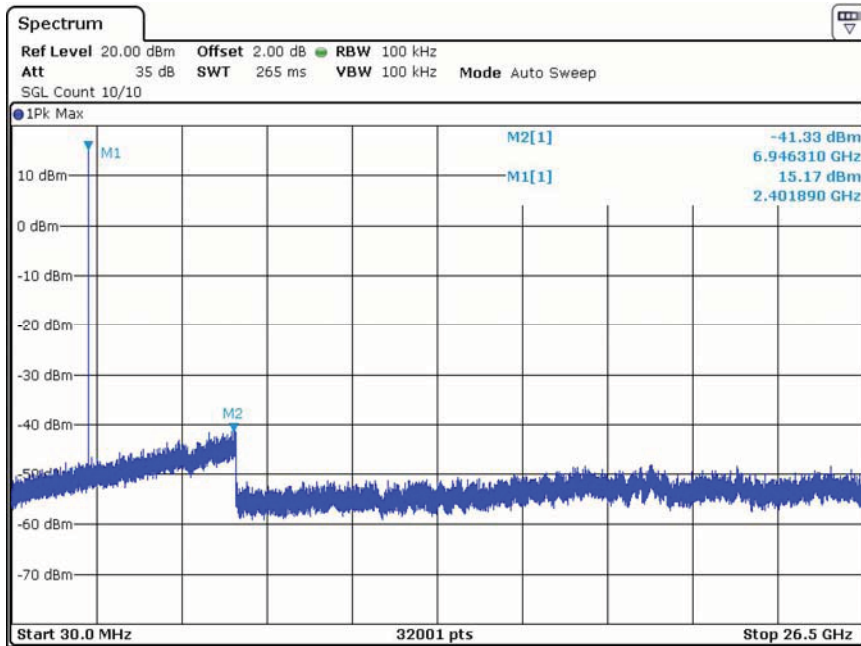
CH78



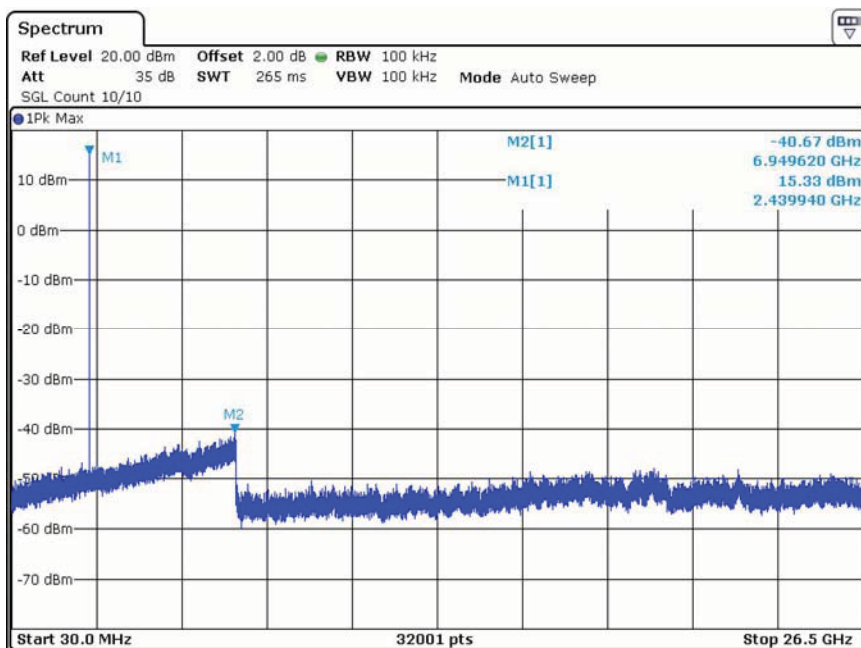


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CH 0



