



Product Service

FCC- TEST REPORT

Report Number : **68.720.12.145.01** Date of Issue: 8 November 2012

Model : **BTP02-B, BTP02-W**

Product Type : Bluetooth Speaker

Applicant : Guillemot Corporation S.A.

Address : Place du Granier BP 97143, 35571 Chantepie, FRANCE

Production Facility : Yommo Technology Company Limited

Address : Huaide Villiage, Humen Town, Dongguan City,

: Guangdong Province, China

Test Result : Positive Negative

Total pages including Appendices : 66

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2 Details about the Test Laboratory

Details about the Test Laboratory

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3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product: Bluetooth Speaker

Model no.: BTP02-B

Brand Name: NIL

Options and accessories: NIL

Rating: 3.7VDC (4000mAh battery)
Or by adaptor : GM12-050200
Adaptor Input: 100-240AC, 50/60Hz, 0.5A
Adaptor Output: 5VDC, 2.0A

RF Transmission Frequency: 2402-2480MHz

Antenna Gain: 2.4dBi

Description of the EUT: NIL

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
MP4 Player	Apple	iPod touch	---



Product Service

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C, 10-1-2011 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Result			Test Location
		Pass	Fail	N/A	
15.207 Conducted Emission AC Power Port	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247 (b) (1) Conducted peak output power	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(d) Band edge compliance of RF emissions	14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(d) Spurious RF conducted emissions	24	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(d) 15.209 Spurious radiated emissions	37	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(a)(1) 20dB bandwidth	41	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(a)(1) Carrier frequency separation	49	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(a)(1)(iii) Number of hopping frequencies	52	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2
15.247(a)(1)(iii) Dwell Time	55	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location 2

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: NAM5061301 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

The only difference between BTP02-B and BTP02-W is their model name and outlook colour, so the full RF tests were applied on BTP02-B, the other model is deemed to fulfill relevant requirement without further testing.

All the configurations of the product were tested and only the worst test results are listed in the report.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 12 September 2012

Testing Start Date: 14 September 2012

Testing End Date: 30 October 2012

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

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Assistant EMC Manager

Prepared by:



Phoebe Hu
EMC Project Manager

Tested by:



Leo Li
EMC Test Engineer

7 Technical Requirement

7.1 Conducted Emission

Test Method

- 1 The EUT was placed on a table, which is 0.8m above ground plane
- 2 The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3 Maximum procedure was performed to ensure EUT compliance
- 4 A EMI test receiver is used to test the emissions from both sides of AC line

Limit

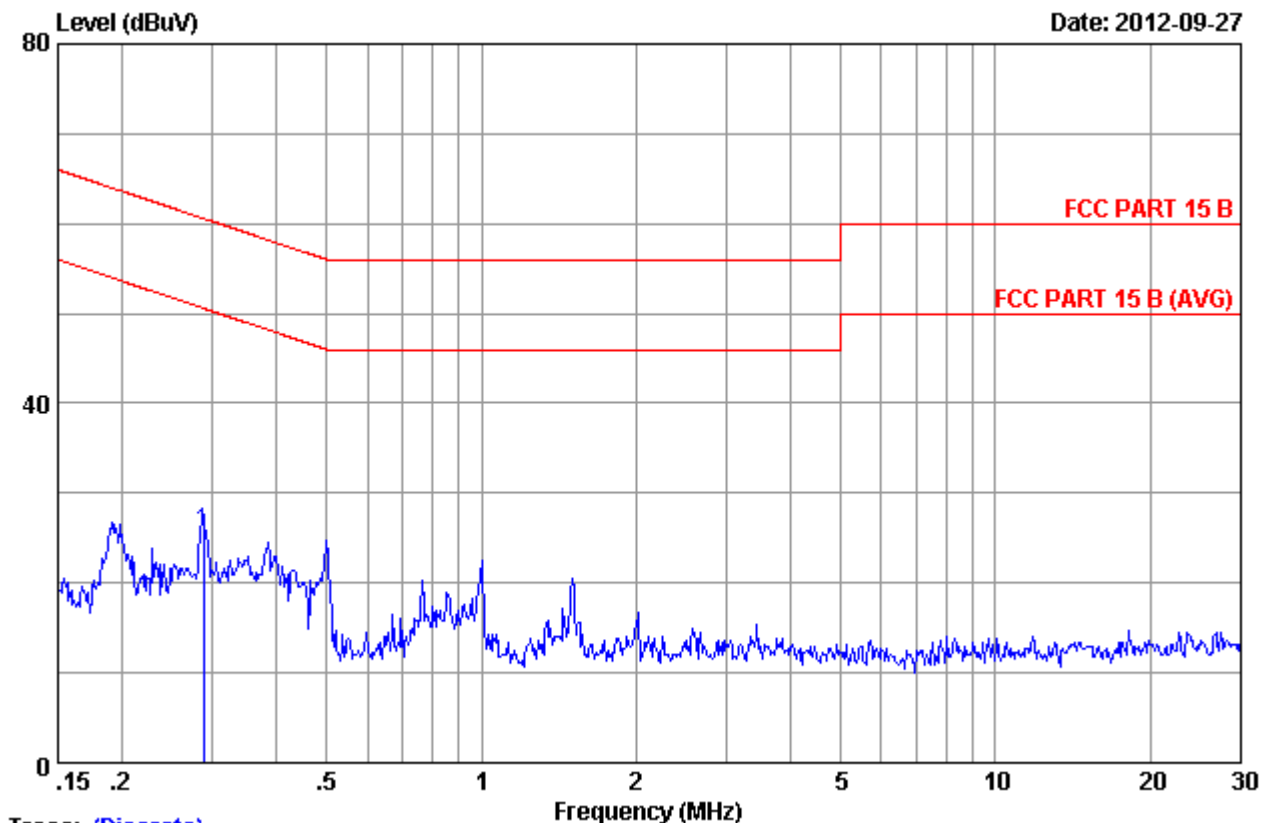
Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

Remark: This test was carried out in all the test modes, here only the worst test result was shown.

Conducted Emission

Product Type : Bluetooth Speaker
 M/N : BTP02-B
 Operating Condition : Charging and transmitting
 Test Specification : Power Line, Live
 Comment : AC 120V/60Hz



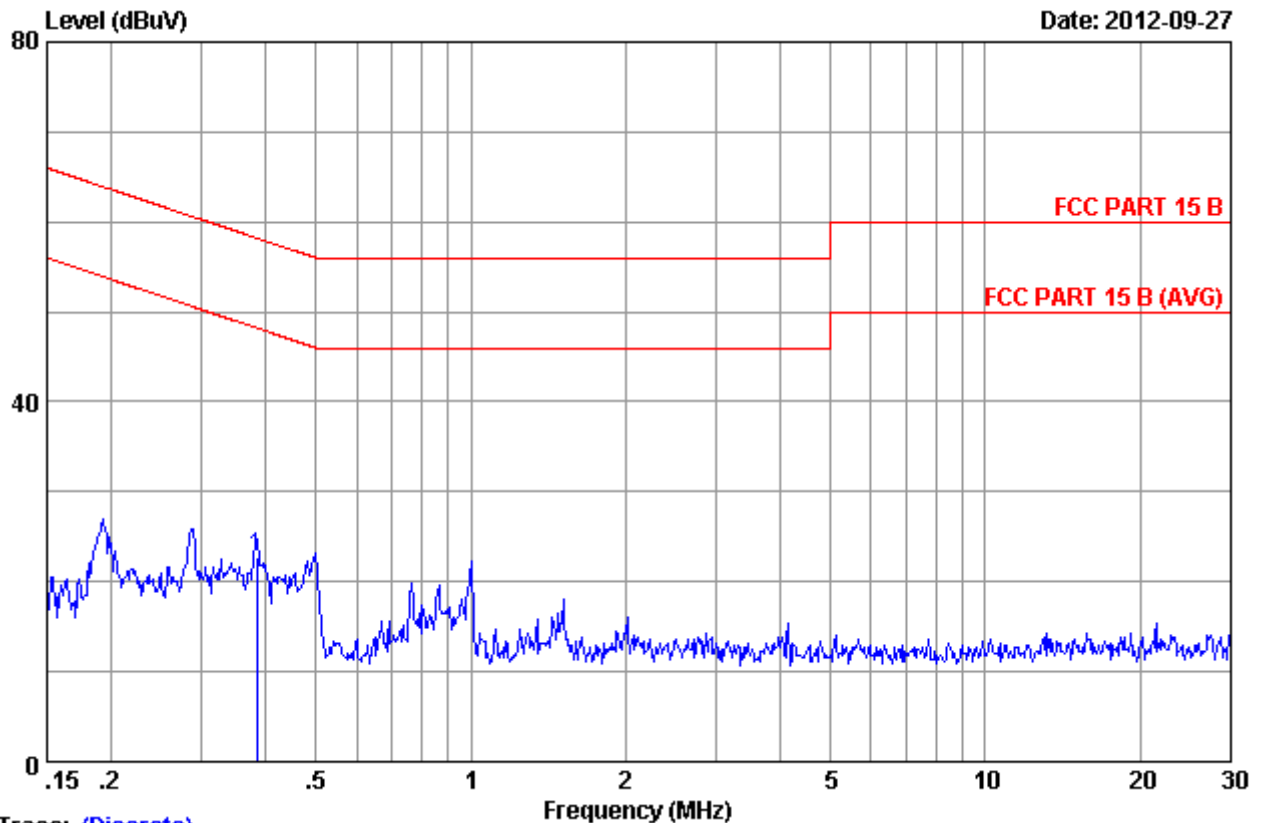
Trace: (Discrete)

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.28782	0.15	9.95	15.53	25.63	60.59	34.96	Peak

Remarks: 1. Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Conducted Emission

Product Type : Bluetooth Speaker
 M/N : BTP02-B
 Operating Condition : Charging and transmitting
 Test Specification : Power Line, Neutral
 Comment : AC 120V/60Hz



Trace: (Discrete)

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.38315	0.15	9.95	12.66	22.76	58.21	35.45	Peak

Remarks: 1. Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 13
Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 13
Amplifier	HP	8447D	2648A04738	May.08, 13
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 12
RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 13
Coaxial Switch	Anritsu	MP59B	M73989	May.08, 13

7.2 Conducted peak output power

Test Method

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an Power meter
3. Add a correction factor to the display.

Limits for conducted peak output power measurements

Frequency Range MHz	Limit W	Limit dBm
2400-2483	≤1	≤30

Conducted peak output power

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	4.05	Pass
Middle channel 2441MHz	4.33	Pass
High channel 2480MHz	4.30	Pass

Bluetooth Mode $\pi/4$ -DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	3.22	Pass
Middle channel 2441MHz	3.41	Pass
High channel 2480MHz	3.11	Pass

Bluetooth Mode 8-DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	3.47	Pass
Middle channel 2441MHz	3.76	Pass
High channel 2480MHz	3.52	Pass



Product Service

Test Equipment

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013

7.3 Band edge compliance of RF emissions

Test Method

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBW to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100kHz, to measure the conducted peak band edge.

Limits

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Frequency MHz	Limit Average dBuV/m	Limit Peak dBuV/m
Below 2390 Above 2483.5	54	74

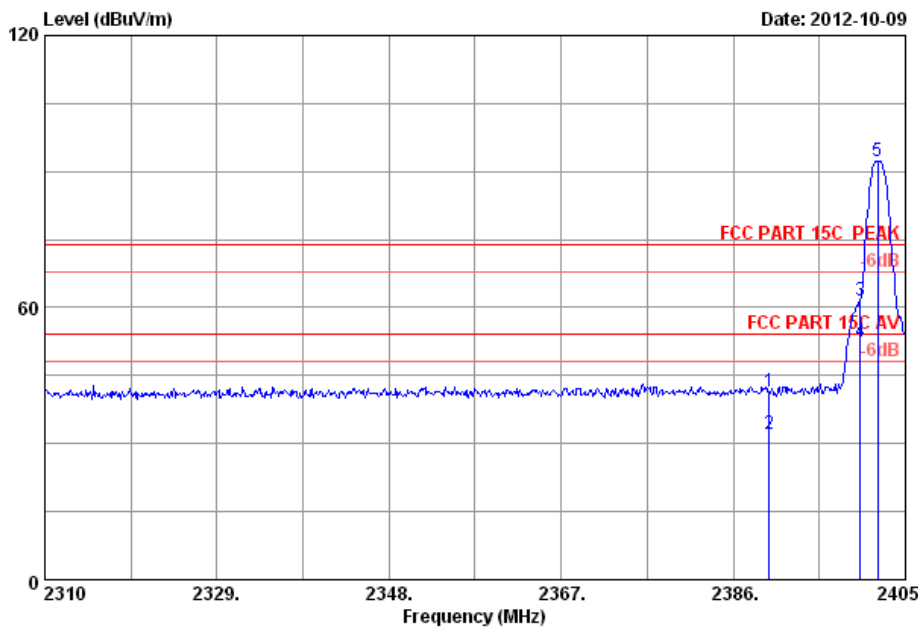
Band edge compliance of RF emissions

The EUTs have been tested under all modulation modes, only the worst case GFSK and 8-DPSK modulation test result are listed in the report.

Bluetooth Mode GFSK Modulation Test Result:

Lower edge peak Plot:

Vertical:



Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23*C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : GFSK 2402MHz Tx
 M/N : WAE-BTPO2

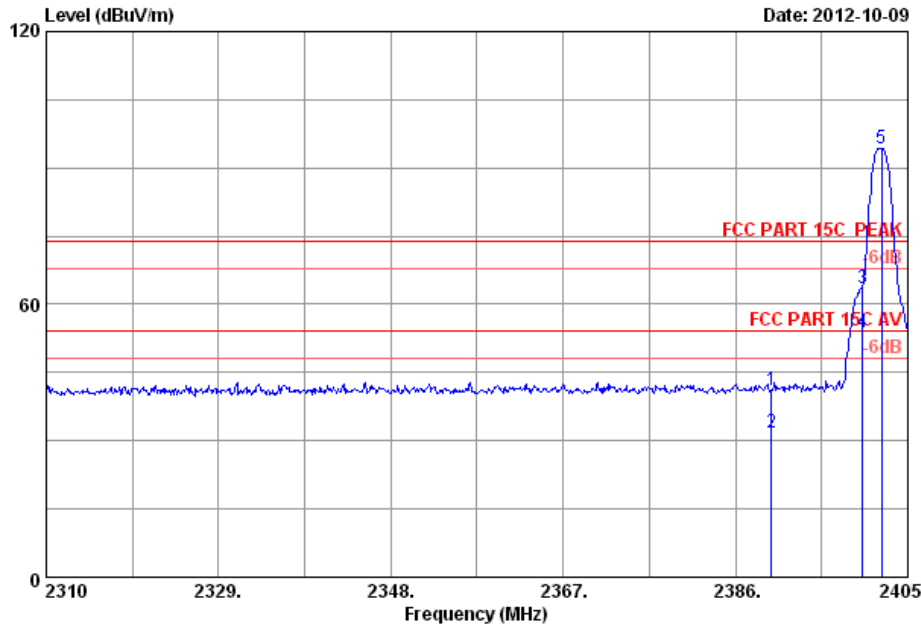
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	44.60	41.38	74.00	32.62	Peak
2	2390.000	26.70	6.00	35.92	35.37	32.15	54.00	21.85	Average
3	2400.000	26.76	6.02	35.92	64.80	61.66	74.00	12.34	Peak
4	2400.000	26.76	6.02	35.92	55.57	52.43	54.00	1.57	Average
5	2401.960	26.77	6.02	35.92	95.36	92.23	74.00	-18.23	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Lower edge peak Plot:
Horizontal:



Site no. : 3m Chamber Data no. : 3
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : GFSK 2402MHz Tx
 M/N : WAE-BTPO2

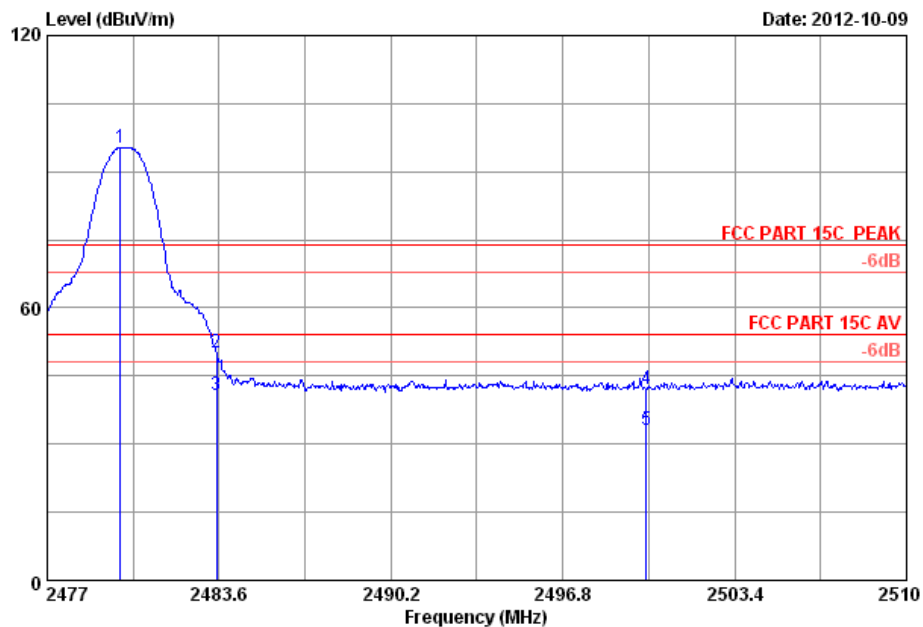
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	44.24	41.02	74.00	32.98	Peak
2	2390.000	26.70	6.00	35.92	35.01	31.79	54.00	22.21	Average
3	2400.000	26.76	6.02	35.92	66.65	63.51	74.00	10.49	Peak
4	2400.000	26.76	6.02	35.92	57.02	53.88	54.00	0.12	Average
5	2402.150	26.77	6.02	35.92	97.50	94.37	74.00	-20.37	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Upper edge peak Plot:
Vertical:



Site no. : 3m Chamber Data no. : 11
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : GFSK 2480MHz Tx
 M/N : WAE-BTPO2

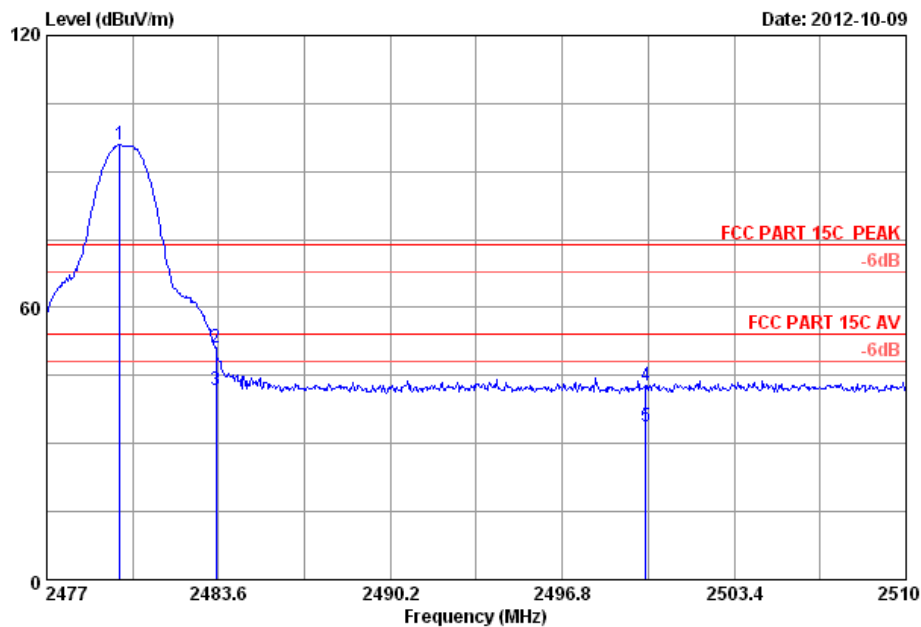
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.805	27.27	6.15	35.92	97.78	95.28	74.00	-21.28	Peak
2	2483.500	27.29	6.16	35.92	52.55	50.08	74.00	23.92	Peak
3	2483.500	27.29	6.16	35.92	43.32	40.85	54.00	13.15	Average
4	2500.000	27.40	6.19	35.93	44.60	42.26	74.00	31.74	Peak
5	2500.000	27.40	6.19	35.93	35.37	33.03	54.00	20.97	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Upper edge peak Plot:
Horizontal:



Site no. : 3m Chamber
 Dis. / Ant. : 3m 2012 3115 (4580)
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54%
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : GFSK 2480MHz Tx
 M/N : WAE-BTPO2

Data no. : 12
 Ant. pol. : HORIZONTAL
 Engineer : Leo-Li

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.805	27.27	6.15	35.92	98.30	95.80	74.00	-21.80	Peak
2	2483.500	27.29	6.16	35.92	53.45	50.98	74.00	23.02	Peak
3	2483.500	27.29	6.16	35.92	44.22	41.75	54.00	12.25	Average
4	2500.000	27.40	6.19	35.93	45.27	42.93	74.00	31.07	Peak
5	2500.000	27.40	6.19	35.93	36.04	33.70	54.00	20.30	Average

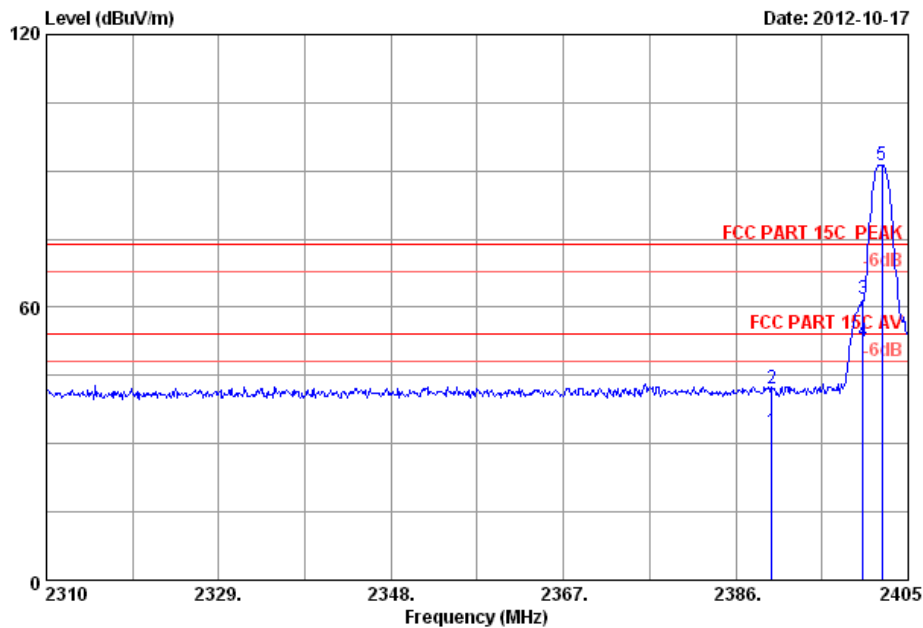
Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Bluetooth Mode 8-DPSK Modulation Test Result:

Lower edge peak Plot:
Vertical:



Site no. : 3m Chamber Data no. : 30
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : 8-DPSK 2402MHz Tx
 M/N : WAE-BTPO2

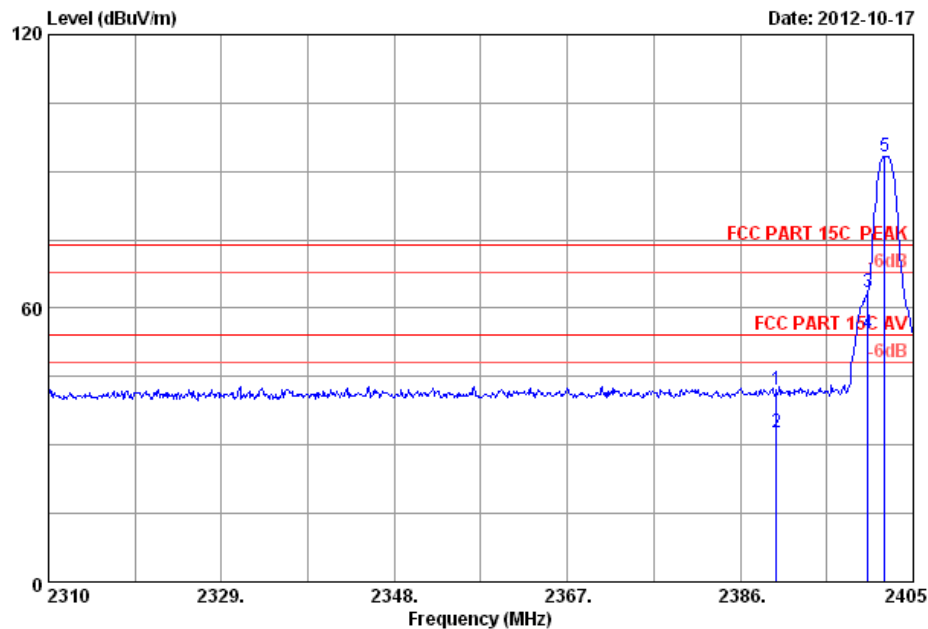
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	35.98	32.76	74.00	41.24	Peak
2	2390.000	26.70	6.00	35.92	45.21	41.99	74.00	32.01	Peak
3	2400.000	26.76	6.02	35.92	64.90	61.76	74.00	12.24	Peak
4	2400.000	26.76	6.02	35.92	55.68	52.54	54.00	1.46	Average
5	2402.150	26.77	6.02	35.92	94.35	91.22	74.00	-17.22	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Lower edge peak Plot:
Horizontal:



Site no. : 3m Chamber Data no. : 29
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : 8-DPSK 2402MHz Tx
 M/N : WAE-BTPO2

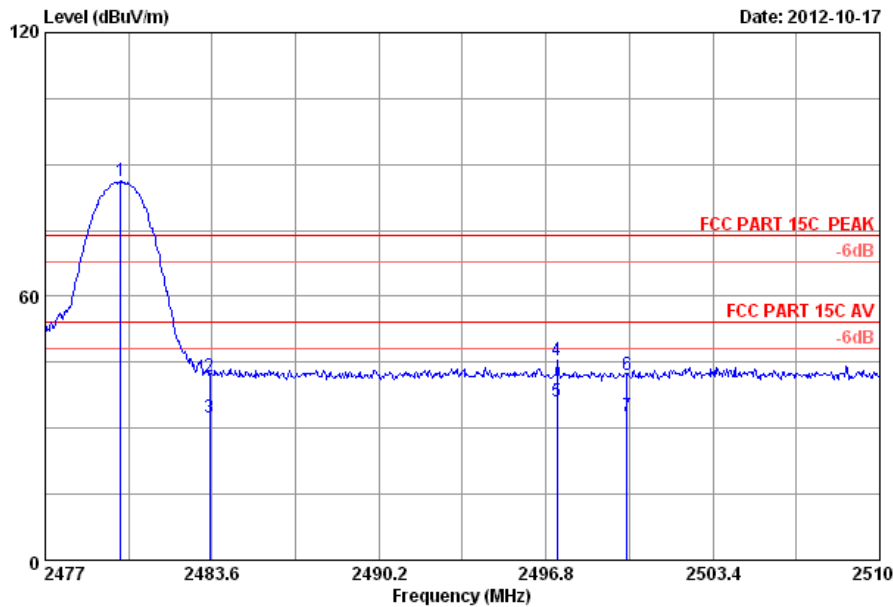
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	45.17	41.95	74.00	32.05	Peak
2	2390.000	26.70	6.00	35.92	35.94	32.72	54.00	21.28	Average
3	2400.000	26.76	6.02	35.92	66.71	63.57	74.00	10.43	Peak
4	2400.000	26.76	6.02	35.92	57.48	54.34	54.00	-0.34	Average
5	2401.865	26.77	6.02	35.92	96.48	93.35	74.00	-19.35	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Upper edge peak Plot:
Vertical:



Site no. : 3m Chamber
 Dis. / Ant. : 3m 2012 3115 (4580)
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54%
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : 8-DPSK 2480MHz Tx
 M/N : WAE-BTPO2
 Data no. : 21
 Ant. pol. : VERTICAL
 Engineer : Leo-Li

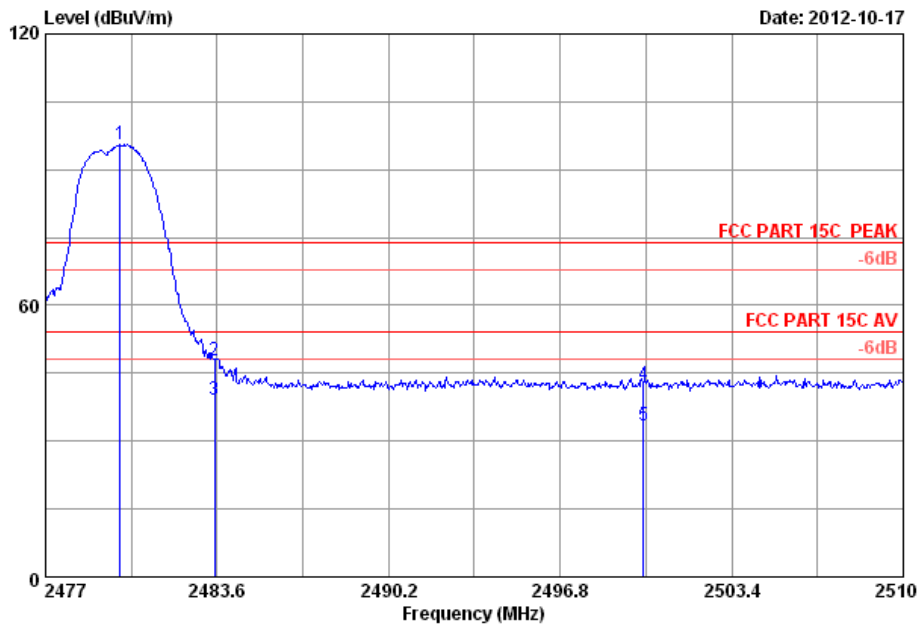
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	2479.970	27.27	6.15	35.92	88.72	86.22	74.00	-12.22	Peak
2	2483.500	27.29	6.16	35.92	44.22	41.75	74.00	32.25	Peak
3	2483.500	27.29	6.16	35.92	34.99	32.52	54.00	21.48	Average
4	2497.229	27.38	6.18	35.92	47.74	45.38	74.00	28.62	Peak
5	2497.229	27.38	6.18	35.92	38.51	36.15	54.00	17.85	Average
6	2500.000	27.40	6.19	35.93	44.46	42.12	74.00	31.88	Peak
7	2500.000	27.40	6.19	35.93	35.23	32.89	54.00	21.11	Average

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- The emission levels that are 20dB below the official limit are not reported.

Band edge compliance of RF emissions

Upper edge peak Plot:
Horizontal:



Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Bluetooth Speaker
 Power supply : AC 120V/60Hz
 Test mode : 8-DPSK 2480MHz Tx
 M/N : WAE-BTPO2

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.871	27.27	6.15	35.92	98.07	95.57	74.00	-21.57	Peak
2	2483.500	27.29	6.16	35.92	50.39	47.92	74.00	26.08	Peak
3	2483.500	27.29	6.16	35.92	41.57	39.10	54.00	14.90	Average
4	2500.000	27.40	6.19	35.93	44.85	42.51	74.00	31.49	Peak
5	2500.000	27.40	6.19	35.93	35.62	33.28	54.00	20.72	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 08, 2013
Amp	HP	8449B	3008A02495	May 08, 2013
Antenna	EMCO	3115	9607-4877	May 17, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May 08, 2013

7.4 Spurious RF conducted emissions

Test Method

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The resolution bandwidth(RBW) and the video bandwidth (VBW) of the spectrum analyzer were respectively set to 100kHz and 300kHz.

