



Test Report

Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8 FCC Part15 Subpart C

Product Name : Bluetooth headset
Model No. : M165
FCC ID : AL8-M165
IC : 457A-M165

Applicant : Plantronics, Inc.

Address : 345 Encinal Street, Santa Cruz, CA95060 USA

Date of Receipt : 30/05/2012
Test Date : 30/05/2012~17/06/2012
Issued Date : 21/06/2012
Report No. : 125S089R-RF-US-P06V01
Report Version : V 1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Test Report Certification

Issued Date : 21/06/2012

Report No. : 125S089R-RF-US-P06V01



Product Name : Bluetooth headset
Applicant : Plantronics, Inc.
Address : 345 Encinal Street, Santa Cruz, CA95060 USA
Manufacturer : Weifang GoerTek Electronics Co., Ltd
Address : Dongfang North Road Hi-tech Industry Development District,
Weifang Shandong, China
Model No. : M165
FCC ID : AL8-M165
IC : 457A-M165
EUT Voltage : DC 3.7V
Brand Name : PLANTRONICS
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2011
ANSI C63.4: 2009; ANSI C63.10: 2009
Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8
Test Result : Complied
Performed Location : Suzhou EMC Laboratory
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FCC Registration Number: 800392; IC Lab Code: 4075B

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We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

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Germany	:	TUV Rheinland
Norway	:	Nemko, DNV
USA	:	FCC, NVLAP
Japan	:	VCCI
China	:	CNAS

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site :<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :
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1. General Information**1.1. EUT Description**

Product Name	Bluetooth headset
Brand Name	PLANTRONICS
Model No.	M165
Working Voltage	DC 3.7V
Frequency Range	2402 - 2480 MHz
Channel Number	79
Channel Separation	1MHz
Type of Modulation	FHSS
Data Rate	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Channel Control	Auto
Antenna Type	Monopole
Peak Antenna Gain	Reference to Antenna List

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

Bluetooth Antenna List

Antenna	Manufacturer	Peak Gain
Monopole Antenna	Goertek	2.4GHz: 0.27dBi

1.2. Mode of Operation

Quietek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter-1Mbps(GFSK_DH5)
Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Note:

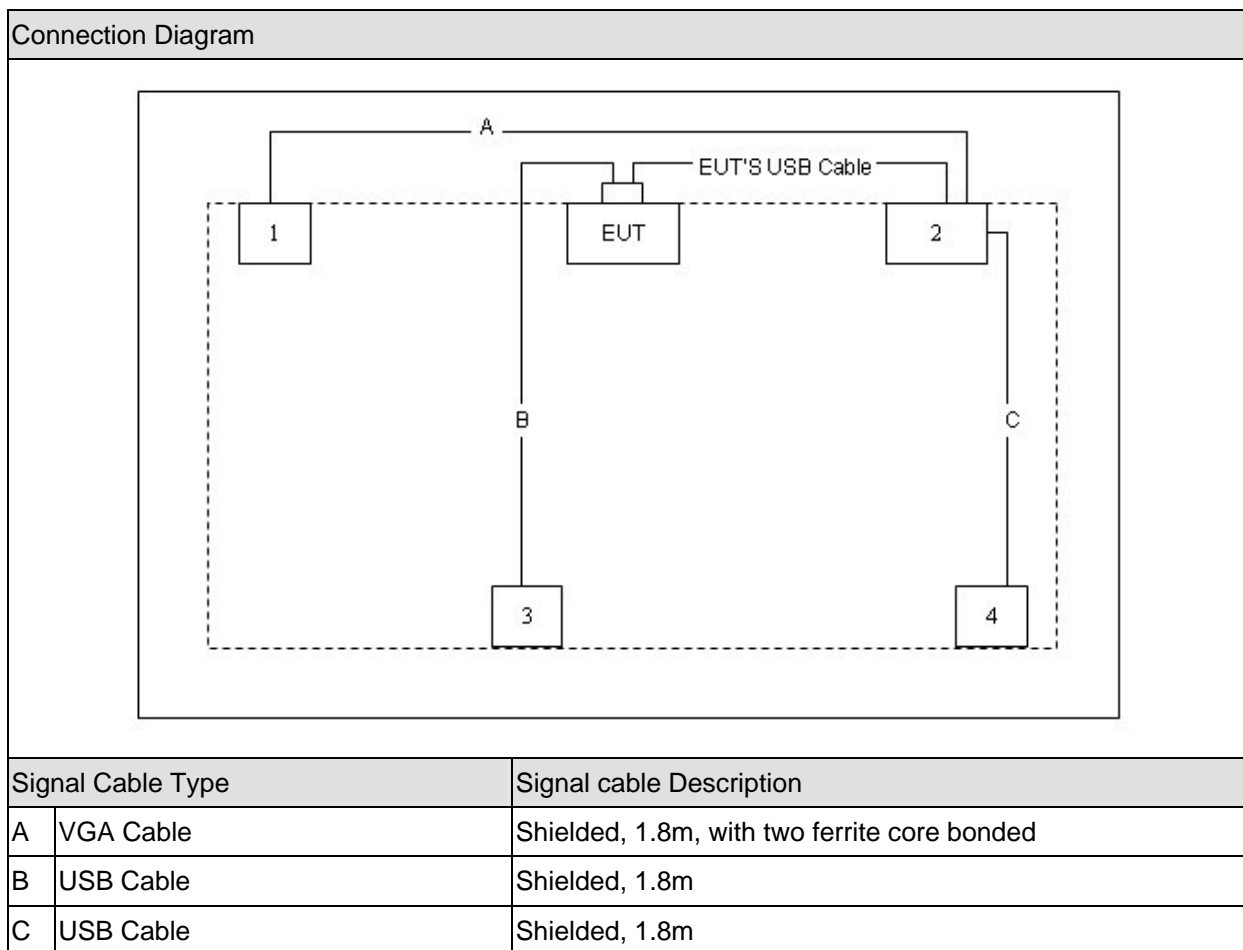
1. DH5 is for GFSK modulation, and 3DH5 is for 8DPSK.
2. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
3. For portable device, radiated spurious emission was verified over X, Y, Z axis, and shown the worst case on this report.
4. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is 125S089R-RF-US-P01V03.

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 LCD Monitor	DELL	U2410f	CN-OJ257M-72872-99E-1KJL	Non-Shielded, 1.8m
2 Laptop PC	Asus	N80V	8BN0AS226971468	Non-Shielded, 1.8m
3 iPod	Apple	A1199	6U715YGEVQ5	Power by PC
4 USB Mouse	DELL	MOC5UO	10D00JL	Power by PC

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run the RF test software "Bluetool", and set the test mode and channel, then press OK to start continue transmit.

2. Technical Test

2.1. Summary of Test Result

No deviations from the test standards

Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.207 RSS-Gen Issue 3 December 2010 Section 7.2.2	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.209 RSS-210 Issue 8 December 2010 Section 2.7 Table 2 and Table 3	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.247(a)(1) RSS-210 Issue 8 December 2010 Section A8.1	Yes	No
99% Occupied Bandwidth	RSS-Gen Issue 3 June 2010 Section 4.6.1	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.247(a)(1) RSS-210 Issue 8 December 2010 Section A8.1	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.247(a)(1)(iii) RSS-210 Issue 8 December 2010 Section A8.1	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.247(a)(1)(iii) RSS-210 Issue 8 December 2010 Section A8.1	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.247(b)(1) RSS-210 Issue 8 December 2010 Section A8.4	Yes	No
Band-edge Compliance of RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2011 Section 15.215(c), 15.247(d)	Yes	No
Spurious RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2011 15.247(d) RSS-210 Issue 8 December 2010 Section A8.5	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2011 15.247(d) RSS-210 Issue 8 December 2010 Section A8.5	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

3. Conducted Emission

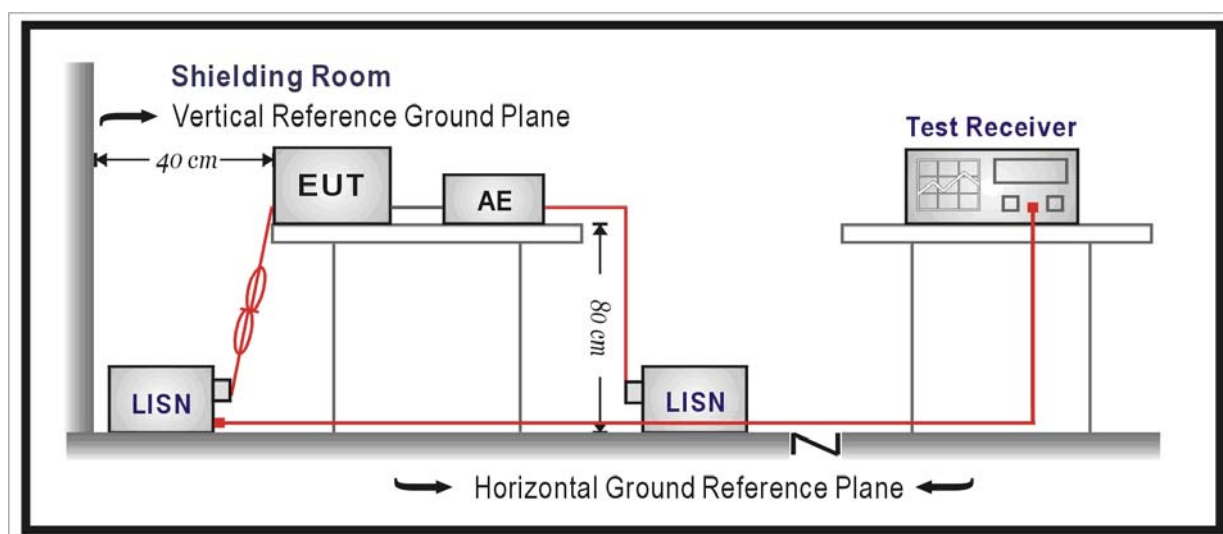
3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2013.04.18
Two-Line V-Network	R&S	ENV216	101043	2013.04.18
Two-Line V-Network	R&S	ENV216	101044	2012.09.07
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.05.04
50ohm Termination	SHX	TF2	07081401	2012.09.22
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2013.01.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

3.4. Test Procedure

According to FCC ANSI C63.4: 2009 & ANSI C63.10: 2009.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

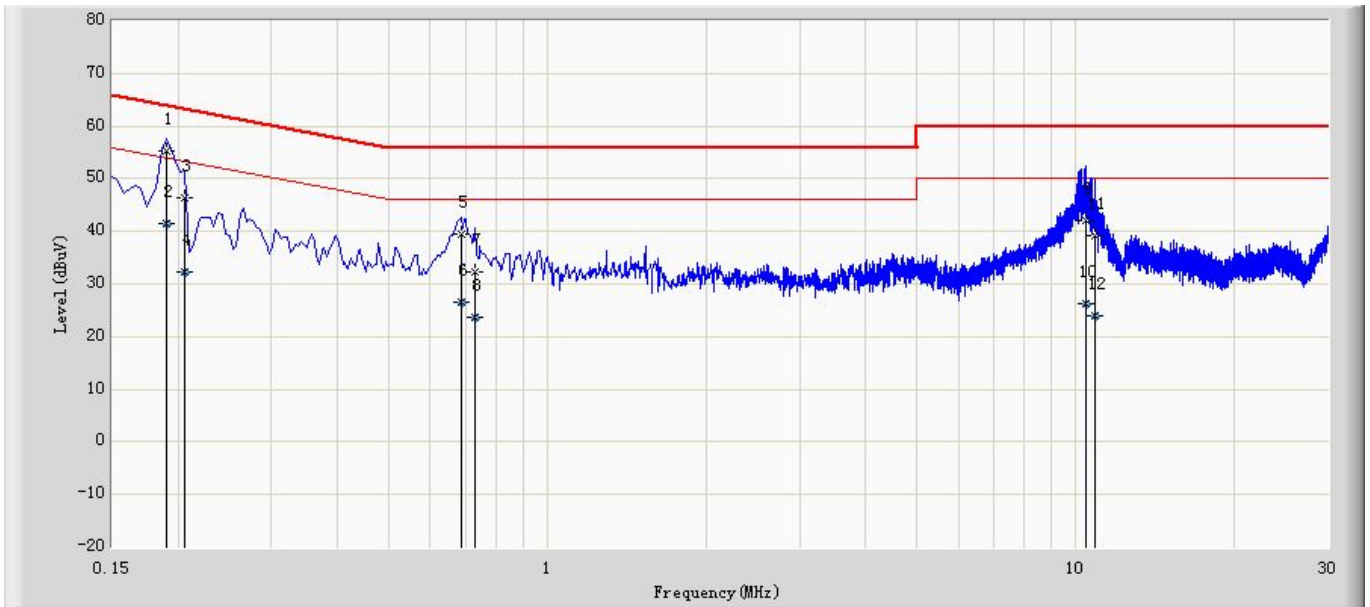
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

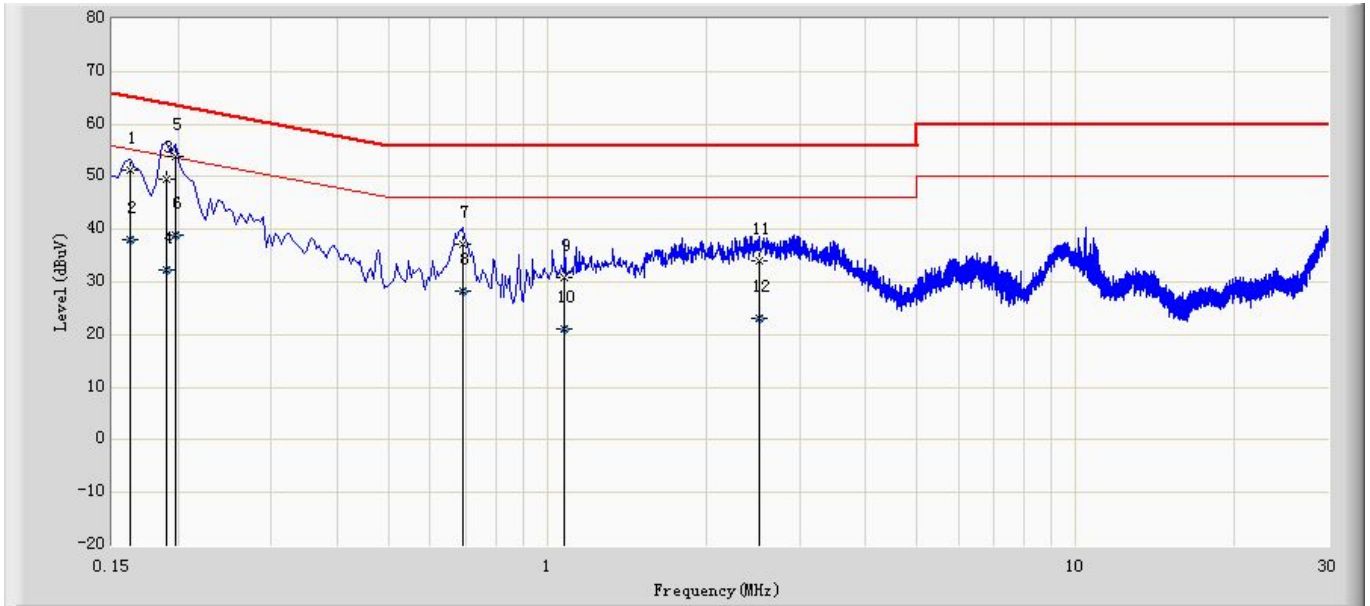
3.6. Test Result

Engineer: Aileen	
Site: TR1	Time: 2012/06/07 - 09:23
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: Bluetooth headset	Power: AC 120V/60Hz
Note: Mode 1: Transmit at channel 2402MHz with PC	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1	*	0.190	55.212	45.354	-8.824	64.037	9.858	QP
2		0.190	41.622	31.764	-12.415	54.037	9.858	AV
3		0.206	46.237	36.376	-17.128	63.365	9.861	QP
4		0.206	32.216	22.356	-21.149	53.365	9.861	AV
5		0.686	39.390	29.545	-16.610	56.000	9.845	QP
6		0.686	26.608	16.763	-19.392	46.000	9.845	AV
7		0.730	32.298	22.463	-23.702	56.000	9.836	QP
8		0.730	23.712	13.876	-22.288	46.000	9.836	AV
9		10.450	42.166	32.162	-17.834	60.000	10.004	QP
10		10.450	26.233	16.228	-23.767	50.000	10.004	AV
11		10.842	39.229	29.211	-20.771	60.000	10.018	QP
12		10.842	23.911	13.893	-26.089	50.000	10.018	AV

Engineer: Aileen	
Site: TR1	Time: 2012/06/07 - 09:30
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: Bluetooth headset	Power: AC 120V/60Hz
Note: Mode 1: Transmit at channel 2402MHz with PC	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.162	51.335	41.349	-14.026	65.361	9.986	QP
2		0.162	37.946	27.961	-17.414	55.361	9.986	AV
3		0.190	49.407	39.480	-14.630	64.037	9.926	QP
4		0.190	32.377	22.450	-21.660	54.037	9.926	AV
5	*	0.198	53.904	43.982	-9.790	63.694	9.922	QP
6		0.198	38.809	28.888	-14.885	53.694	9.922	AV
7		0.694	37.277	27.392	-18.723	56.000	9.885	QP
8		0.694	28.278	18.393	-17.722	46.000	9.885	AV
9		1.078	30.739	20.707	-25.261	56.000	10.031	QP
10		1.078	21.223	11.191	-24.777	46.000	10.031	AV
11		2.522	34.047	24.071	-21.953	56.000	9.976	QP
12		2.522	23.023	13.047	-22.977	46.000	9.976	AV

4. Radiated Emission

4.1. Test Equipment

Radiated Emission / AC-2

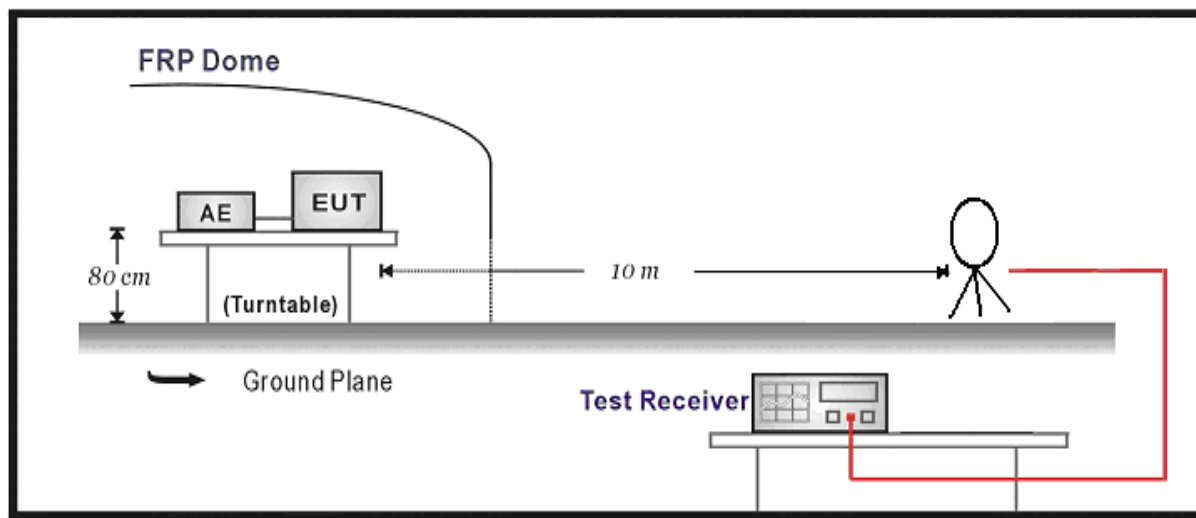
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Loop Antenna	R&S	HFH2-Z2	833799/003	2012.11.22
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2012.10.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.01.10

Radiated Emission / AC-5

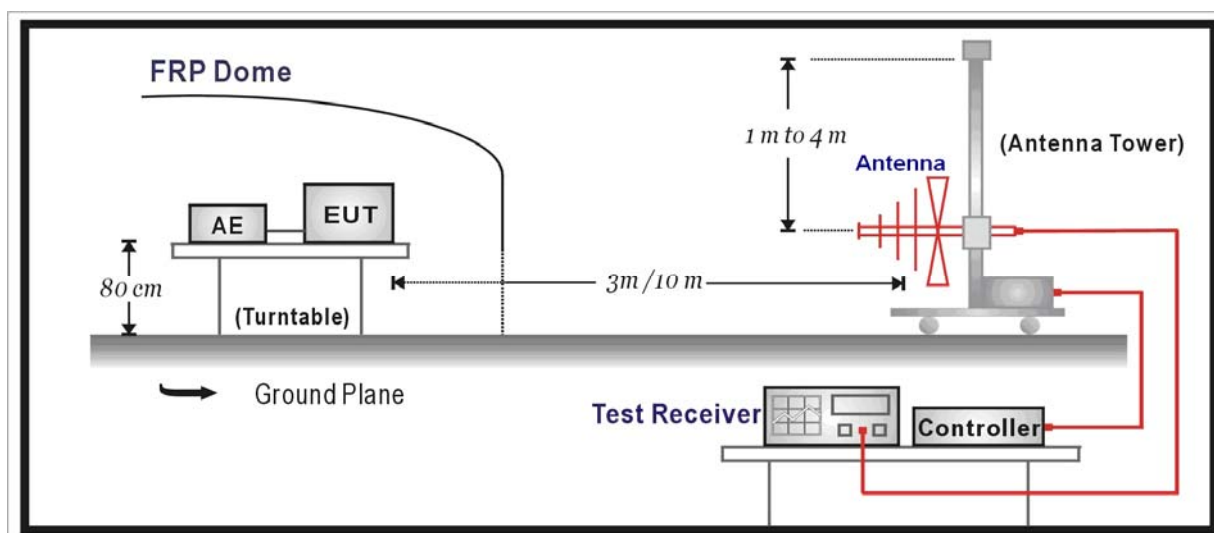
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2013.01.10

4.2. Test Setup

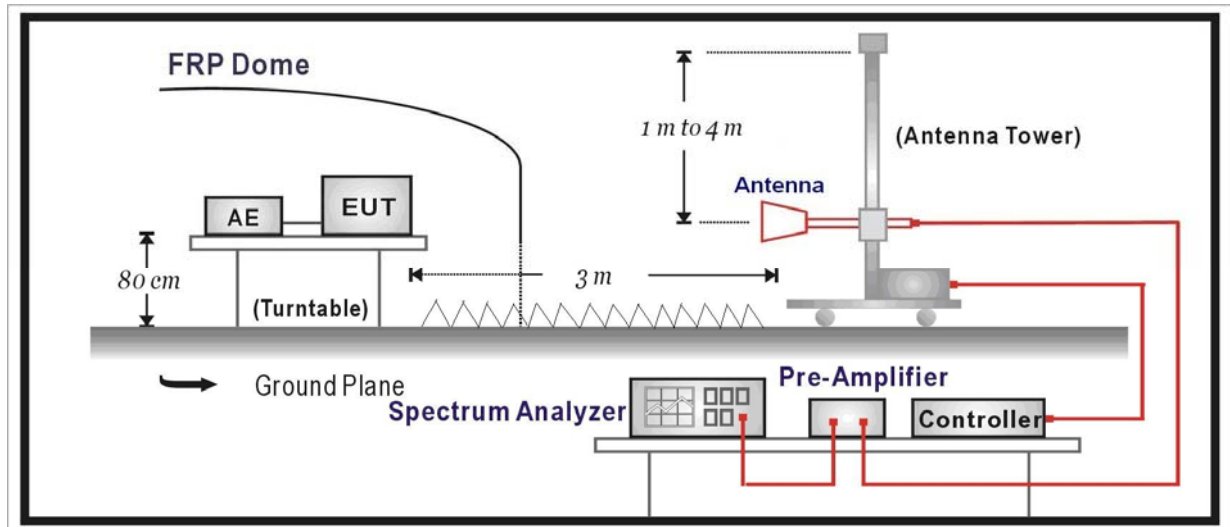
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the

maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
below 1G is defined as ± 3.8 dB

4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor – Preamplifier Gain

Mode 1: Transmitter-1Mbps(GFSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	V	2401.9	63.3	31.2	94.5	Fundamental	/	PK
	H	31.8	4.6	27.3	31.9	40	-8.1	QP
	H	636.9	4.7	29.1	33.8	46	-12.2	QP
	H	3201.5	59.6	-15.9	43.7	54(Note3)	-10.3	PK
	H	4799.5	66.6	-11.9	54.7	74	-19.3	PK
	H	4799.0	58.5	-11.9	46.6	54	-7.4	AV
	H	7260.0	47.6	-3.3	44.3	54(Note3)	-9.7	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
39	H	2441.0	64.2	31.2	95.4	Fundamental	/	PK
	H	434.6	6.2	27.1	33.3	46	-12.7	QP
	V	772.3	5.6	31.7	37.3	46	-8.7	QP
	V	3210.0	58.4	-15.9	42.5	54(Note3)	-11.5	PK
	V	4884.5	67.9	-11.7	56.2	74	-17.8	PK
	V	4884.0	59.3	-11.7	47.6	54	-6.4	AV
	H	7323.0	47.7	-3.0	44.7	54(Note3)	-9.3	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
78	V	2479.9	64.1	31.2	95.3	Fundamental	/	PK
	V	239.9	4.4	25.7	30.1	46	-15.9	QP
	V	552.5	6.0	28.0	34.0	46	-12.0	QP
	V	3201.5	56.3	-15.9	40.4	54(Note3)	-13.6	PK
	V	4961.0	72.3	-11.4	60.9	74	-13.1	PK
	V	4960.0	63.4	-11.4	52.0	54	-2.0	AV
	V	7440.0	47.3	-2.6	44.7	54(Note3)	-9.3	PK
	V	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average

limit, then average measurement needn't be performed.

Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	V	2402.0	66.1	31.2	97.3	Fundamental	/	PK
	H	625.0	5.5	29.1	34.6	46	-11.4	QP
	V	636.4	6.7	27.9	34.6	46	-11.4	QP
	H	3201.5	59.5	-15.9	43.6	54(Note3)	-10.4	PK
	H	4799.5	67.8	-11.9	55.9	74	-18.1	PK
	H	4799.0	56.8	-11.9	44.9	54	-9.1	AV
	V	7260.0	47.7	-3.3	44.4	54(Note3)	-9.6	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
39	H	2441.0	66.8	31.2	98.0	Fundamental	/	PK
	V	455.2	5.5	26.5	32.0	46	-14.0	QP
	H	521.1	6.5	28.0	34.5	46	-11.5	QP
	H	3201.5	59.2	-15.9	43.3	54(Note3)	-10.7	PK
	H	4884.5	68.2	-11.7	56.5	74	-17.5	PK
	H	4884.0	56.5	-11.7	44.8	54	-9.2	AV
	V	7323.0	47.0	-3.0	44.0	54(Note3)	-10.0	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
78	V	2479.9	66.6	31.2	97.8	Fundamental	/	PK
	V	544.1	6.4	27.8	34.2	46	-11.8	QP
	H	677.0	6.5	28.7	35.2	46	-10.8	QP
	H	3201.5	55.3	-15.9	39.4	54(Note3)	-14.6	PK
	H	4961.0	70.2	-11.4	58.8	74	-15.2	PK
	H	4961.0	59.2	-11.4	47.8	54	-6.2	AV
	V	7440.0	47.7	-2.6	45.1	54(Note3)	-8.9	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 3: Transmitter-3Mbps(8DPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	V	2402.0	66.2	31.2	97.4	Fundamental	/	PK
	H	419.8	5.1	27.0	32.0	46	-14.0	QP
	V	556.3	5.2	28.0	33.2	46	-12.8	QP
	H	3201.5	58.7	-15.9	42.8	54(Note3)	-11.2	PK
	H	4799.5	67.6	-11.9	55.7	74	-18.3	PK
	H	4799.0	54.1	-11.9	42.2	54	-11.8	AV
	H	7260.0	47.4	-3.3	44.1	54(Note3)	-9.9	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
39	H	2441.0	66.9	31.2	98.1	Fundamental	/	PK
	V	544.1	5.2	27.8	33.0	46	-13.0	QP
	H	574.9	5.9	28.8	34.7	46	-11.3	QP
	H	3193.0	57.7	-15.9	41.8	54(Note3)	-12.2	PK
	H	4884.5	68.6	-11.7	56.9	74	-17.1	PK
	H	4884.0	57.6	-11.7	45.9	54	-8.1	AV
	V	7323.0	47.0	-3.0	44.0	54(Note3)	-10.0	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK
78	V	2479.9	67.1	31.2	98.3	Fundamental	/	PK
	V	554.8	5.5	28.1	33.6	46	-12.4	QP
	H	684.1	5.8	29.2	35.0	46	-11.0	QP
	H	3201.5	56.9	-15.9	41.0	54(Note3)	-13.0	PK
	H	4961.0	70.9	-11.4	59.5	74	-14.5	PK
	H	4961.0	57.3	-11.4	45.9	54	-8.1	AV
	V	7440.0	47.0	-2.6	44.4	54(Note3)	-9.6	PK
	H	24000.0	59.1	-8.9	50.2	54(Note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

5. 20dB Bandwidth

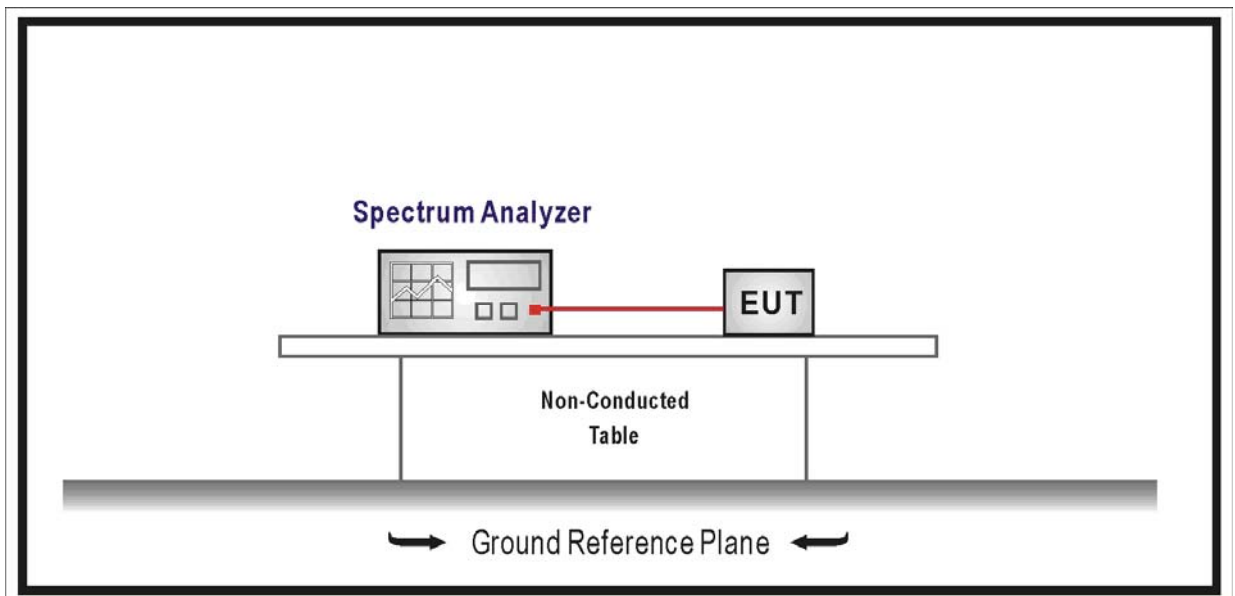
5.1. Test Equipment

20dB Bandwidth / TR8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2. Test Setup



5.3. Limit

- For frequency hopping systems operating in 2400-2483.5 MHz band, no limitation.
- For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

5.4. Test Procedure

According to ANSI C63.10: 2009.

Use the following spectrum analyzer settings:

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

RBW \geq 1% of the 20dB bandwidth

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.

Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

5.5. Uncertainty

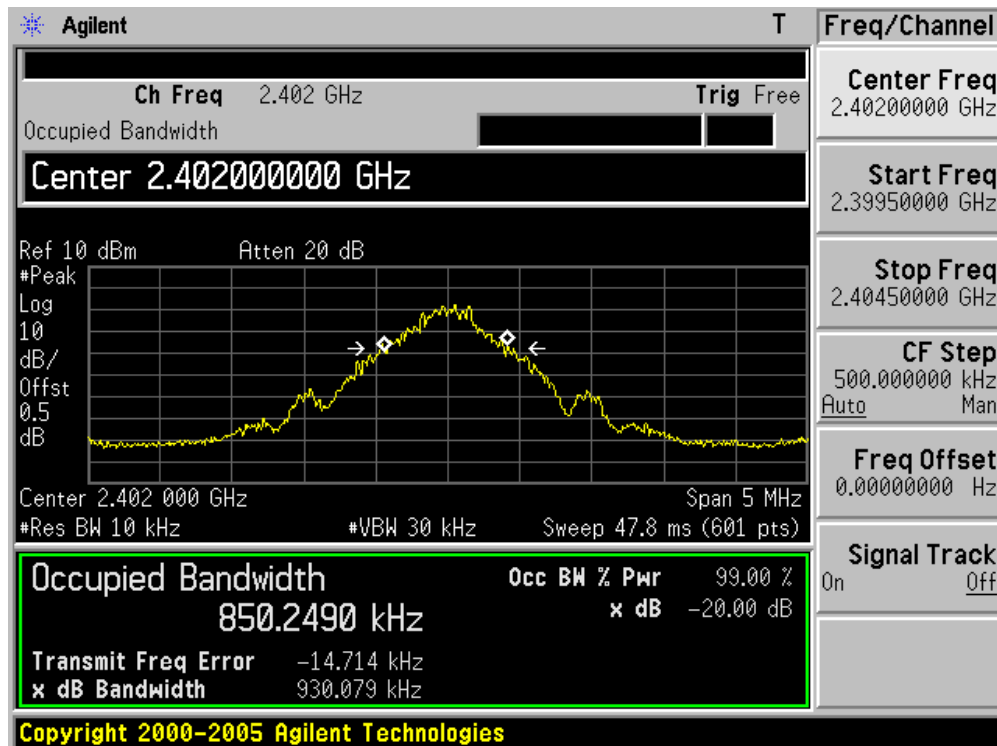
The measurement uncertainty is defined as ± 1 kHz

5.6. Test Result

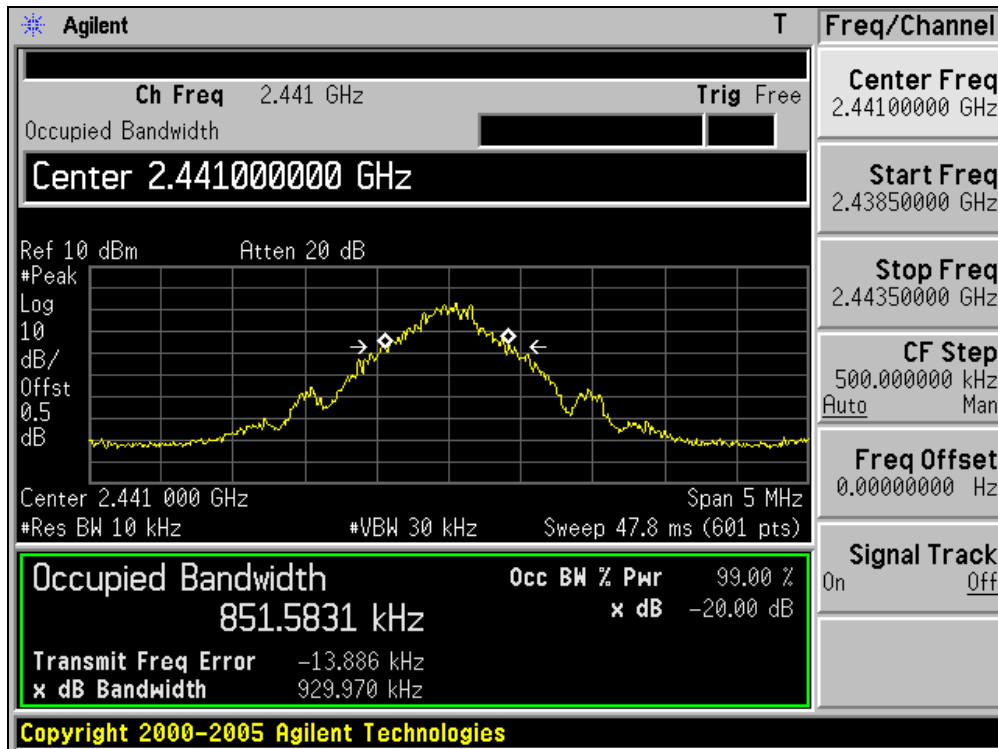
Product	:	Bluetooth headset
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	930.08	850.25
39	2441	929.97	851.58
78	2480	925.03	850.59

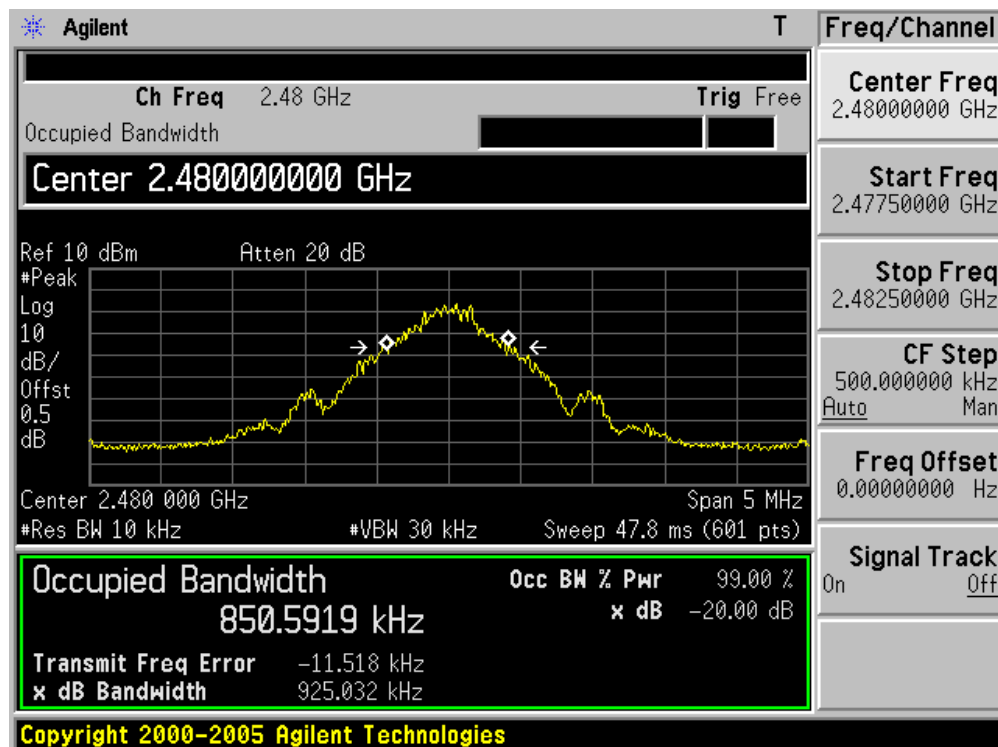
Channel 00 (2402MHz)



Channel 39 (2441MHz)



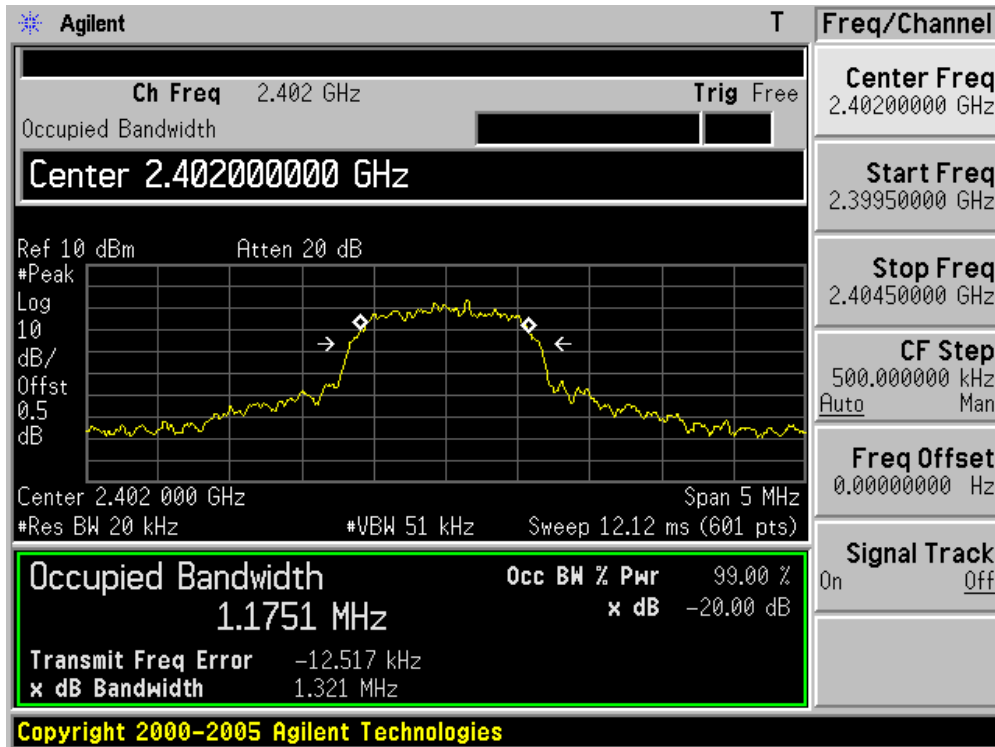
Channel 78 (2480MHz)



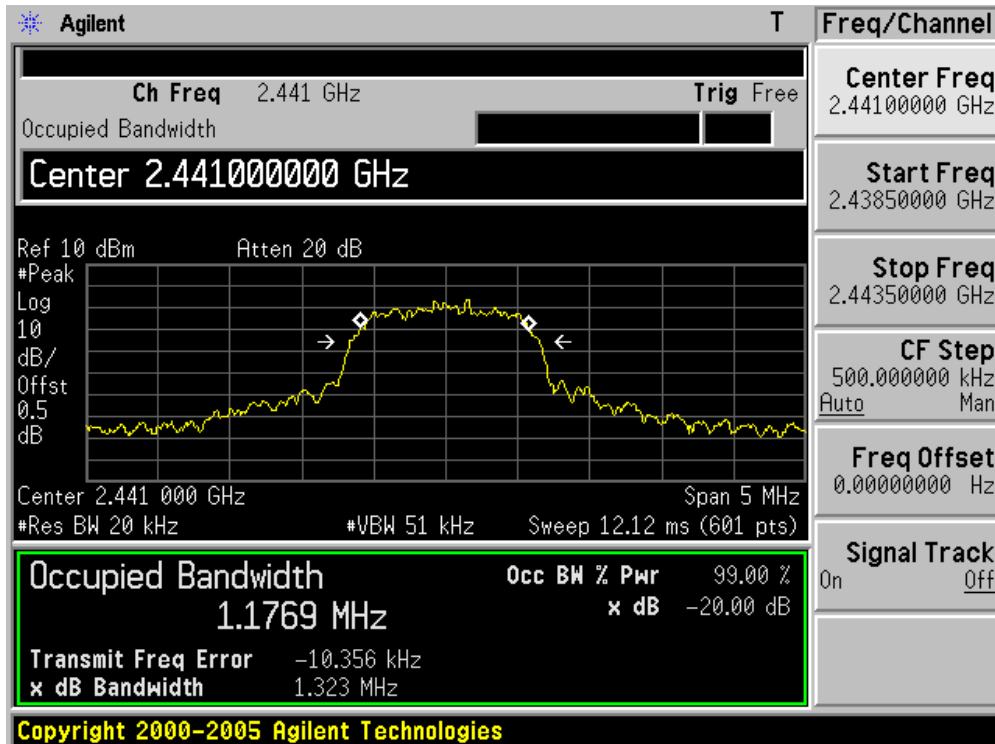
Product	:	Bluetooth headset
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1321.0	1175.1
39	2441	1323.0	1176.9
78	2480	1324.0	1176.5

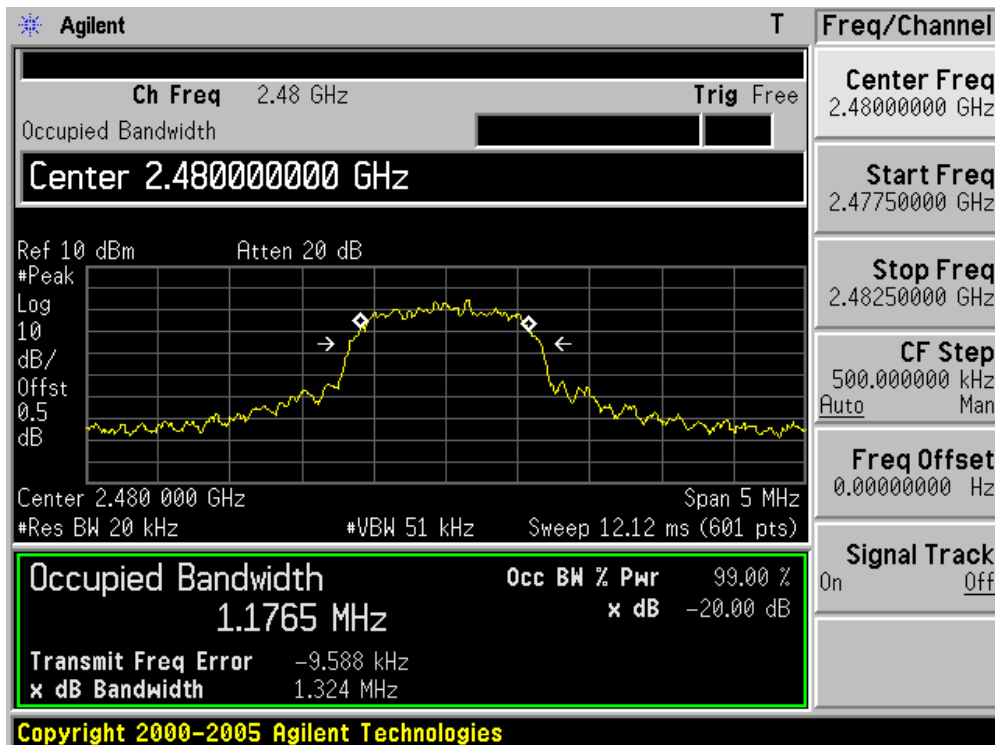
Channel 00 (2402MHz)



Channel 39 (2441MHz)



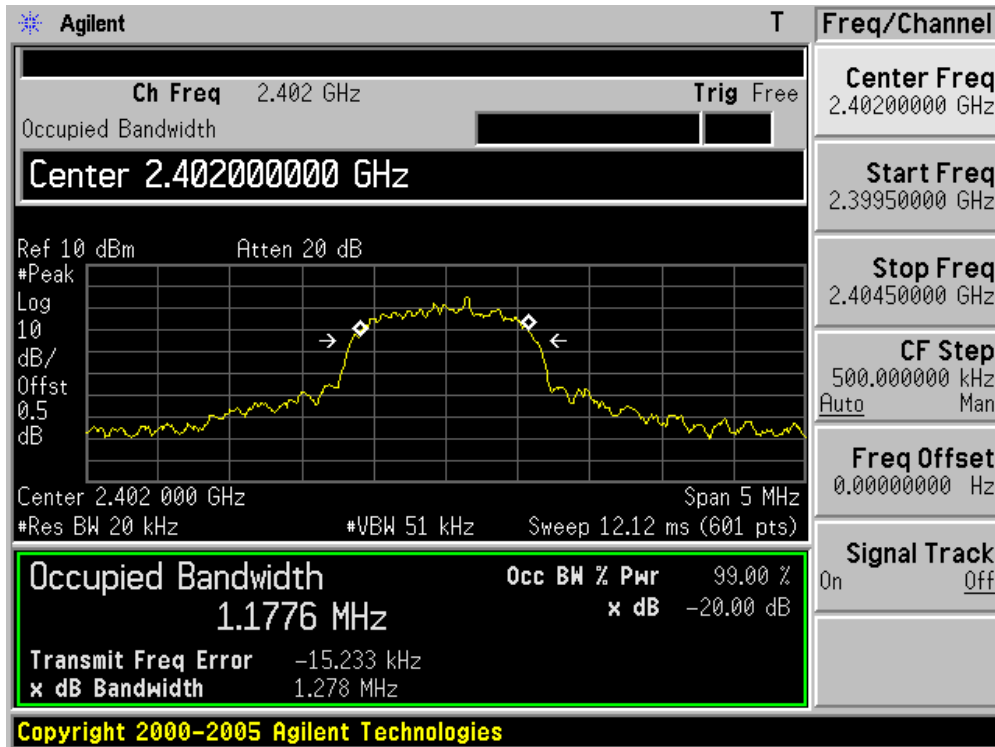
Channel 78 (2480MHz)



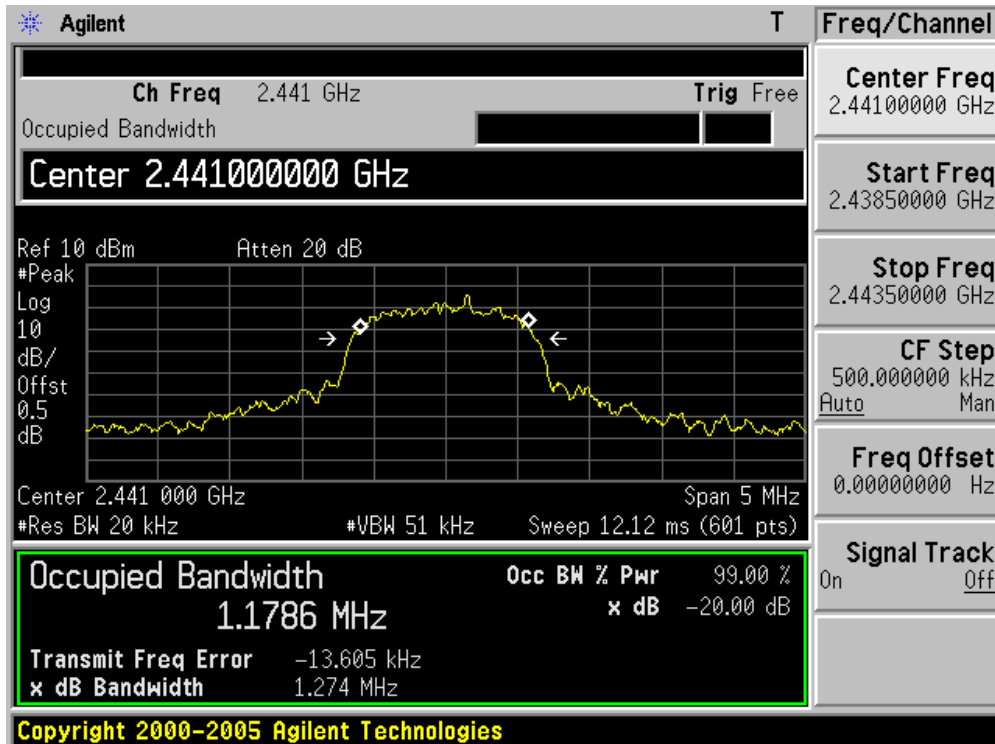
Product	:	Bluetooth headset
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1278.0	1177.6
39	2441	1274.0	1178.6
78	2480	1274.0	1177.7

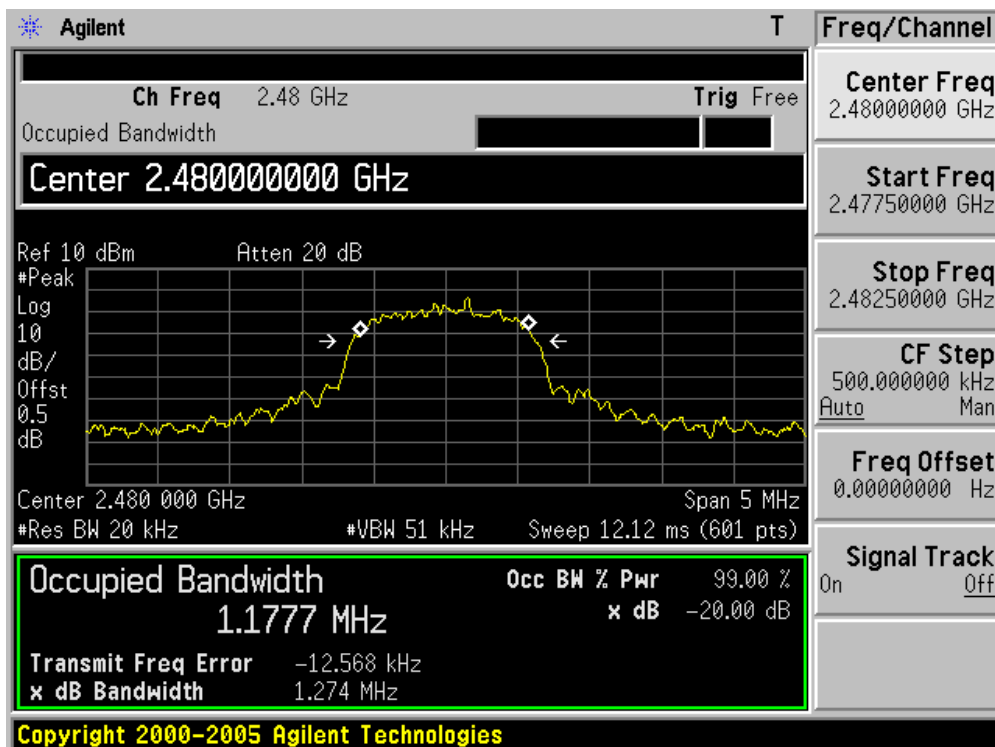
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



6. Carrier Frequency Separation

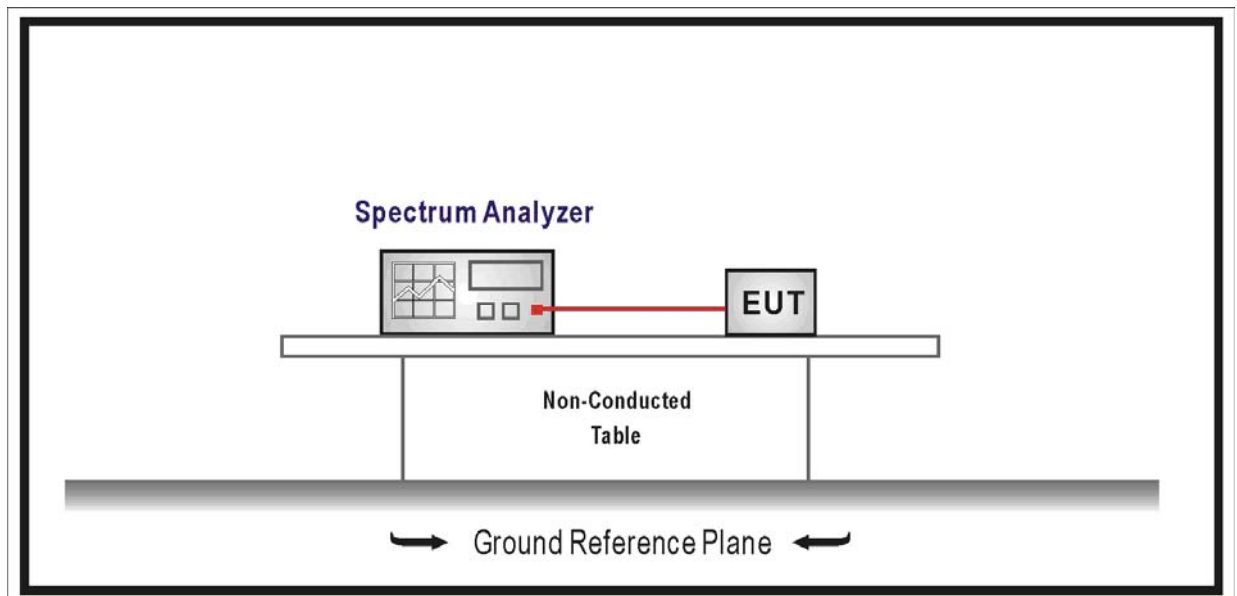
6.1. Test Equipment

Carrier Frequency Separation / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

6.2. Test Setup



6.3. Limit

- Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping

channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

6.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

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

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

Video (or Average) Bandwidth VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

6.5. Uncertainty

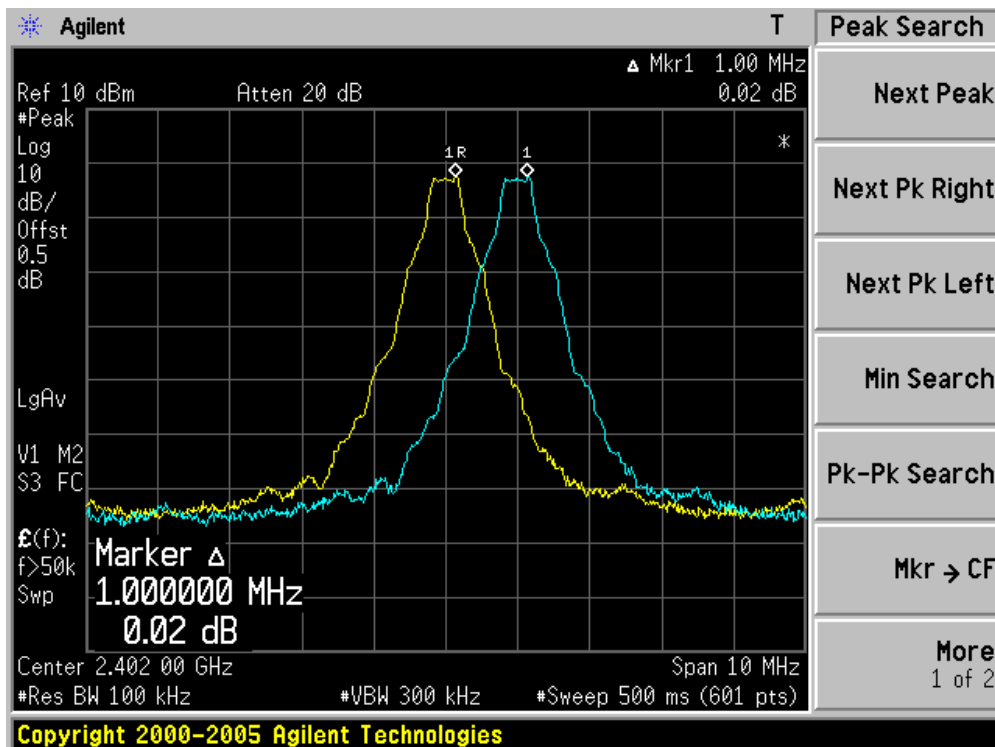
The measurement uncertainty is defined as ± 1 kHz

6.6. Test Result

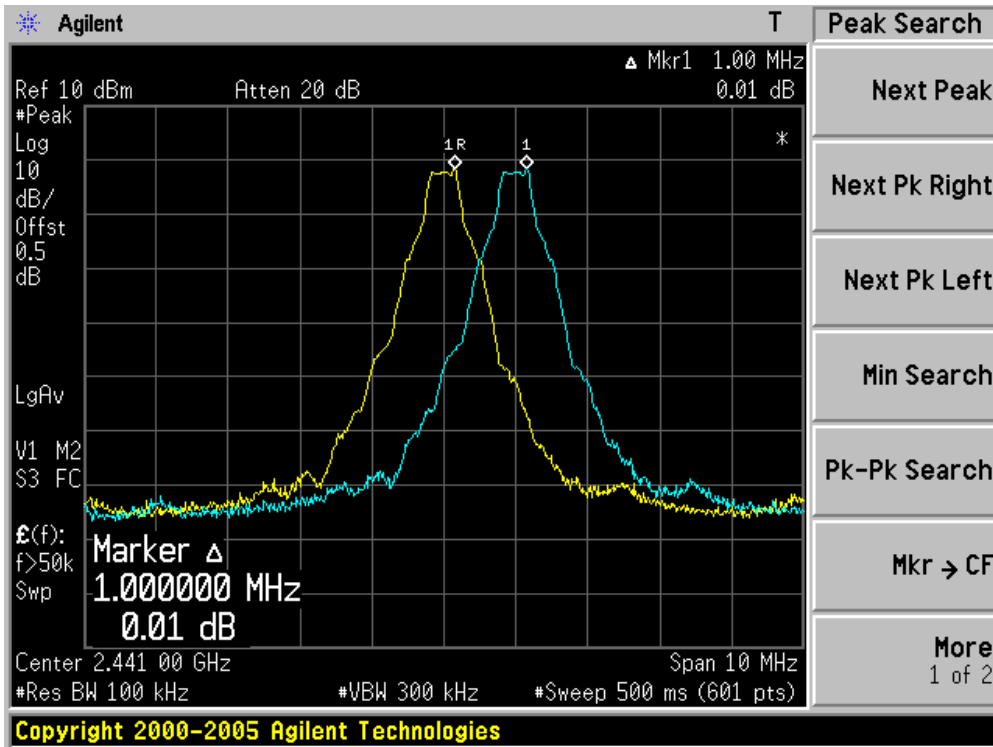
Product	:	Bluetooth headset
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

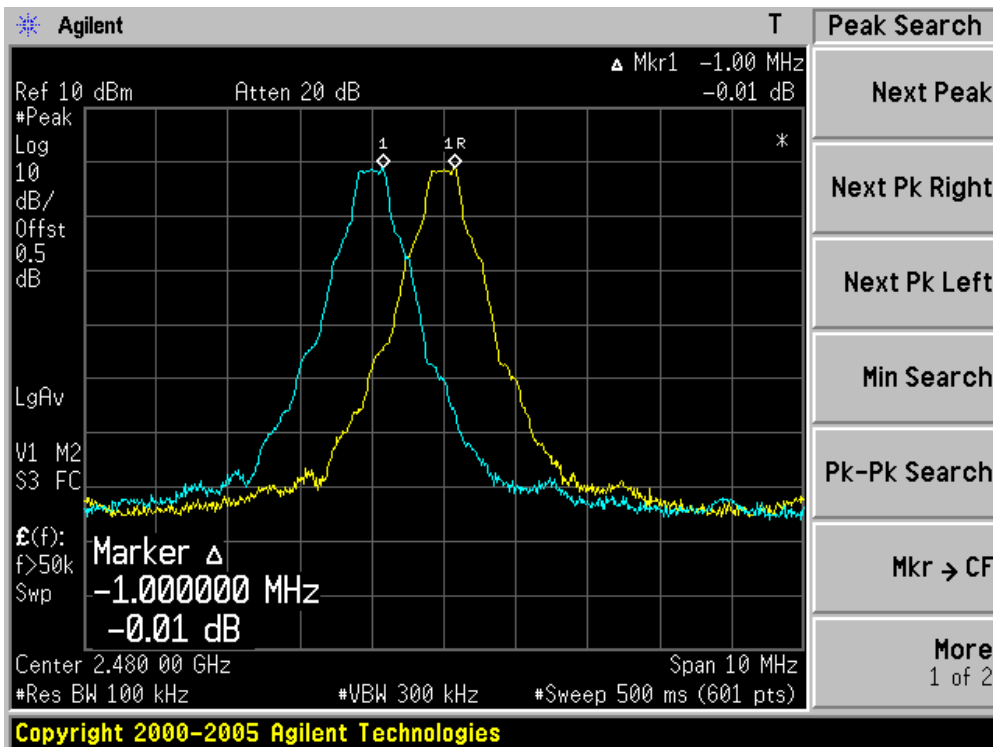
Channel 00 (2402MHz)



Channel 39 (2441MHz)



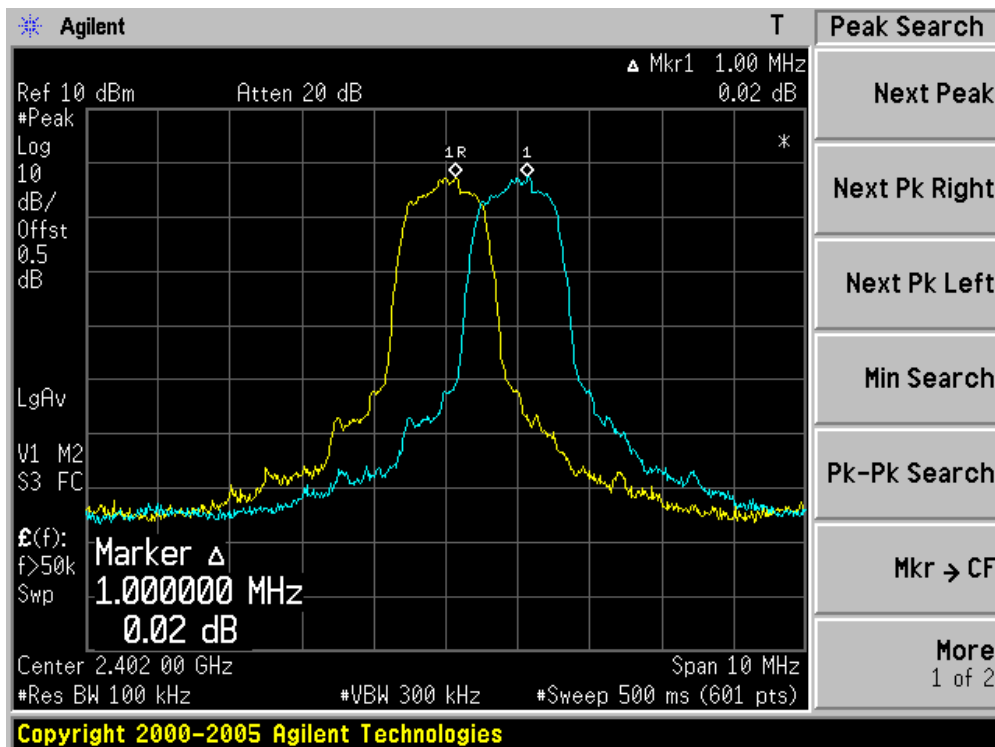
Channel 78 (2480MHz)