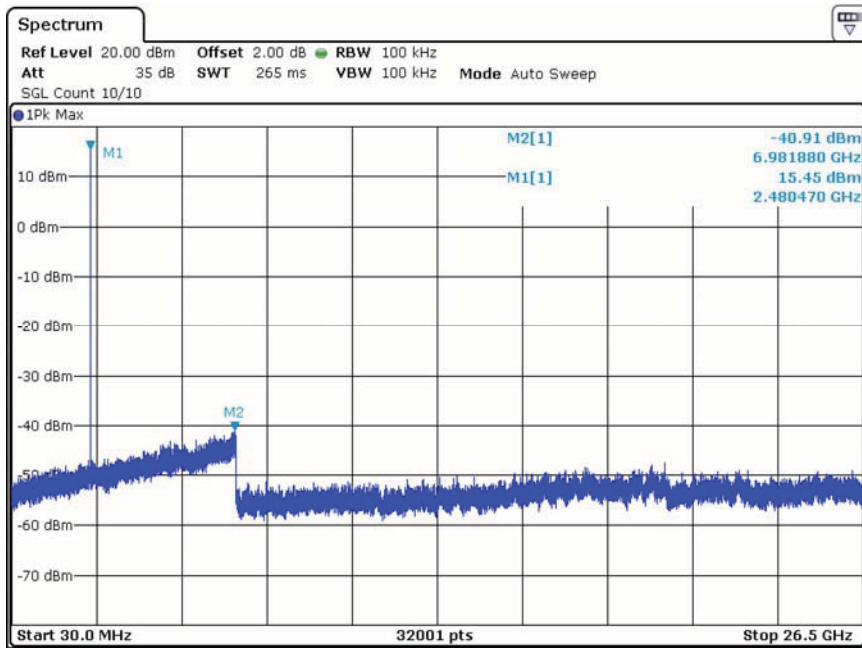
CH38





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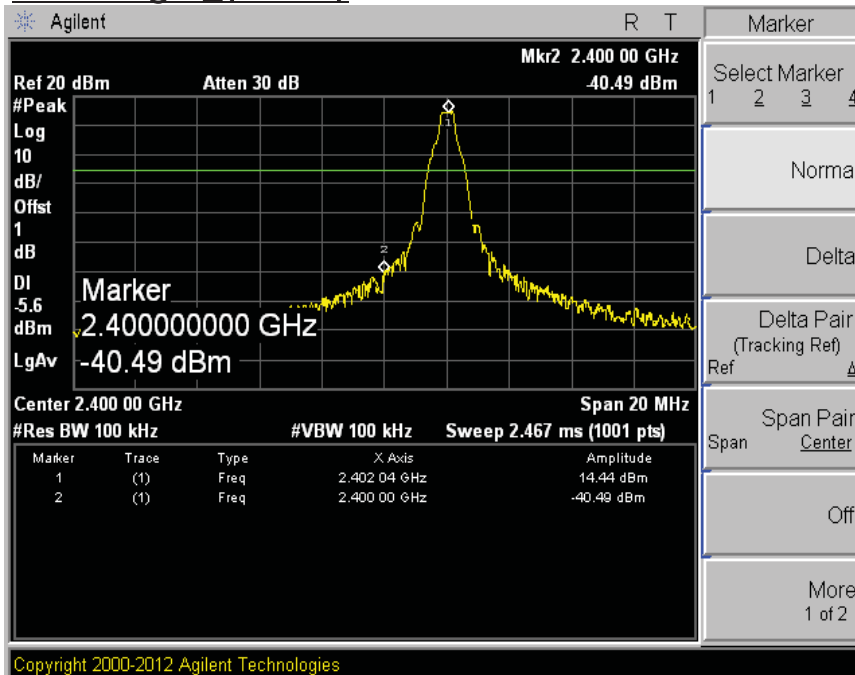
CH78