Limit

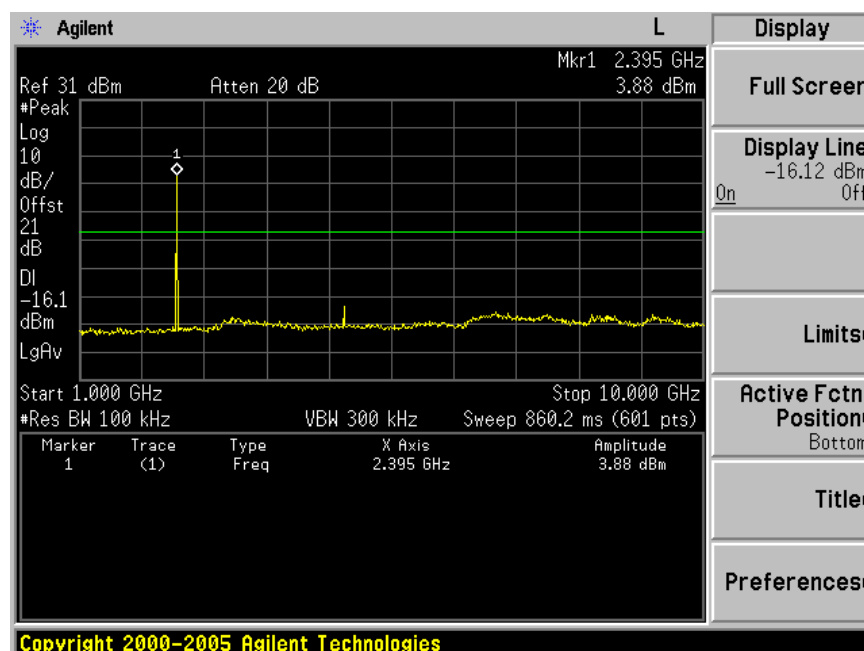
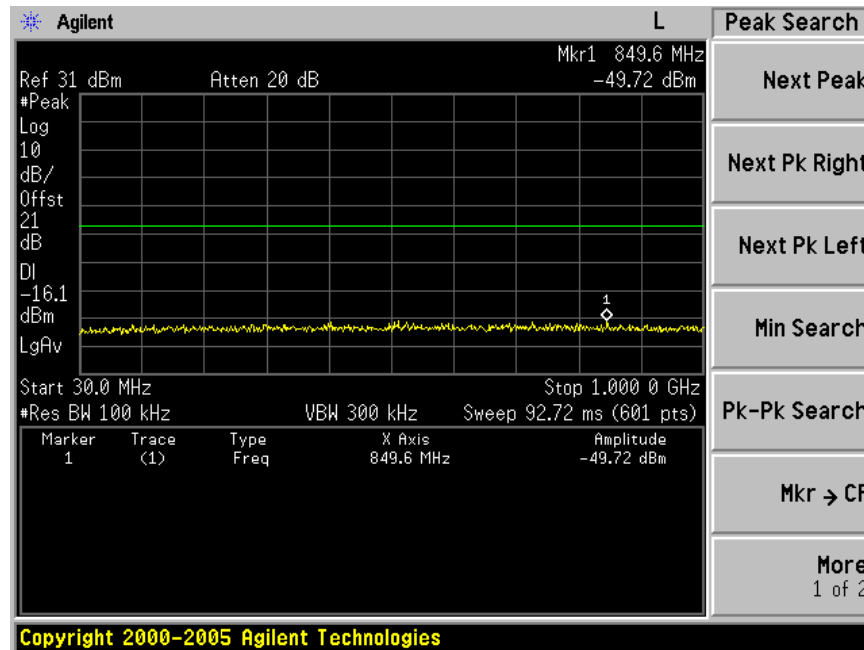
Frequency Range MHz	Limit (dBc)
30-25000	-20

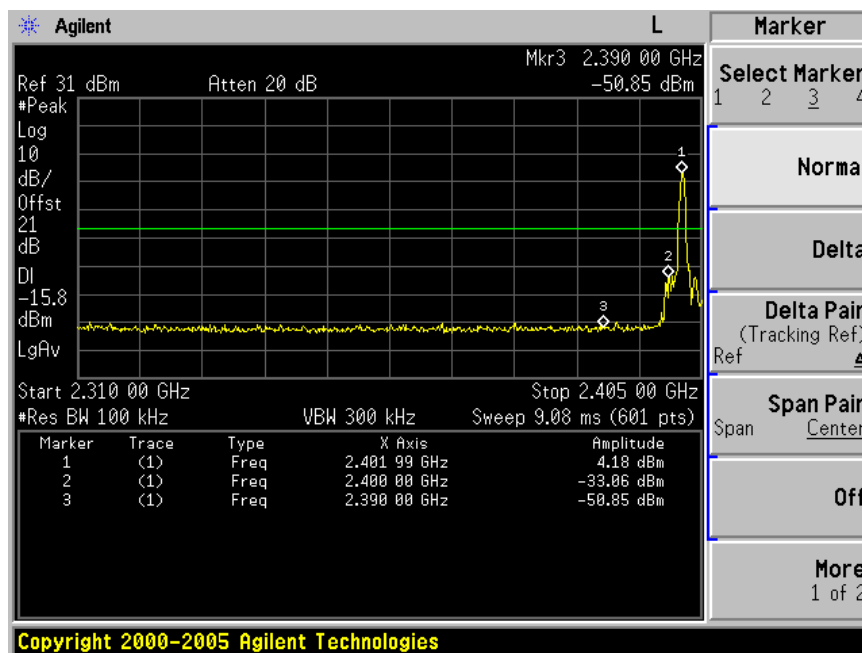
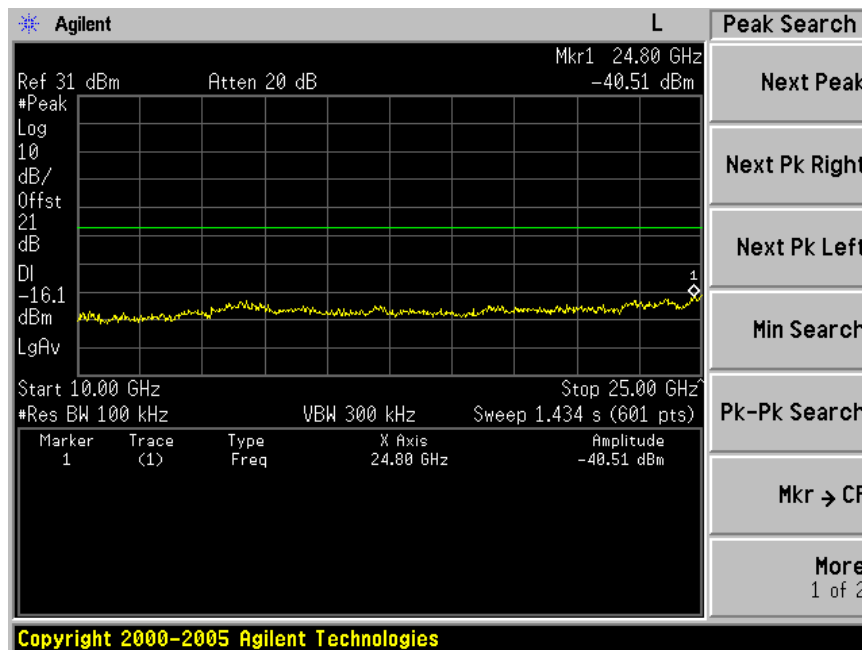
Spurious RF conducted emissions

The EUTs have been tested under all modulation modes, only the worst case GFSK and 8-DPSK modulation test result are listed in the report.

Bluetooth Mode GFSK Modulation Test Result:

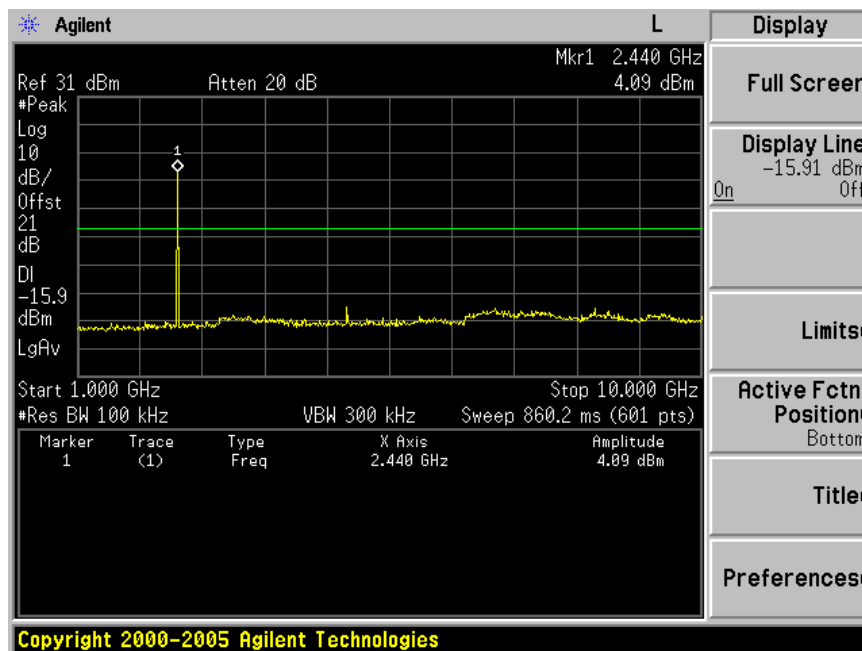
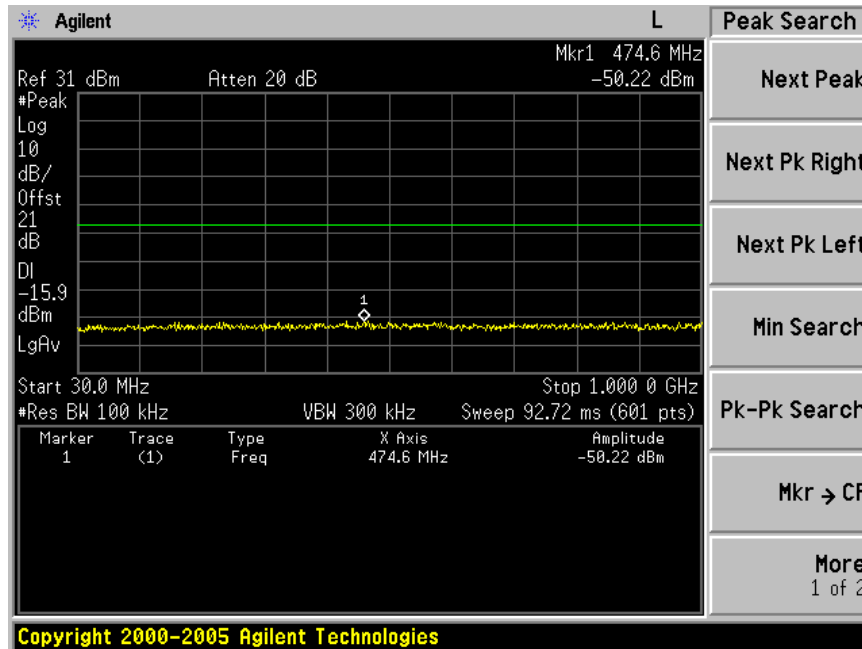
2402MHz



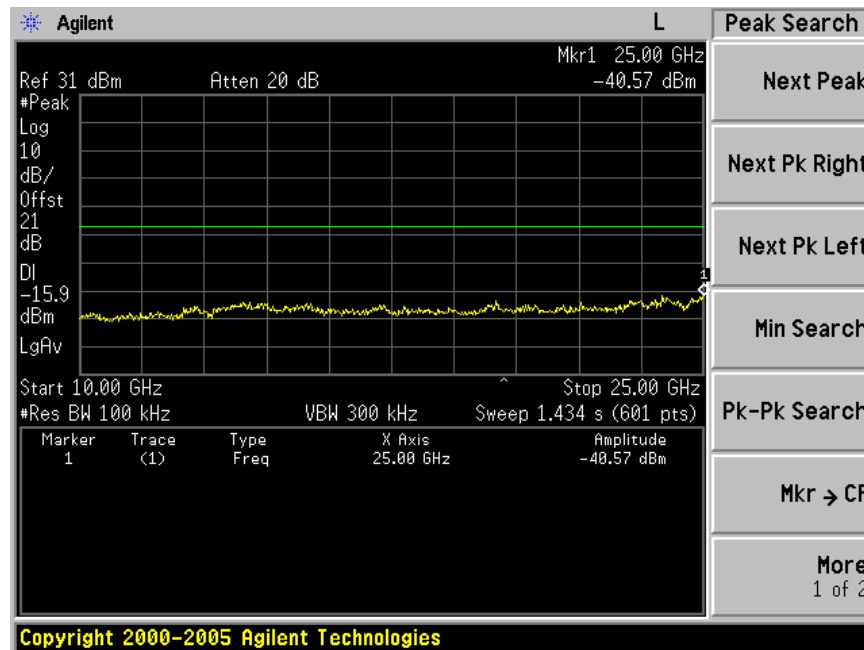


Spurious RF conducted emissions

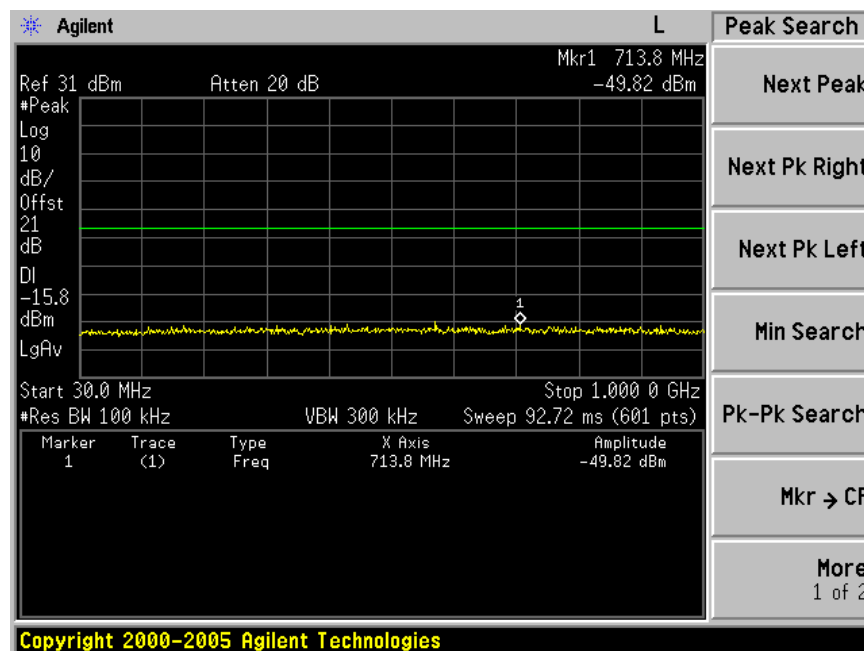
2441MHz



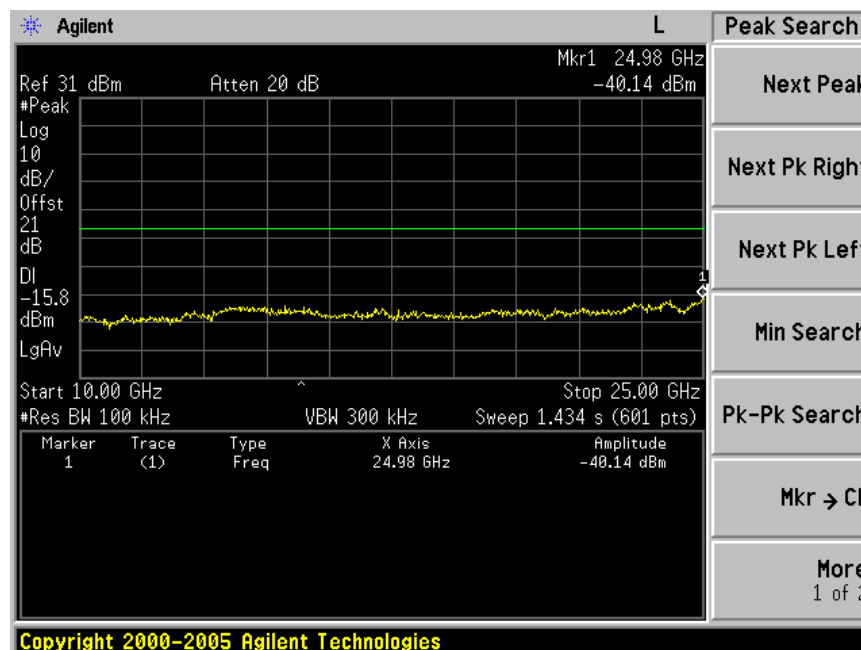
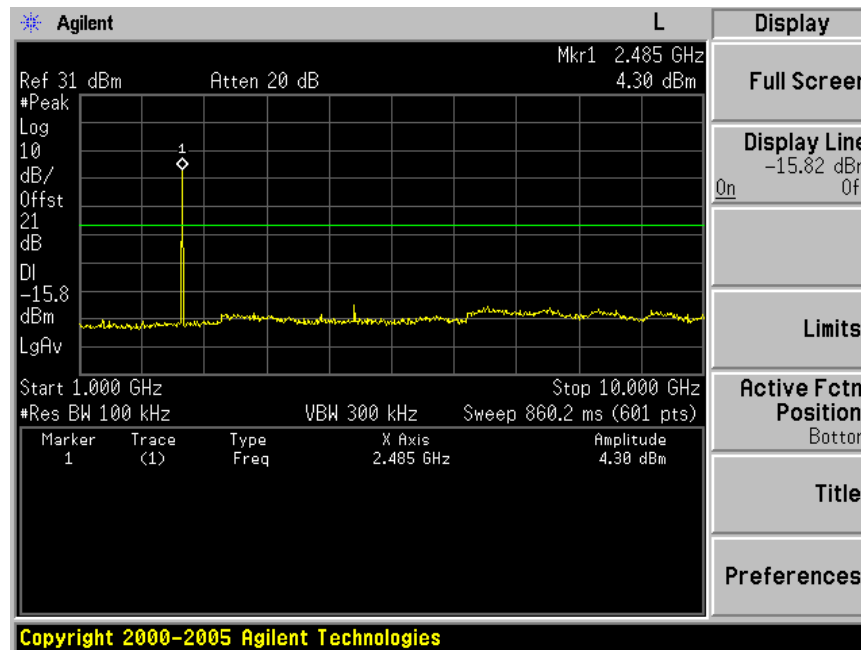
Spurious RF conducted emissions