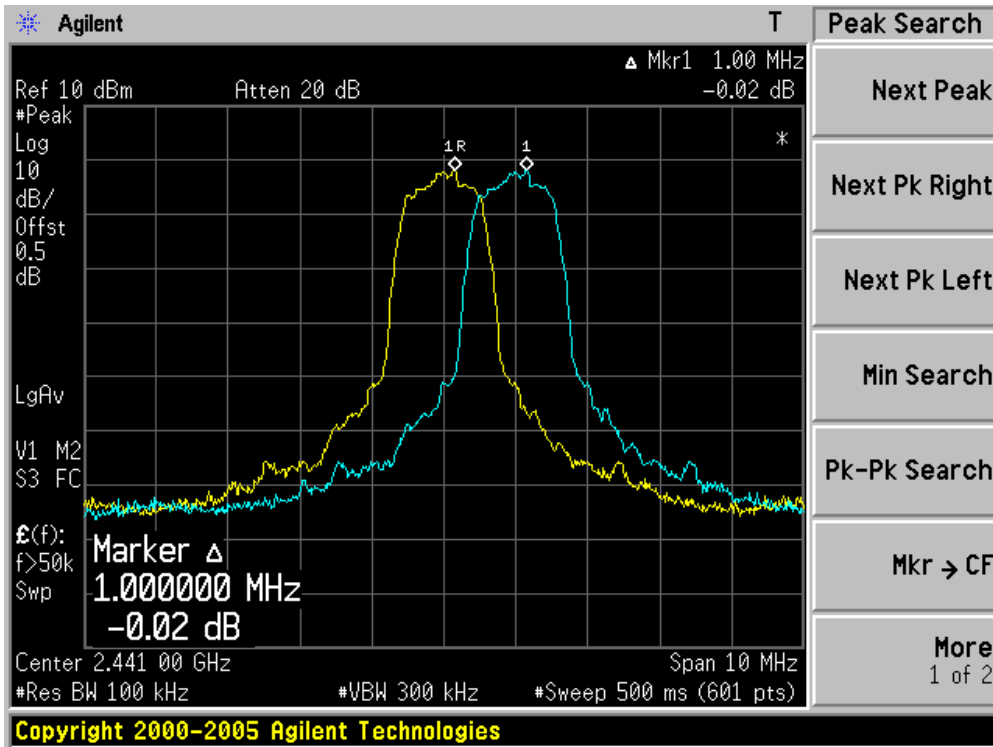
Product	:	Bluetooth headset
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

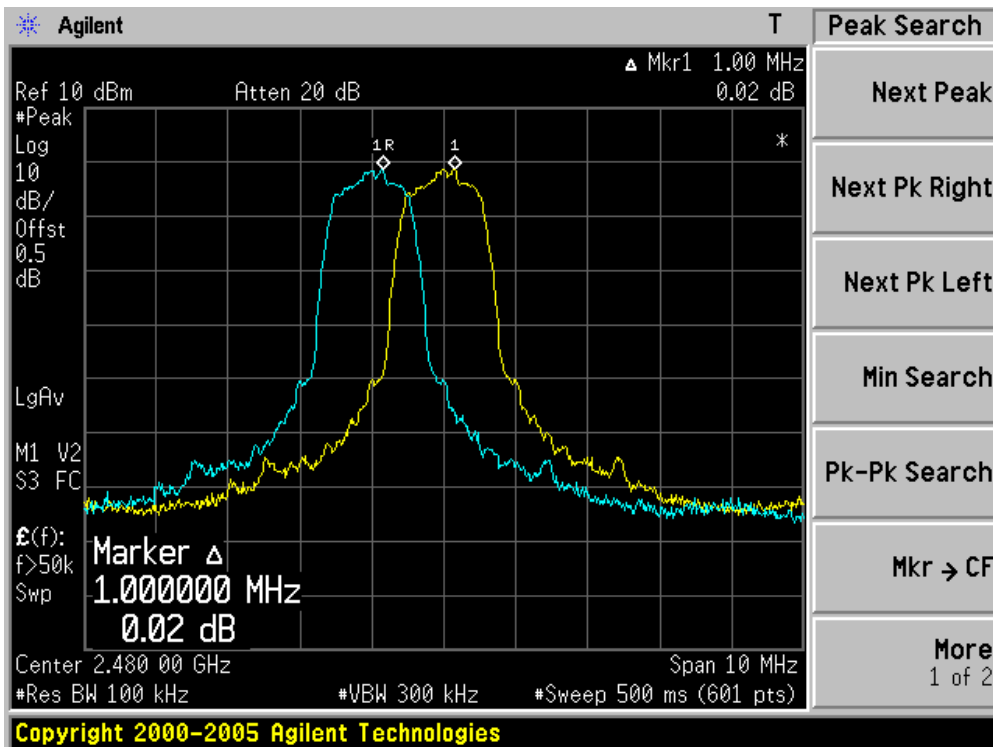
Channel 00 (2402MHz)



Channel 39 (2441MHz)



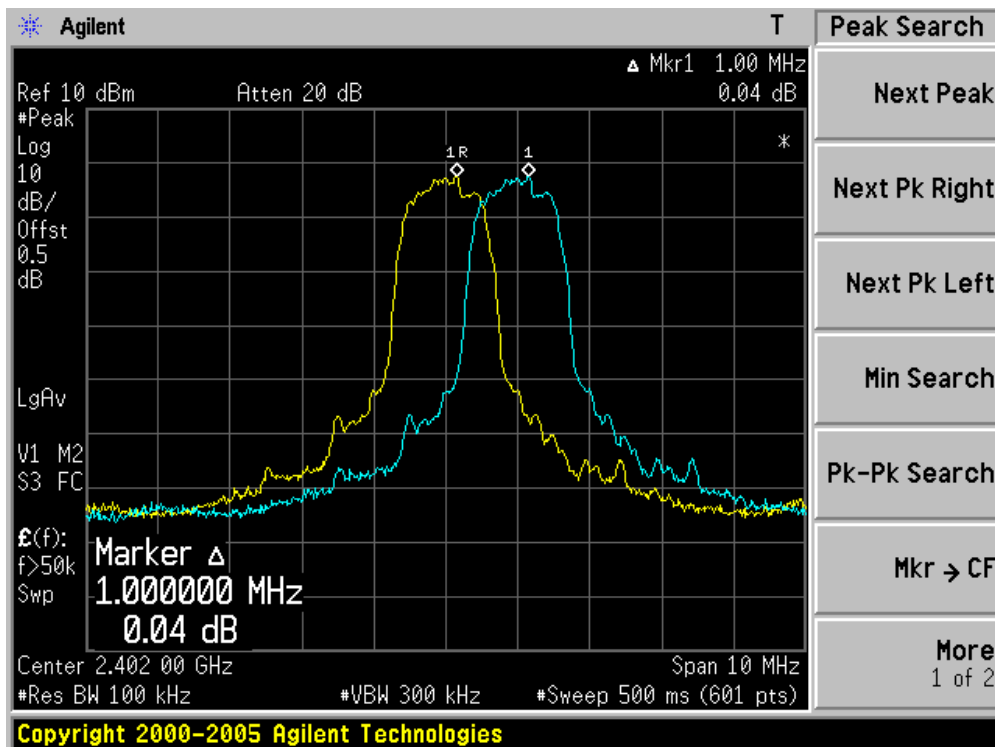
Channel 78 (2480MHz)



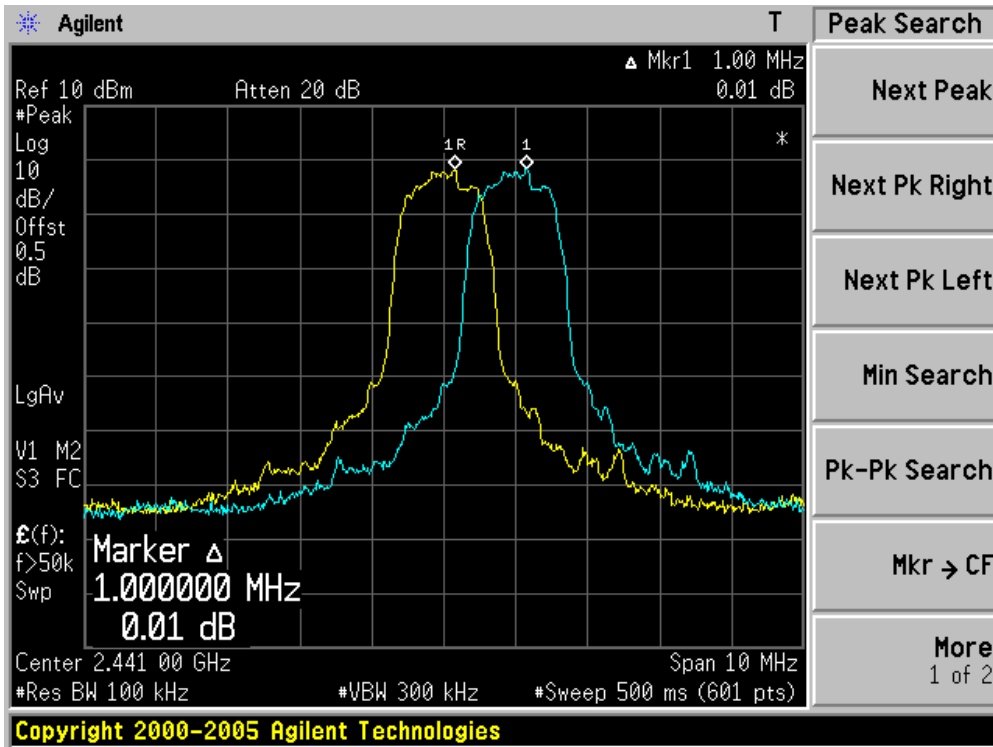
Product	:	Bluetooth headset
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

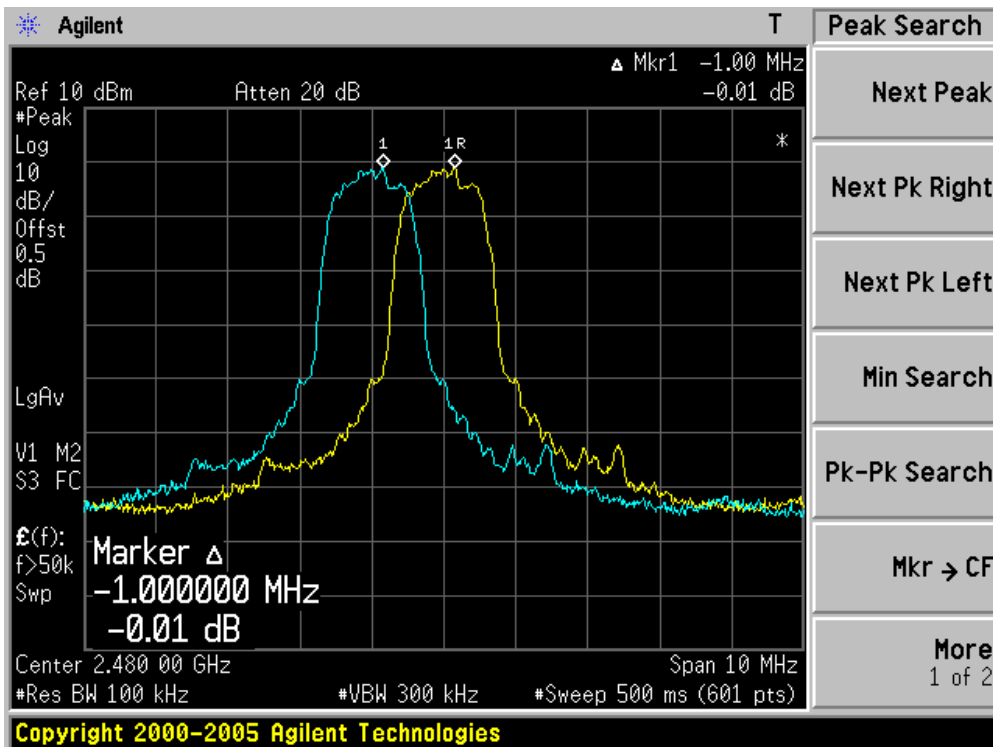
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



7. Number of Hopping Frequencies

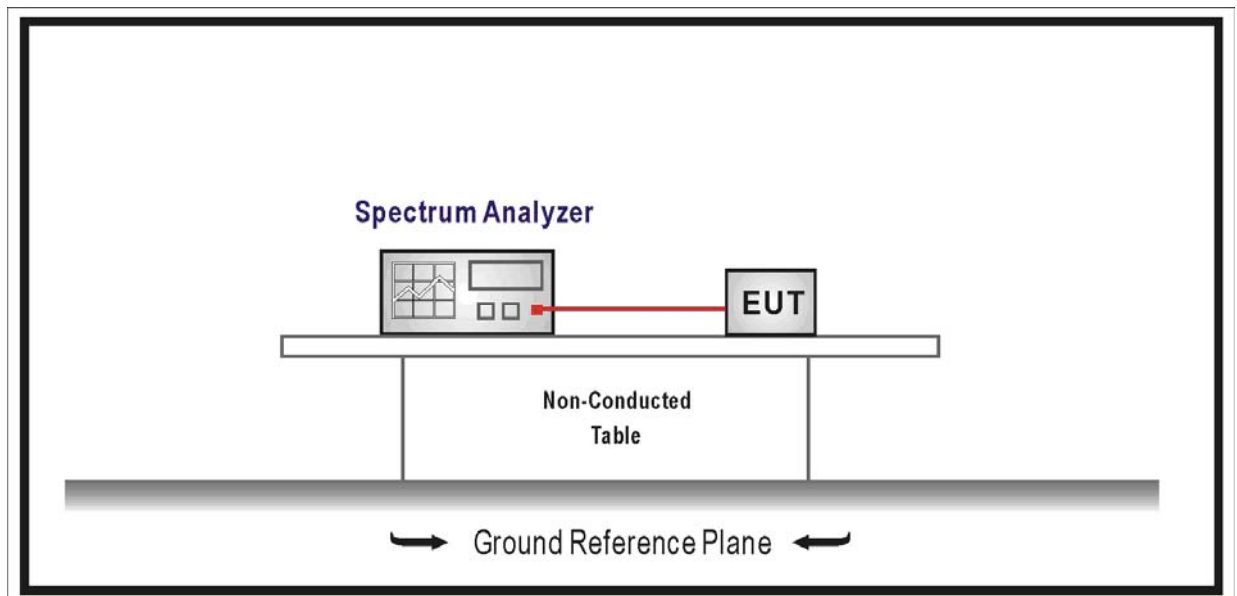
7.1. Test Equipment

Number of Hopping Frequencies / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
- For frequency hopping systems operating in 902-928 MHz band shall use at least 50 hopping frequencies.
- For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

7.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW \geq 1% of the span

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. It may prove necessary to bread the span up to sections, in order to clearly show all of the hopping frequencies.

7.5. Uncertainty

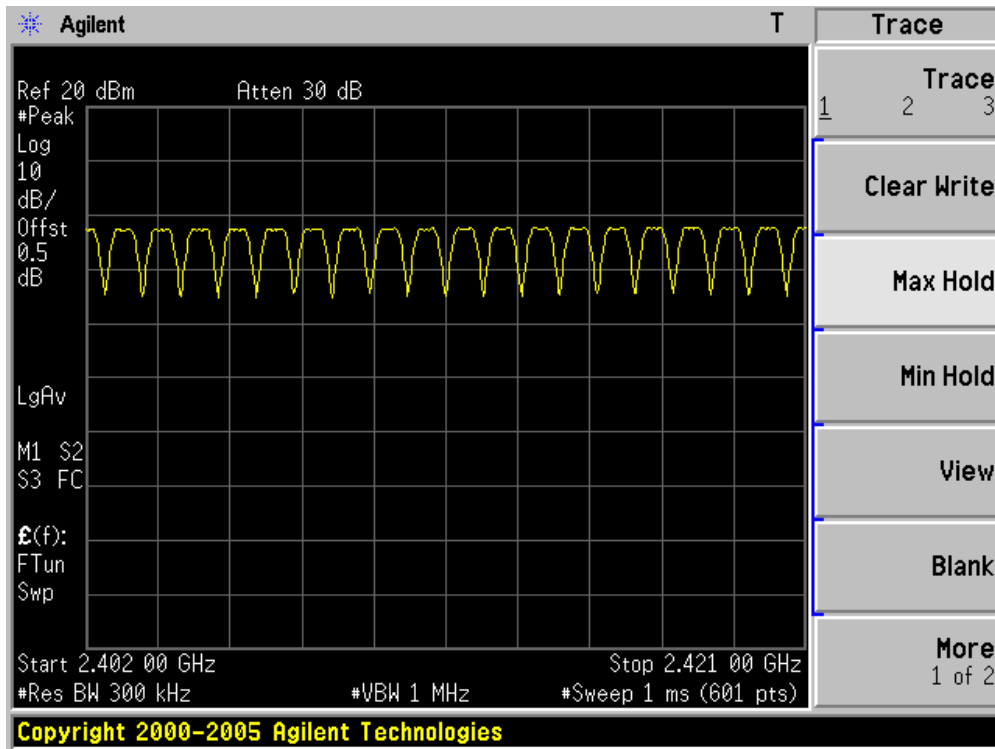
The measurement uncertainty is defined as ± 1 kHz

7.6. Test Result

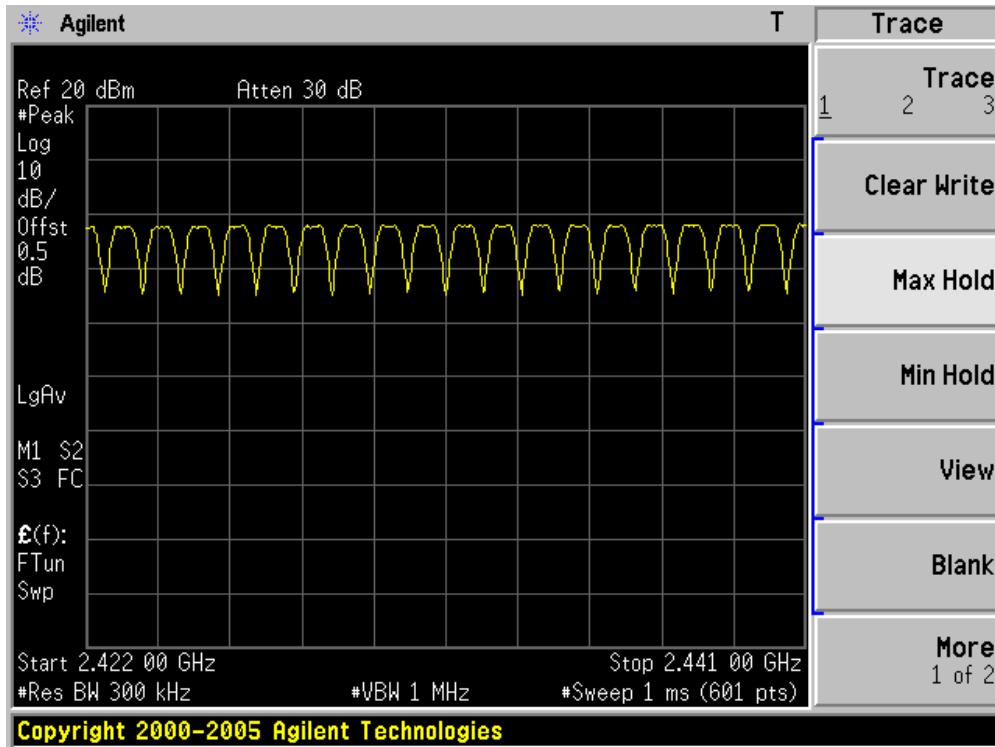
Product	:	Bluetooth headset
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

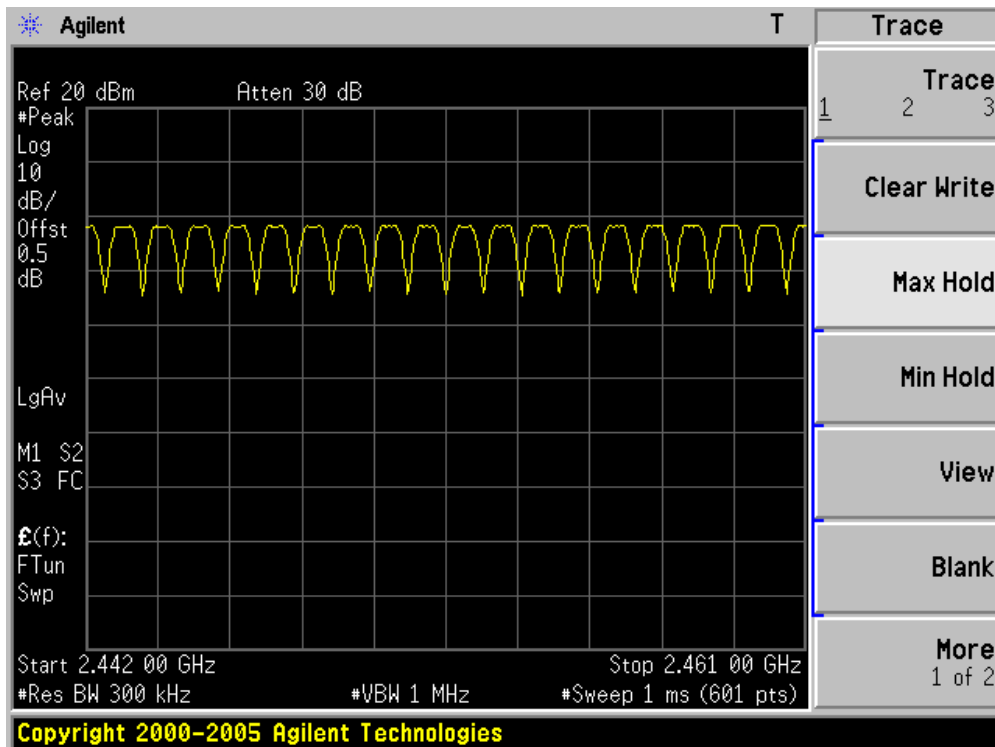
2402 - 2421 MHz



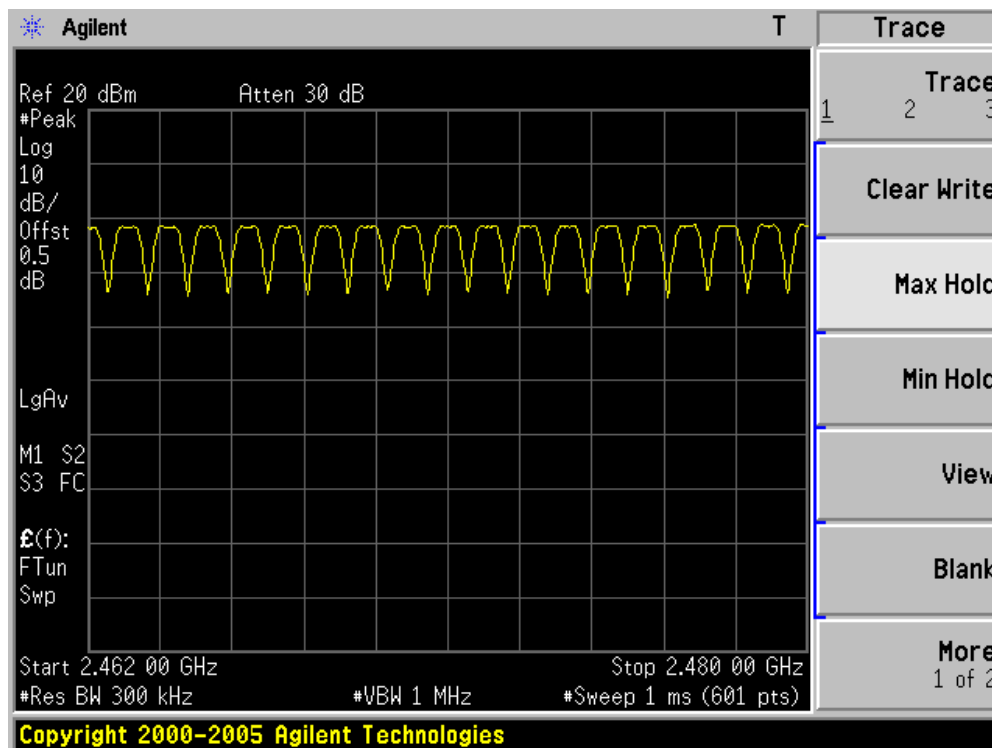
2422 - 2441 MHz



2442 - 2461 MHz



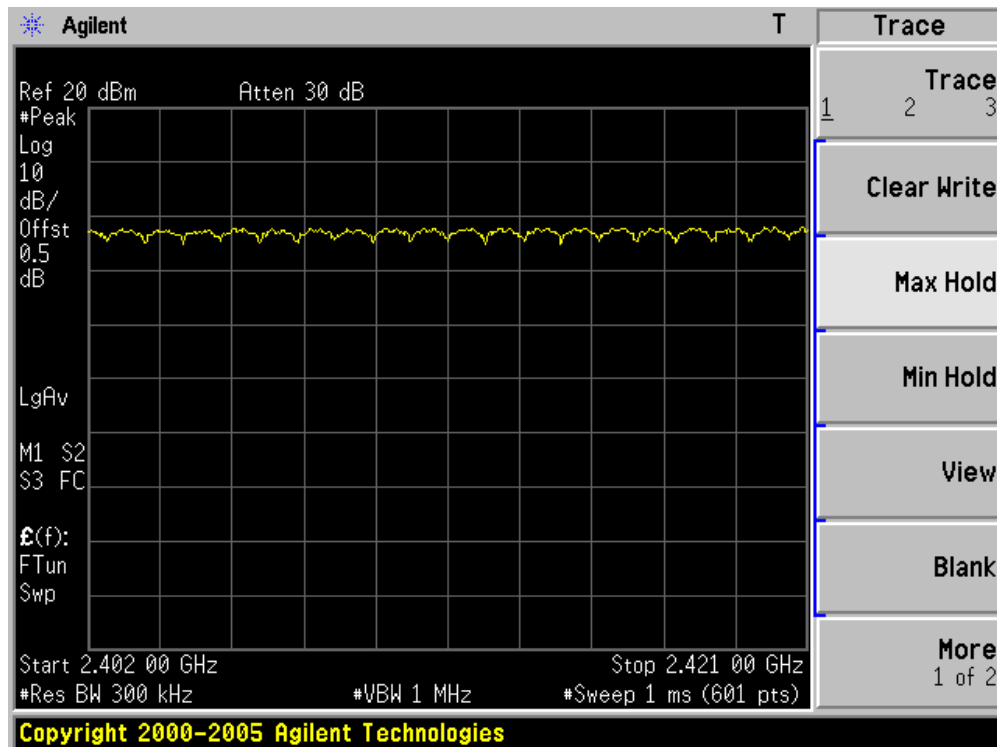
2462 - 2480 MHz



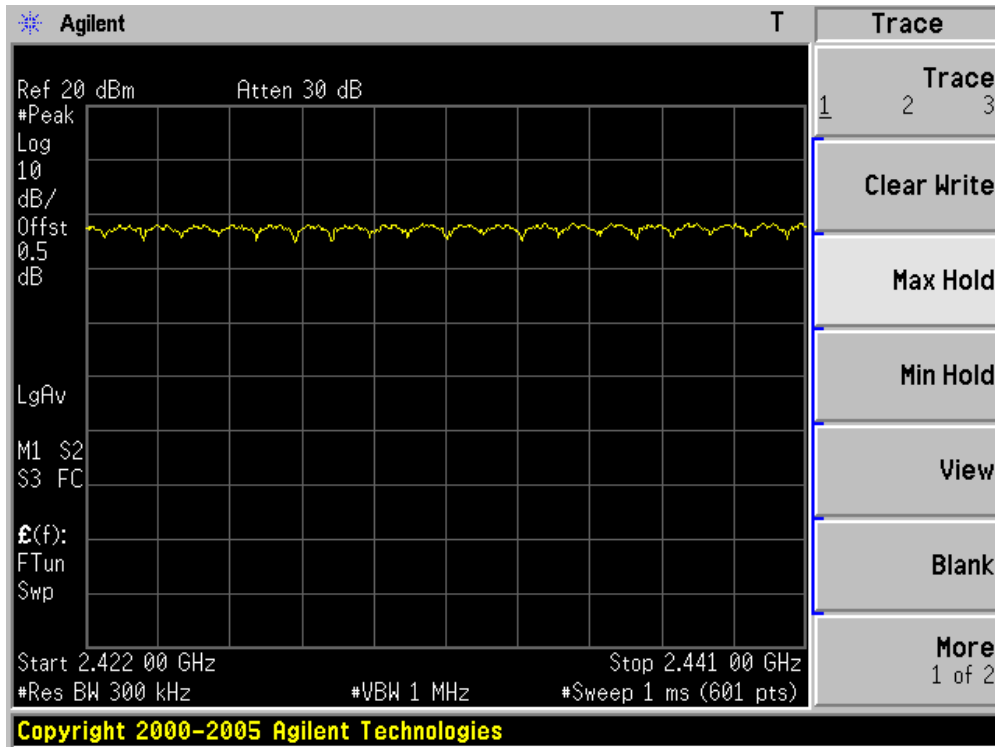
Product	:	Bluetooth headset
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