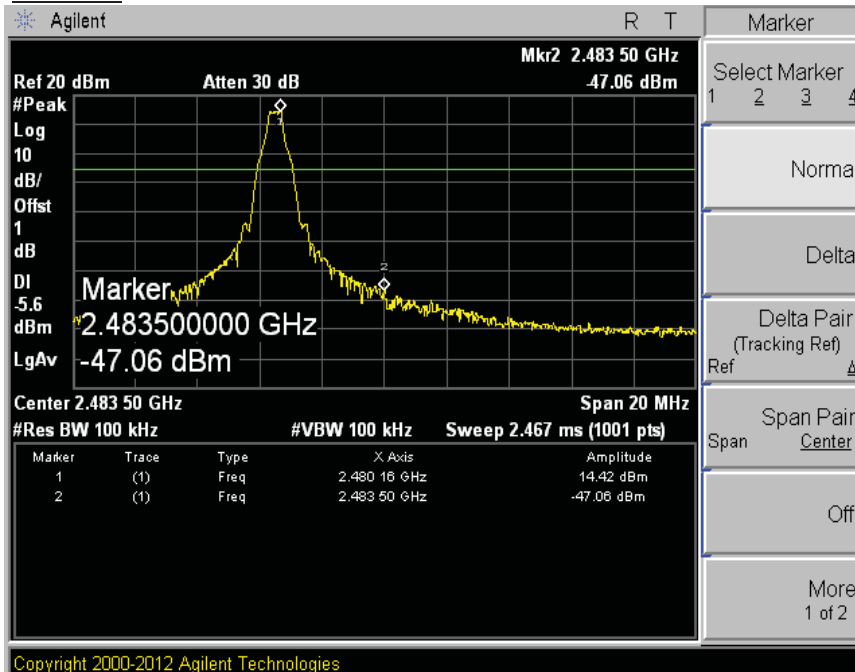


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CH0 Right (GFSK)