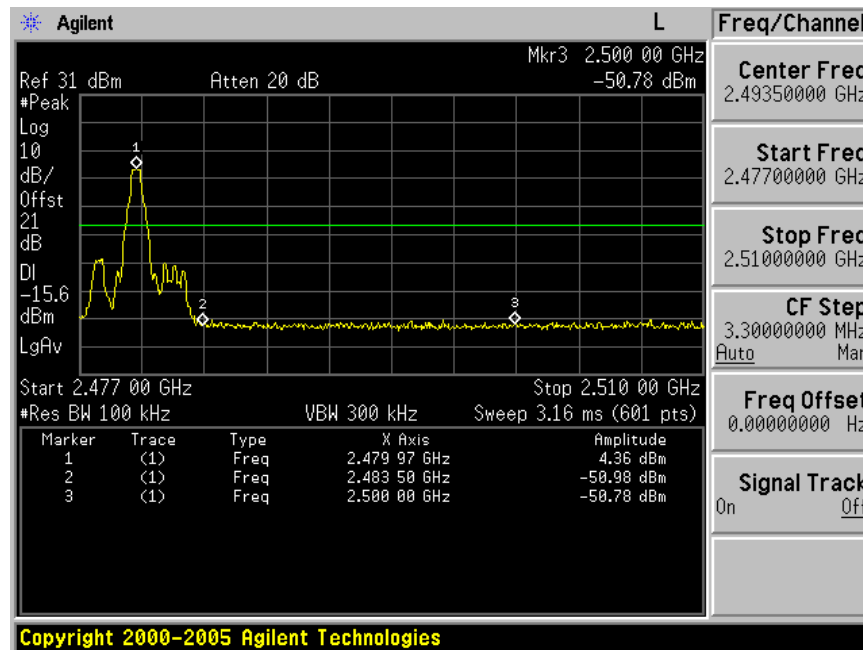
2480MHz



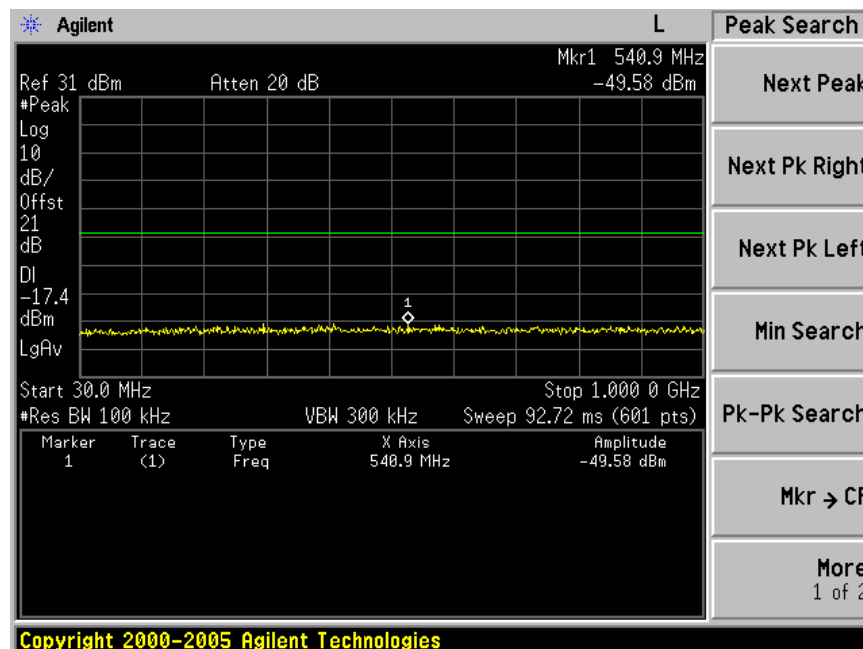
Spurious RF conducted emissions



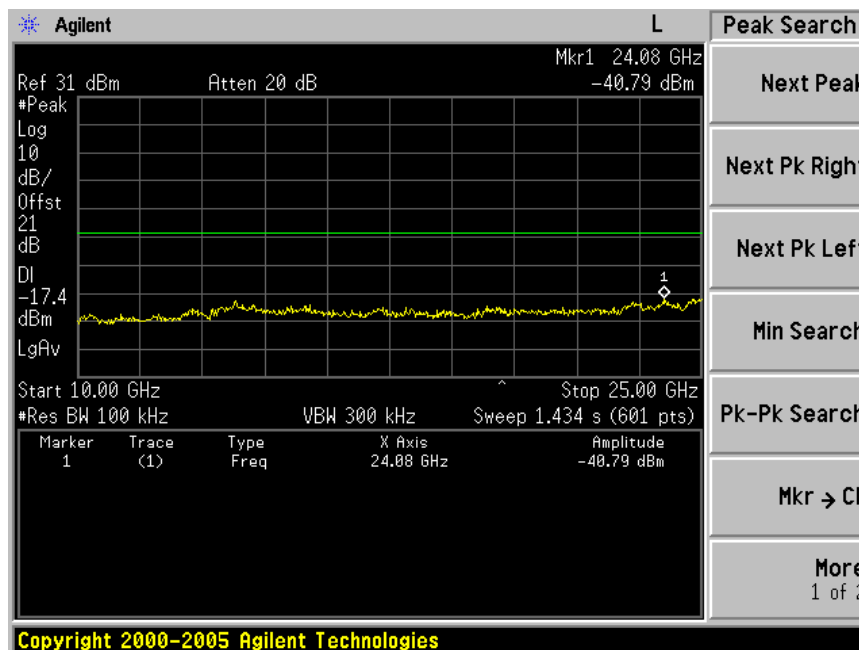
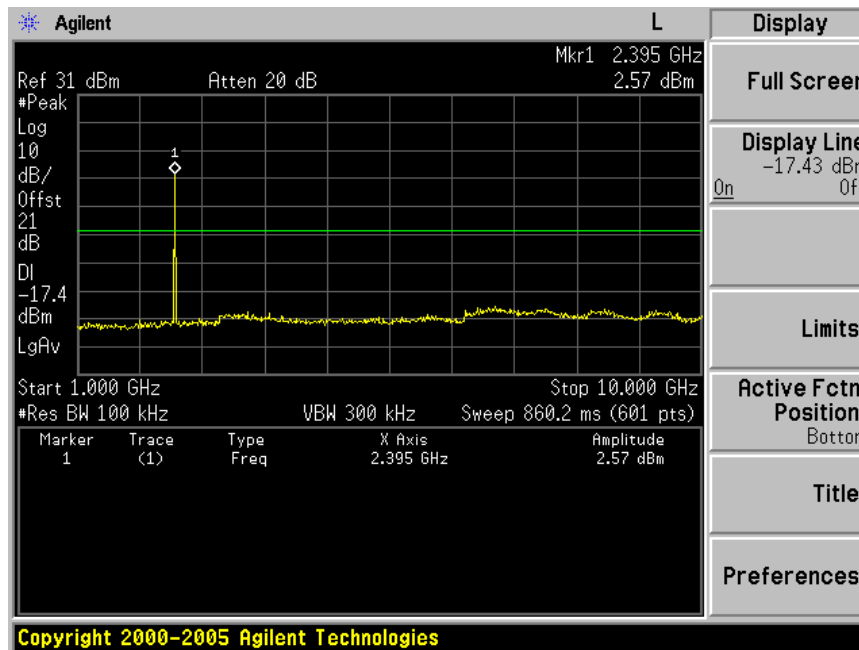
Spurious RF conducted emissions



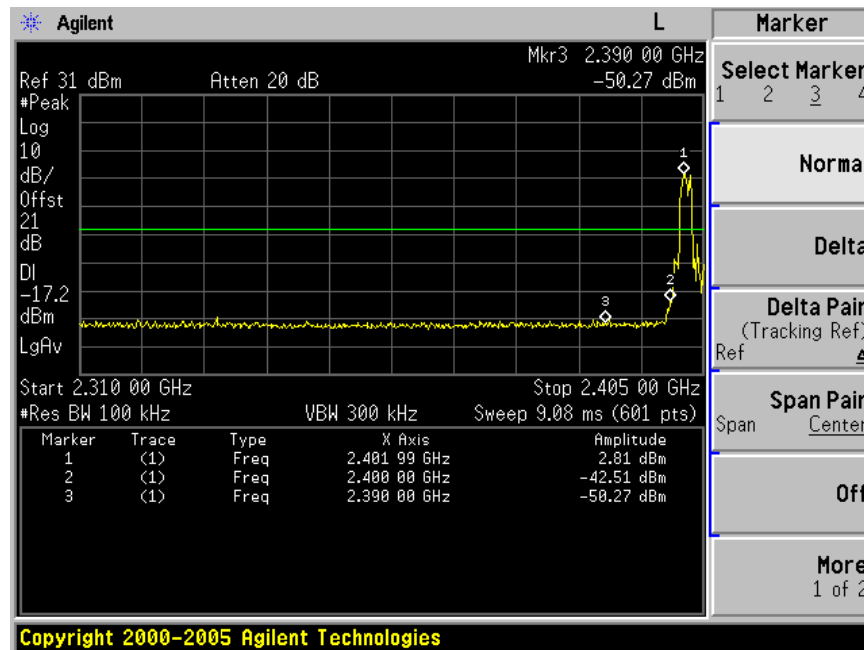
Bluetooth Mode 8-DPSK Modulation Test Result: 2402MHz



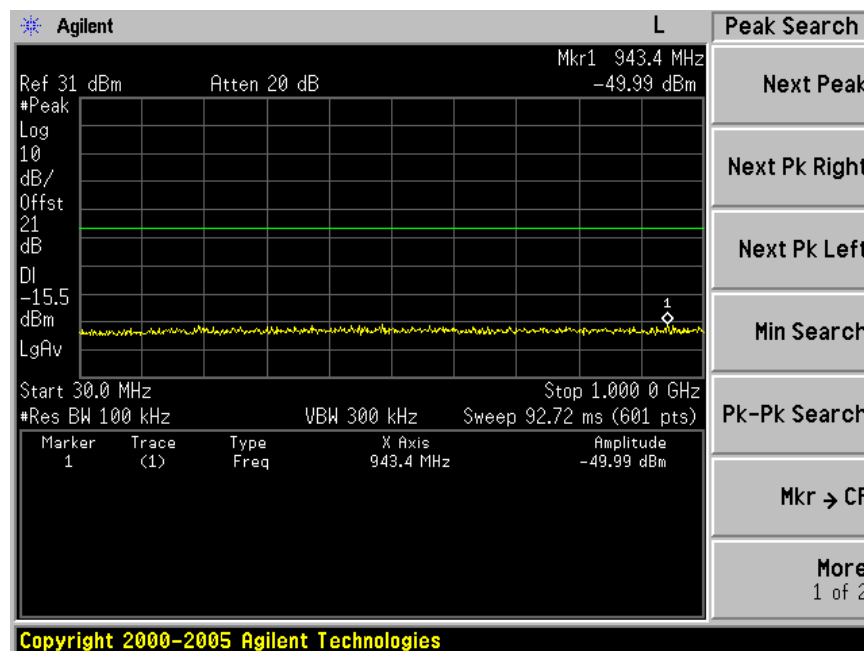
Spurious RF conducted emissions



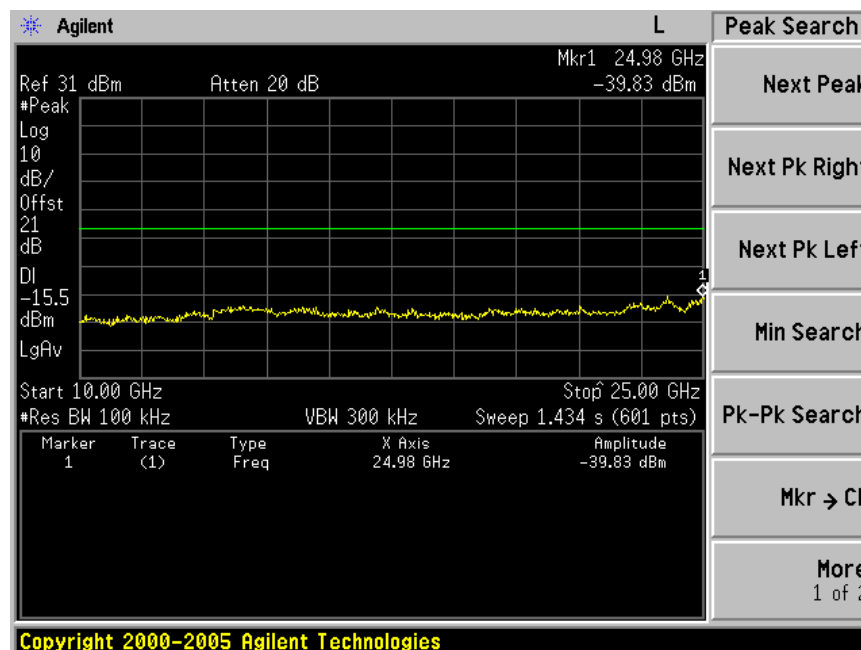
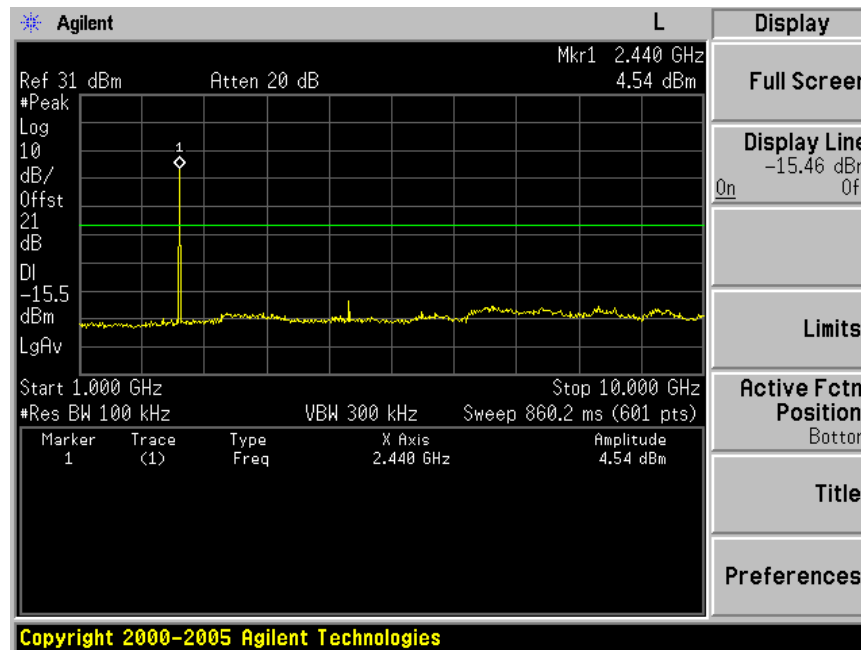
Spurious RF conducted emissions



2441MHz

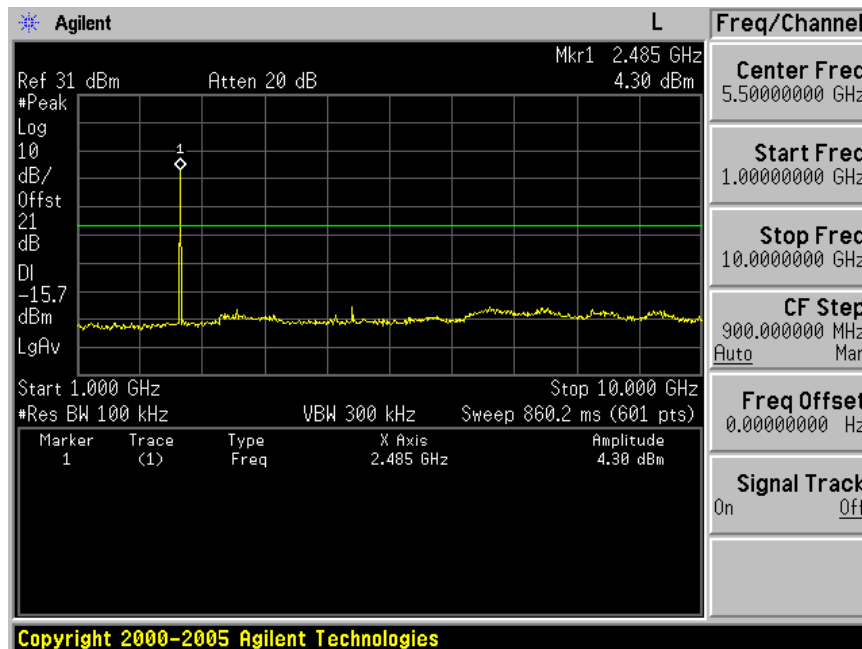
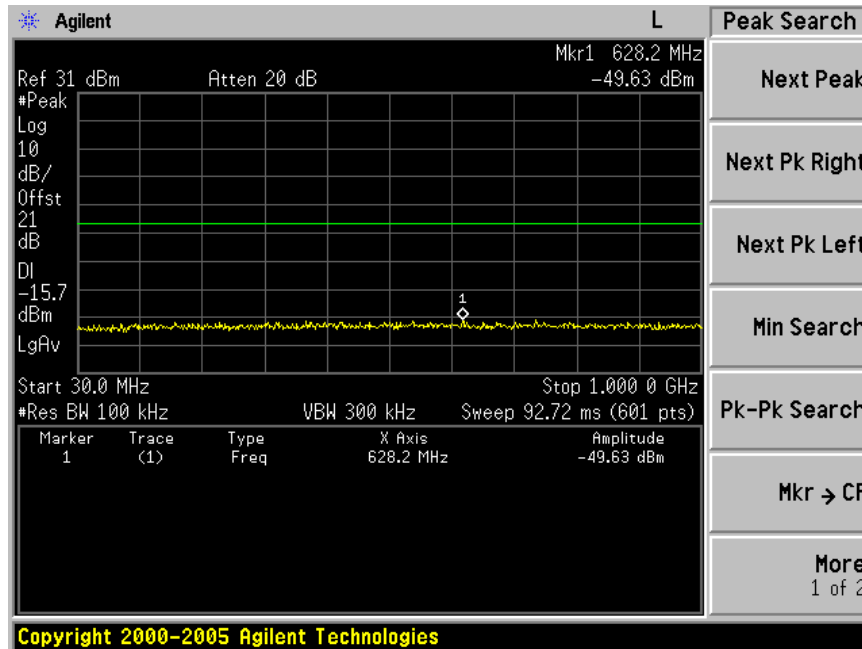