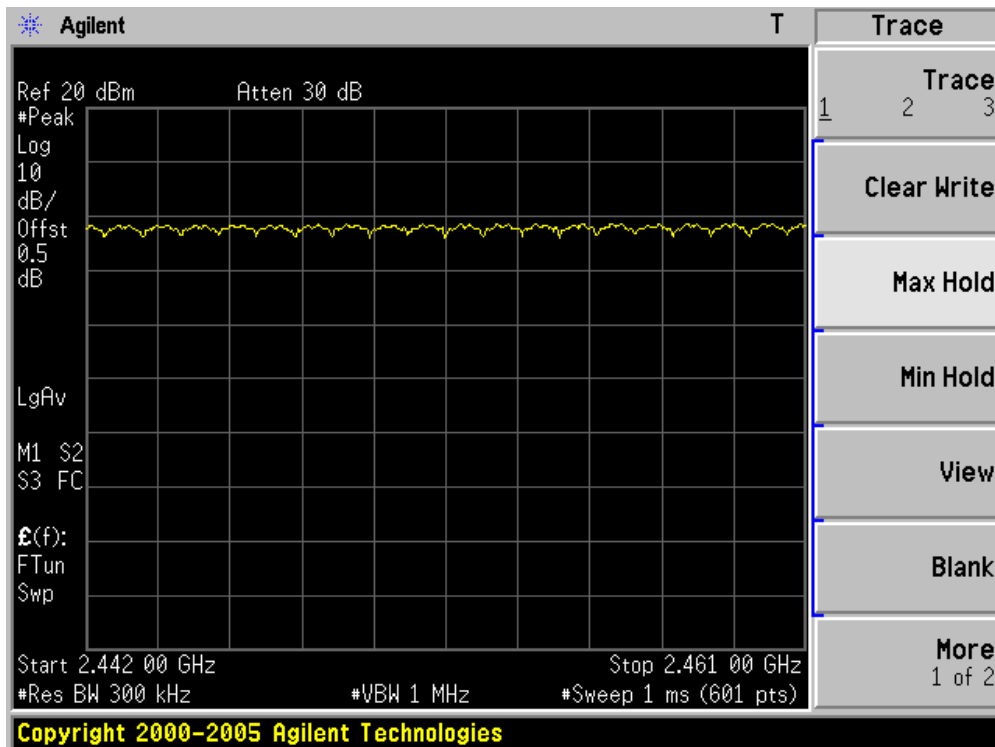
2402 - 2421 MHz



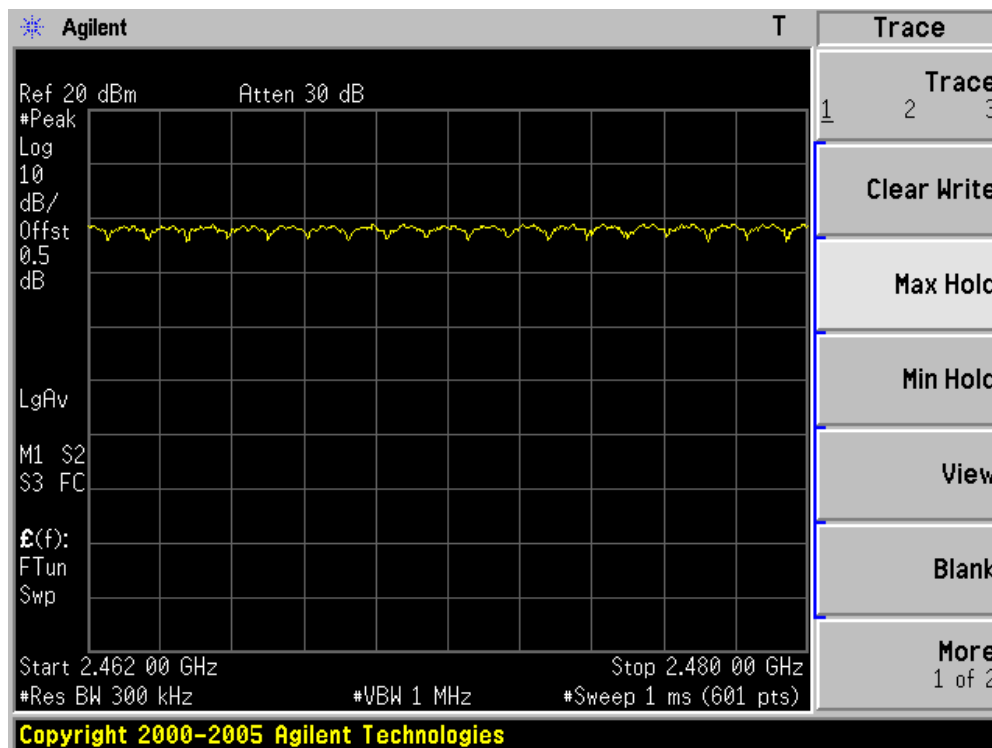
2422 - 2441 MHz



2442 - 2461 MHz



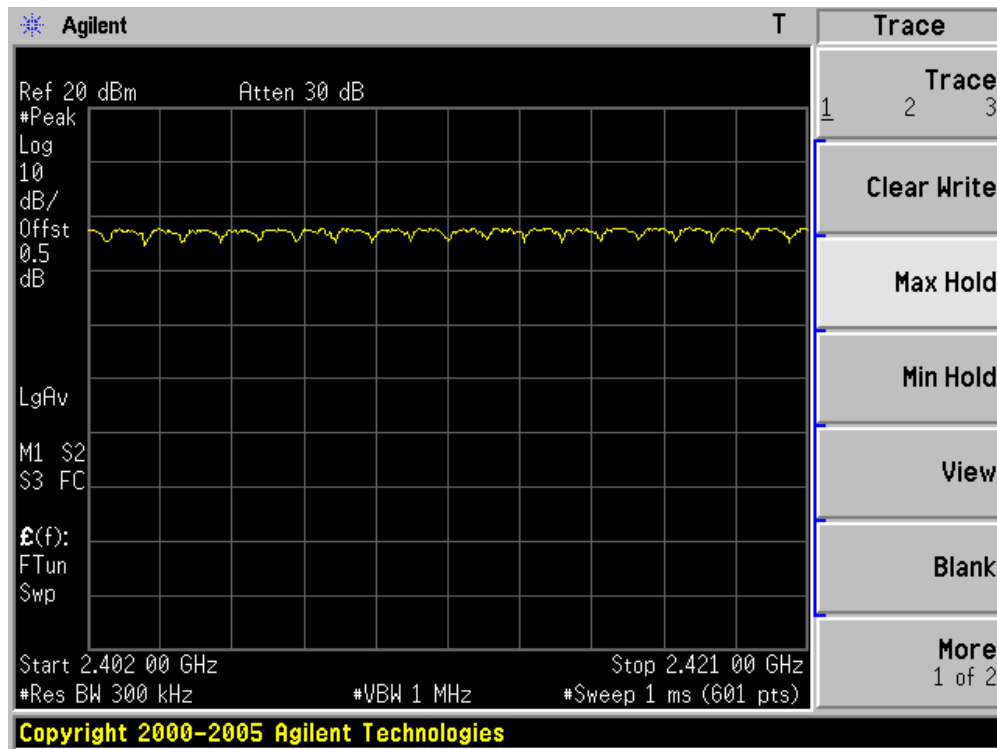
2462 - 2480 MHz



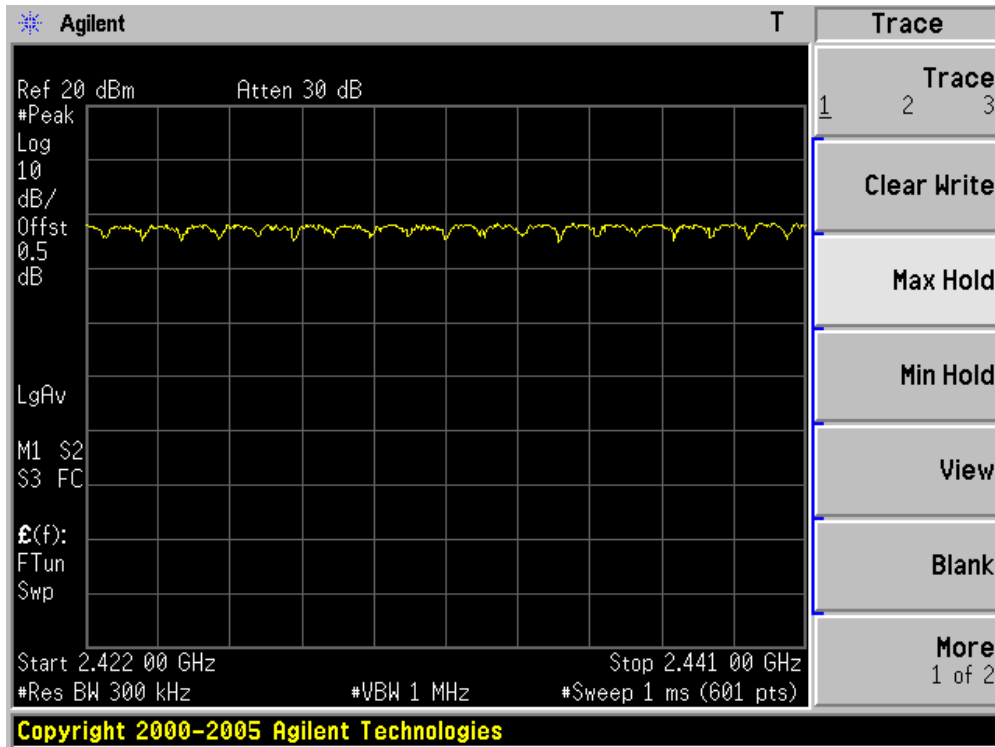
Product	:	Bluetooth headset
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

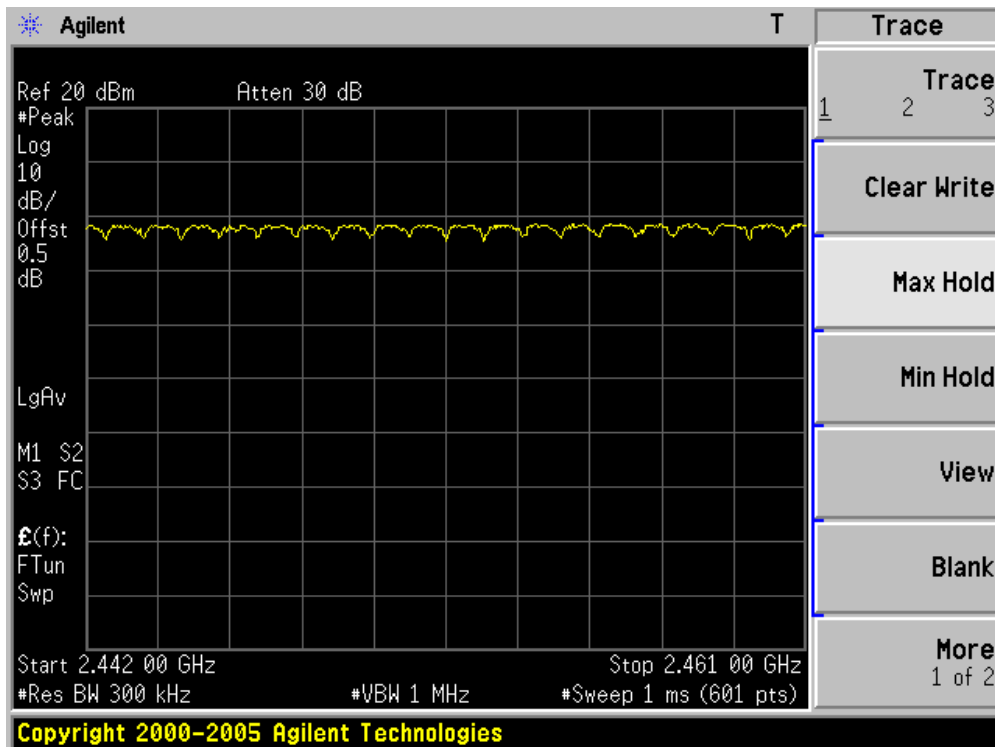
2402 - 2421 MHz



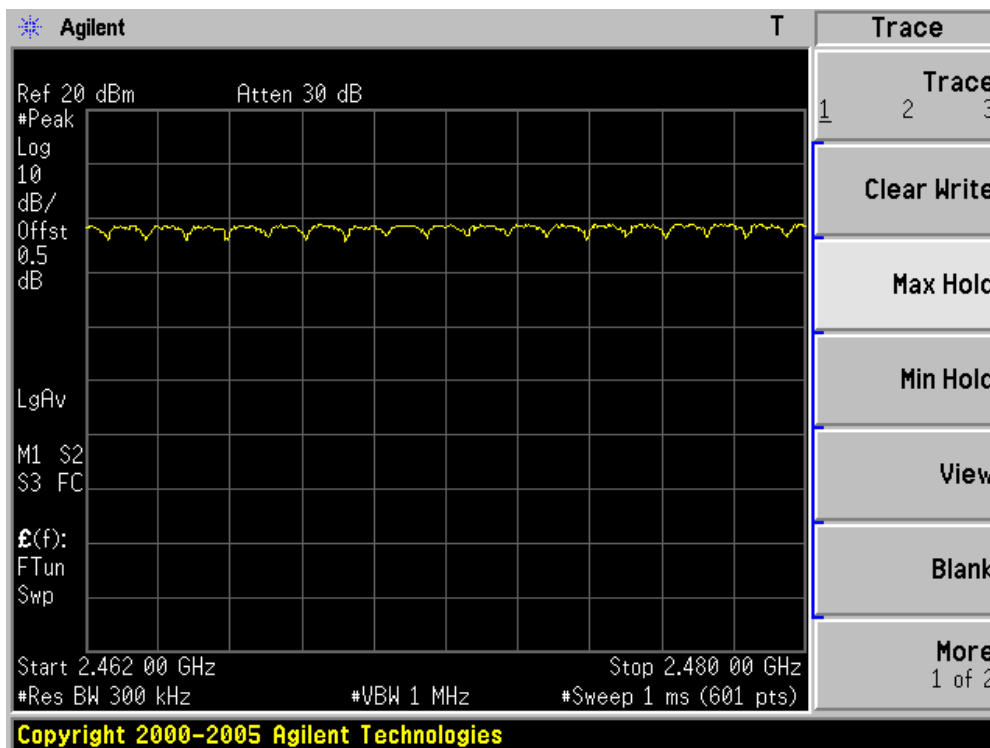
2422 - 2441 MHz



2442 - 2461 MHz



2462 - 2480 MHz



8. Time of Occupancy (Dwell Time)

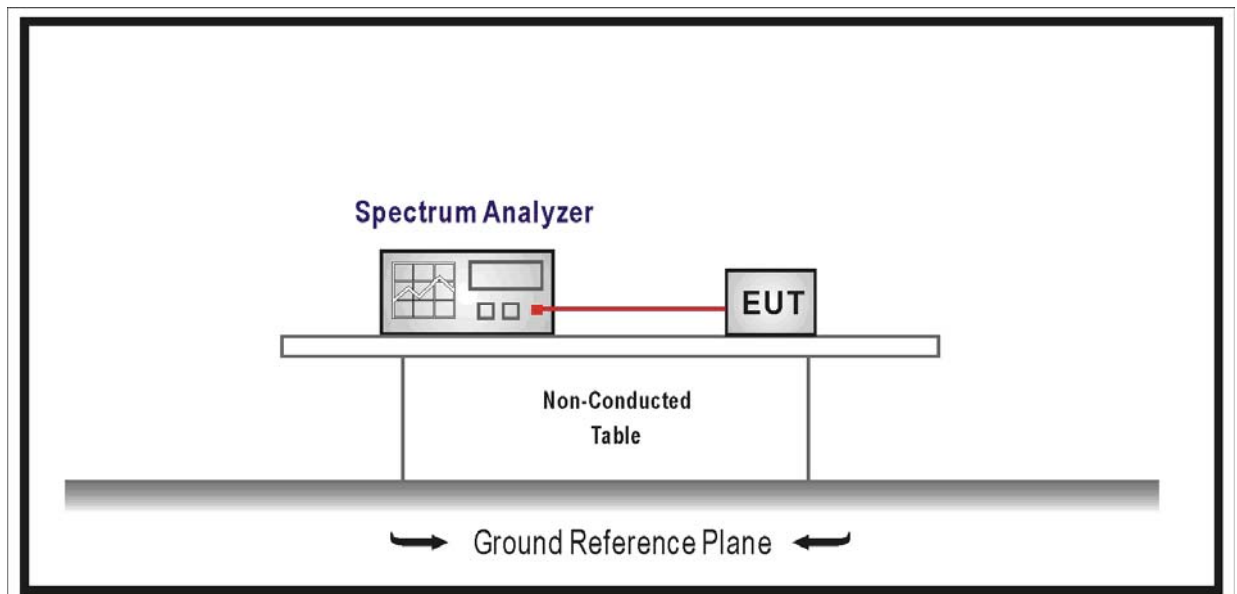
8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. Limit

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75

hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

- Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1MHz

VBW \geq RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

8.5. Uncertainty

The measurement uncertainty is defined as ± 0.1 us

8.6. Test Result

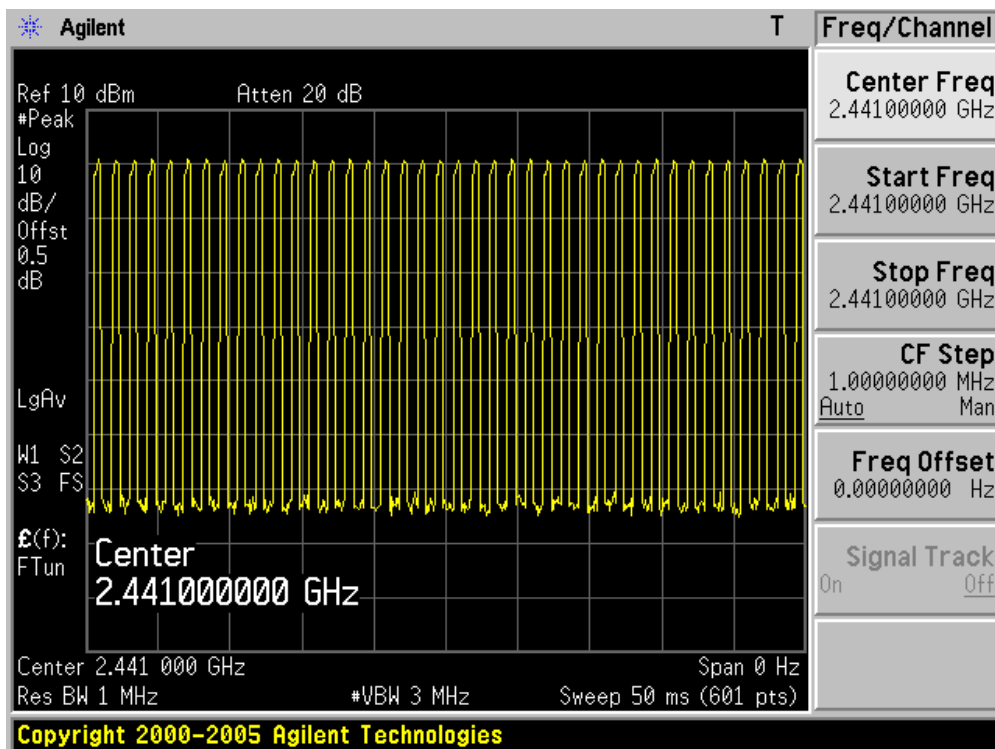
Product	:	Bluetooth headset
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH1)

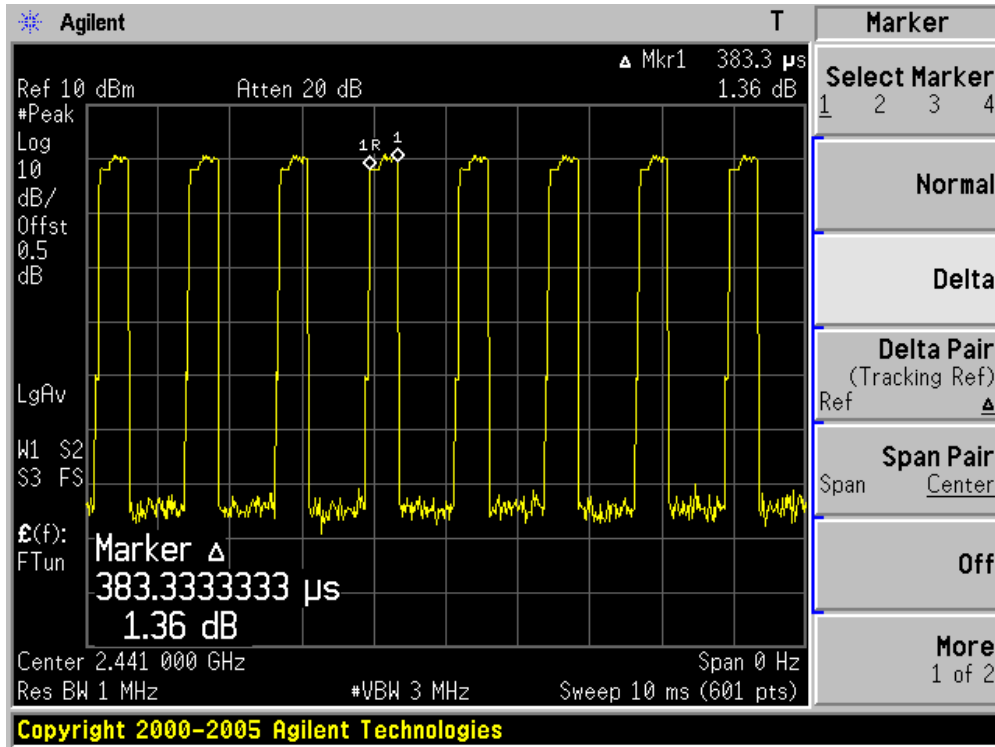
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	122.67	< 400	Pass

Test Time Period: $0.4 * 79 = 31.6 \text{sec}$, Hopping Times Within 1sec: $40/50 \text{msec} = 800 \text{hops/sec}$.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(383.33 \mu \text{s} * 800) / 79] * 31.6 = 122.67 \text{msec}$

Channel 39 (2441MHz)-(3DH1)





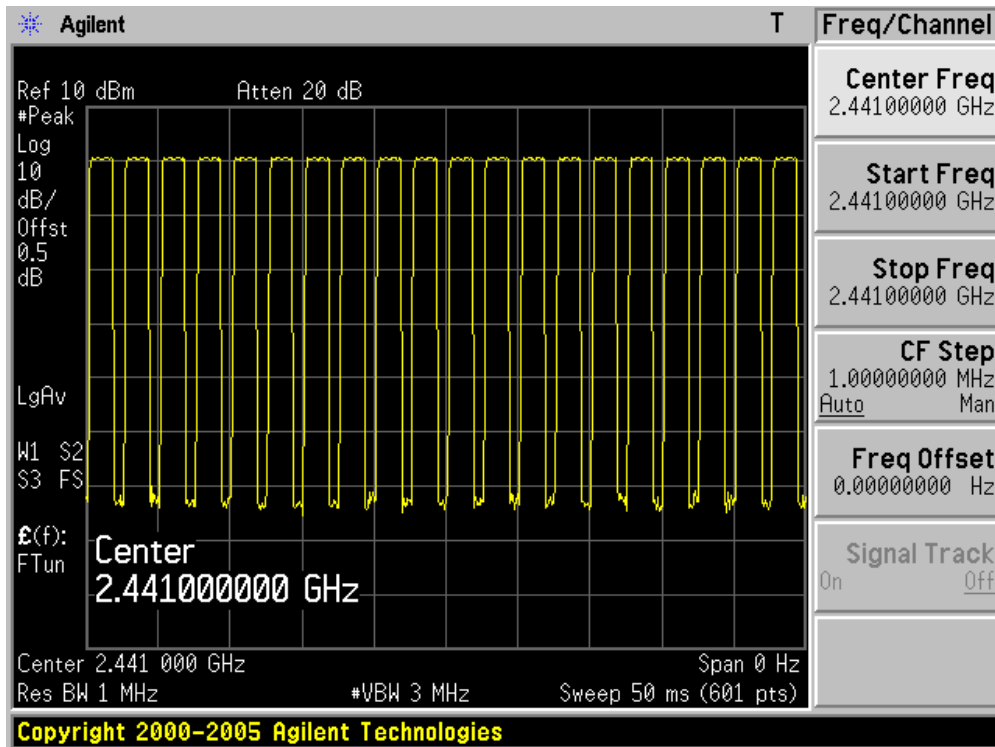
Product	:	Bluetooth headset
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH3)

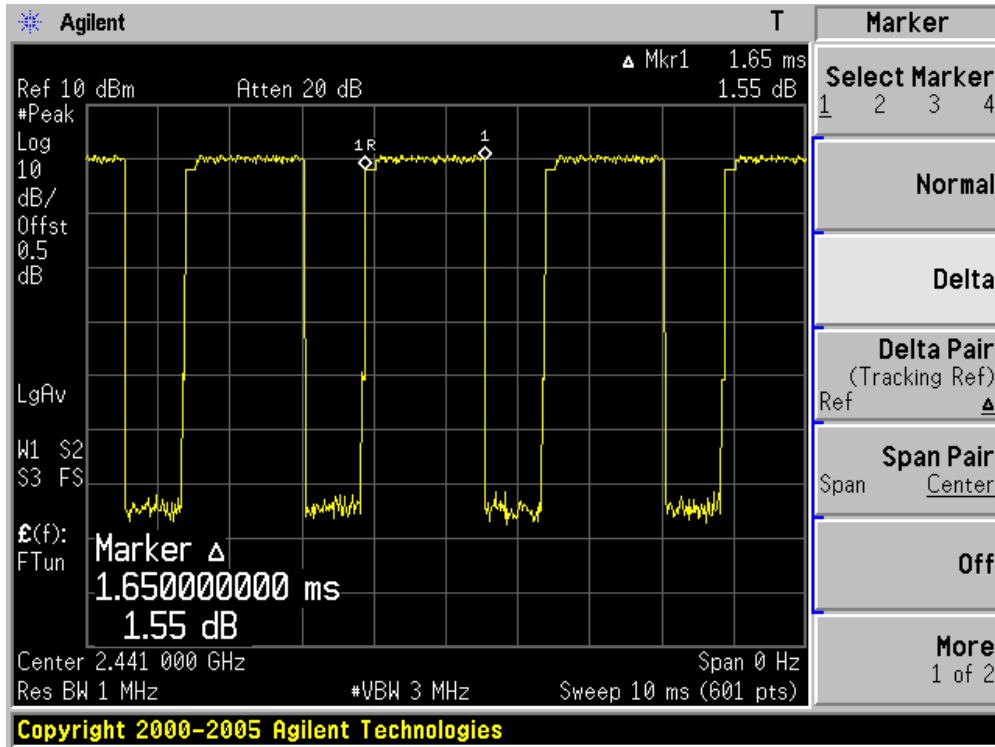
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	264.00	< 400	Pass

Test Time Period: $0.4 * 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $20/50\text{msec} = 400\text{hops/sec}$.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(1.65 \text{ ms} * 400) / 79] * 31.6 = 264.00\text{msec}$

Channel 39 (2441MHz) - (3DH3)





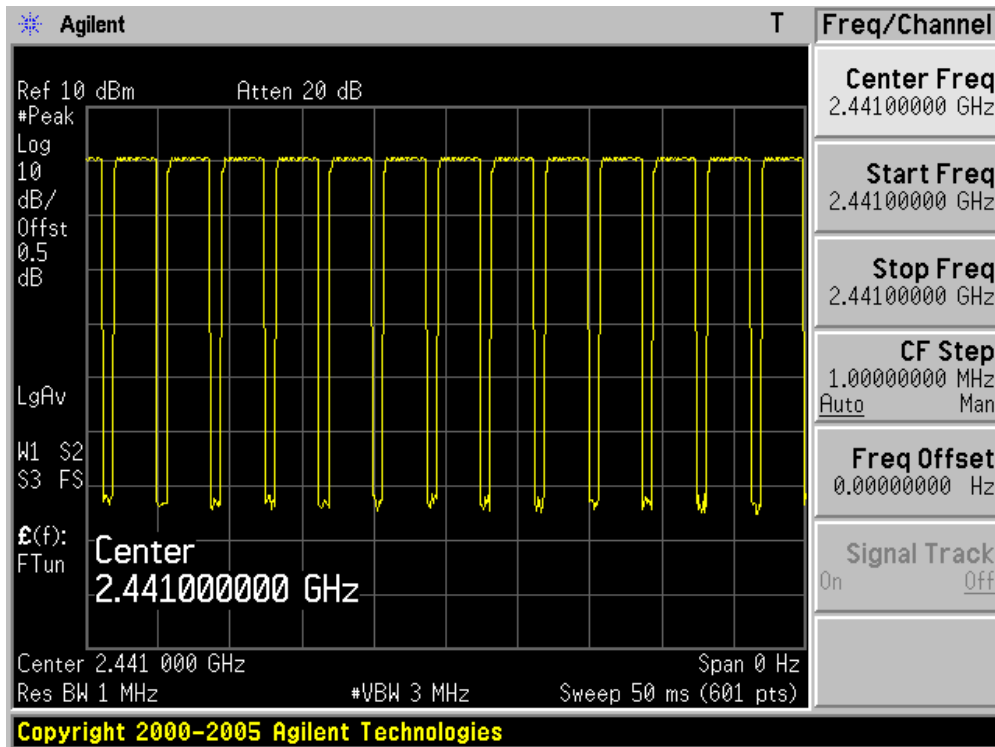
Product	:	Bluetooth headset
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH5)

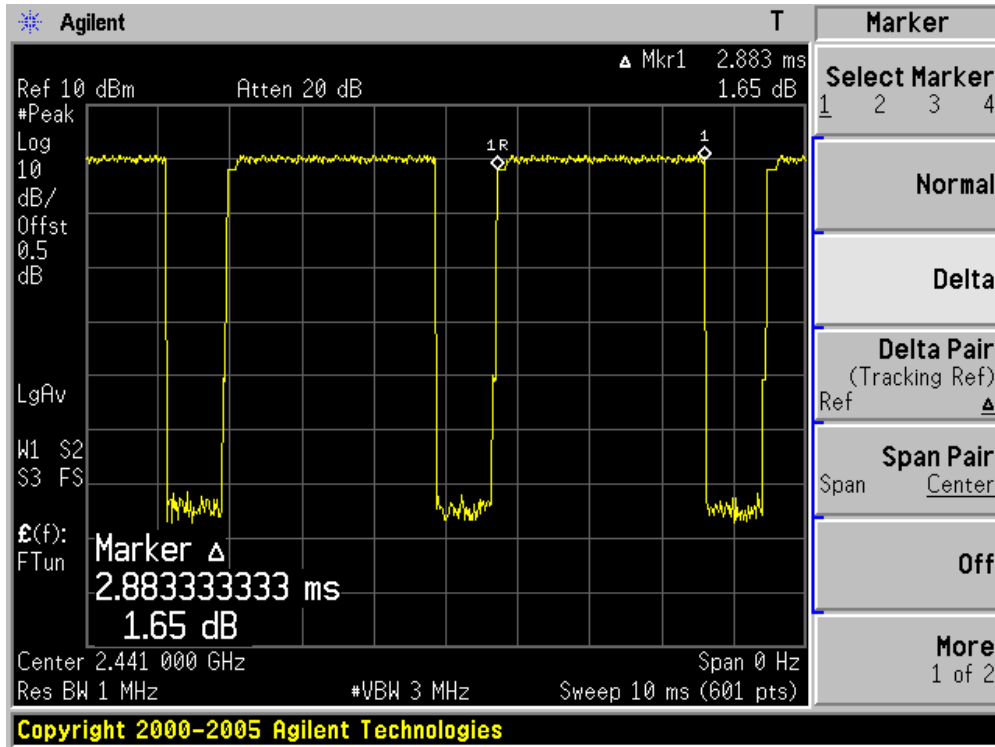
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	322.93	< 400	Pass

Test Time Period: $0.4 \times 79 = 31.6$ sec, Hopping Times Within 1sec: $14/50$ msec= 280 hops/sec.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(2.8833\text{ms} \times 280)/79] \times 31.6 = 322.93$ msec

Channel 39 (2441MHz) - (3DH5)





9. Peak Output Power

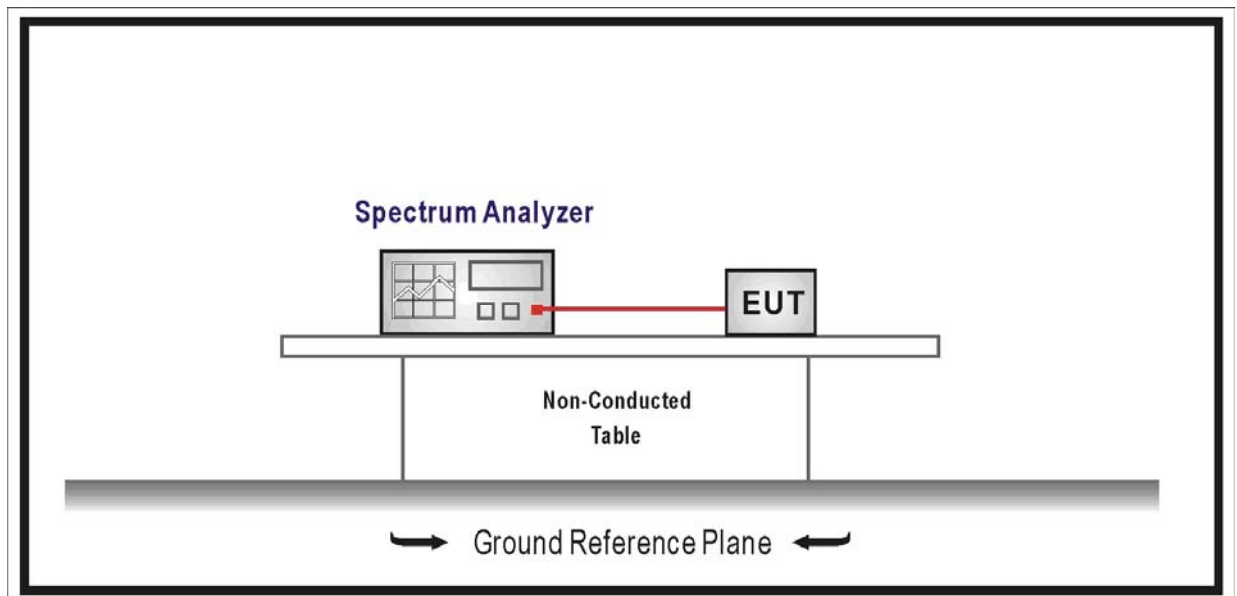
9.1. Test Equipment

Peak Output Power / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Note: the conducted output power limit specified above is based on the use the antennas with

directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

9.4. Test Procedure

According to ANSI C63.10: 2009.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured.