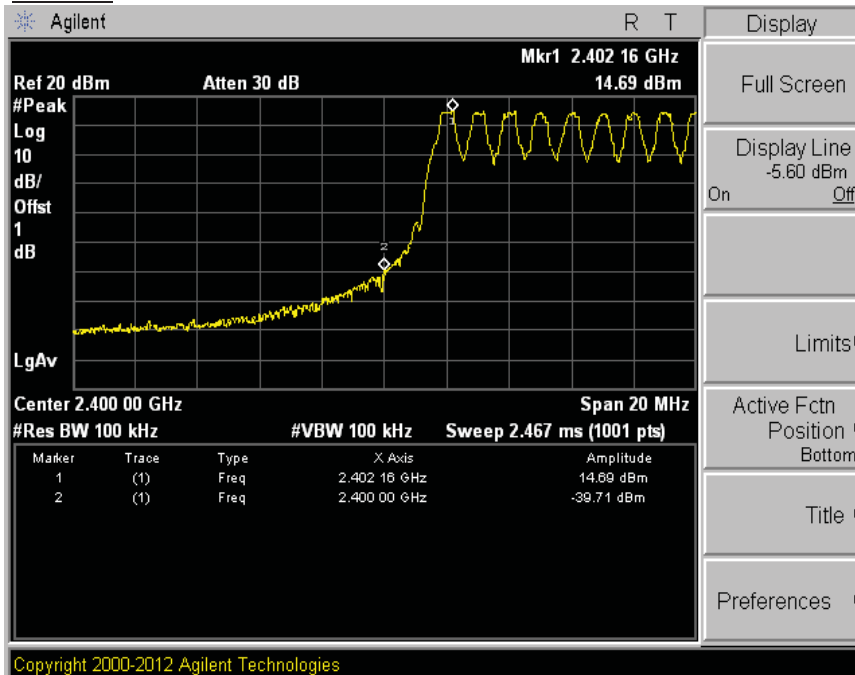
CH78



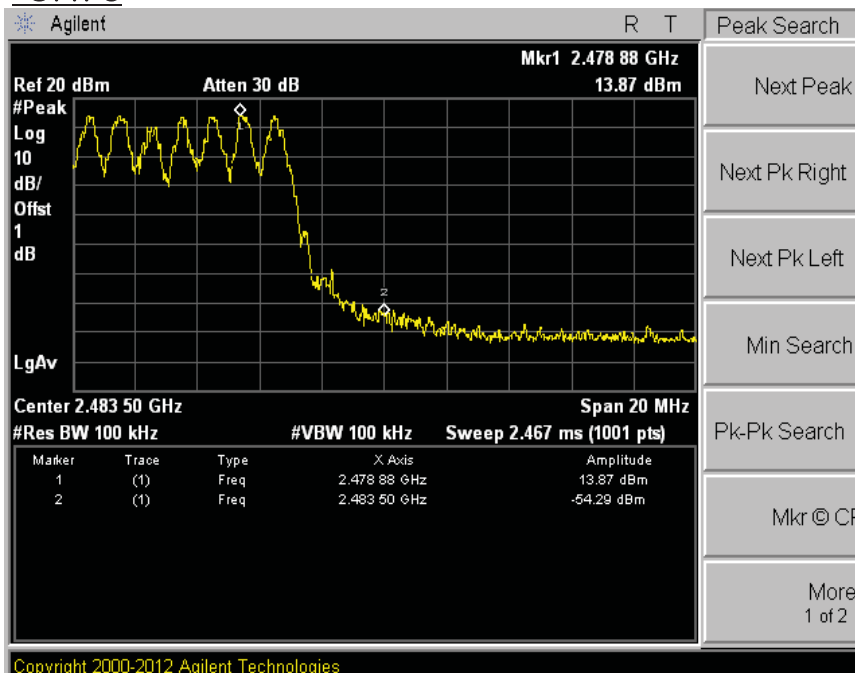


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CH0



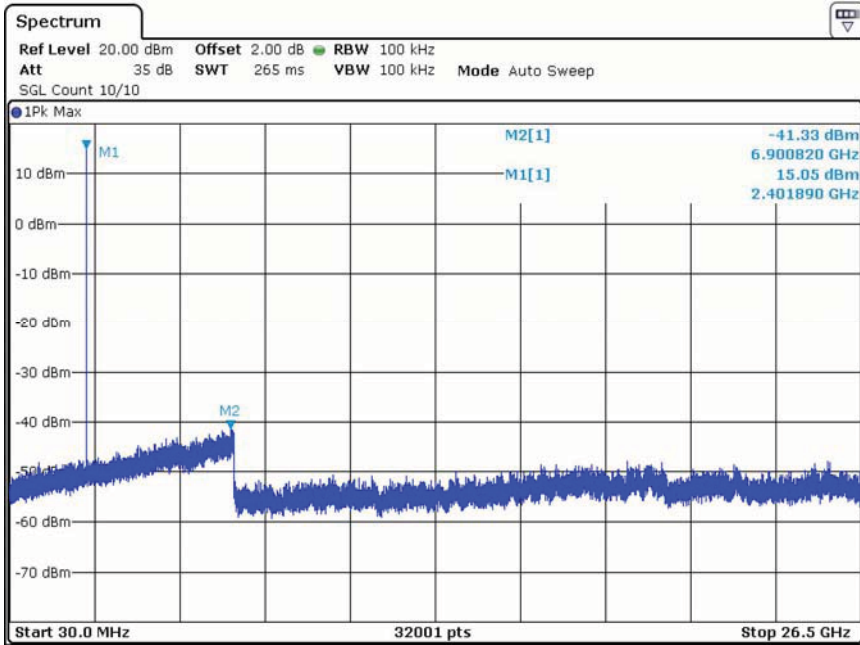