Spurious RF conducted emissions

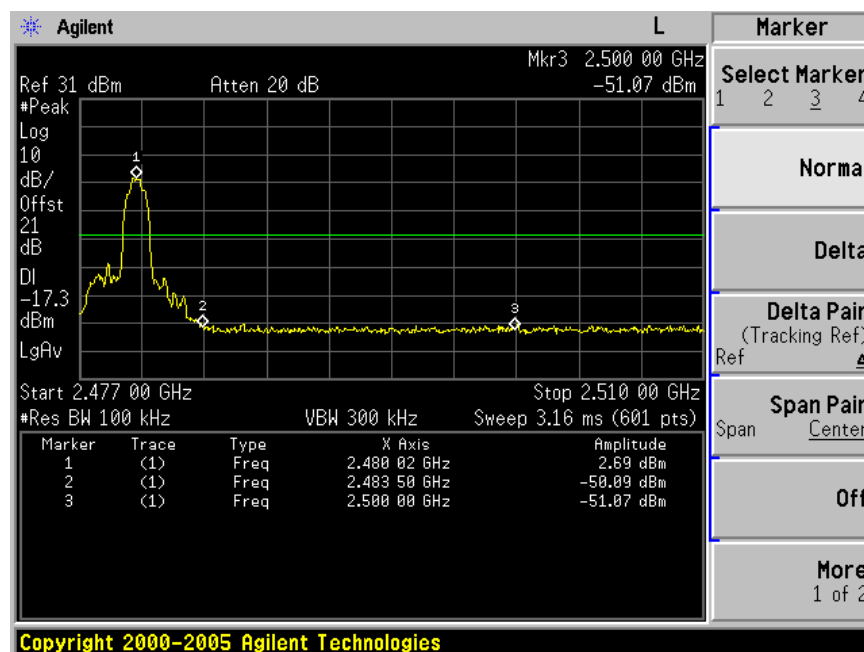
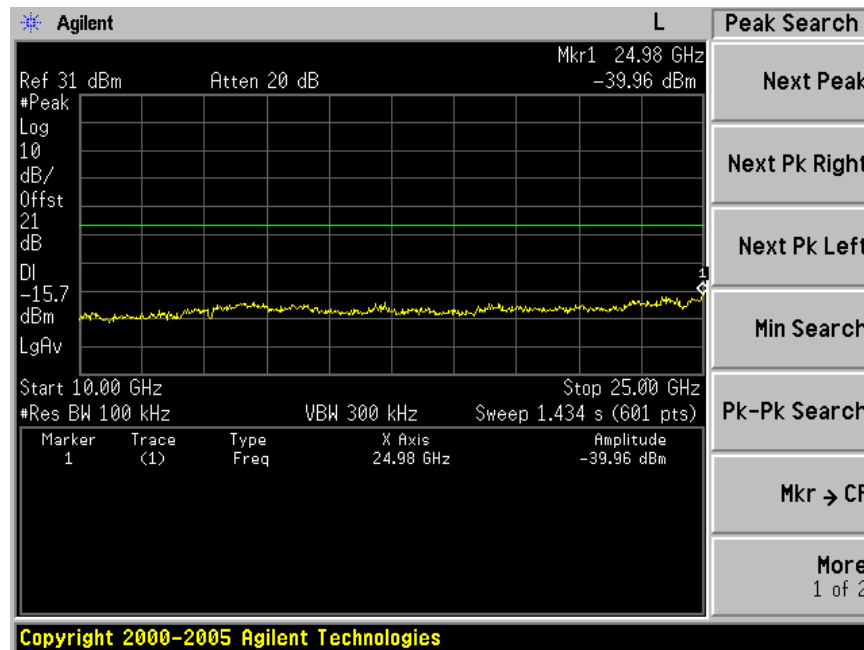


Spurious RF conducted emissions

2480MHz



Spurious RF conducted emissions





Product Service

Test Equipment List

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013

7.5 Spurious radiated emissions

Test Method

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Limit

Frequency MHz	Field Strength uV/m	Field Strength dB μ V/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

**Radiated Emission**

Remark: According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.
The testing was applied on all the modes, only the worst case data was shown in the report.

Bluetooth Mode GFSK Modulation 2402MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
34.850	16.01	0.51	-	10.55	27.07	Vertical	40	QP	Pass
393.750	16.50	1.54	-	3.97	23.13	Horizontal	46	QP	Pass
1600.000	24.92	4.65	36.34	53.29	46.52	Vertical	74	PK	Pass
1600.000	24.92	4.65	36.34	55.11	48.34	Horizontal	74	PK	Pass
4804.00	32.47	8.67	35.72	55.70	61.12	Vertical	74	PK	Pass
4804.00	32.47	8.67	35.72	54.74	60.16	Horizontal	74	PK	Pass
4804.00	32.47	8.67	35.72	46.47	51.89	Vertical	54	AV	Pass
4804.00	32.47	8.67	35.72	45.51	50.93	Horizontal	54	AV	Pass

Bluetooth Mode GFSK Modulation 2441MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
1624.00	24.88	4.69	36.31	47.80	41.06	Vertical	74.0	PK	Pass
1624.00	24.88	4.69	36.31	51.41	44.67	Horizontal	74.0	PK	Pass
4882.000	32.64	8.74	35.69	55.93	61.62	Vertical	74.0	PK	Pass
4882.000	32.64	8.74	35.69	56.31	62.00	Horizontal	74.0	PK	Pass
4882.000	32.64	8.74	35.69	46.70	52.39	Vertical	54	AV	Pass
4882.000	32.64	8.74	35.69	47.08	52.55	Horizontal	54	AV	Pass

Bluetooth Mode GFSK Modulation 2480MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
1654.00	24.82	4.75	36.28	47.09	40.38	Vertical	74.0	PK	Pass
1654.00	24.82	4.75	36.28	44.72	38.01	Horizontal	74.0	PK	Pass
4960.000	32.81	8.81	35.66	54.80	60.76	Vertical	74.0	PK	Pass
4960.000	32.81	8.81	35.66	53.76	59.72	Horizontal	74.0	PK	Pass
4960.000	32.81	8.81	35.66	45.57	51.53	Vertical	54	AV	Pass
4960.000	32.81	8.81	35.66	44.53	50.49	Horizontal	54	AV	Pass

Remark:

- (1) QP Emission Level= Antenna Factor +Cable Loss + Reading
PK Emission Level= Antenna Factor +Cable Loss - Amp. Factor + Reading
AV Emission Level= PK Emission Level+20log (duty cycle)
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

Radiated Emission

Bluetooth Mode 8-DPSK Modulation 2402MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Result
1600.000	24.92	4.65	36.34	45.29	38.52	Vertical	74	PK	Pass
1600.000	24.92	4.65	36.34	47.11	40.34	Horizontal	74	PK	Pass
4804.00	32.47	8.67	35.72	47.94	53.36	Vertical	74	PK	Pass
4804.00	32.47	8.67	35.72	48.96	54.38	Horizontal	74	PK	Pass
4804.00	32.47	8.67	35.72	38.71	44.13	Vertical	54	AV	Pass
4804.00	32.47	8.67	35.72	39.73	45.15	Horizontal	54	AV	Pass

Bluetooth Mode 8-DPSK Modulation 2441MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Result
1624.00	-	-	-	-	-	-	-	-	-
1624.00	24.88	4.69	36.31	50.82	44.08	Horizontal	74	PK	Pass
4882.000	32.64	8.74	35.69	51.38	57.07	Vertical	74.0	PK	Pass
4882.000	32.64	8.74	35.69	49.24	54.93	Horizontal	74.0	PK	Pass
4882.000	32.64	8.74	35.69	42.15	47.84	Vertical	54	AV	Pass
4882.000	32.64	8.74	35.69	40.01	45.70	Horizontal	54	AV	Pass

Bluetooth Mode 8-DPSK Modulation 2480MHz Test Result

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Amp. Factor dB	Reading dBuV	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Result
1720.00	24.70	4.86	36.21	51.91	45.26	Vertical	74.0	PK	Pass
1654.00	24.82	4.75	36.28	48.15	41.44	Horizontal	74.0	PK	Pass
4960.00	32.81	8.81	35.66	49.13	55.09	Vertical	74.0	PK	Pass
4960.00	32.81	8.81	35.66	49.22	55.18	Horizontal	74.0	PK	Pass
4960.00	32.81	8.81	35.66	39.90	45.86	Vertical	54	AV	Pass
4960.00	32.81	8.81	35.66	39.99	45.95	Horizontal	54	AV	Pass

Remark:

- (1) QP Emission Level= Antenna Factor +Cable Loss + Reading
 PK Emission Level= Antenna Factor +Cable Loss - Amp. Factor + Reading
 AV Emission Level= PK Emission Level+20log (duty cycle)
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

**Test Equipment List**

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 08, 2013
Amp	HP	8449B	3008A02495	May 08, 2013
Antenna	EMCO	3115	9607-4877	May 17, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.14, 2012
HF Cable	Hubersuhne	Sucoflex104	---	May 08, 2013



7.6 20 dB bandwidth

Test Method

- 1 Place the EUT on the table and set it in the transmitting mode.
- 2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3 Mark the peak frequency and -20dB (upper and lower) frequency.

Limit

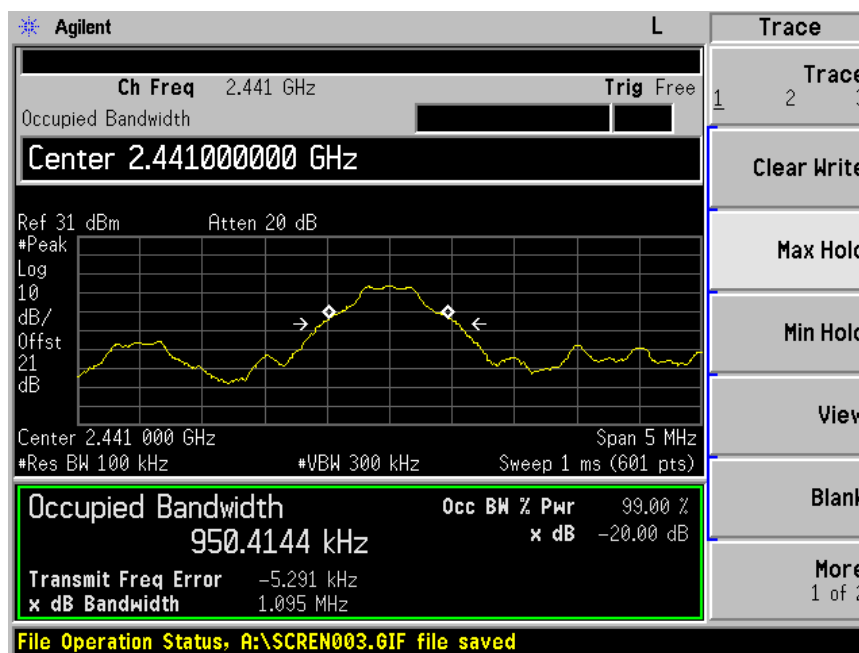
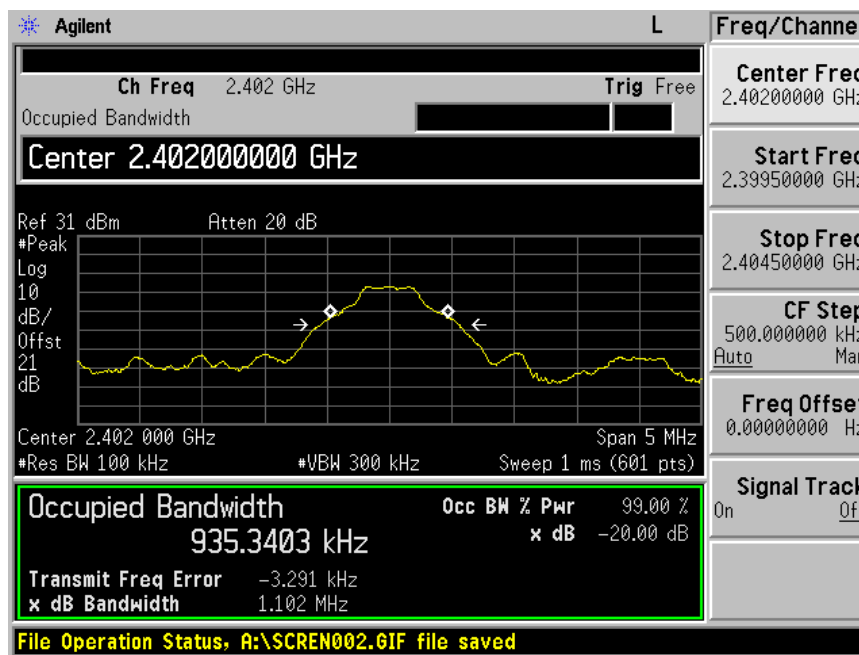
Limit [kHz]

N/A

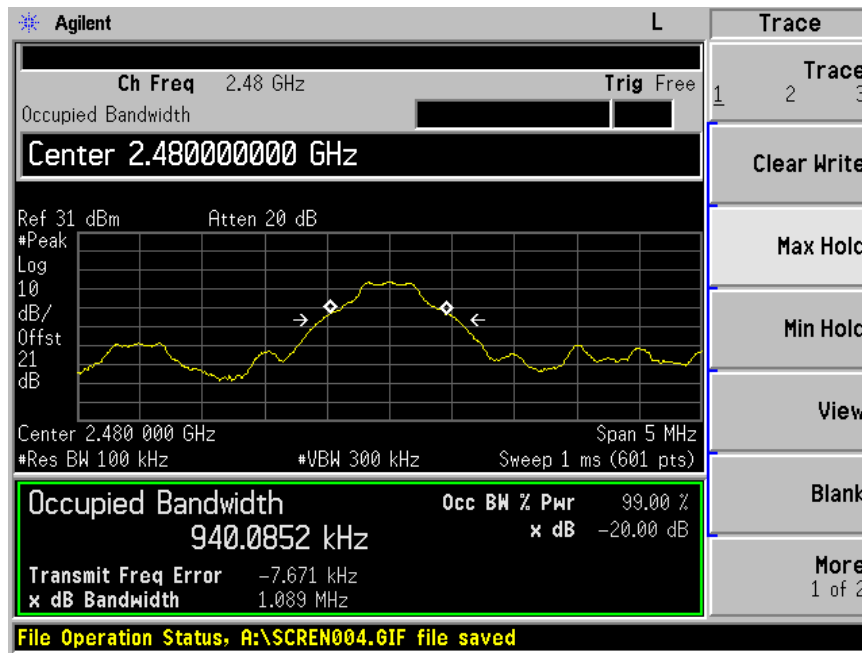
20 dB bandwidth

Bluetooth Mode GFSK Modulation test result

Frequency MHz	Bandwidth kHz	Result
2402	1102	Pass
2441	1095	Pass
2480	1089	Pass



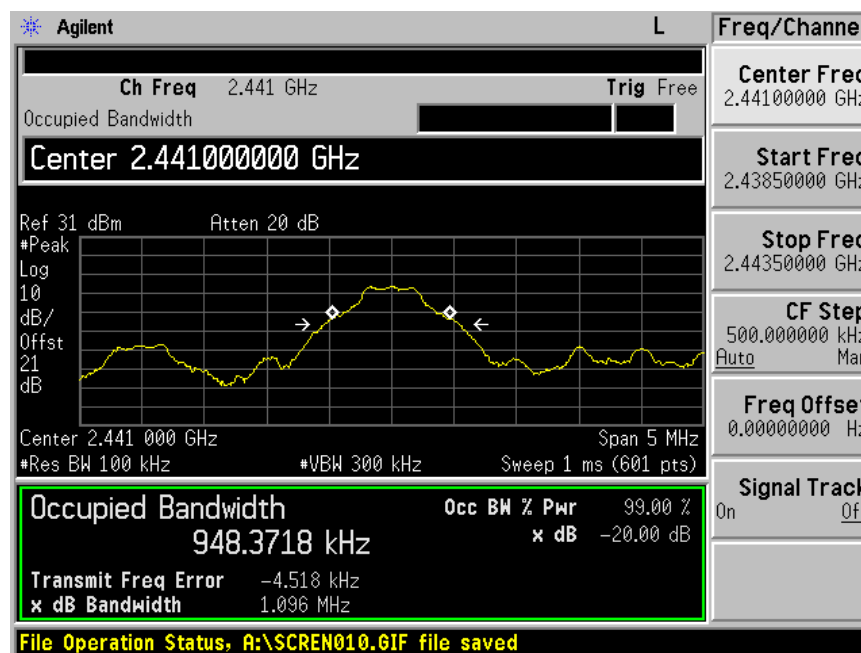
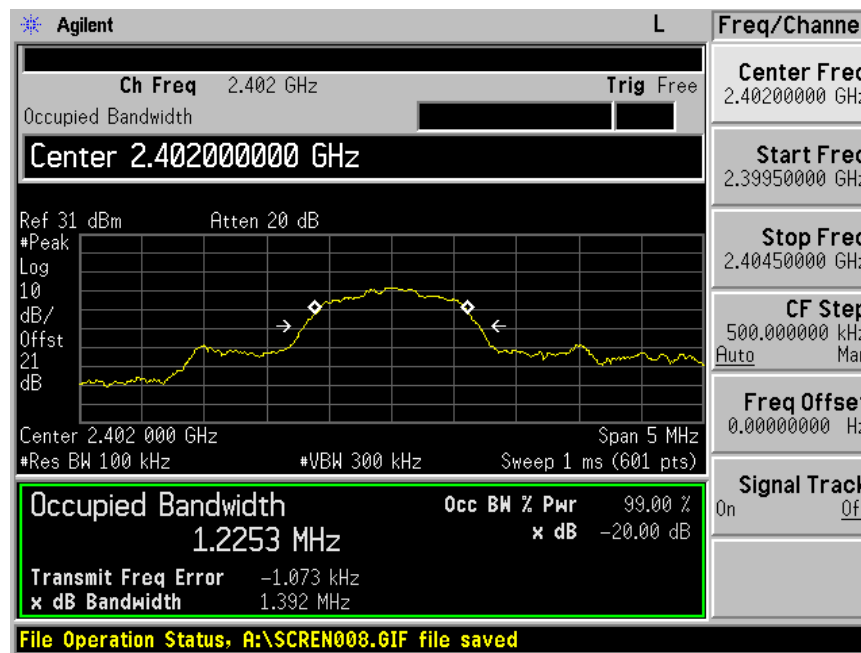
20 dB bandwidth