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

9.5. Uncertainty

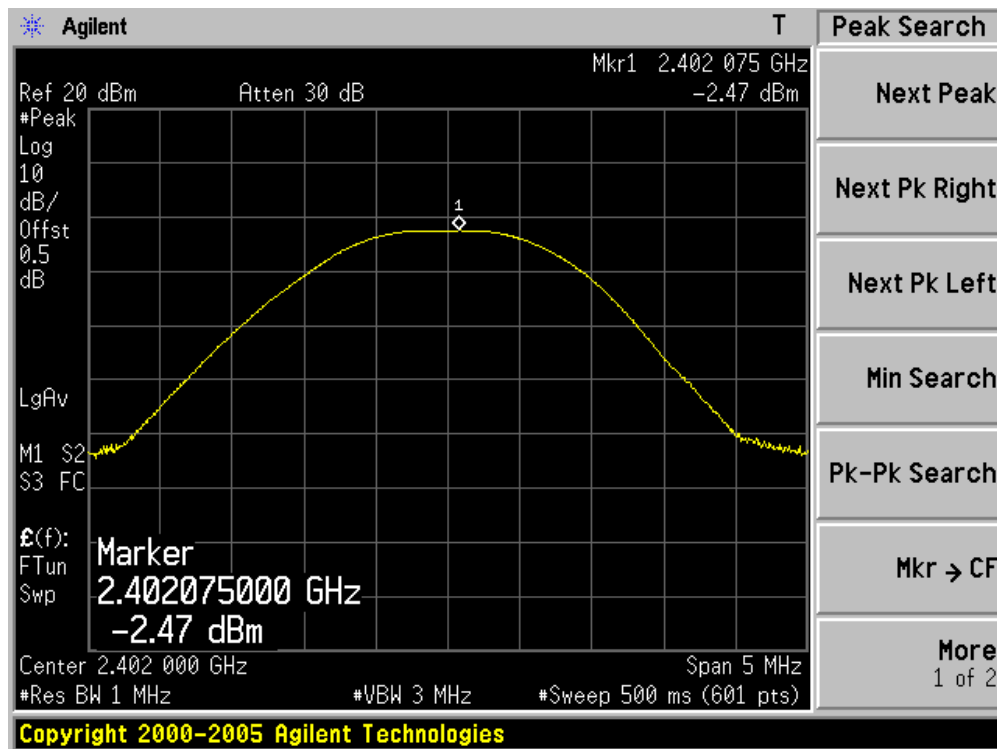
The measurement uncertainty is defined as ± 1.0 dB

9.6. Test Result

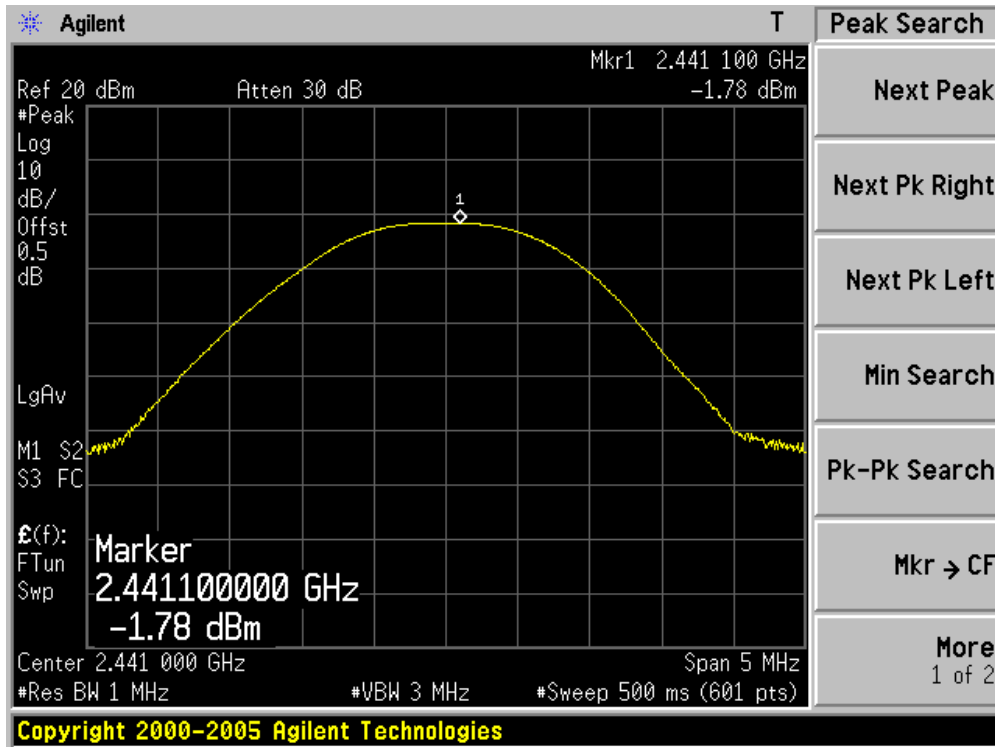
Product	:	Bluetooth headset
Test Item	:	Power Output
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	-2.47	30.00	Pass
39	2441	-1.78	30.00	Pass
78	2480	-1.14	30.00	Pass

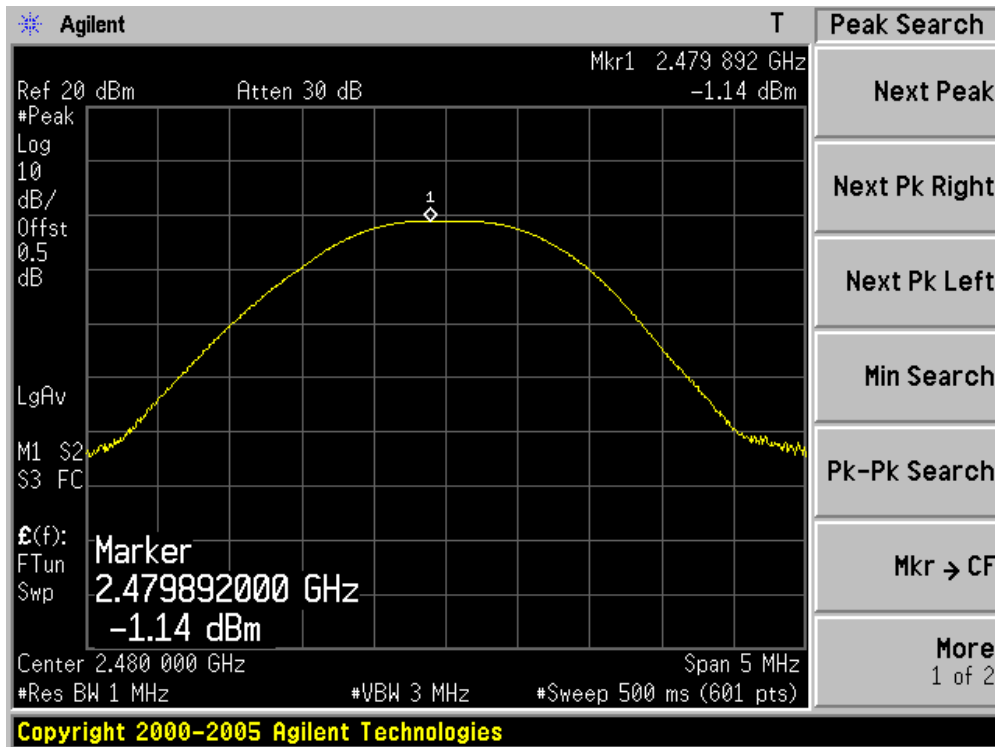
DH5 2402MHz



DH5 2441MHz



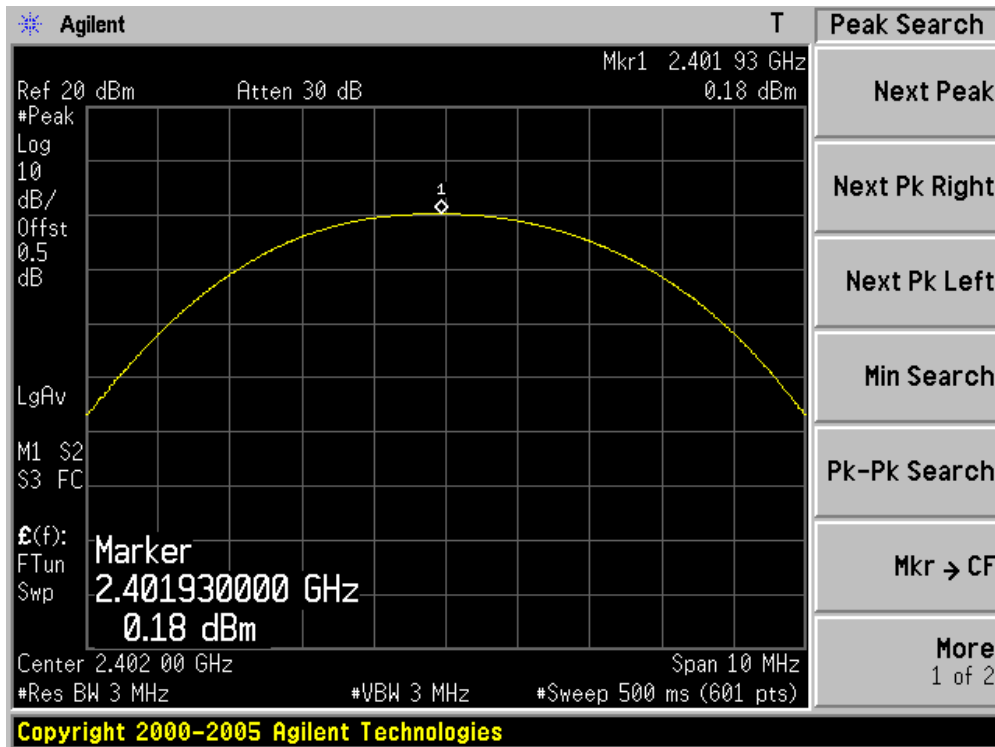
DH5 2480MHz



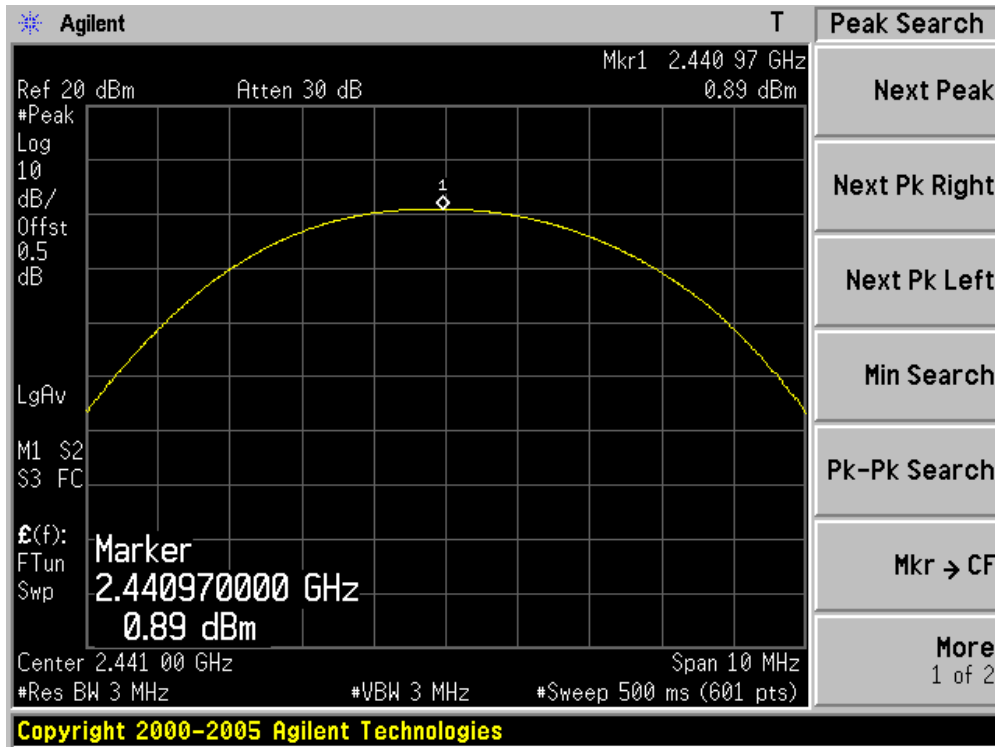
Product	:	Bluetooth headset
Test Item	:	Power Output
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	0.18	30.00	Pass
39	2441	0.89	30.00	Pass
78	2480	1.45	30.00	Pass

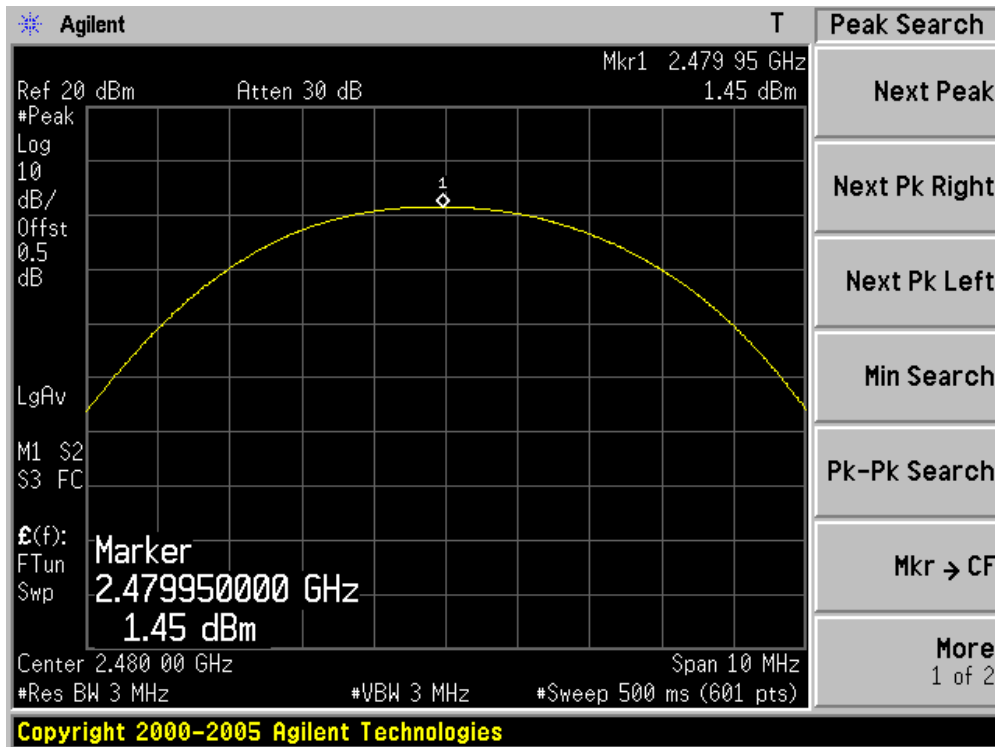
2DH5 2402MHz



2DH5 2441MHz



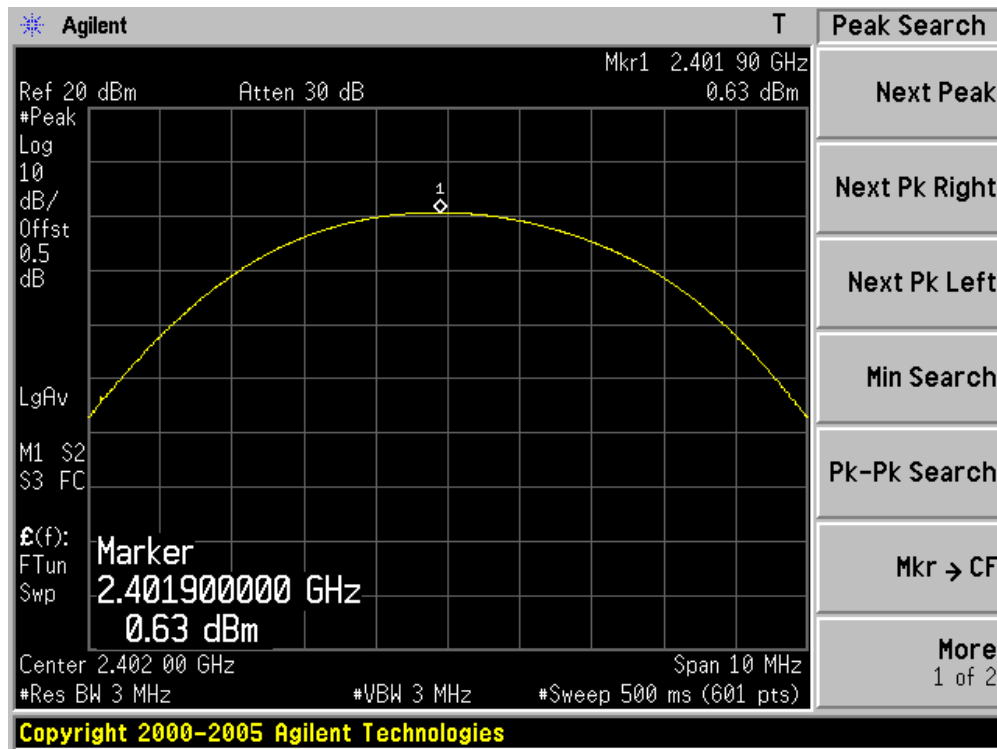
2DH5 2480MHz



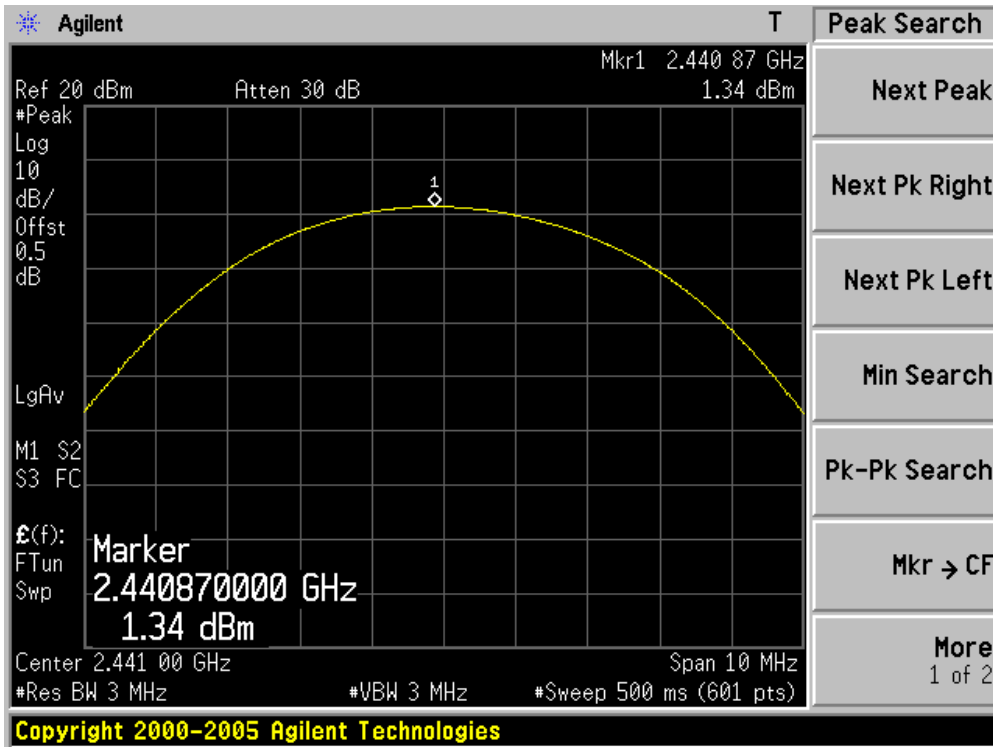
Product	:	Bluetooth headset
Test Item	:	Power Output
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	0.63	30.00	Pass
39	2441	1.34	30.00	Pass
78	2480	1.91	30.00	Pass

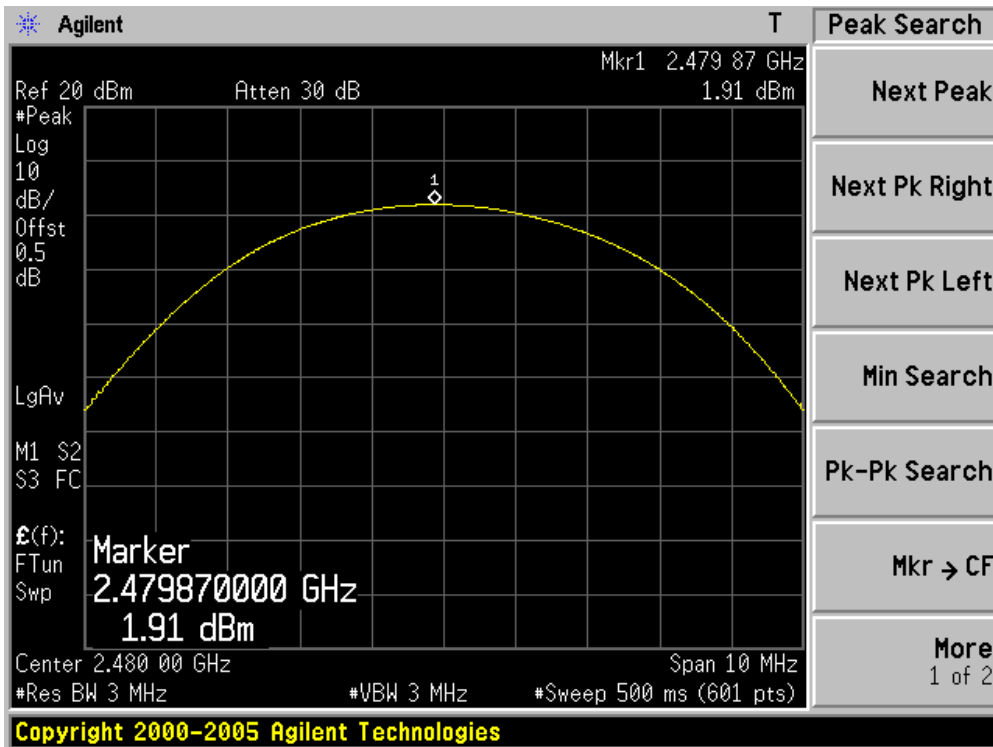
3DH5 2402MHz



3DH5 2441MHz



3DH5 2480MHz



10. Band-edge Compliance of RF Conducted Emissions

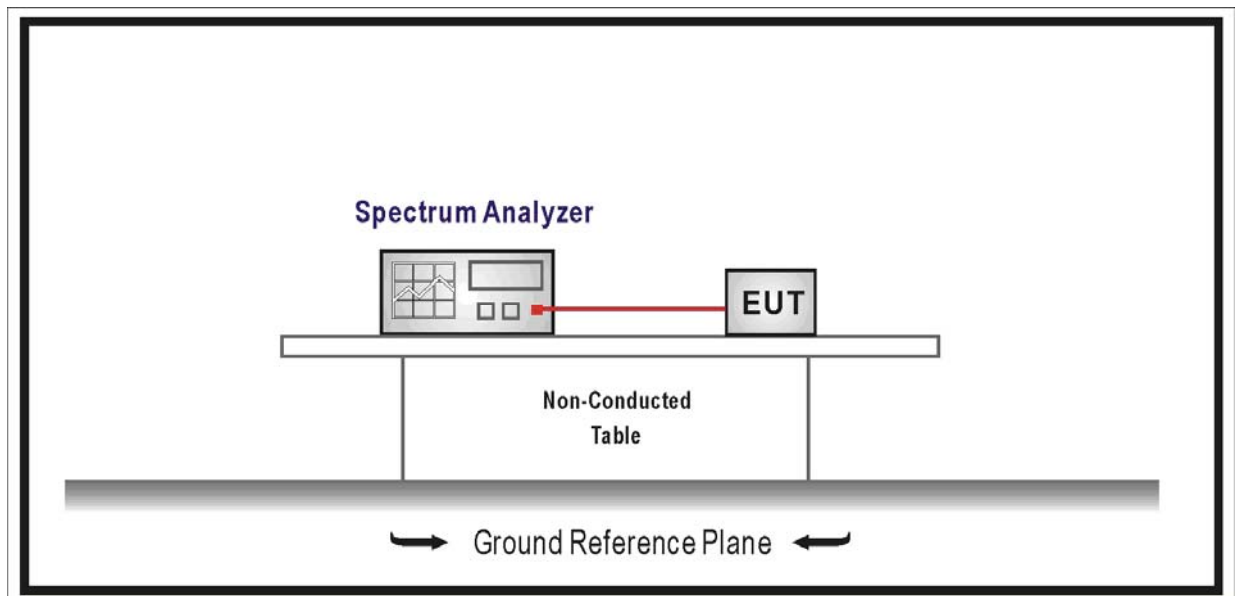
10.1. Test Equipment

Band-edge Compliance of RF Conducted Emissions / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

10.2. Test Setup



10.3. Limit

- Intentional radiators operating under the alternative provisions to the general emission limits as contained in 15.217 through 15.257 and in Subpart E of FCC part 15, must be designed to ensure that 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz

bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

10.4. Test Procedure

According to ANSI C63.10: 2009.

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation.

RBW \geq 1% of the span

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge.

Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

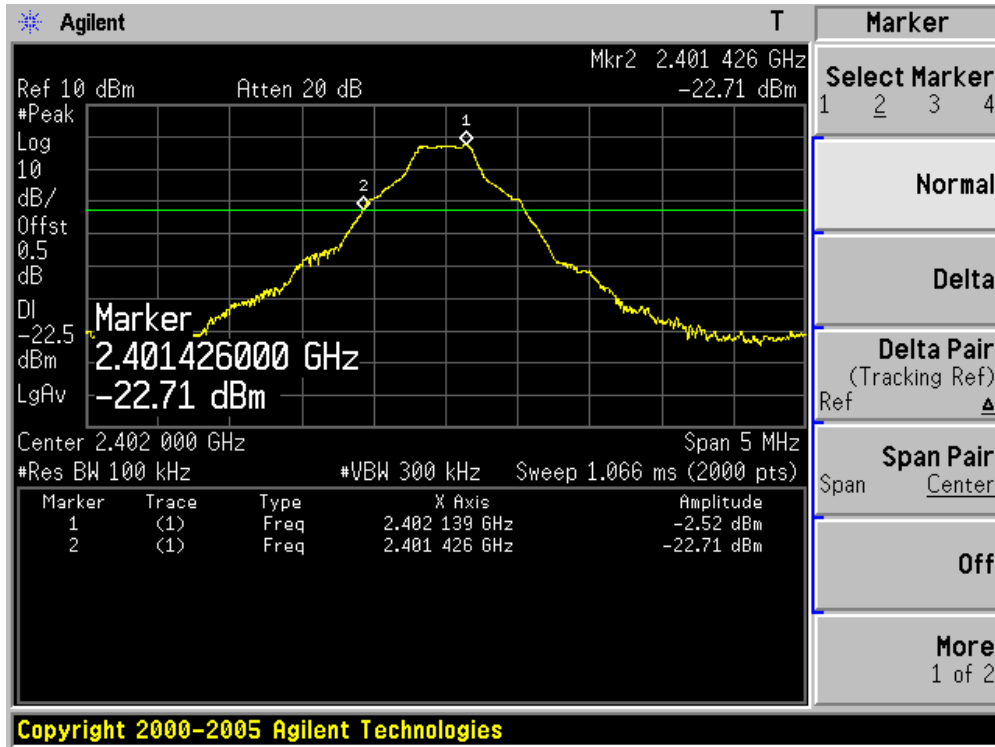
10.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

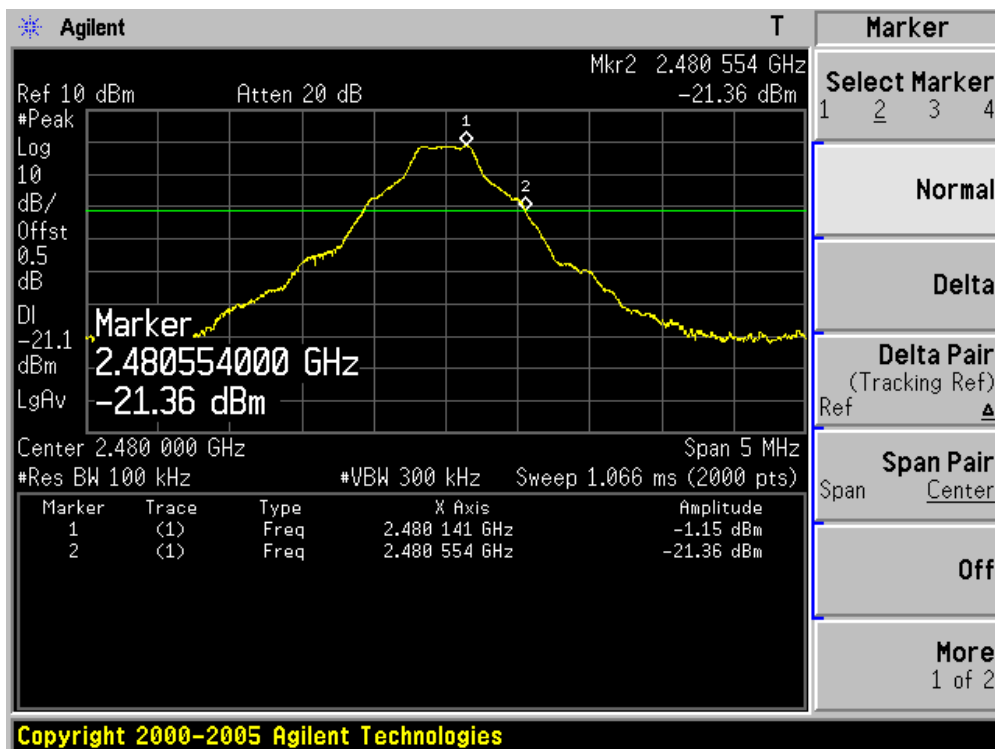
10.6. Test Result

Product	:	Bluetooth headset
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel 00 (2402MHz)

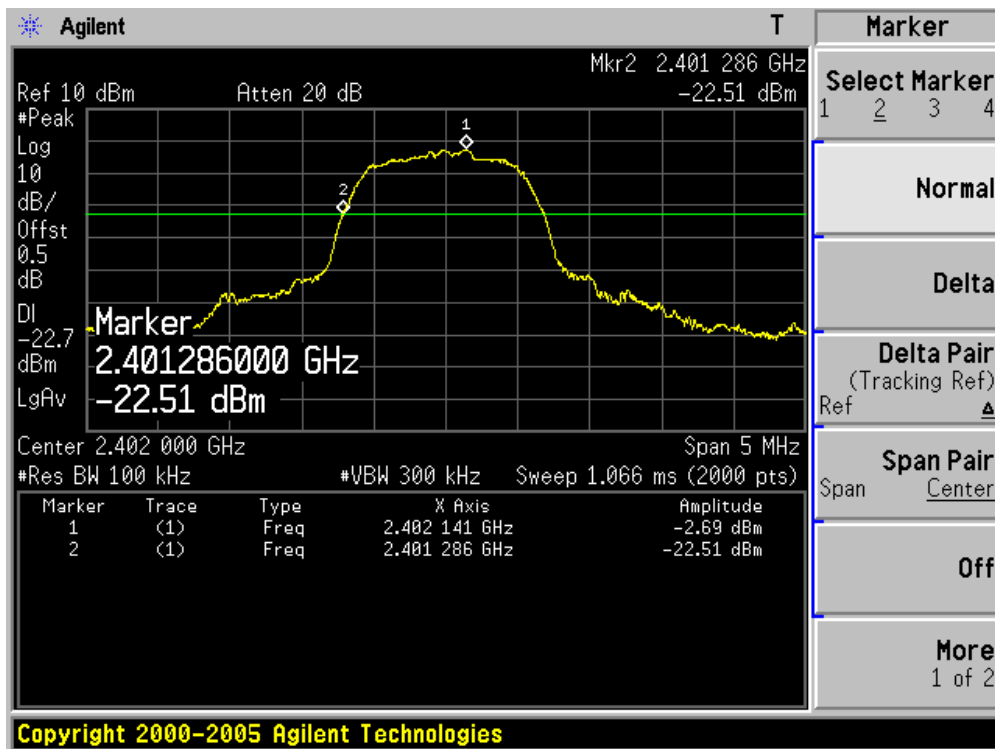


Channel 78 (2480MHz)

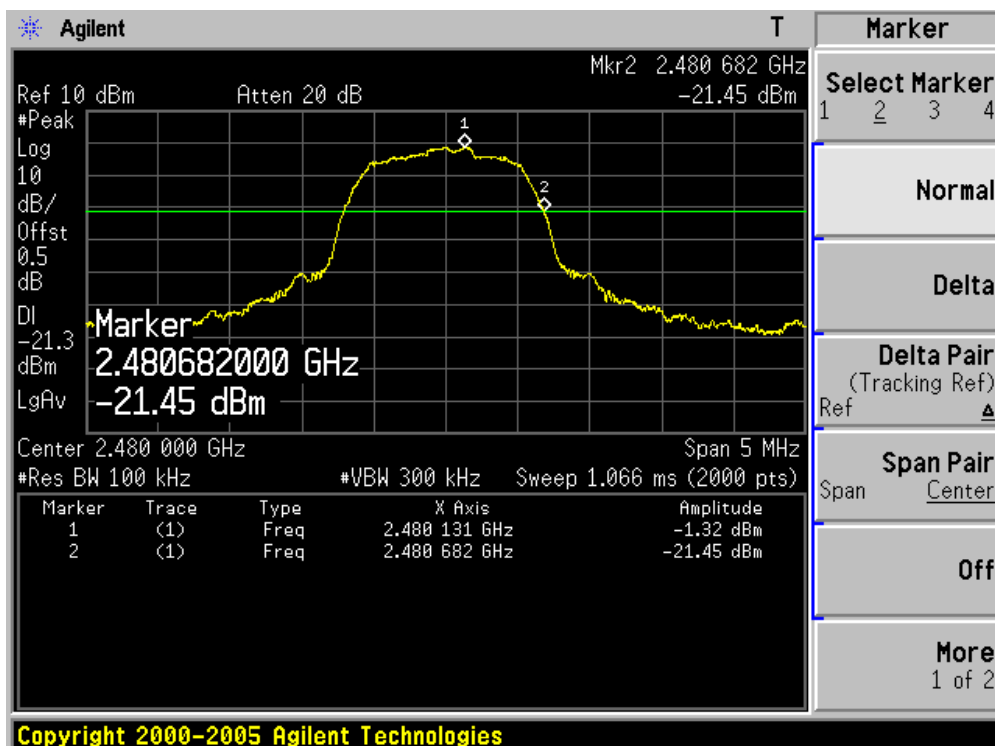


Product	:	Bluetooth headset
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel 00 (2402MHz)