CH78



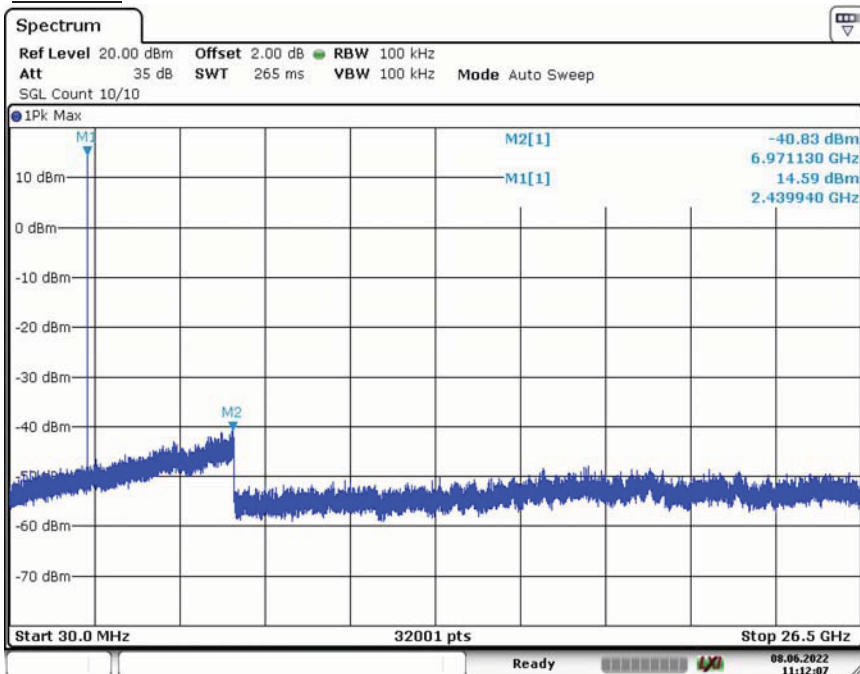


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CH0



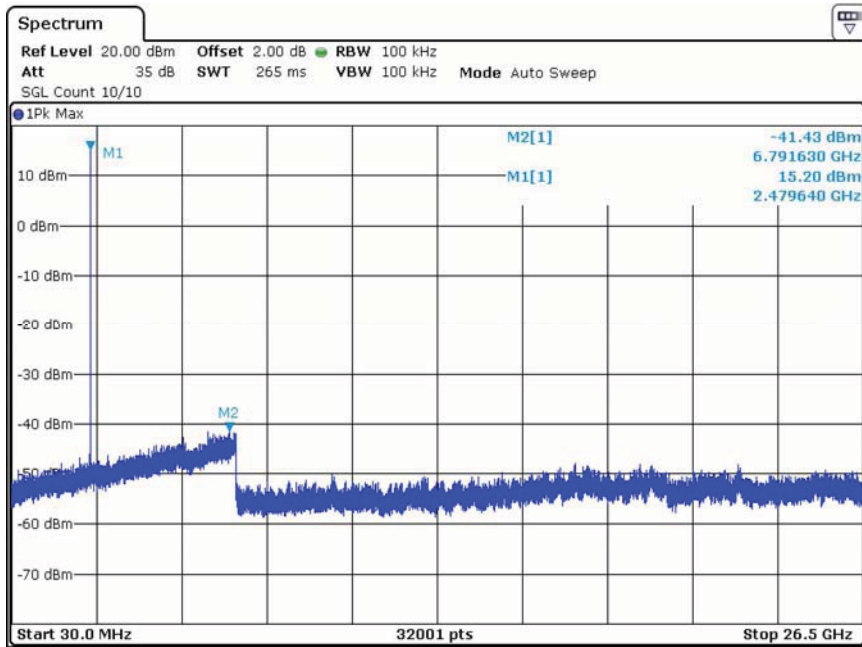
CH38