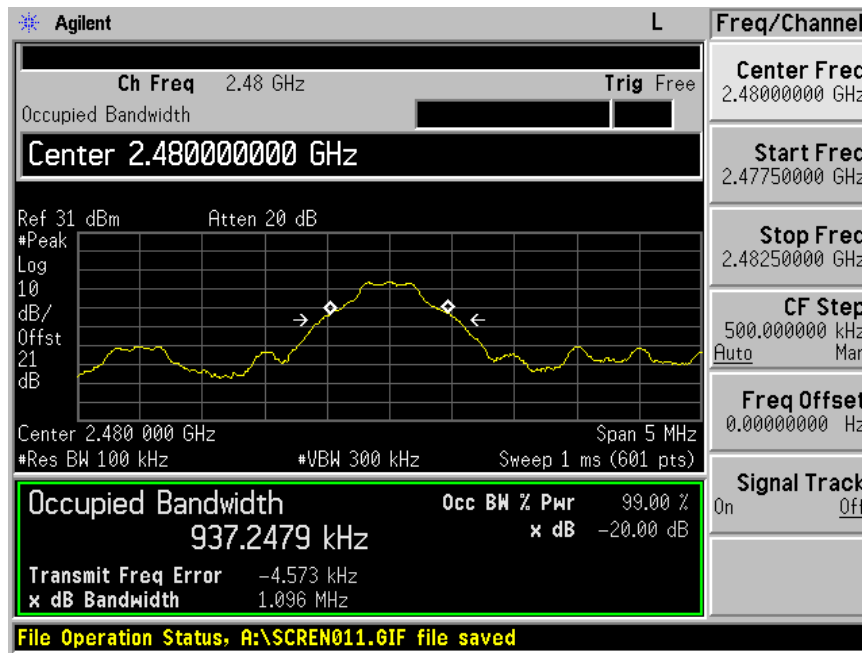
20 dB bandwidth

Bluetooth Mode $\pi/4$ -DQPSK Modulation test result

Frequency MHz	Bandwidth kHz	Result
2402	1392	Pass
2441	1096	Pass
2480	1096	Pass



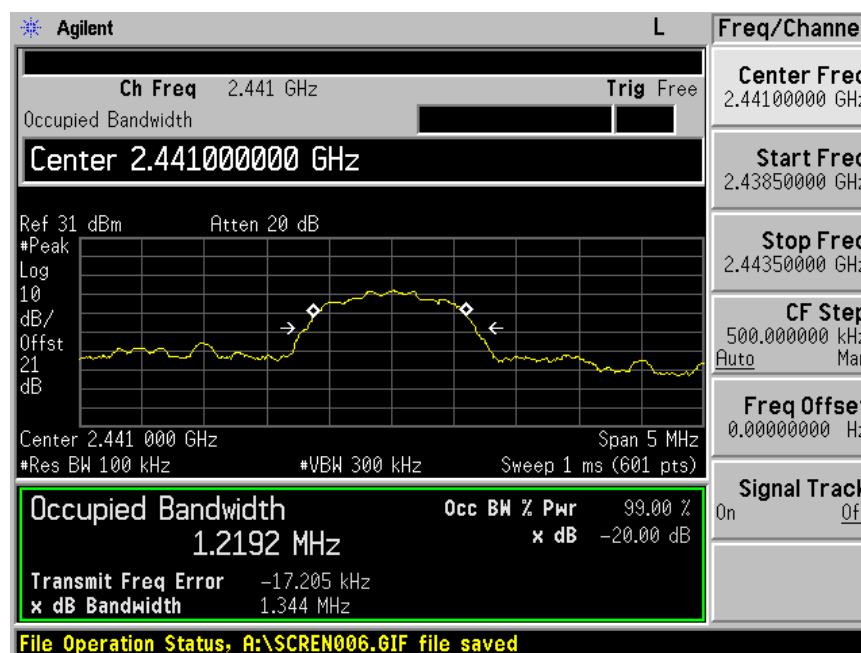
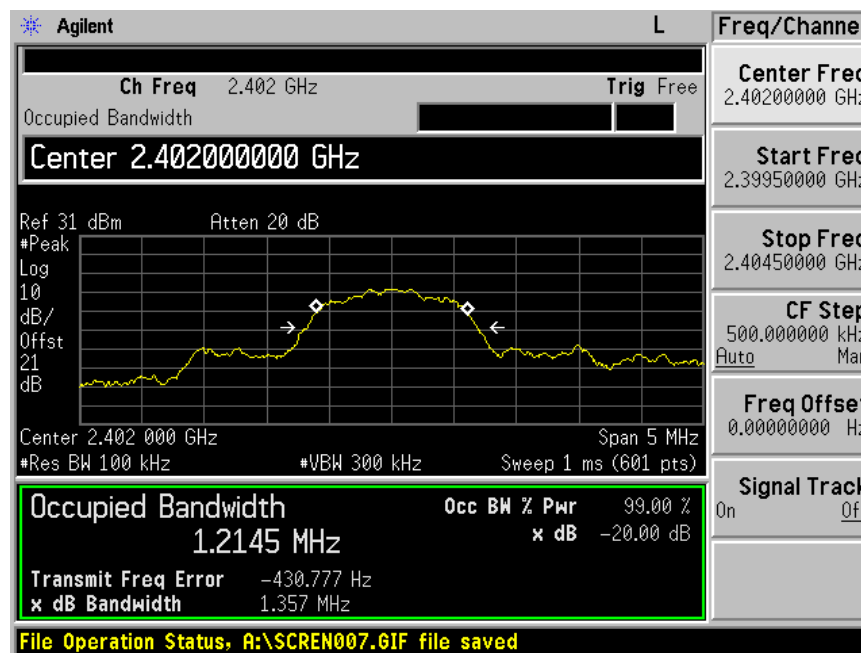
20 dB bandwidth



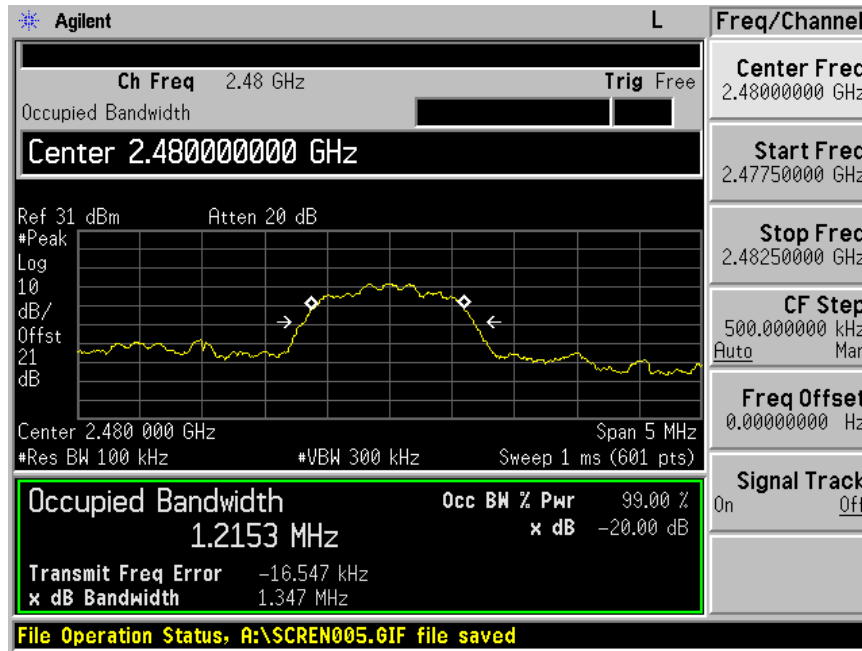
20 dB bandwidth

Bluetooth Mode 8-DPSK Modulation test result

Frequency MHz	Bandwidth kHz	Result
2402	1357	Pass
2441	1344	Pass
2480	1347	Pass



20 dB bandwidth





Product Service

Test Equipment

20 dB bandwidth Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013

7.7 Carrier Frequency Separation

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
Equipment mode: Spectrum analyzer
RBW: 100KHz; VBW: 100KHz; SPAN:5MHz
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer Marker function.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit
kHz

$\geq 25\text{kHz}$ or 2/3 of the 20 dB bandwidth which is greater

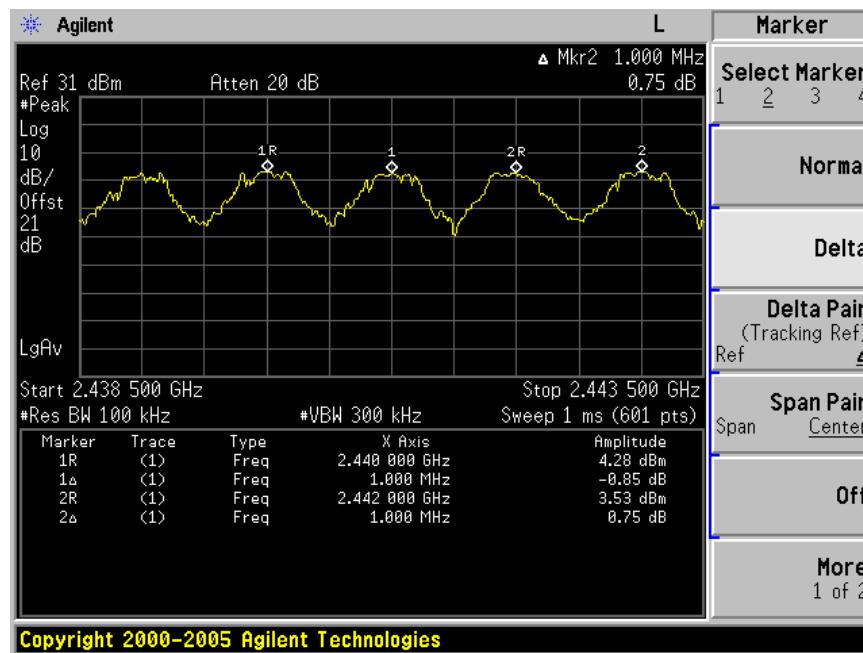
GFSK Modulation Limit

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	734.66
2441	730.00
2480	726.00

Carrier Frequency Separation

GFSK Modulation test result

Frequency MHz	Carrier Frequency Separation kHz	Result
2402	1000	Pass
2441	1000	Pass
2480	1000	Pass





Product Service

Test Equipment

Carrier Frequency Separation Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013

7.8 Number of hopping frequencies

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
Equipment mode: Spectrum analyzer
RBW: 100KHz; VBW: 100KHz
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
3. Repeat above procedures until all frequencies measured were complete.

Limit

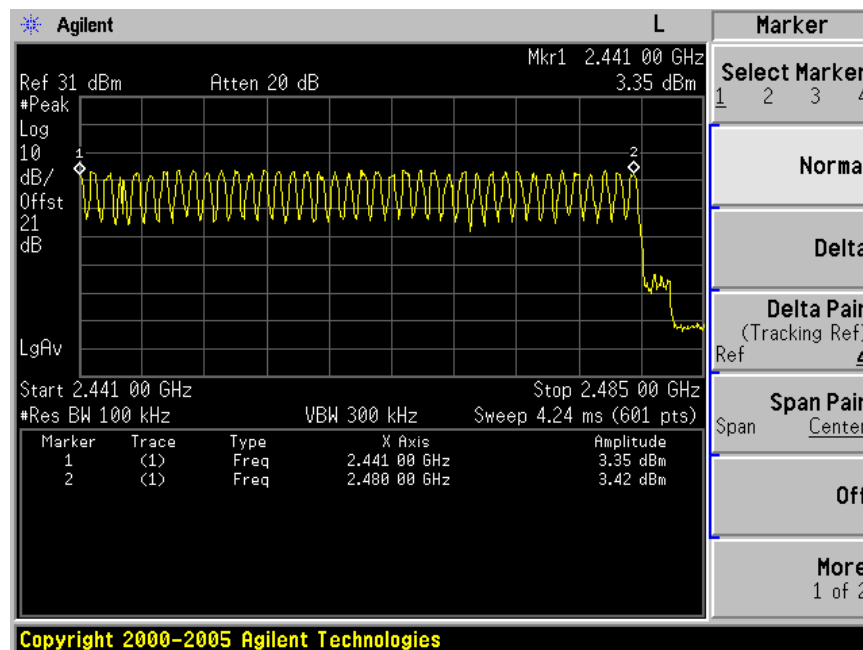
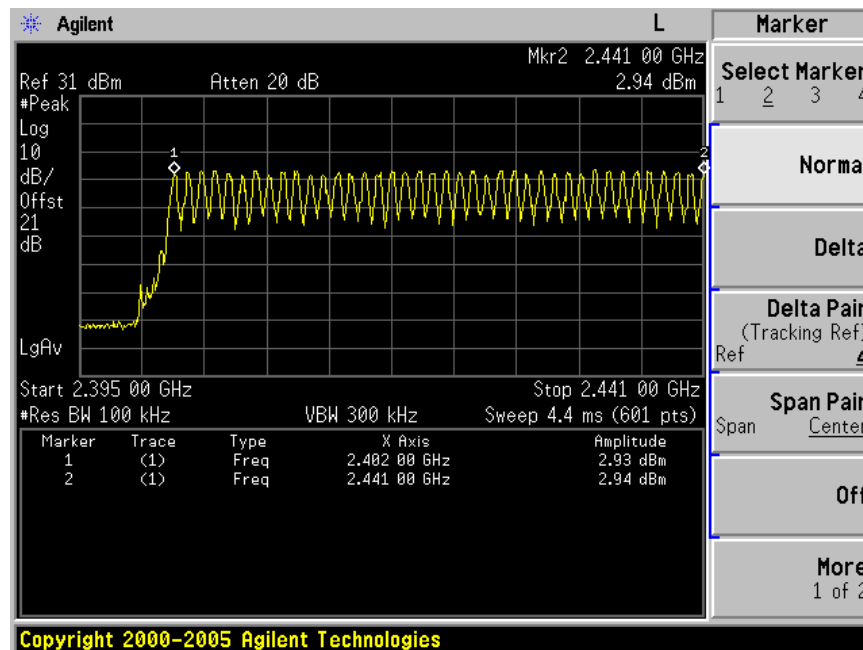
Limit
number

≥ 15

Number of hopping frequencies

Test result:

Number of hopping frequencies	Result
79	Pass





Product Service

Test Equipment

Number of hopping frequencies Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013

7.9 Dwell Time

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.