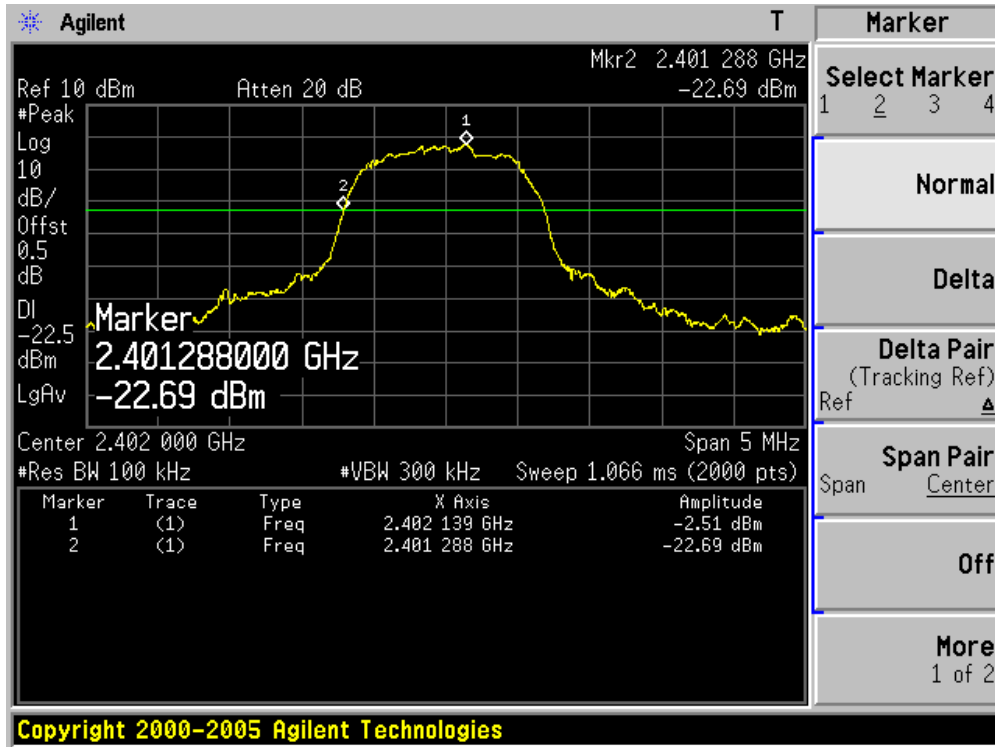


Channel 78 (2480MHz)

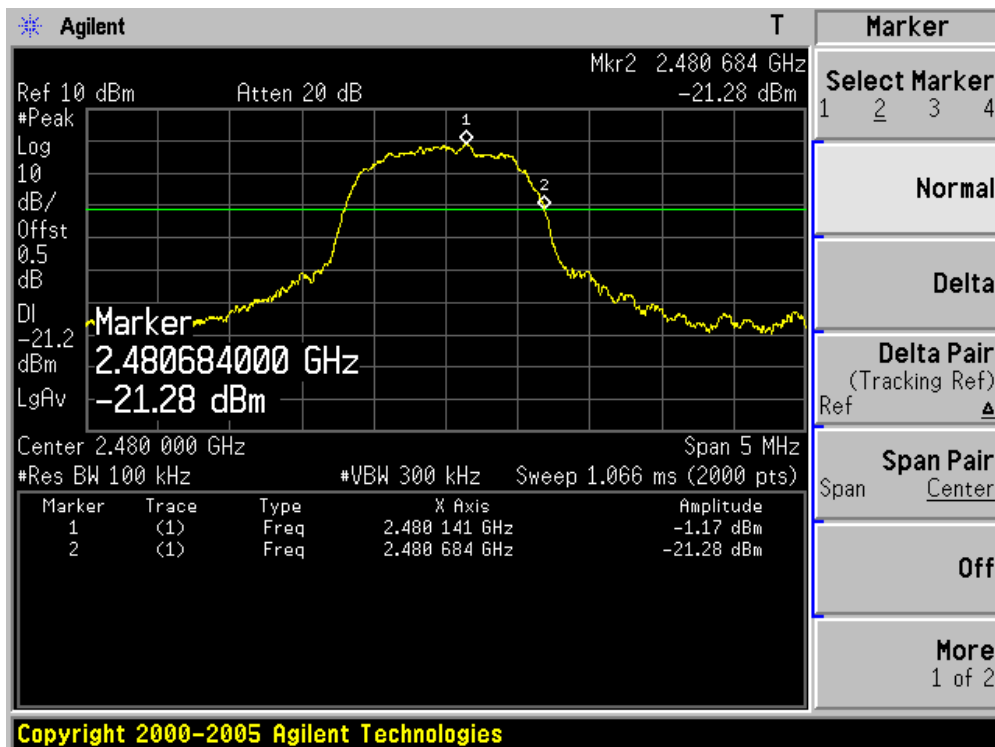


Product	: Bluetooth headset
Test Item	: Band-edge Compliance of RF Conducted Emissions
Test Mode	: Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel 00 (2402MHz)

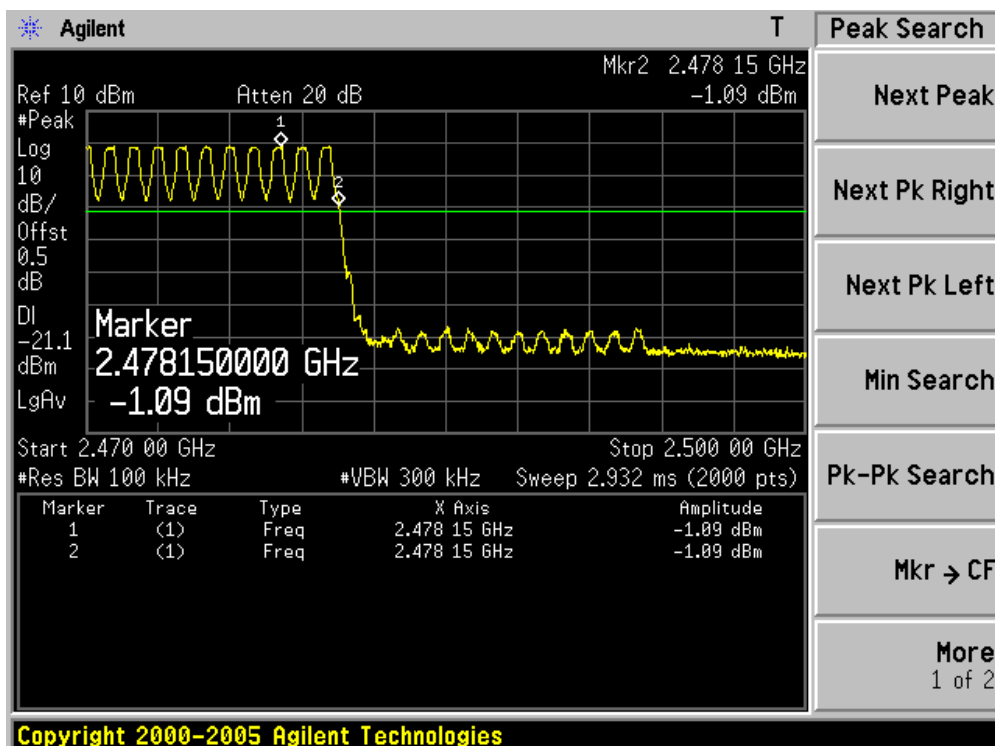
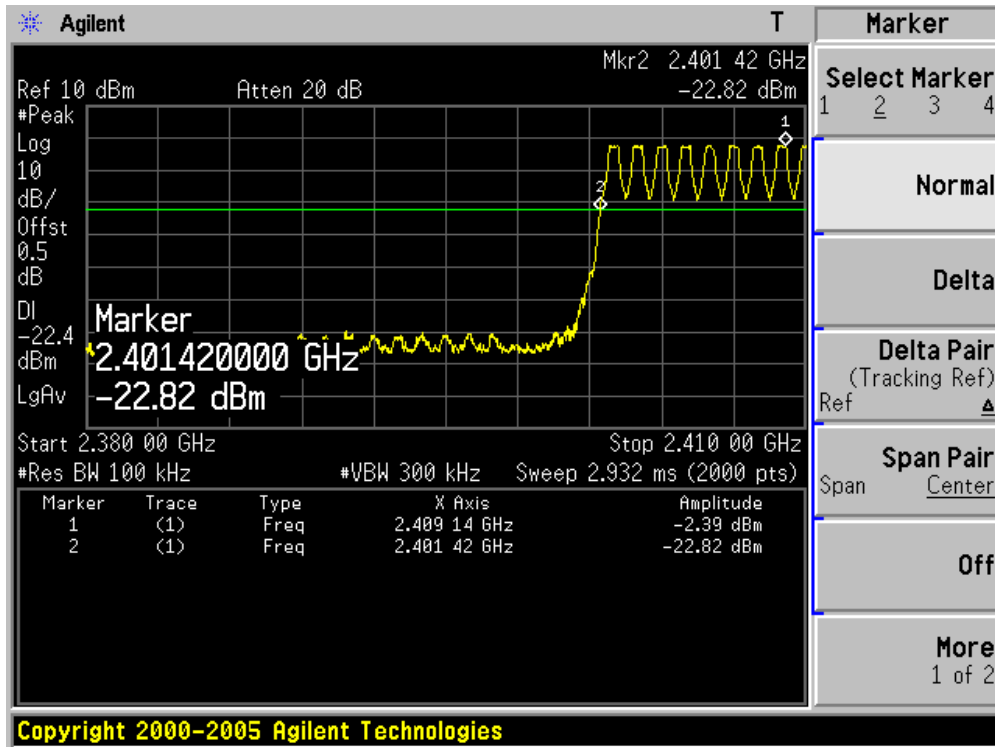


Channel 78 (2480MHz)



Product	:	Bluetooth headset
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Hopping Mode



11. Spurious RF Conducted Emissions

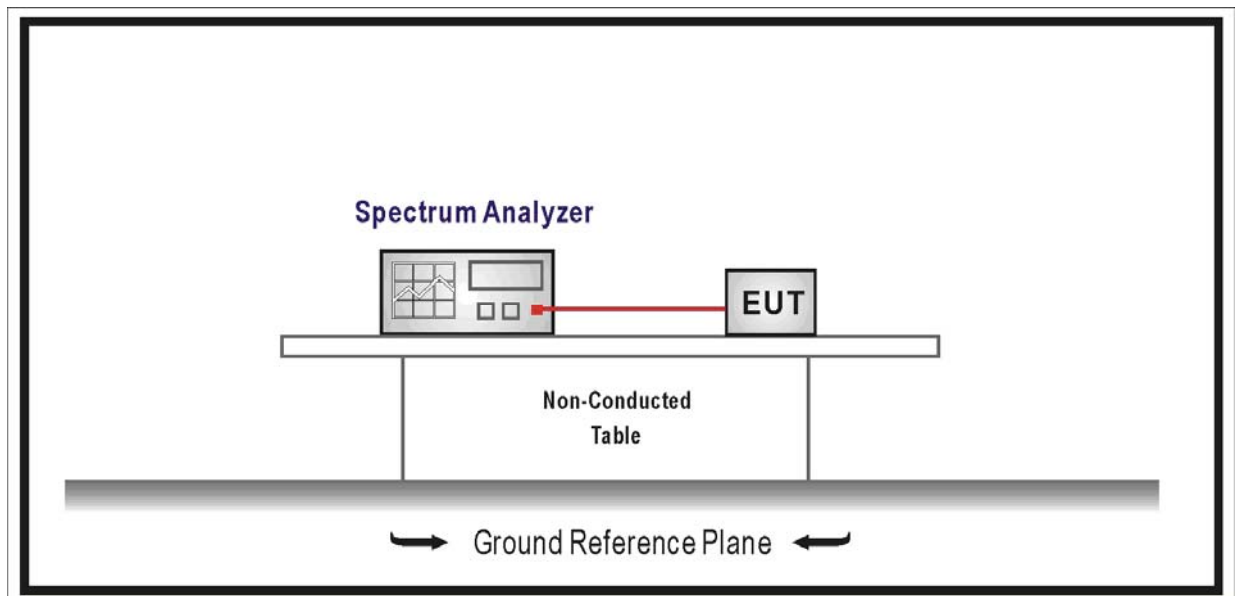
11.1. Test Equipment

Spurious RF Conducted Emissions / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

11.2. Test Setup



11.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in

Section 15.209(a) of FCC part 15 is not required.

11.4. Test Procedure

According to ANSI C63.10: 2009.

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

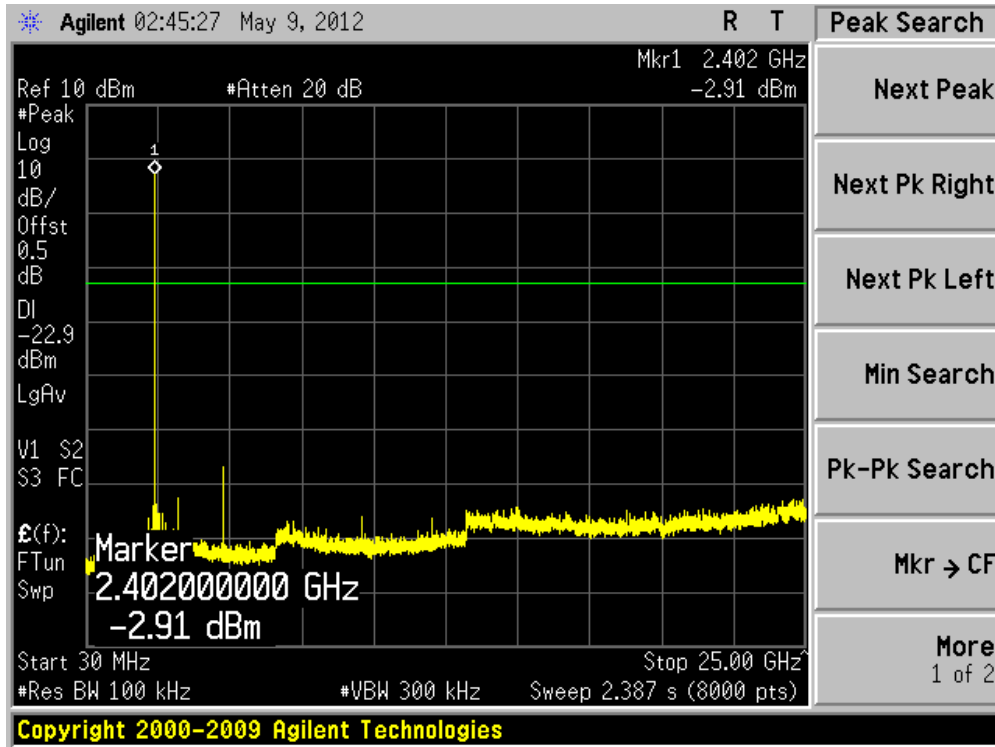
11.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

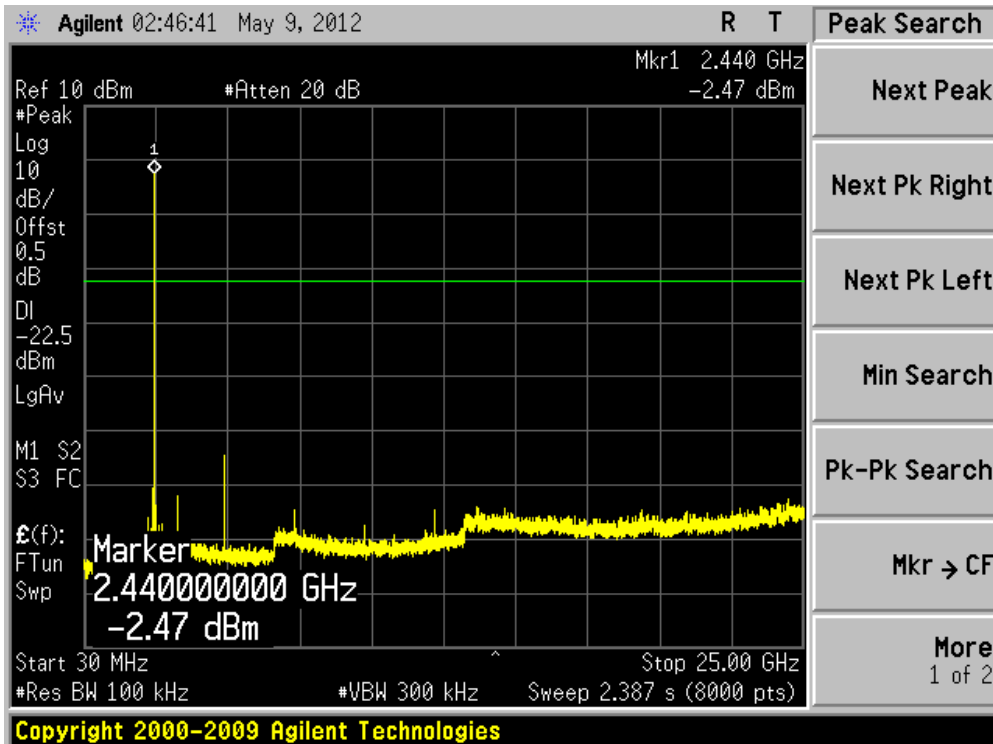
11.6. Test Result

Product	:	Bluetooth headset
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

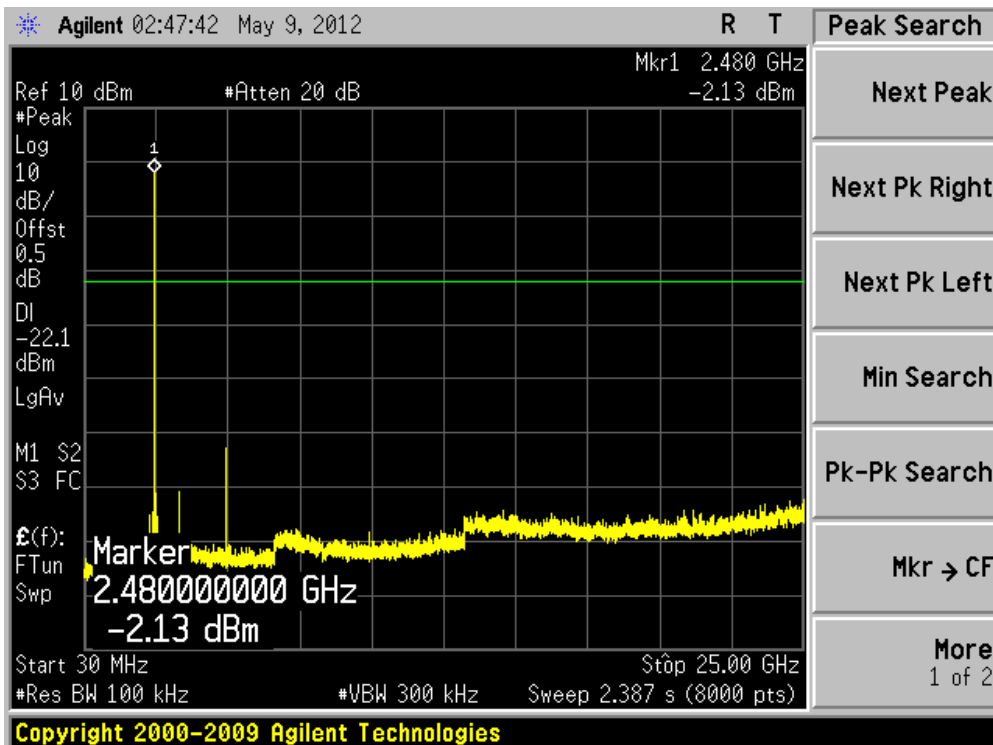
Channel 00 (2402MHz)



Channel 39 (2441MHz)

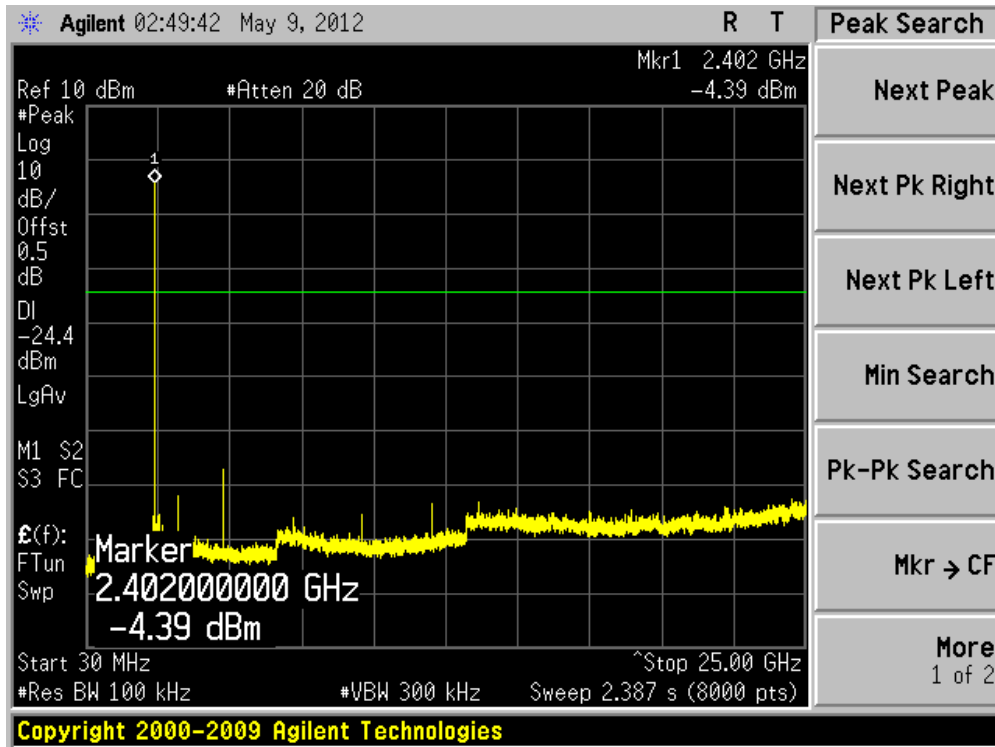


Channel 78 (2480MHz)

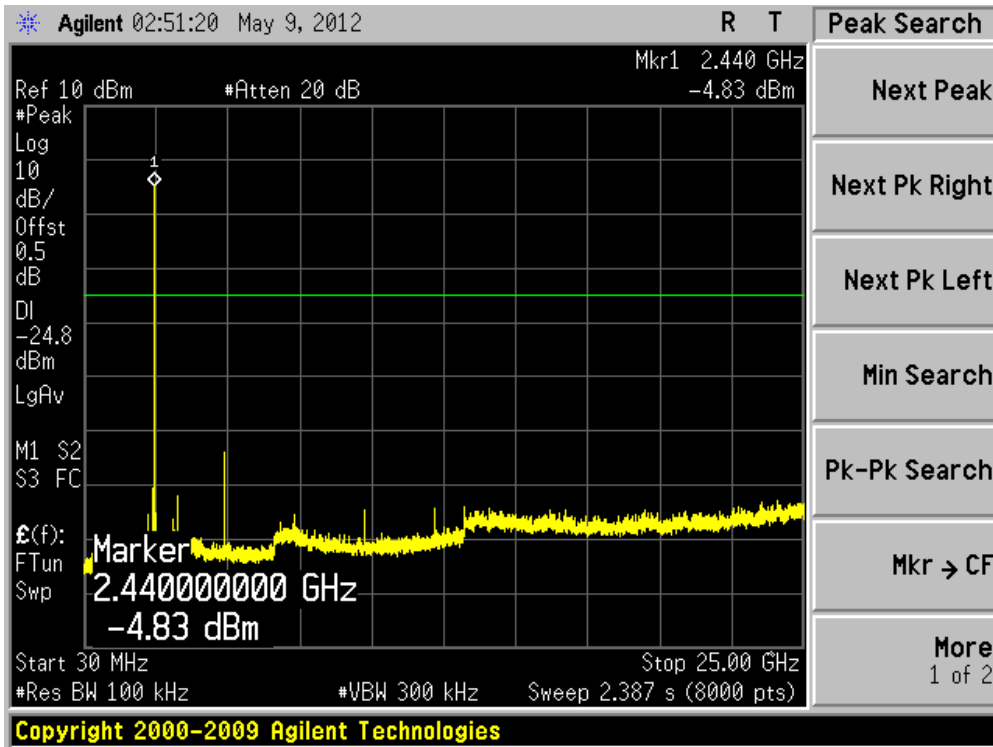


Product	:	Bluetooth headset
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

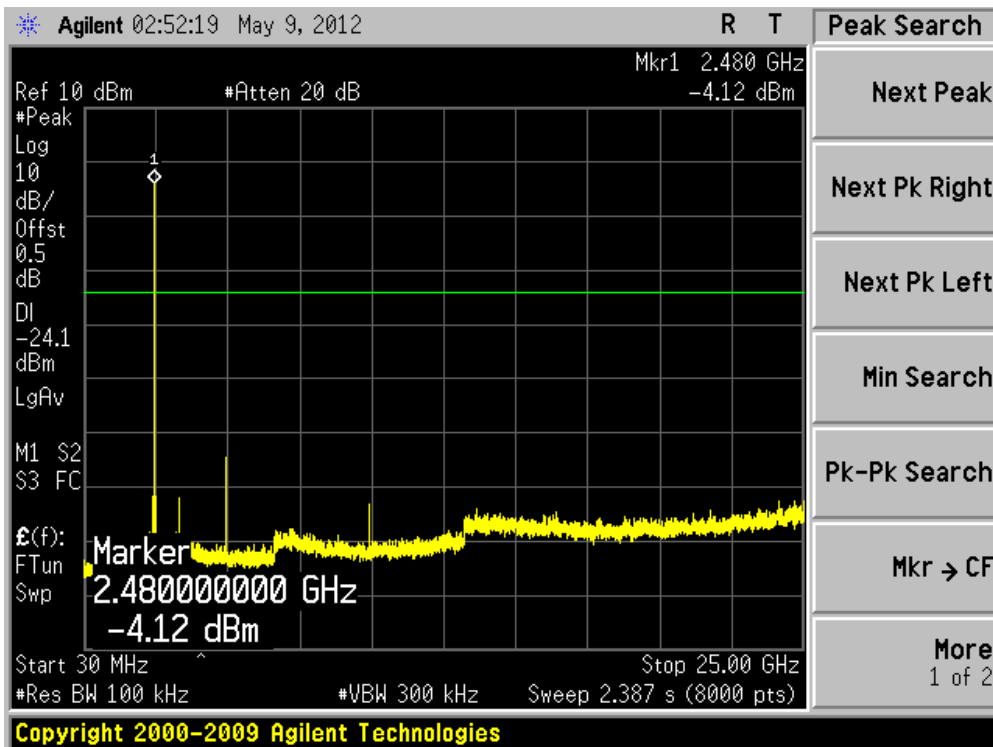
Channel 00 (2402MHz)



Channel 39 (2441MHz)

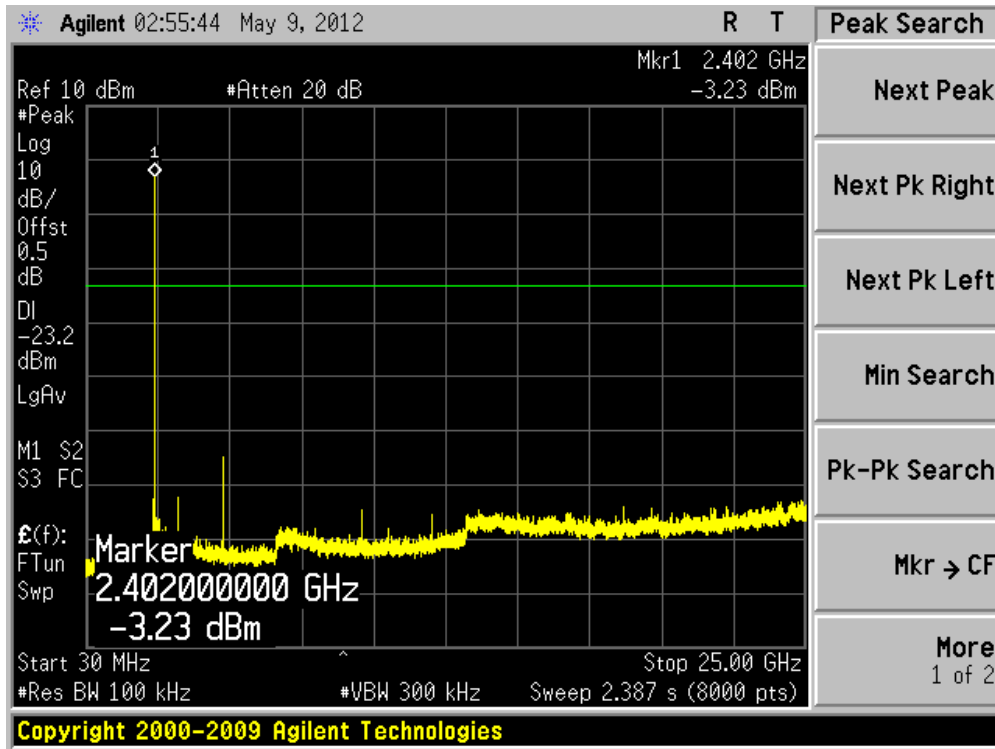


Channel 78 (2480MHz)

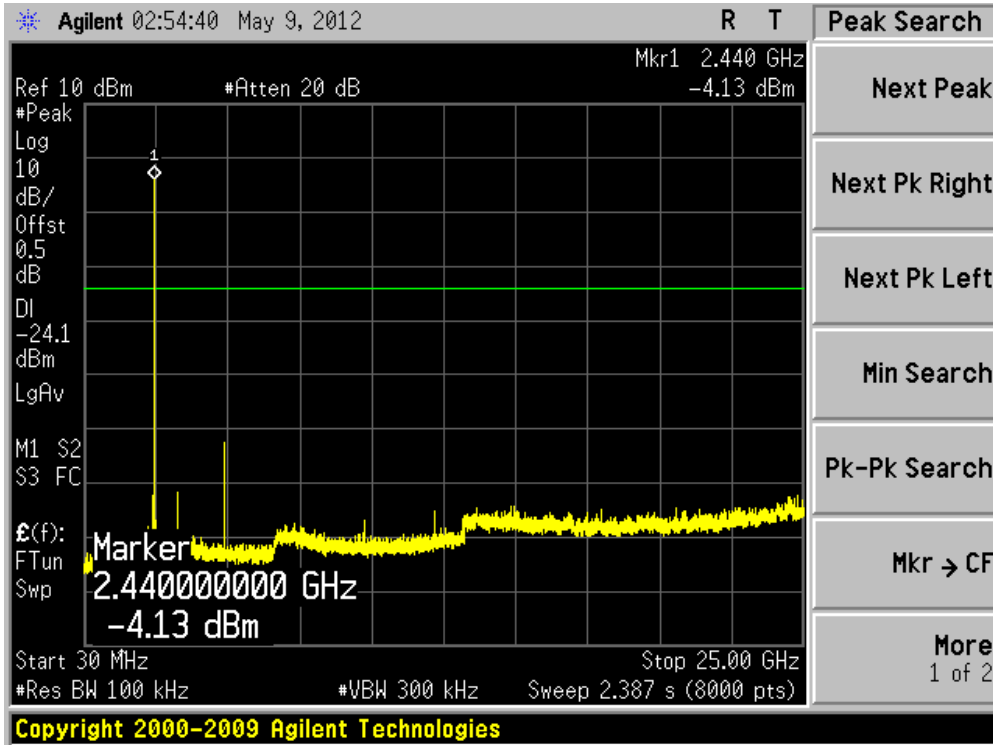


Product	:	Bluetooth headset
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

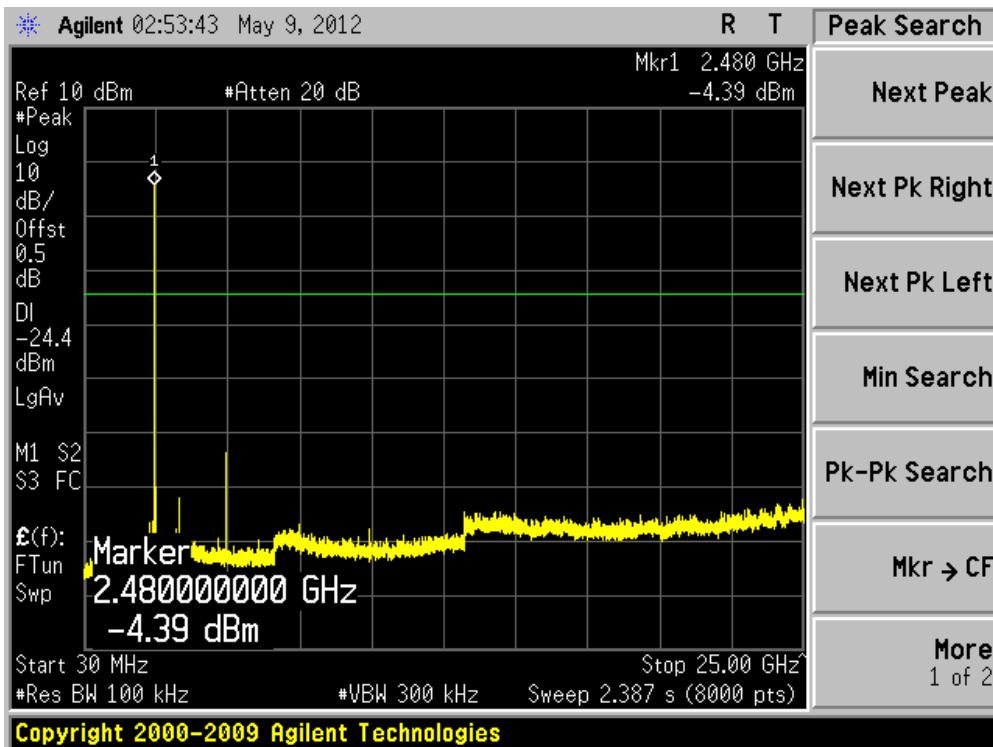
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



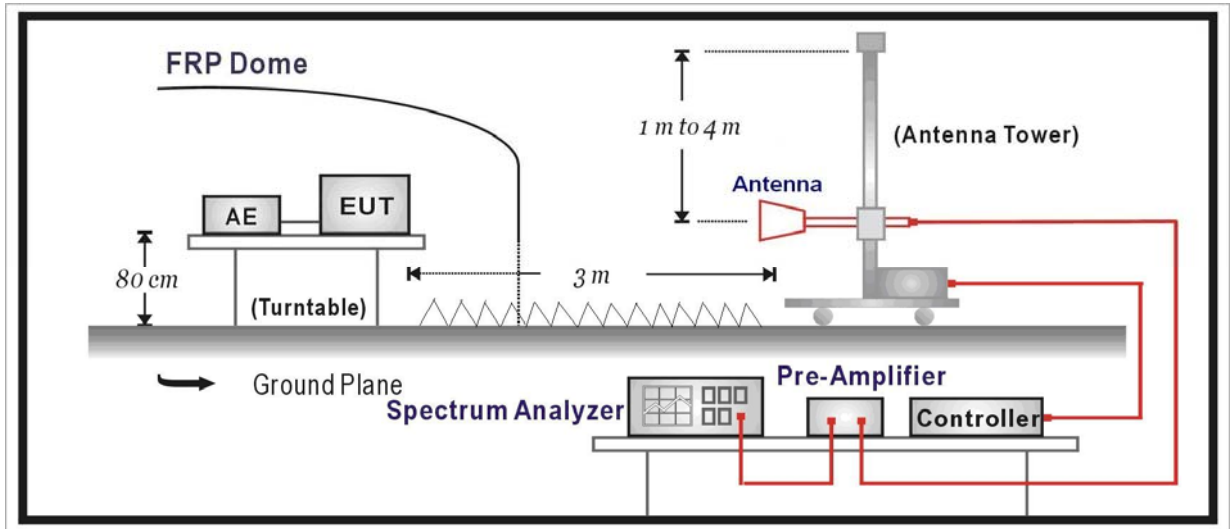
12. Radiated Emission Band Edge

12.1. Test Equipment

Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.03.02
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2013.01.10

12.2. Test Setup



12.3. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

12.4. Test Procedure

According to ANSI C63.10: 2009.