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CH78

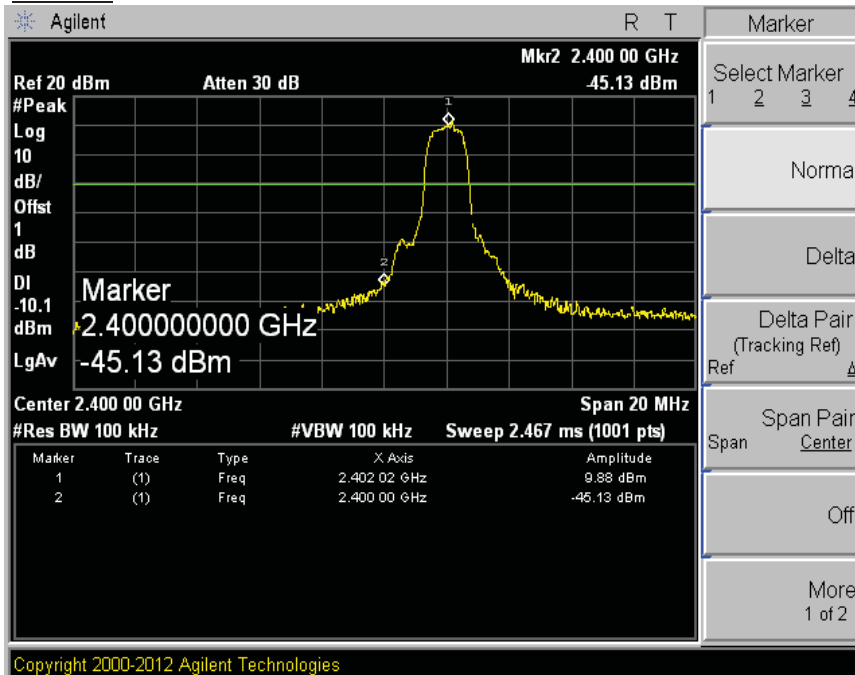




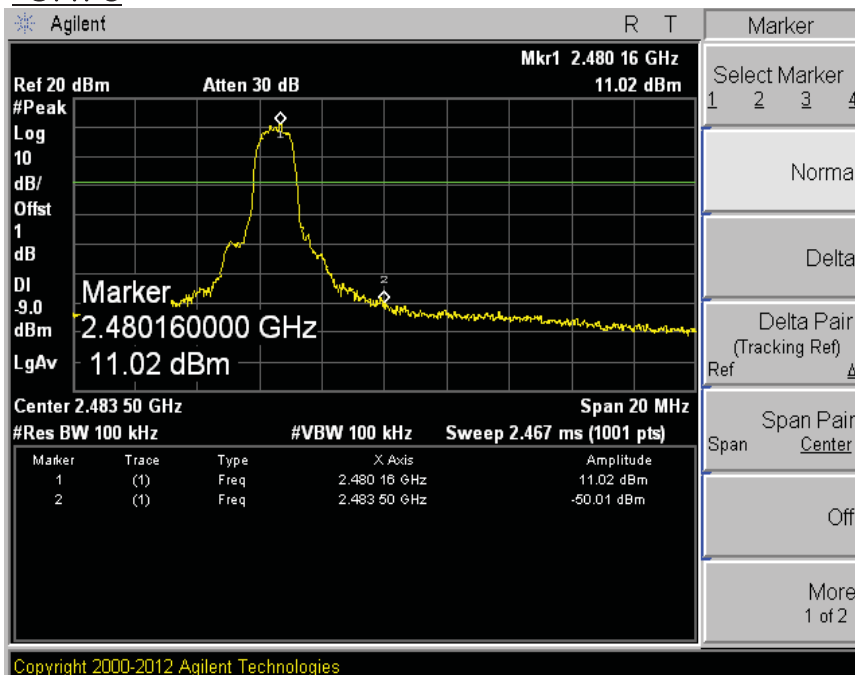
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Right_8DPSK