Equipment mode: Spectrum analyzer

RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span

2. Adjust the center frequency of spectrum analyzer on any frequency be measured.

3. Measure the Dwell Time by spectrum analyzer Marker function.

4. Repeat above procedures until all frequencies measured were complete.

Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Dwell Time

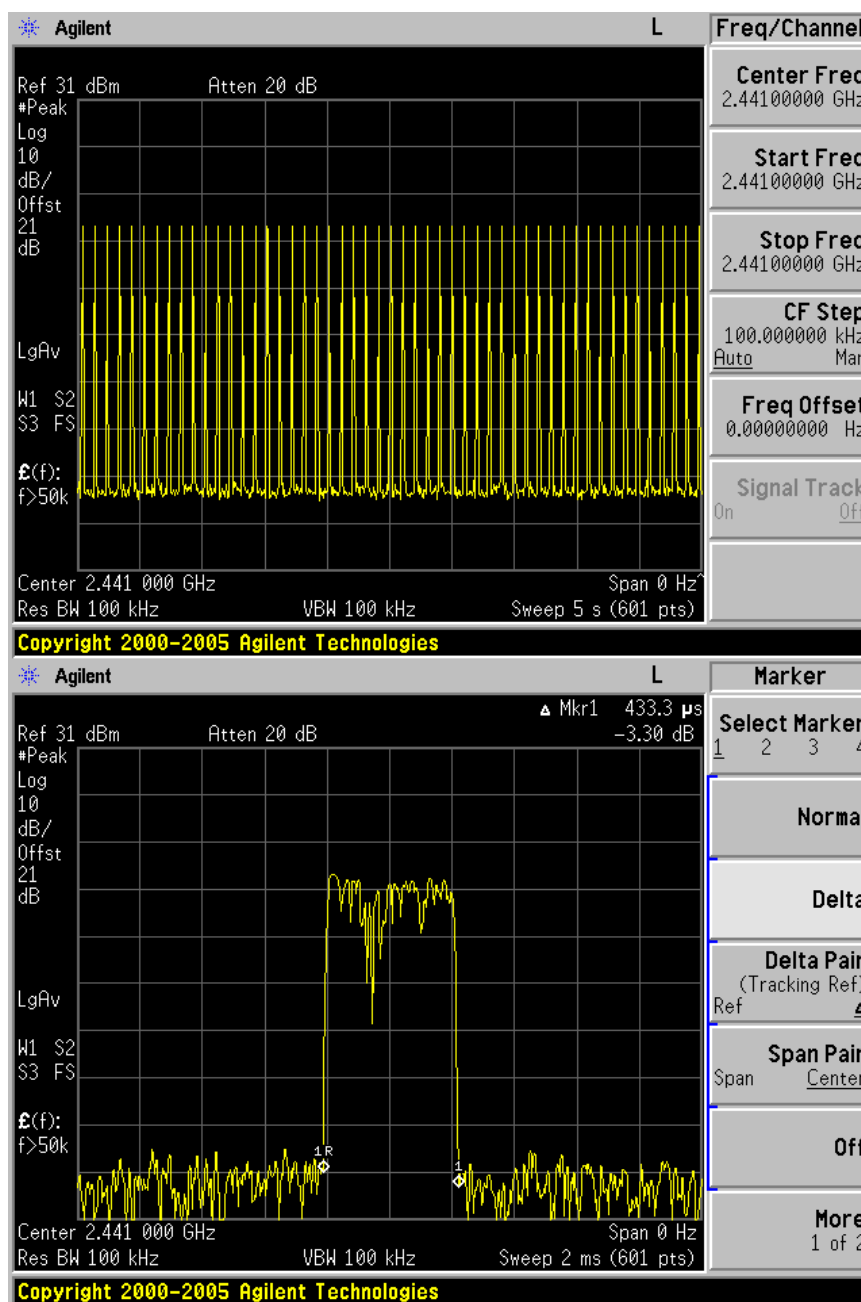
Dwell time

The maximum dwell time shall be 0,4 s.

Bluetooth Mode GFSK Modulation:

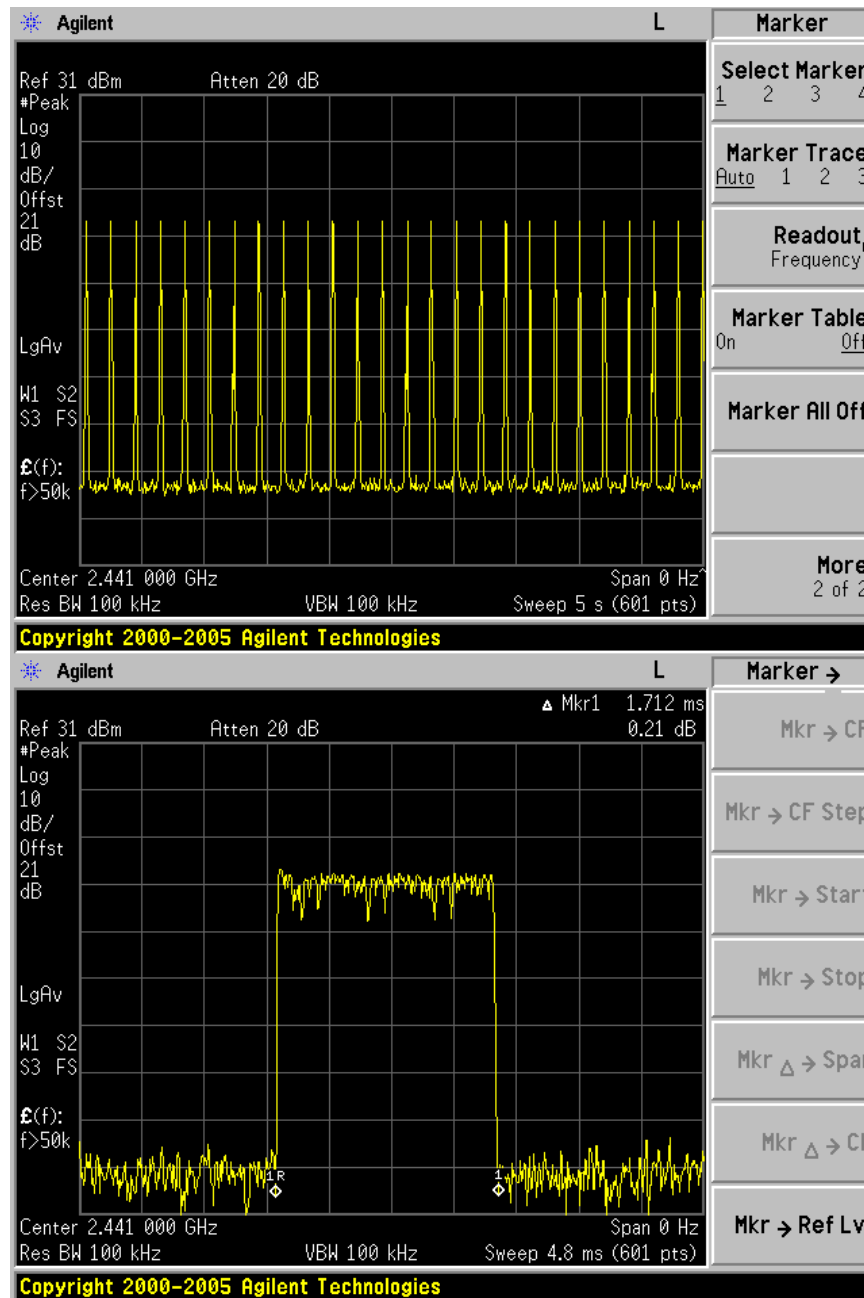
Test Result

Mode	Reading (µs)	Test Result (ms)	Limit (ms)	Result
DH1	433.3	139.66	< 400	Pass
DH3	1712	281.32	< 400	Pass
DH5	3093	332.31	< 400	Pass



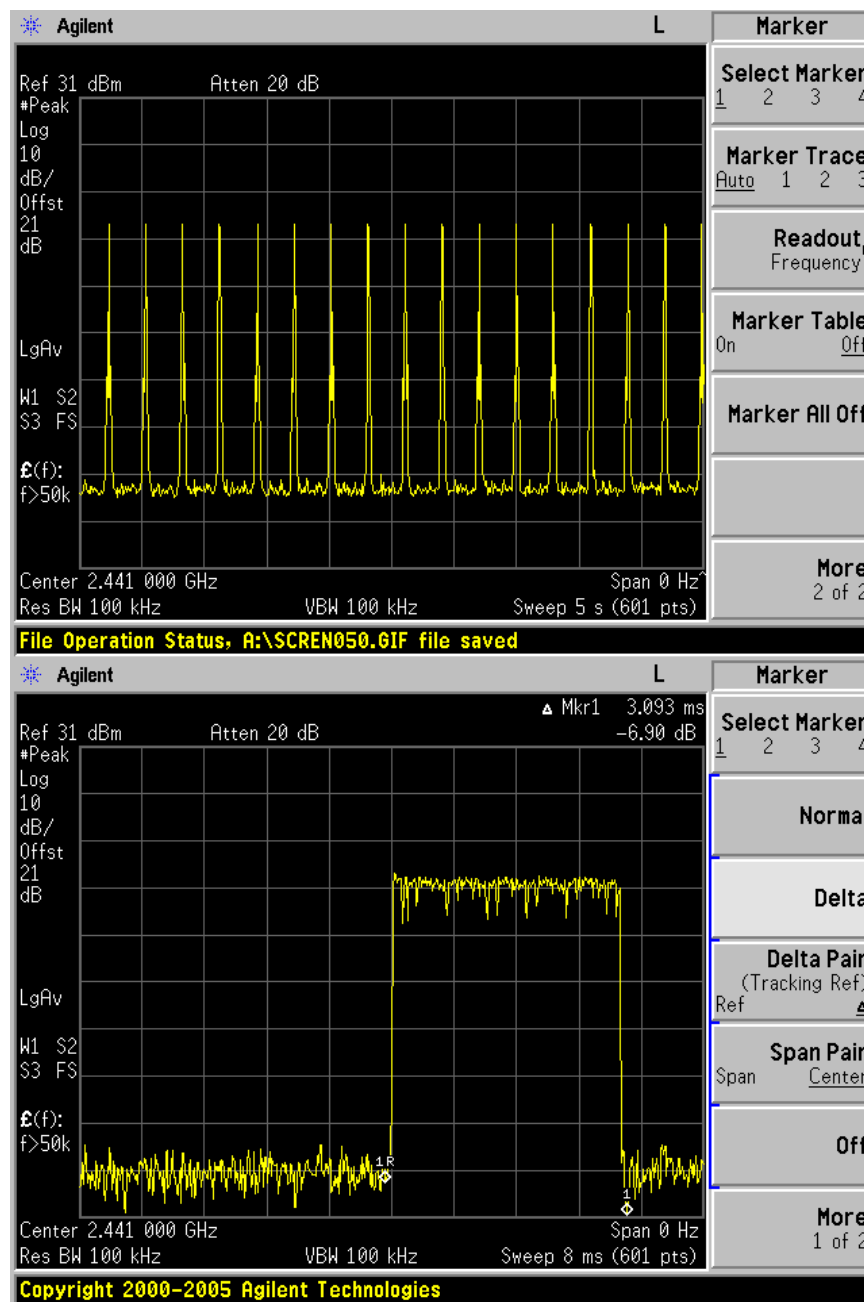
DH1

Dwell Time



DH3

Dwell Time



DH5

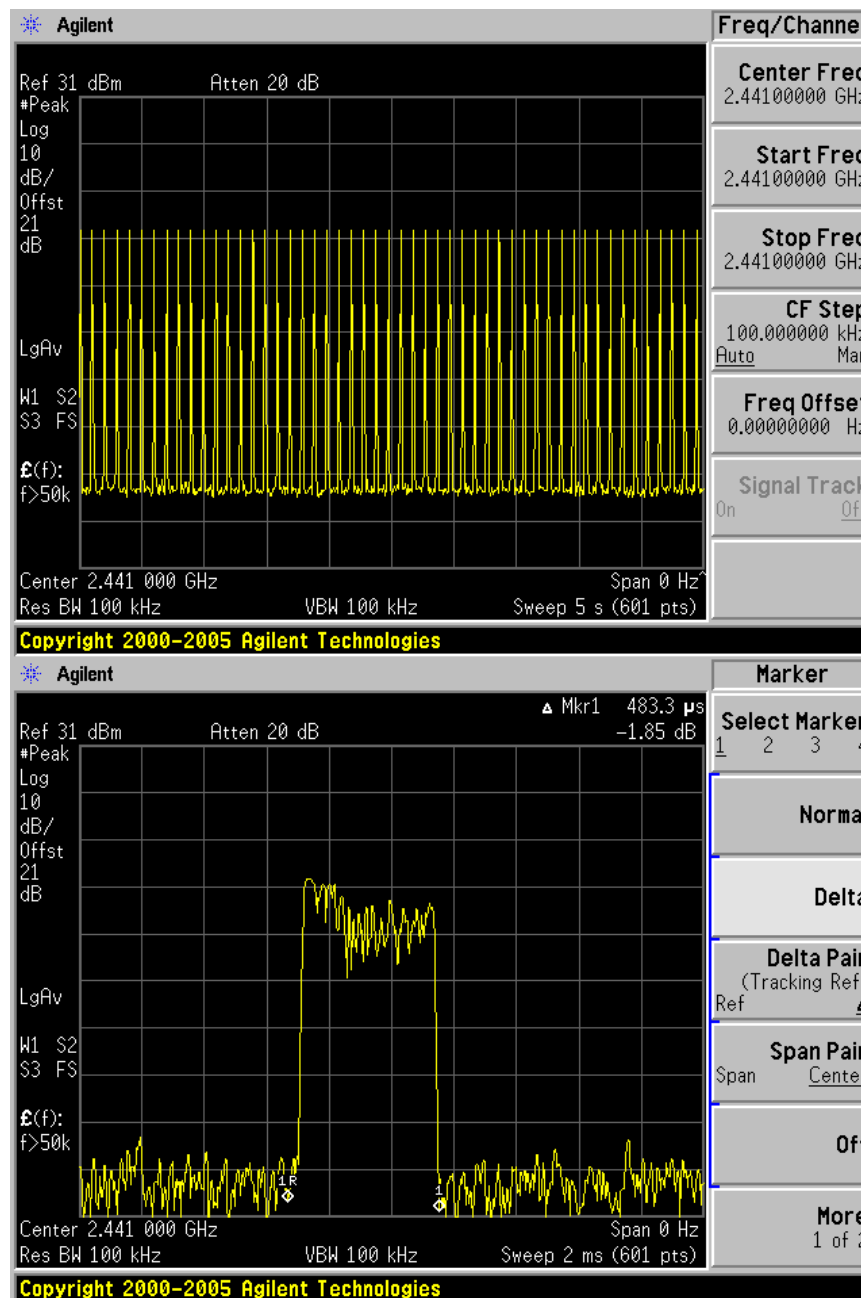
Note:

A period time=79x0.4(s)=31.6(s)

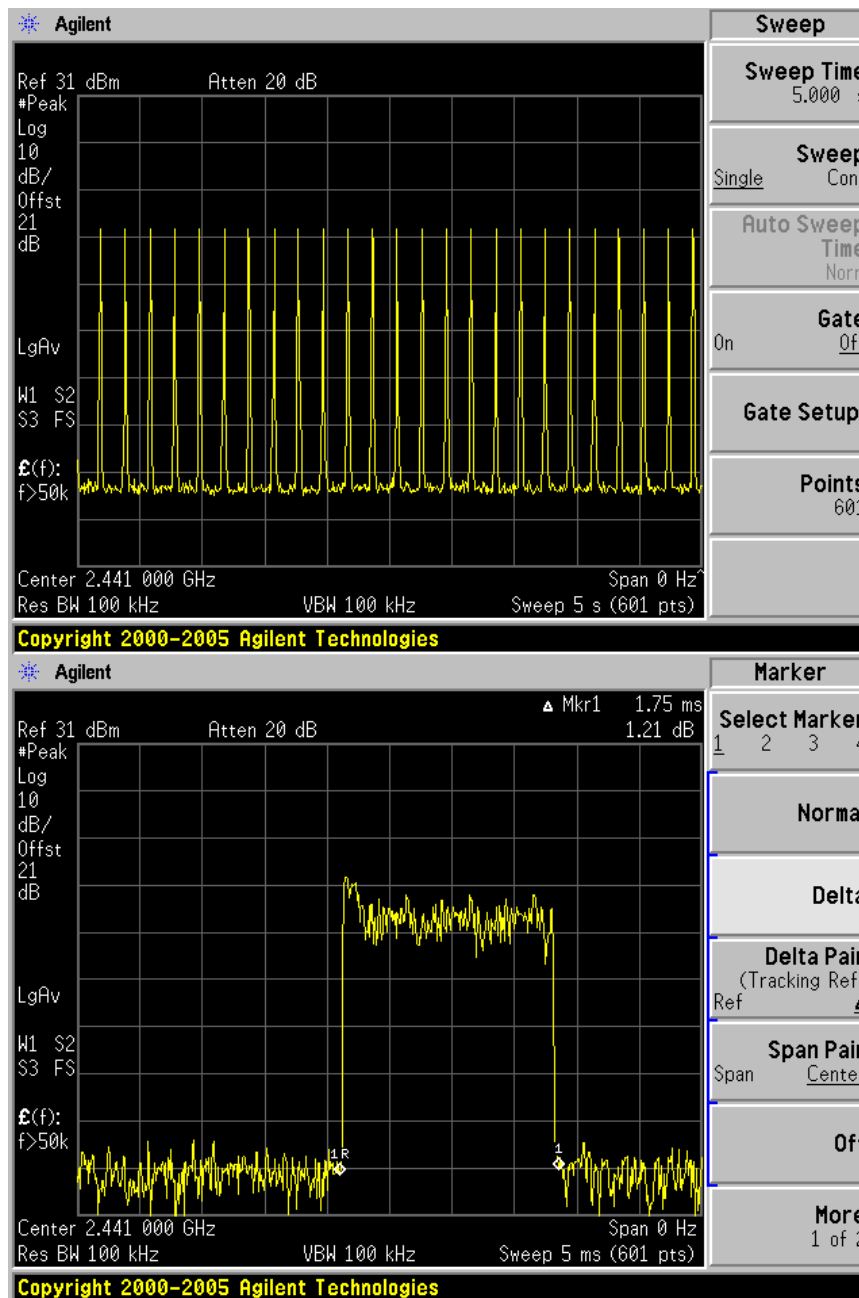
DH1	time slot= 51(times)/5(s) *433.3 (μs) *31.6(s)= 139.66 (ms)
DH3	time slot= 26(times)/5(s) *1712 (μs) *31.6(s)= 281.32(ms)
DH5	time slot= 17(times)/5(s) *3093 (μs) *31.6(s)= 332.31 (ms)