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines 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. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being

corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

12.5. Uncertainty

The measurement uncertainty above 1G is defined as $\pm 3.9 \text{ dB}$

below 1G is defined as $\pm 3.8 \text{ dB}$

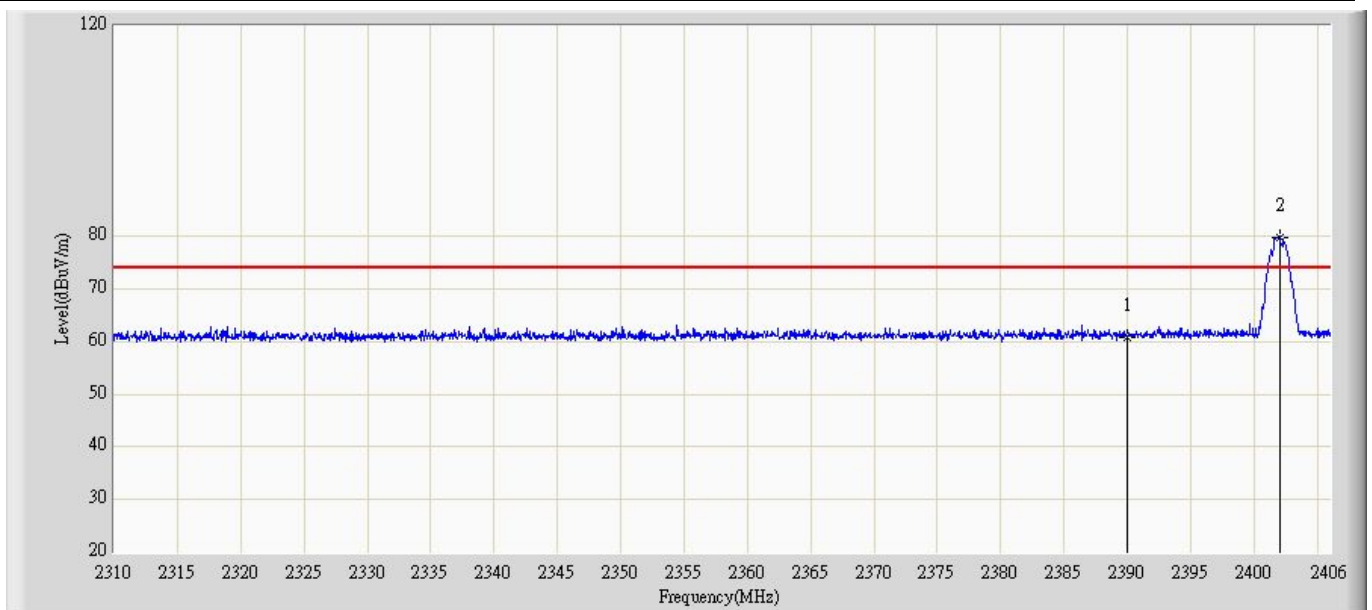
12.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

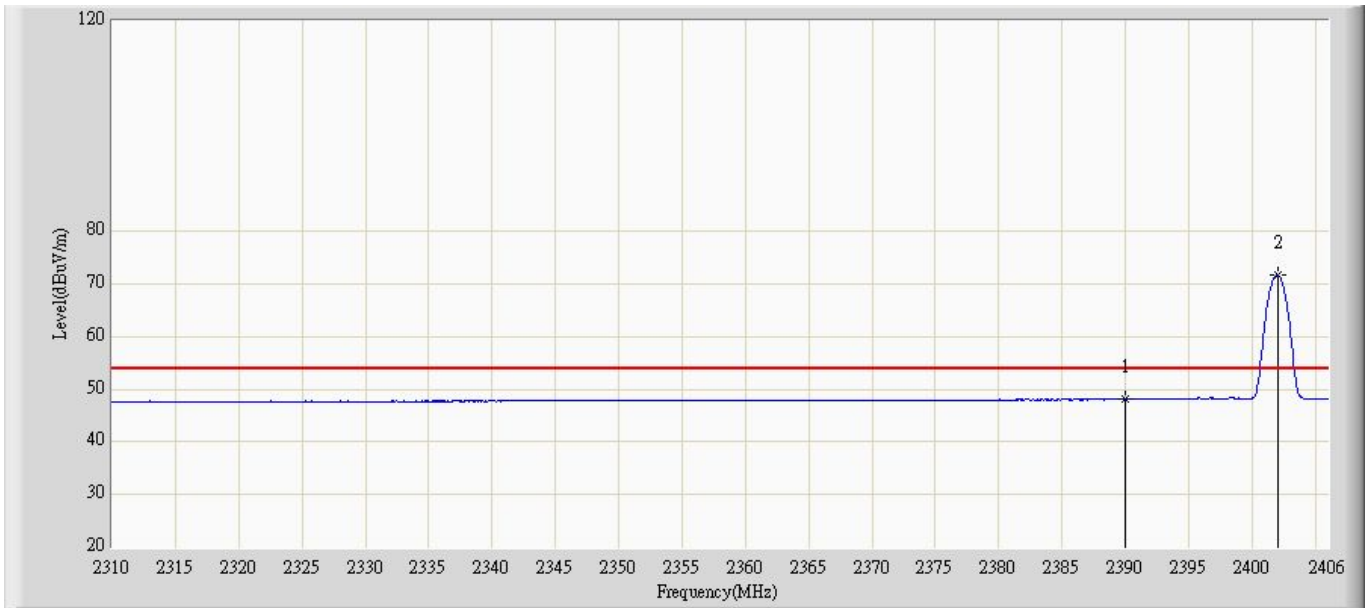
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Profile: 125S089R	Page No.: 9
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 16:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2402 MHz by DH5	



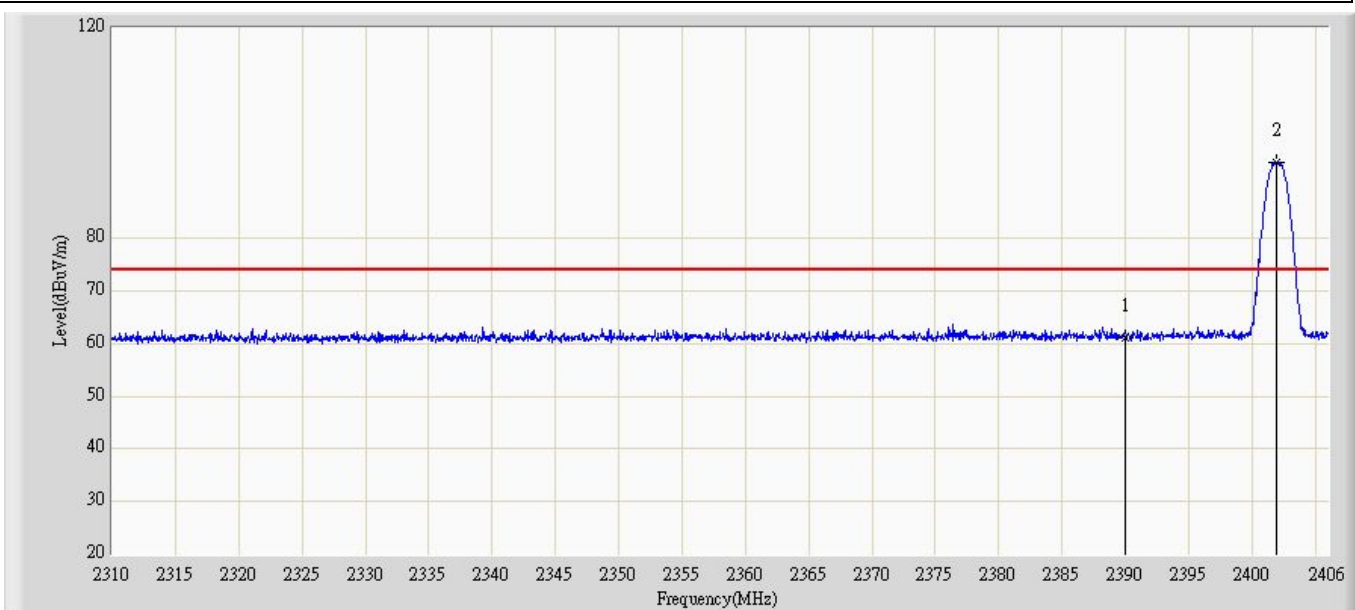
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.881	29.696	-13.119	74.000	31.185	PK
2		*	2402.064	79.833	48.653	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 10
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 16:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2402 MHz by DH5	



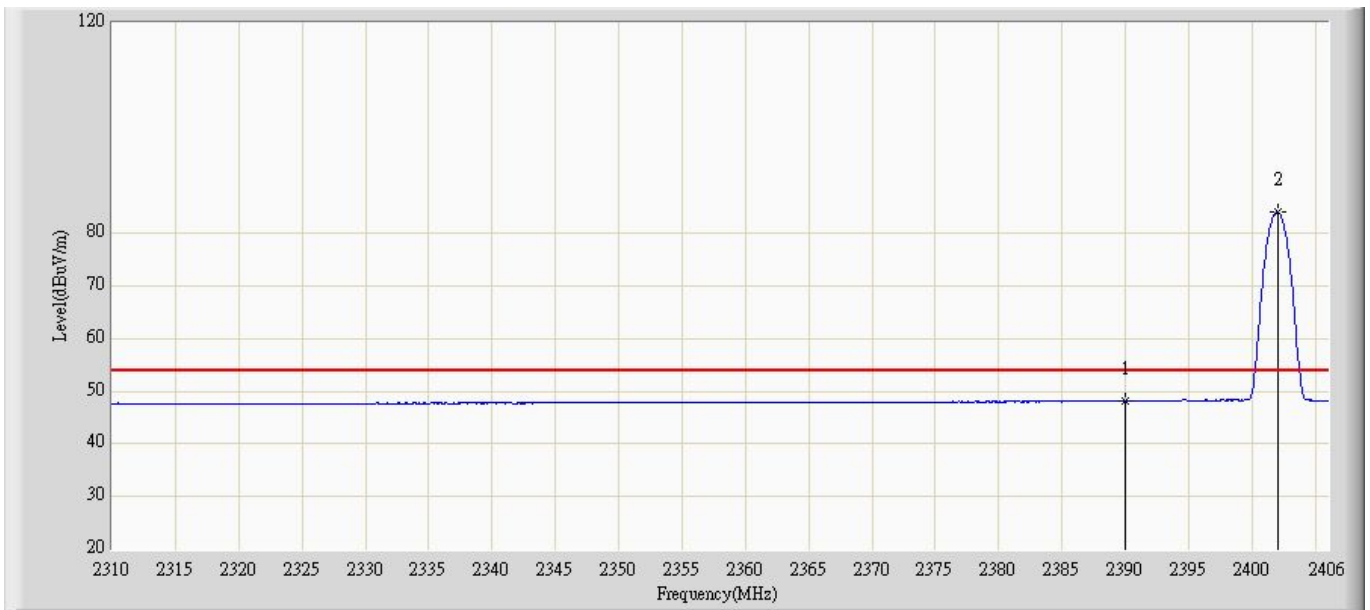
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.034	16.849	-5.966	54.000	31.185	AV
2		*	2402.064	71.623	40.443	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 11
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 16:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2402 MHz by DH5	



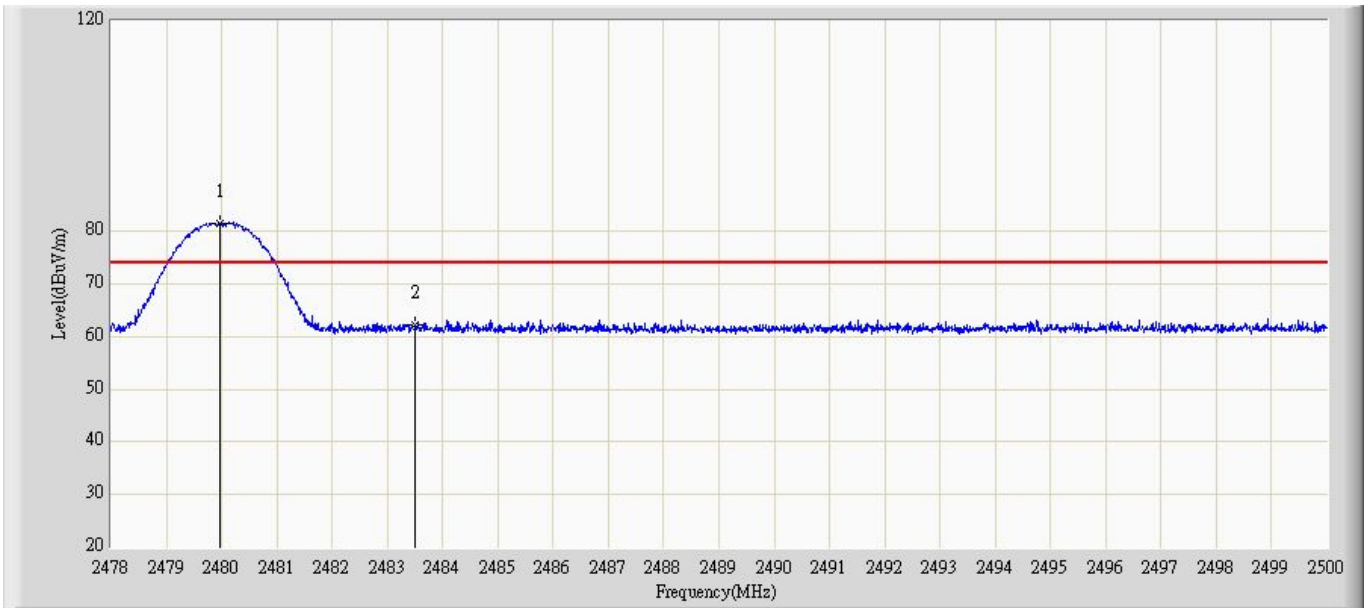
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.099	29.914	-12.901	74.000	31.185	PK
2		*	2401.920	94.520	63.340	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 12
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 16:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2402 MHz by DH5	



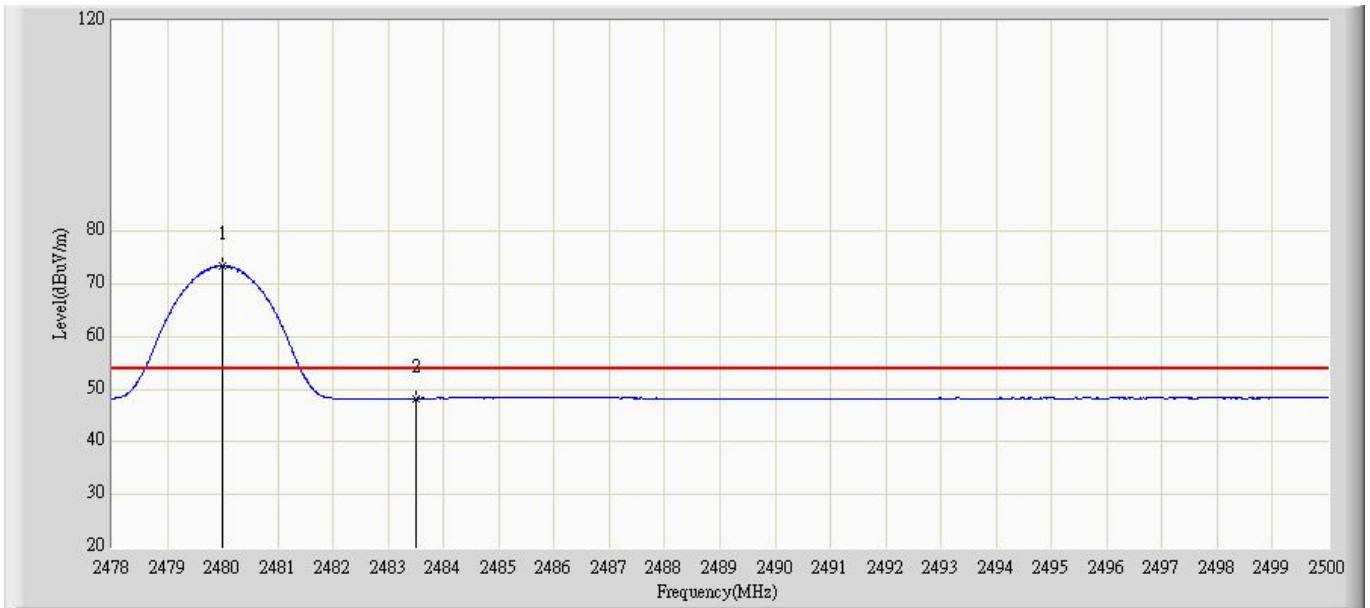
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.086	16.901	-5.914	54.000	31.185	AV
2		*	2402.064	84.008	52.828	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 13
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2480 MHz by DH5	



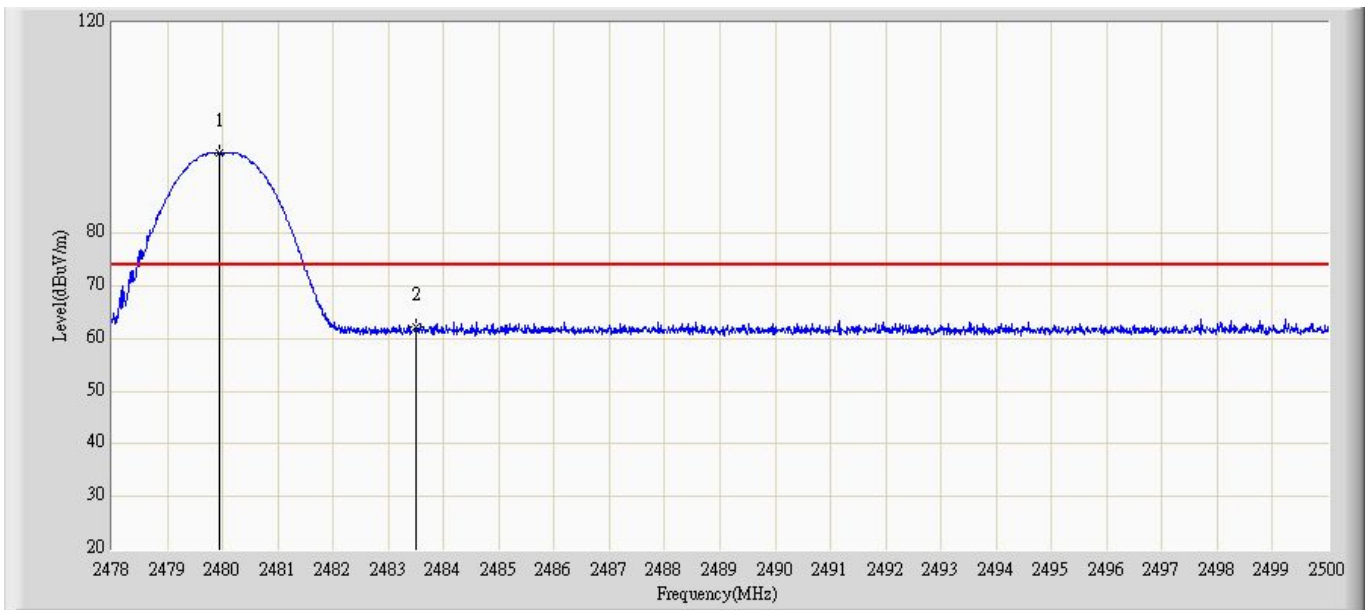
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.969	81.380	50.175	N/A	N/A	31.205	PK
2			2483.500	62.304	31.096	-11.696	74.000	31.208	PK

Profile: 125S089R	Page No.: 14
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2480 MHz by DH5	



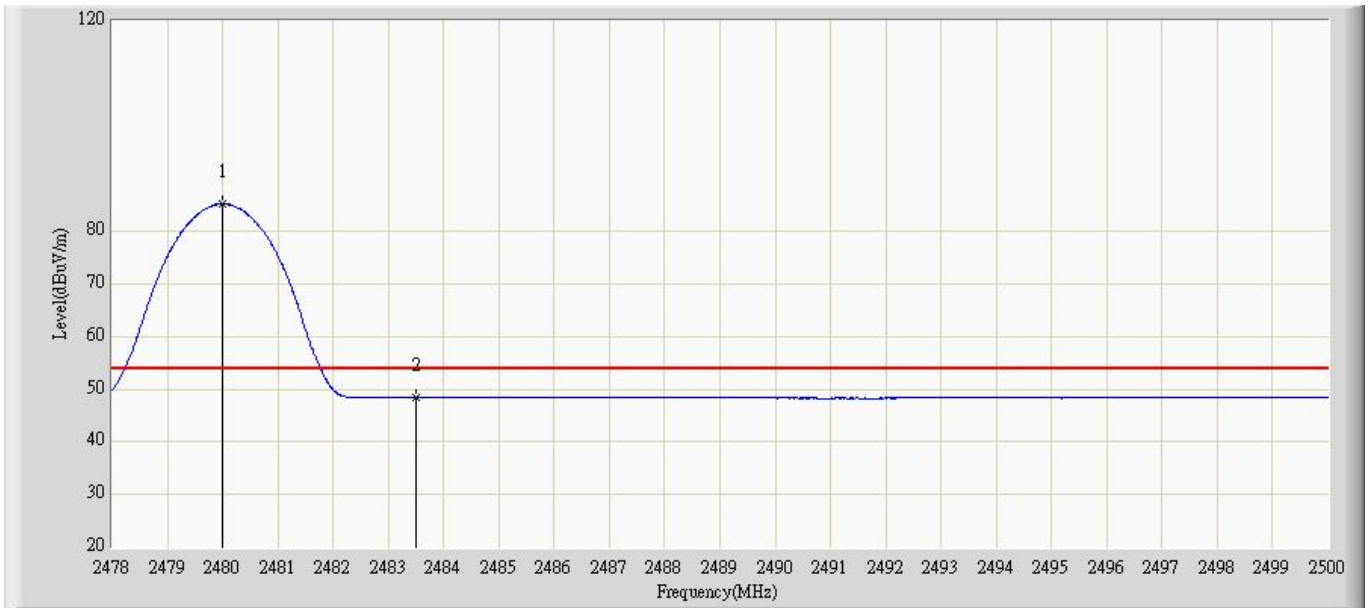
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.002	73.497	42.292	N/A	N/A	31.205	AV
2			2483.500	48.268	17.060	-5.732	54.000	31.208	AV

Profile: 125S089R	Page No.: 15
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2480 MHz by DH5	



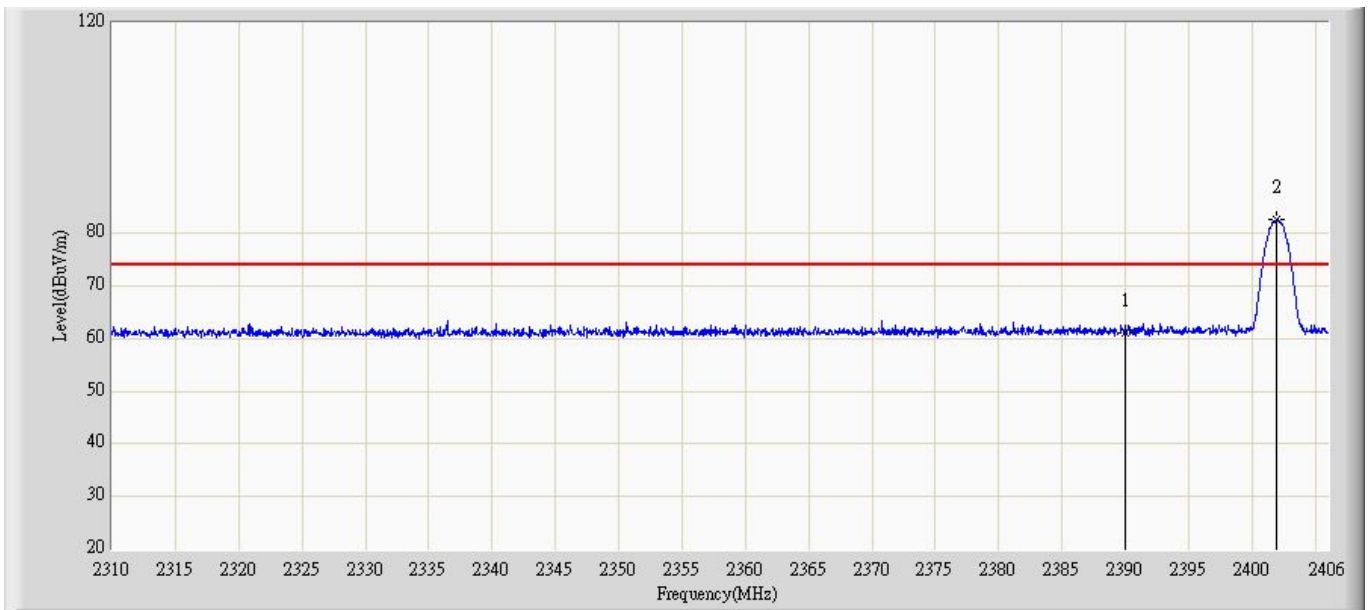
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.947	95.330	64.125	N/A	N/A	31.205	PK
2			2483.500	62.109	30.901	-11.891	74.000	31.208	PK

Profile: 125S089R	Page No.: 16
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 1: Transmit at channel 2480 MHz by DH5	



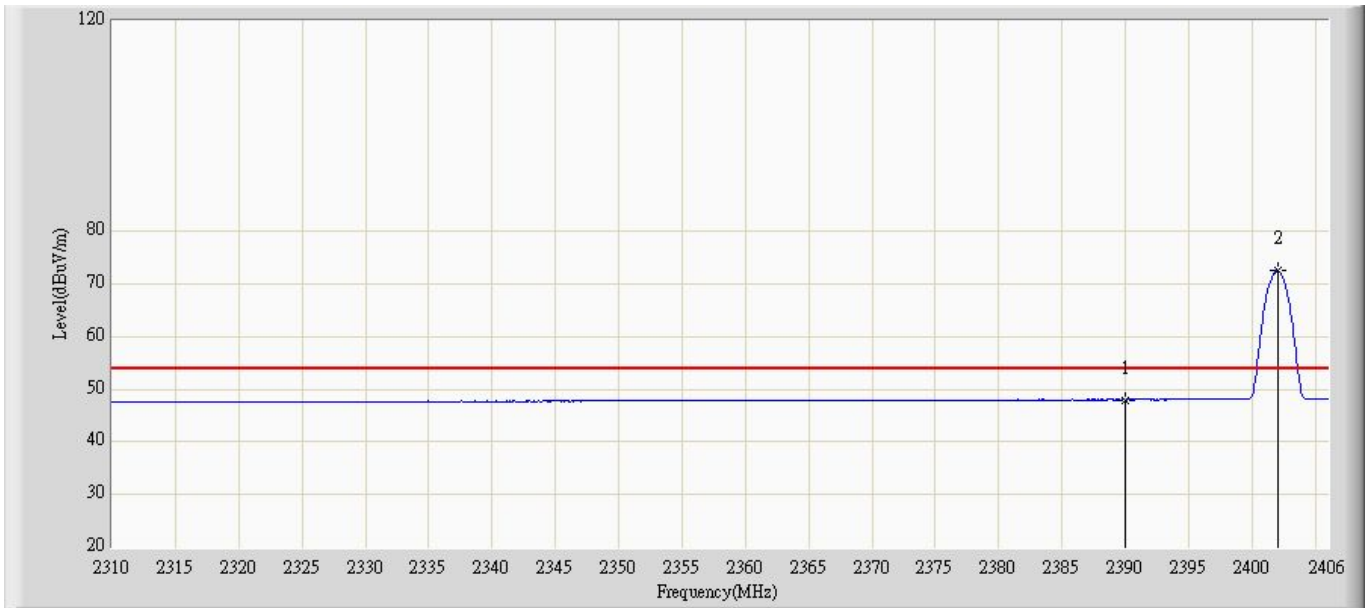
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.002	85.187	53.982	N/A	N/A	31.205	AV
2			2483.500	48.381	17.173	-5.619	54.000	31.208	AV

Profile: 125S089R	Page No.: 17
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2402 MHz by 2DH5	