CH 0



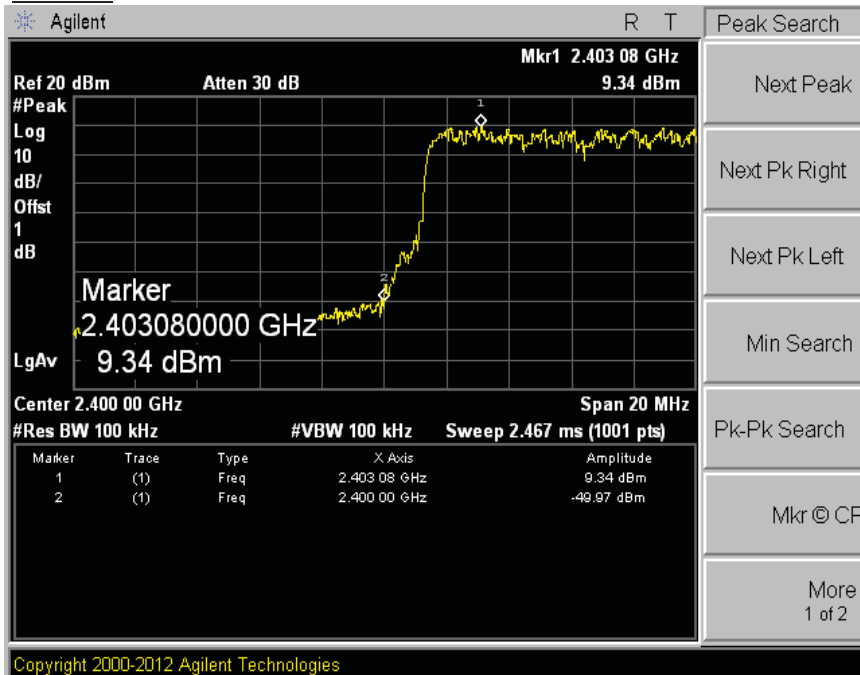
CH78



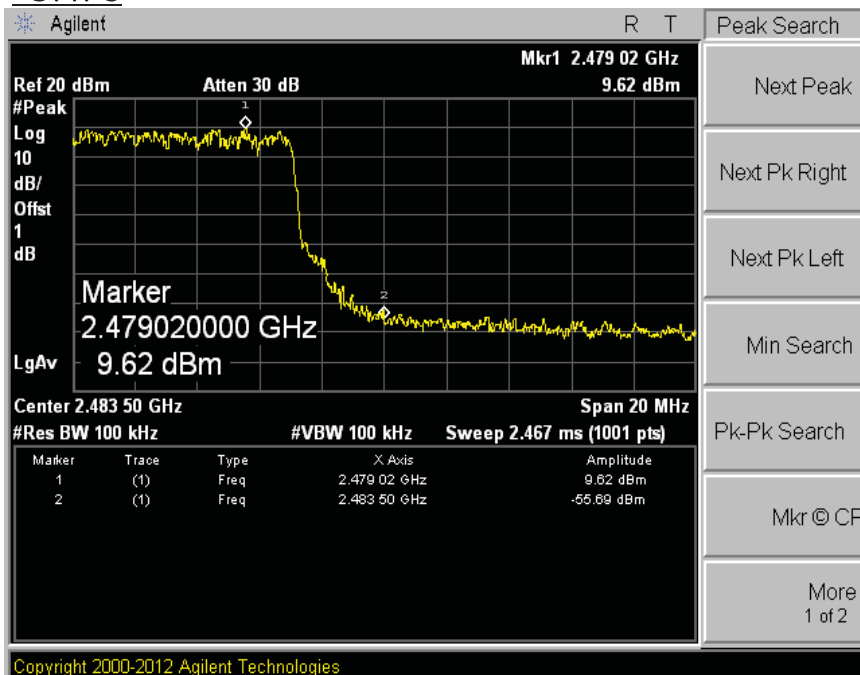


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CH 0



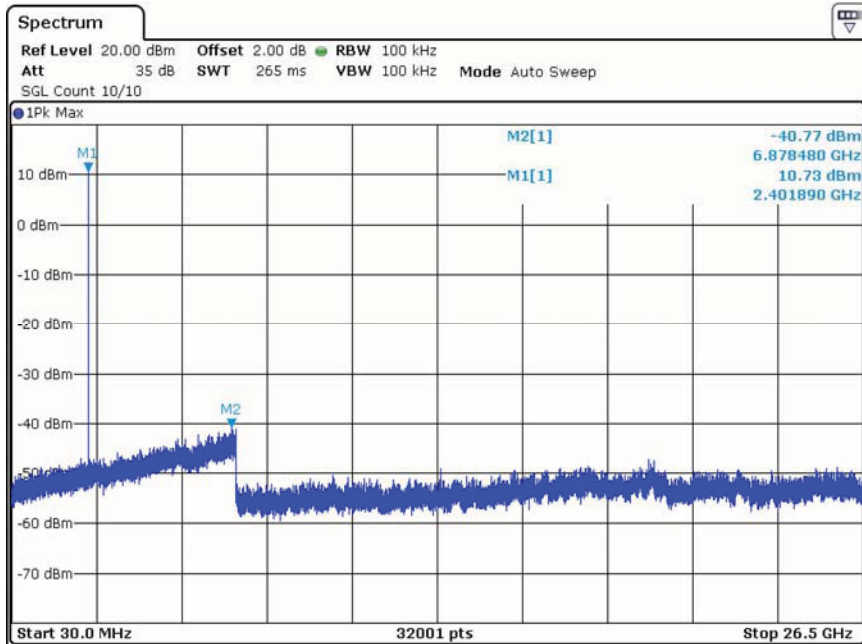
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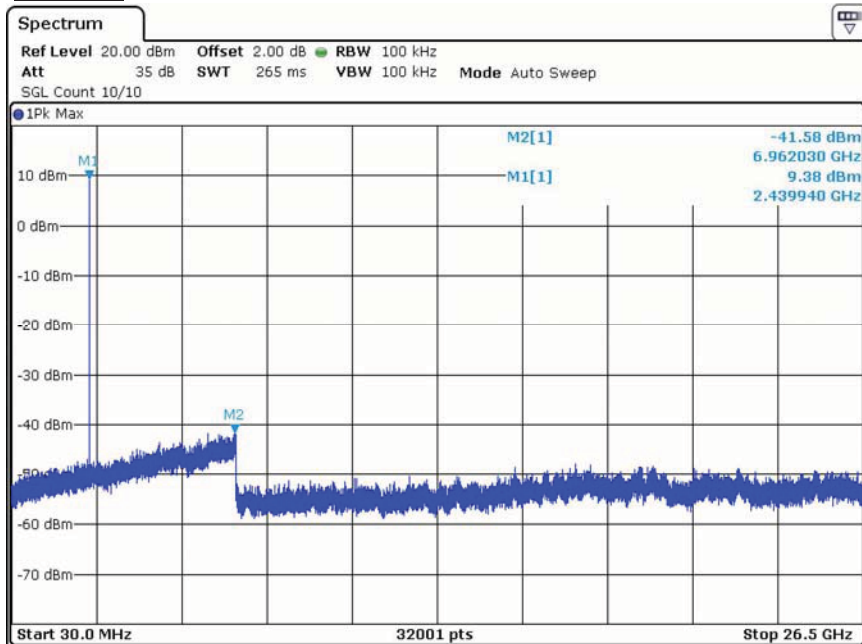


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CH 0



CH38





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CH78