Bluetooth Mode $\pi/4$ -DQPSK Modulation:

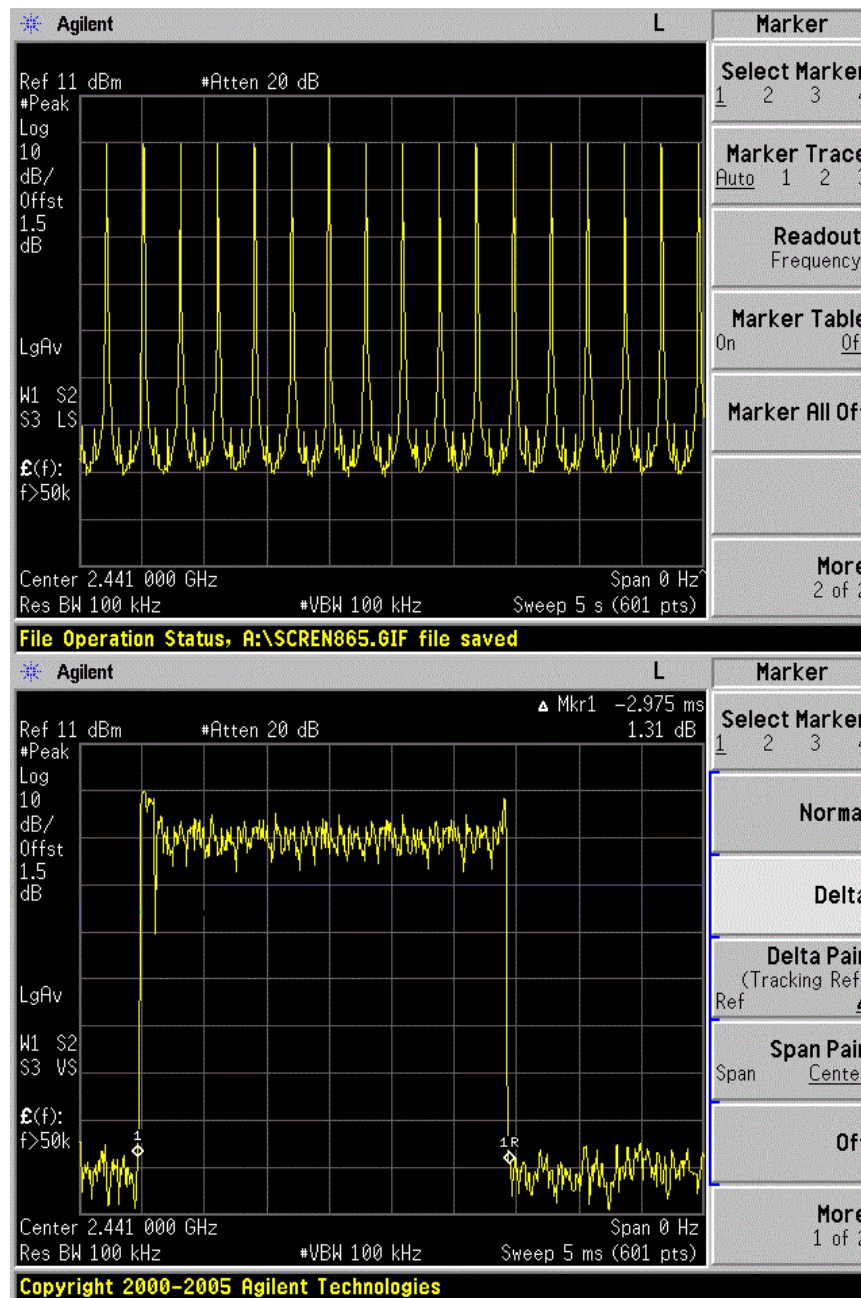
Mode	Reading (μ s)	Test Result (ms)	Limit (ms)	Result
DH1	483.3	152.72	< 400	Pass
DH3	1750	276.50	< 400	Pass
DH5	2975	319.63	< 400	Pass



DH1



DH3



DH5

Note:

A period time=79x0.4(s)=31.6(s)

DH1 time slot= 50(times)/5(s) *483.3(μs) *31.6(s)= 152.72(ms)

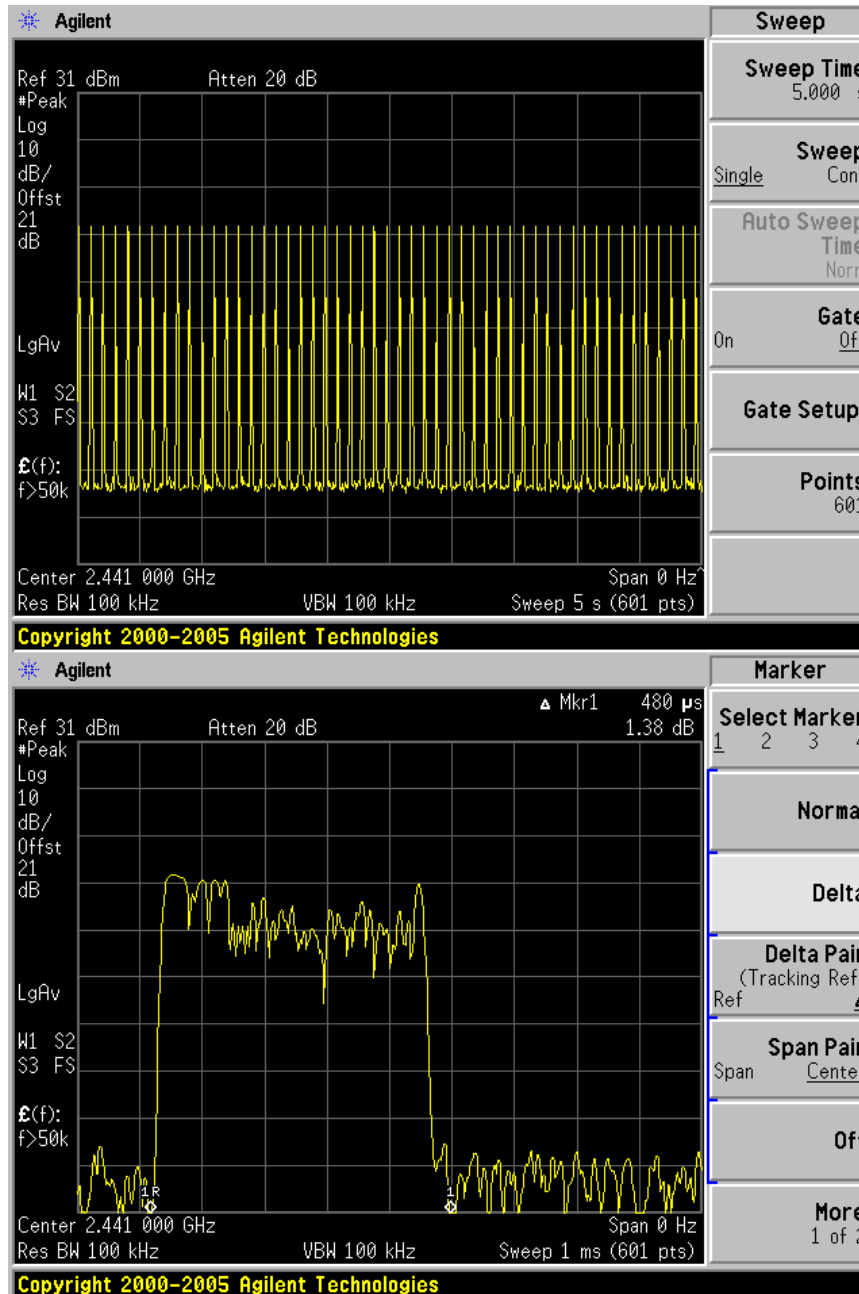
DH3 time slot= 25(times)/5(s) *1750 (μs) *31.6(s)= 276.50(ms)

DH5 time slot= 17(times)/5(s) *2975 (μs) *31.6(s)=319.63 (ms)

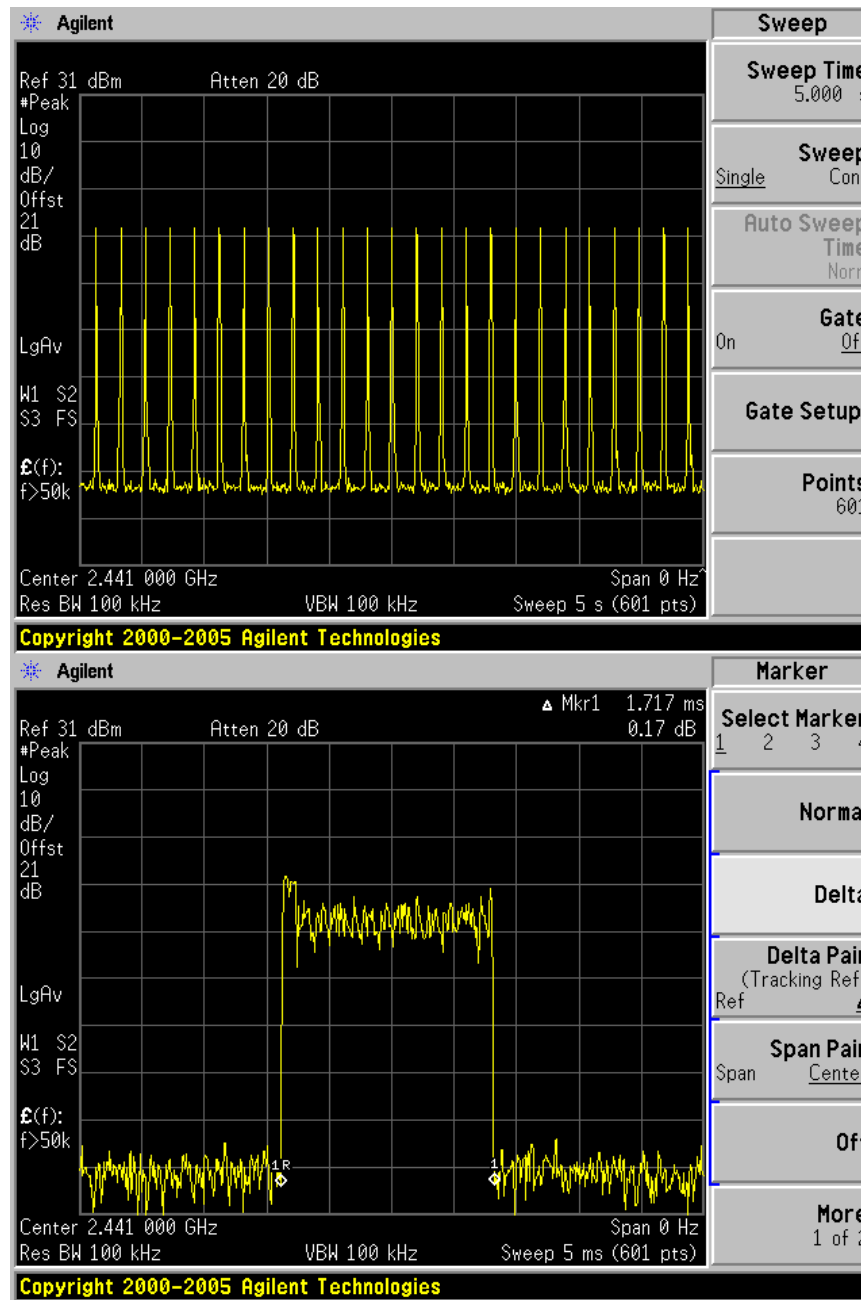
Bluetooth Mode 8-DPSK Modulation:

Test Result

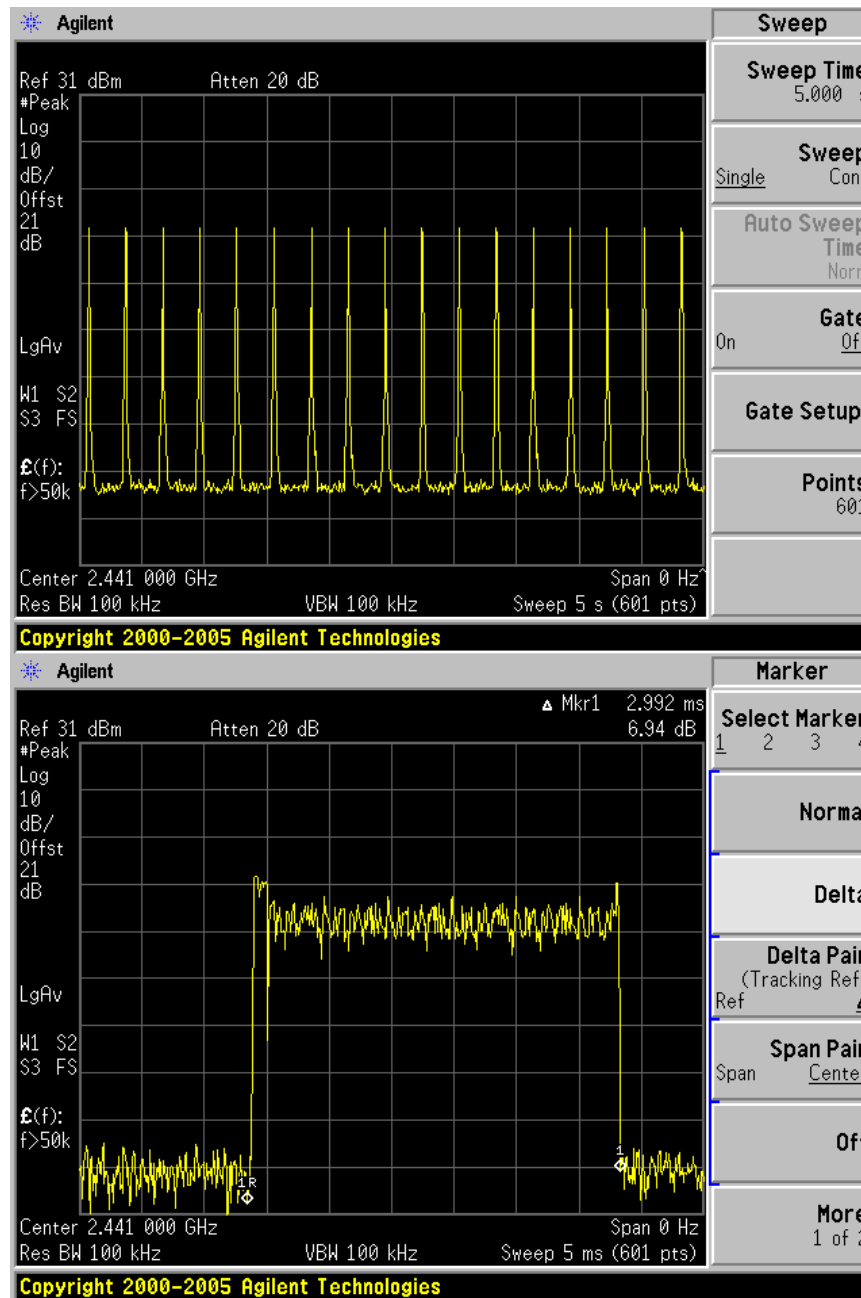
Mode	Reading (μs)	Test Result (ms)	Limit (ms)	Result
DH1	480	154.713	< 400	Pass
DH3	1717	271.29	< 400	Pass
DH5	2992	321.15	< 400	Pass



DH1



DH3



DH5

Note:

A period time=79x0.4(s)=31.6(s)

DH1	time slot= 51(times)/5(s) *480(μs) *31.6(s)= 154.713(ms)
DH3	time slot= 25(times)/5(s) *1717 (μs) *31.6(s)=271.29(ms)
DH5	time slot= 17(times)/5(s) *2992 (μs) *31.6(s)=321.15 (ms)



Product Service

Test Equipment

Dwell Time Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL.DUE.DATE
Spectrum Analyzer	Agilent	E4446A	US44300459	May 08, 2013



8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.32dB (30MHz-25GHz)
CE	Disturbance Voltage (dB μ V)	U=2.4dB