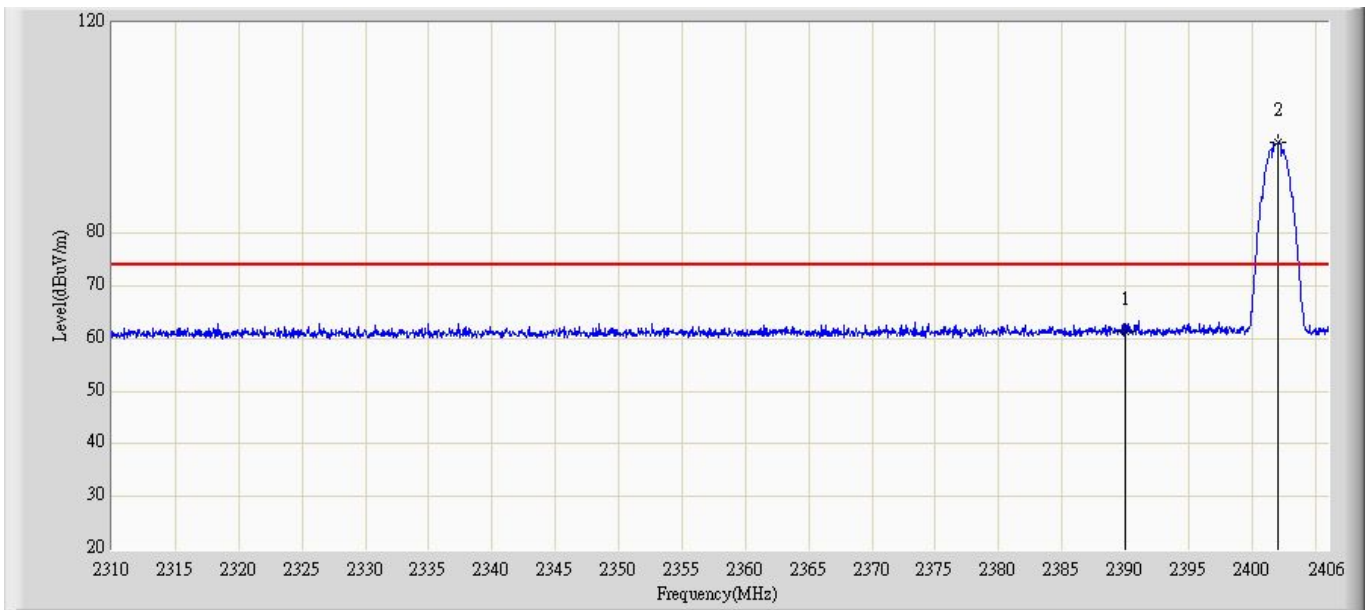
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.104	29.919	-12.896	74.000	31.185	PK
2		*	2401.920	82.557	51.377	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 18
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2402 MHz by 2DH5	



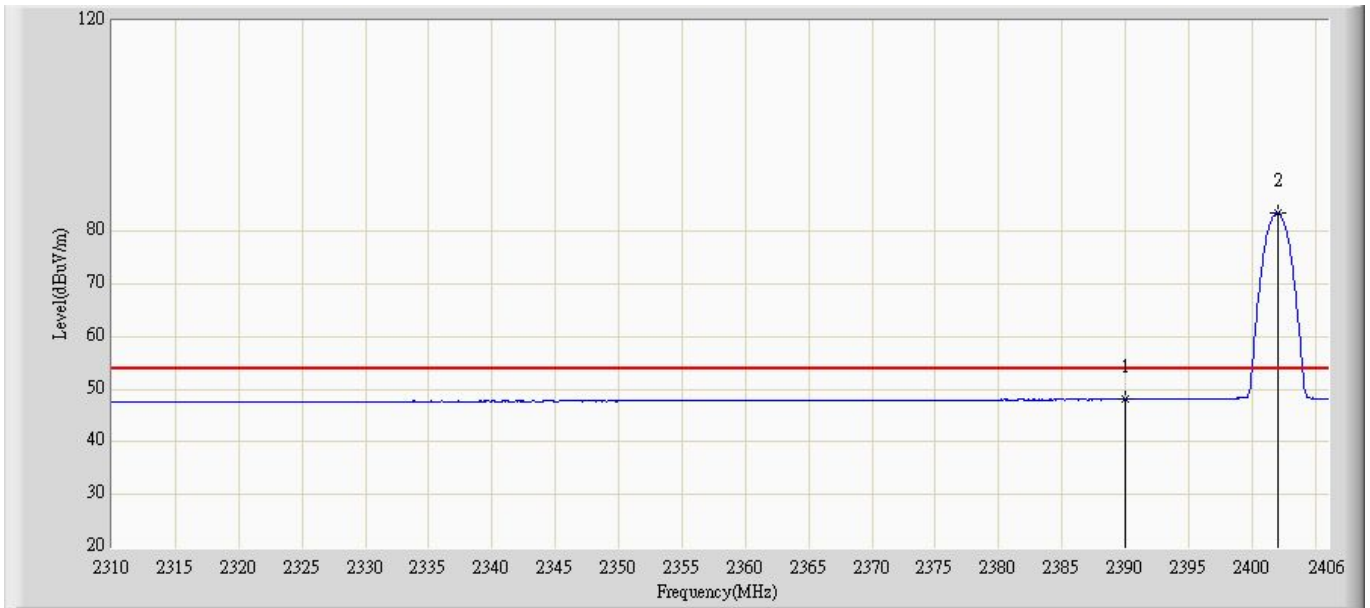
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	47.996	16.811	-6.004	54.000	31.185	AV
2		*	2402.064	72.546	41.366	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 19
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2402 MHz by 2DH5	



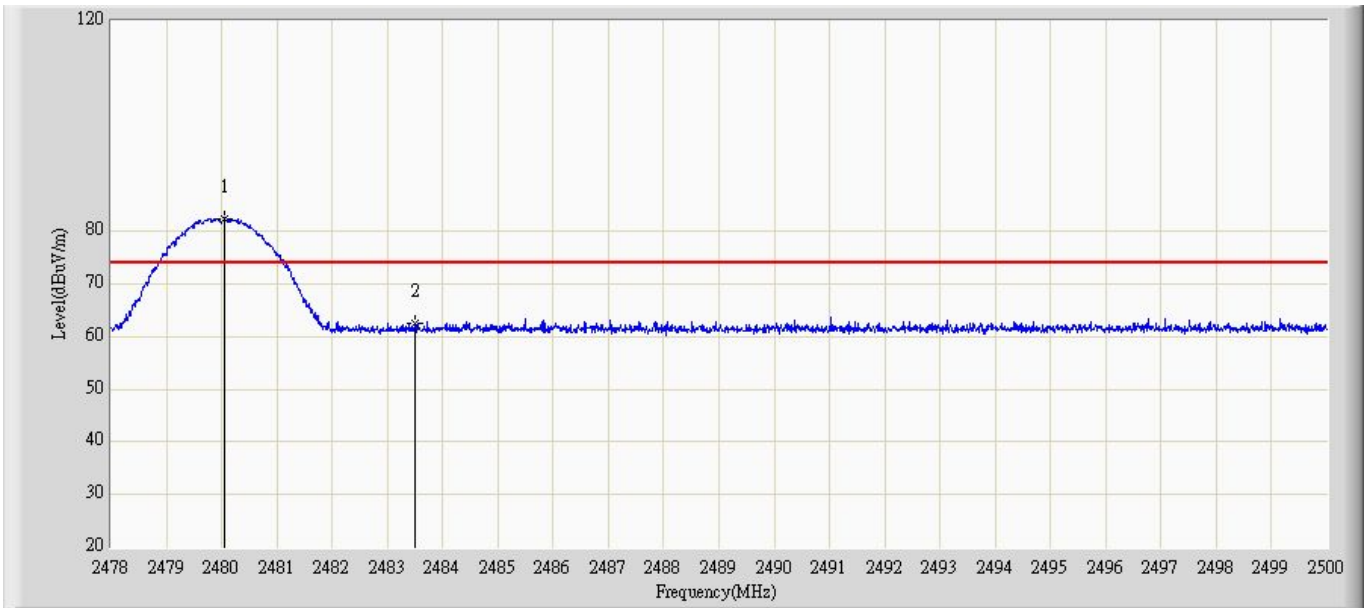
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.352	30.167	-12.648	74.000	31.185	PK
2		*	2402.064	97.269	66.089	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 20
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2402 MHz by 2DH5	



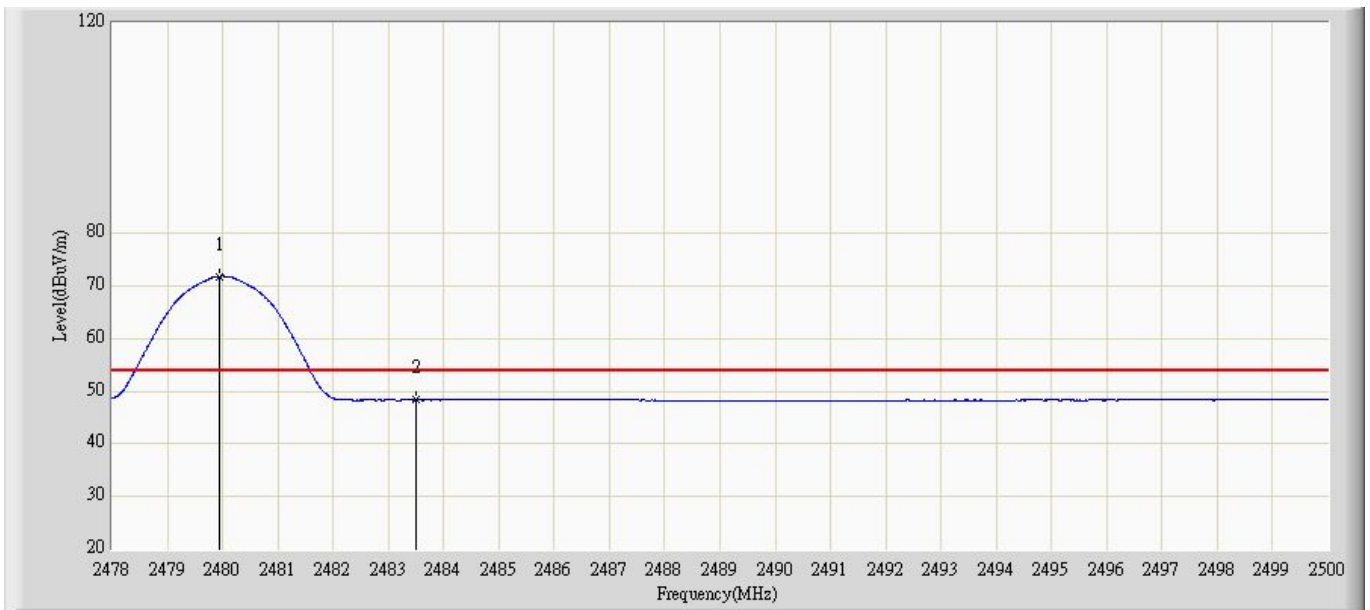
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.095	16.910	-5.905	54.000	31.185	AV
2		*	2402.064	83.609	52.429	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 21
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2480 MHz by 2DH5	



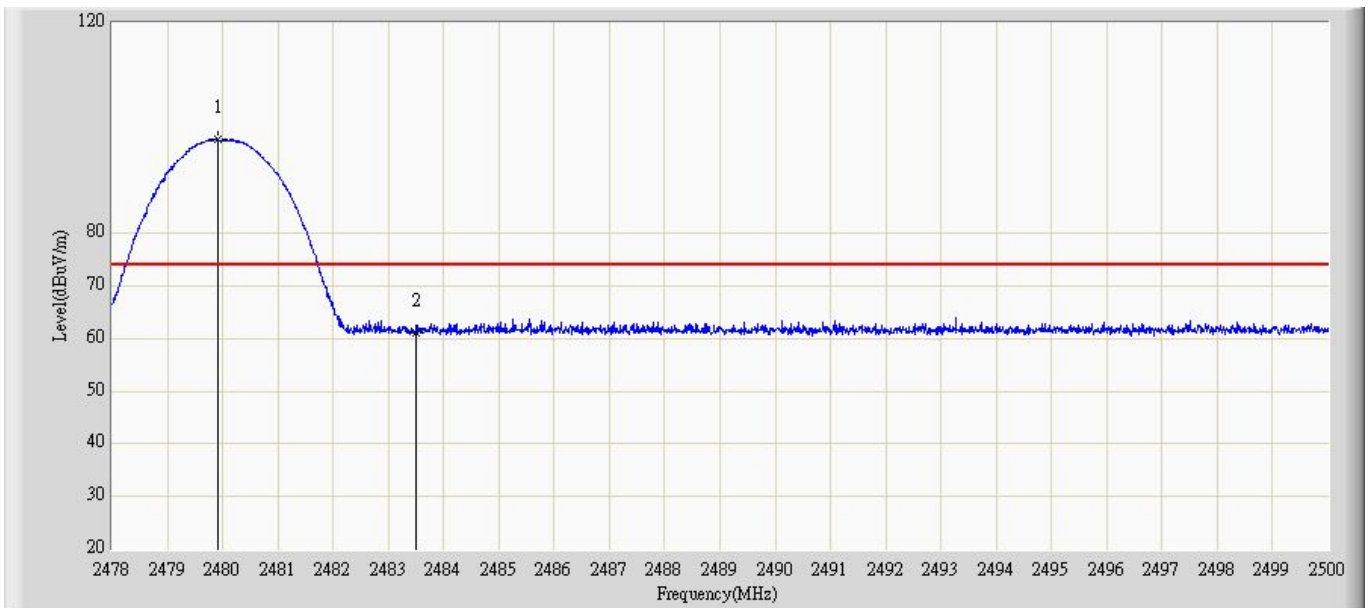
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.046	82.267	51.062	N/A	N/A	31.205	PK
2			2483.500	62.638	31.430	-11.362	74.000	31.208	PK

Profile: 125S089R	Page No.: 22
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2480 MHz by 2DH5	



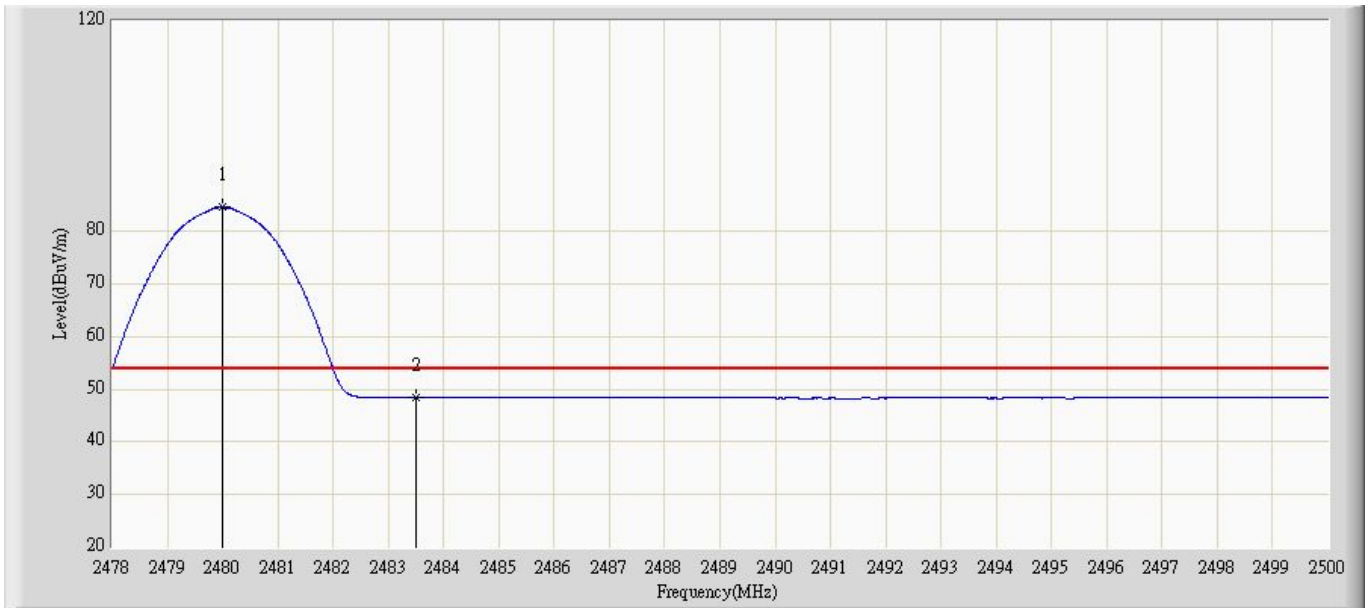
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.936	71.838	40.633	N/A	N/A	31.205	AV
2			2483.500	48.333	17.125	-5.667	54.000	31.208	AV

Profile: 125S089R	Page No.: 23
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2480 MHz by 2DH5	



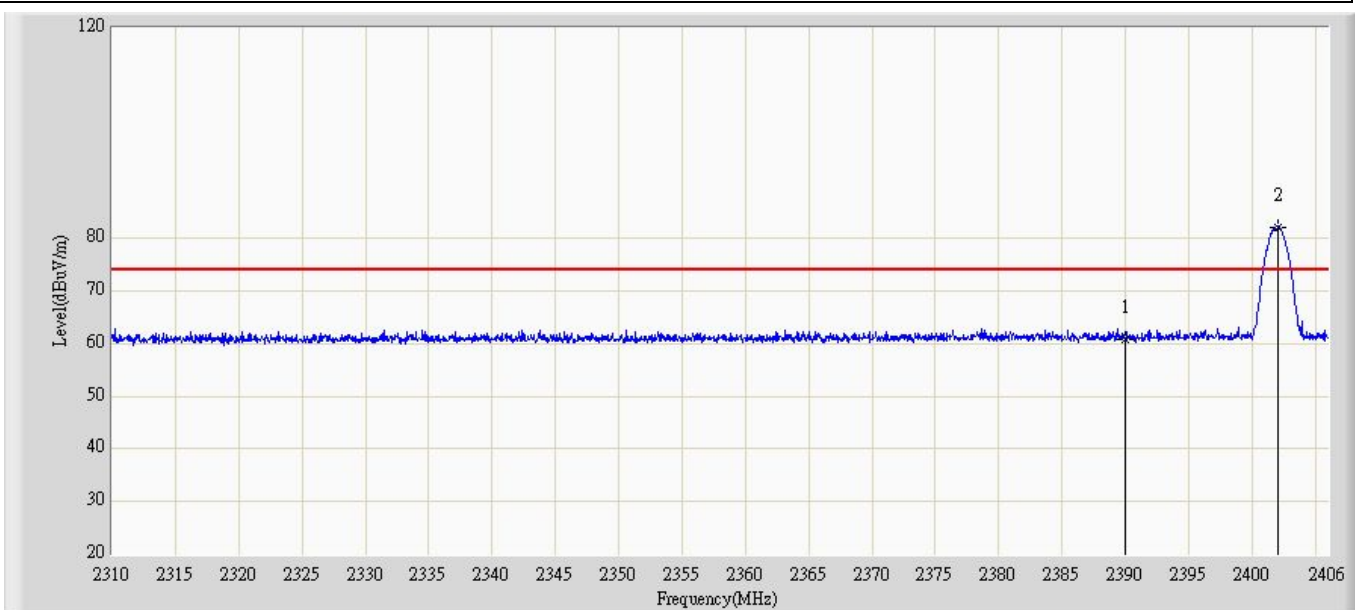
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.903	97.824	66.619	N/A	N/A	31.205	PK
2			2483.500	61.069	29.861	-12.931	74.000	31.208	PK

Profile: 125S089R	Page No.: 24
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 2: Transmit at channel 2480 MHz by 2DH5	



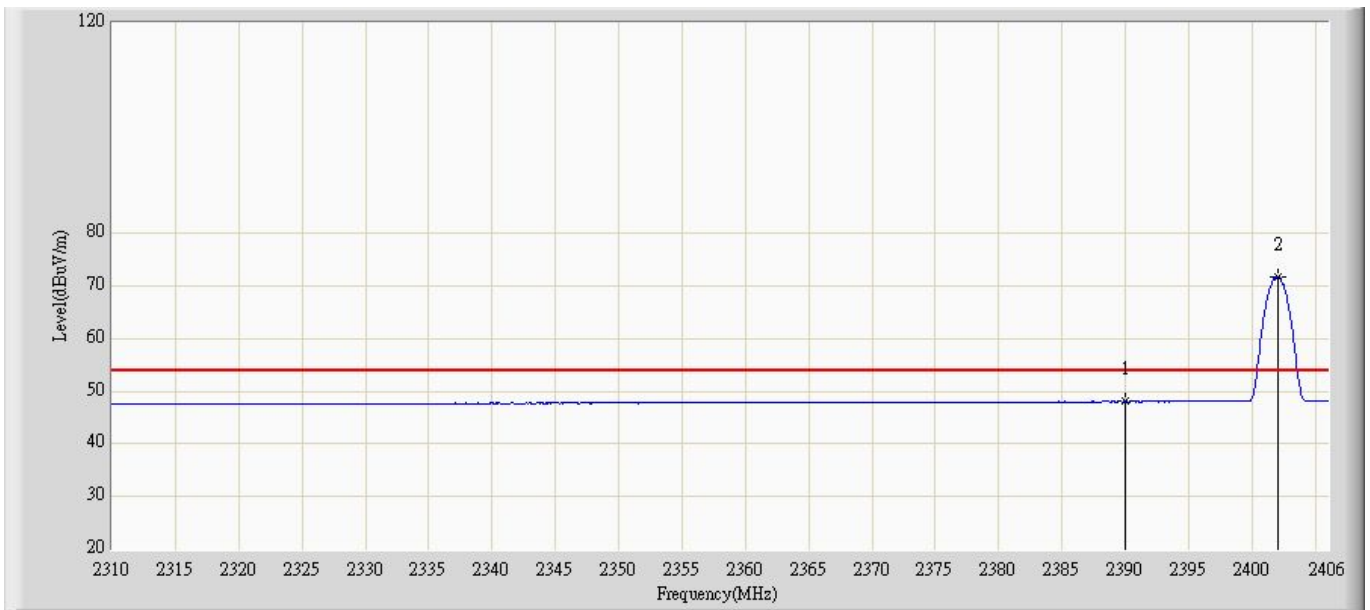
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.002	84.548	53.343	N/A	N/A	31.205	AV
2			2483.500	48.405	17.197	-5.595	54.000	31.208	AV

Profile: 125S089R	Page No.: 25
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2402 MHz by 3DH5	



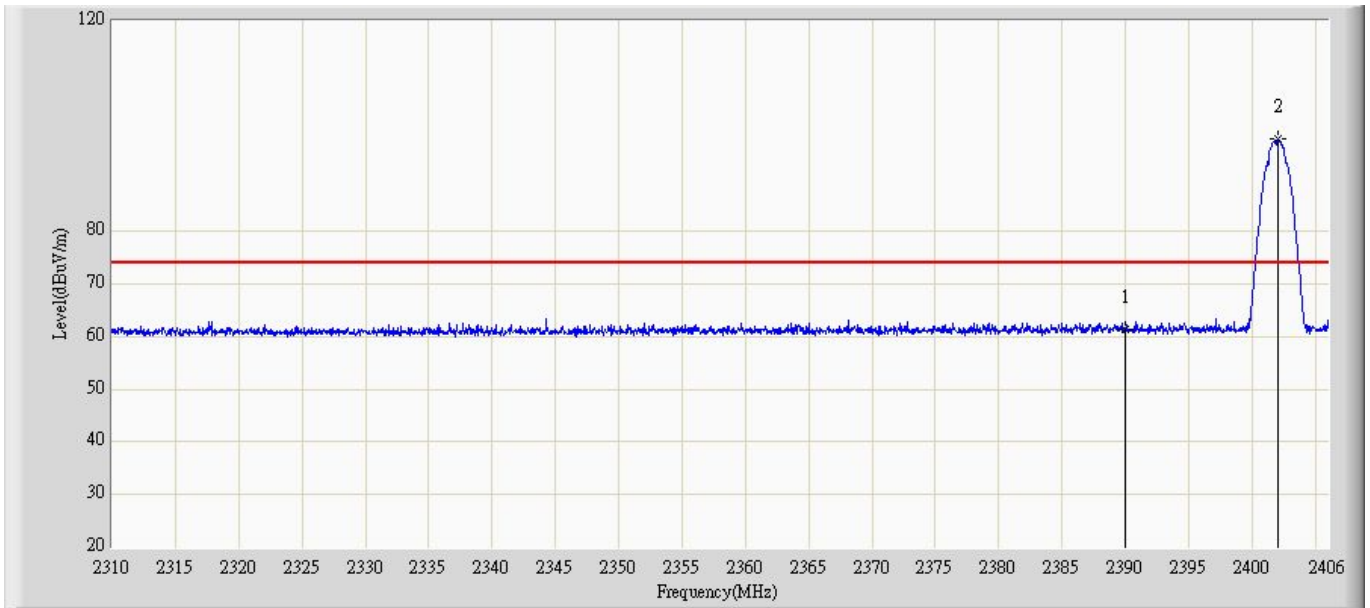
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.786	29.601	-13.214	74.000	31.185	PK
2		*	2402.016	81.993	50.813	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 26
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:29
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2402 MHz by 3DH5	



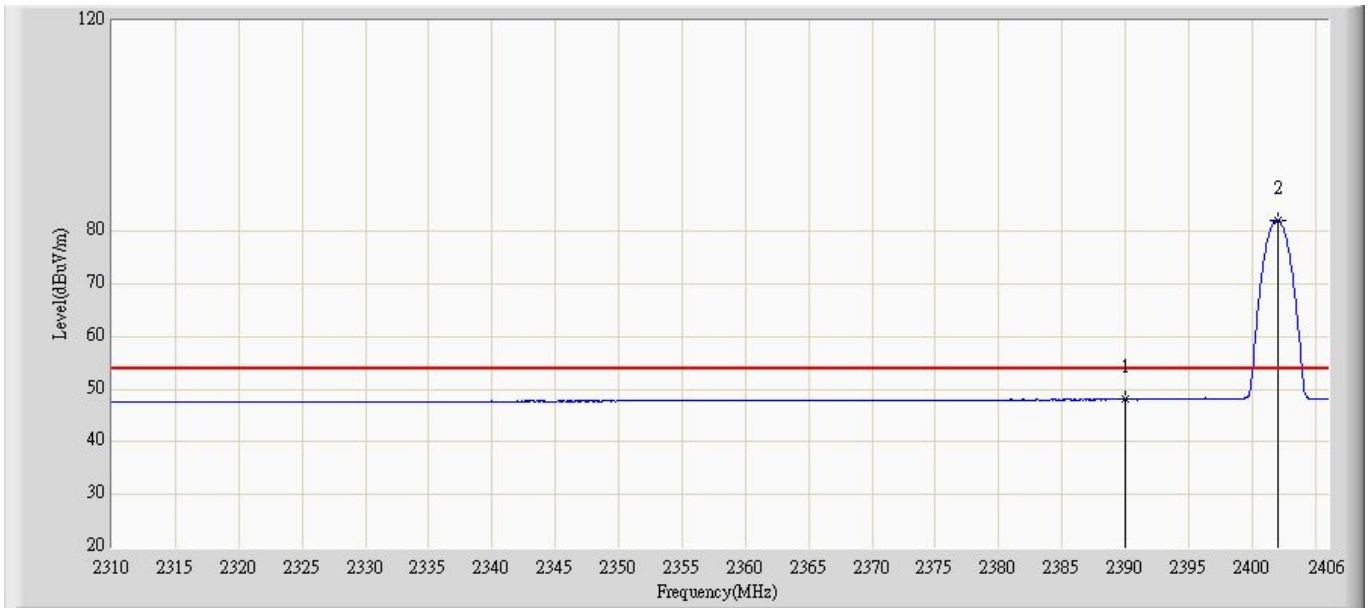
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.030	16.845	-5.970	54.000	31.185	AV
2		*	2402.064	71.681	40.501	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 27
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2402 MHz by 3DH5	



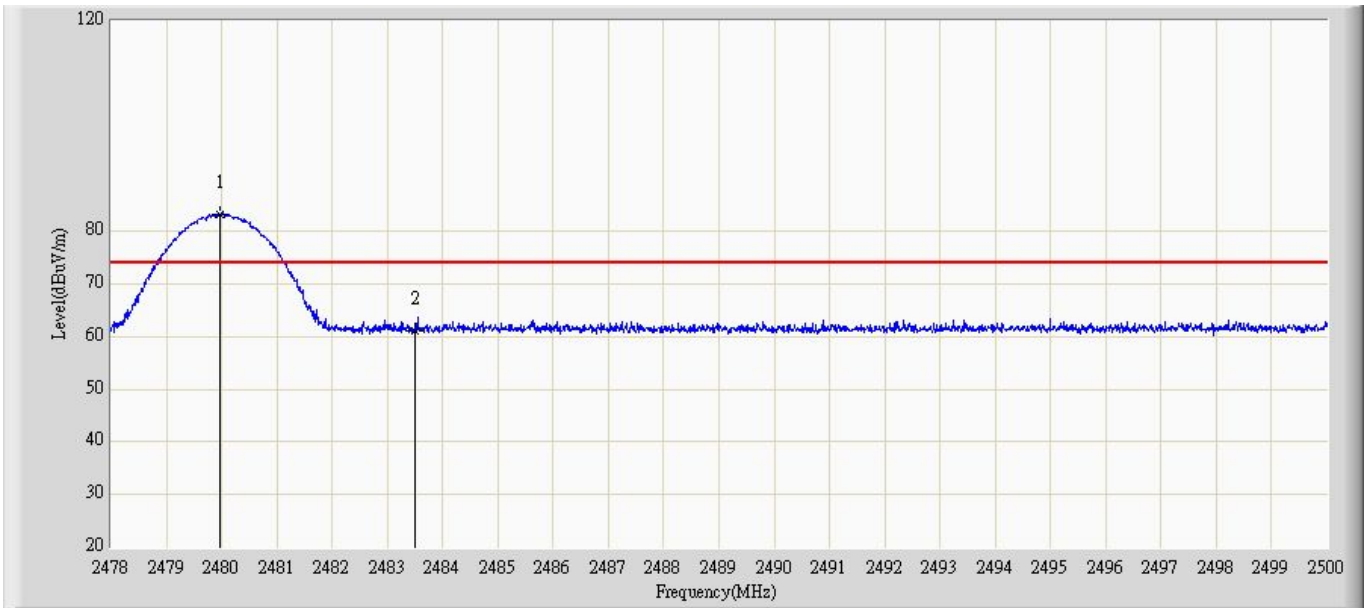
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.427	30.242	-12.573	74.000	31.185	PK
2		*	2402.064	97.461	66.281	N/A	N/A	31.179	PK

Profile: 125S089R	Page No.: 28
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2402 MHz by 3DH5	



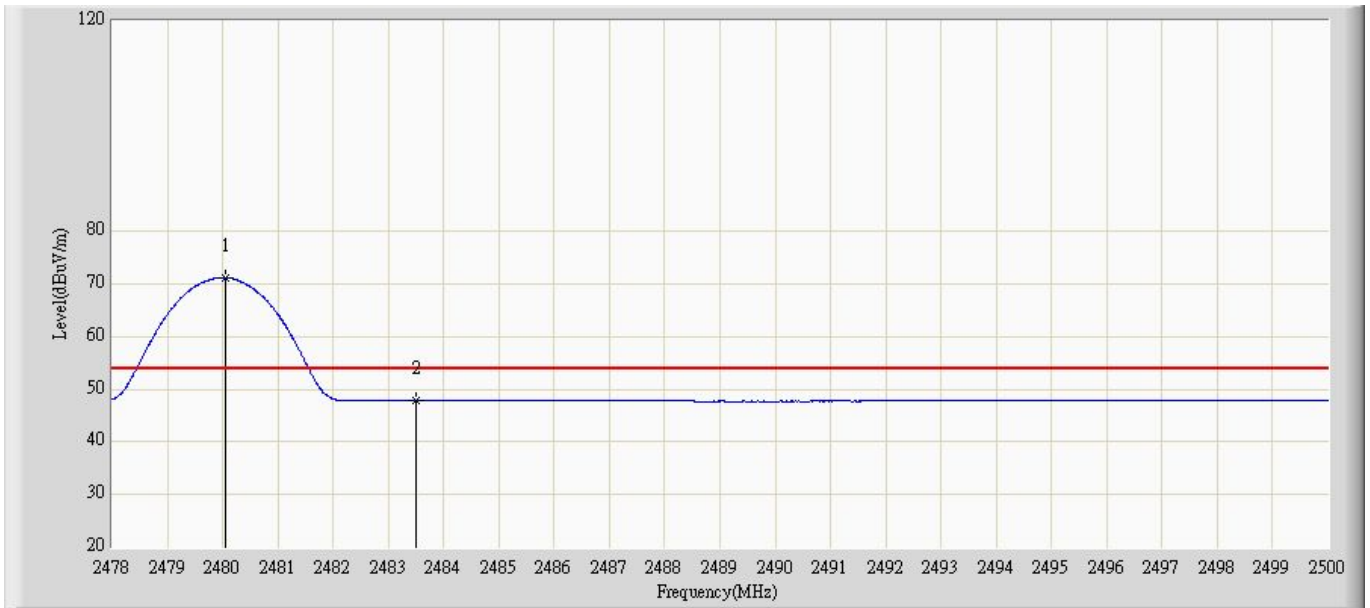
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.044	16.859	-5.956	54.000	31.185	AV
2		*	2402.064	82.116	50.936	N/A	N/A	31.179	AV

Profile: 125S089R	Page No.: 29
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2480 MHz by 3DH5	



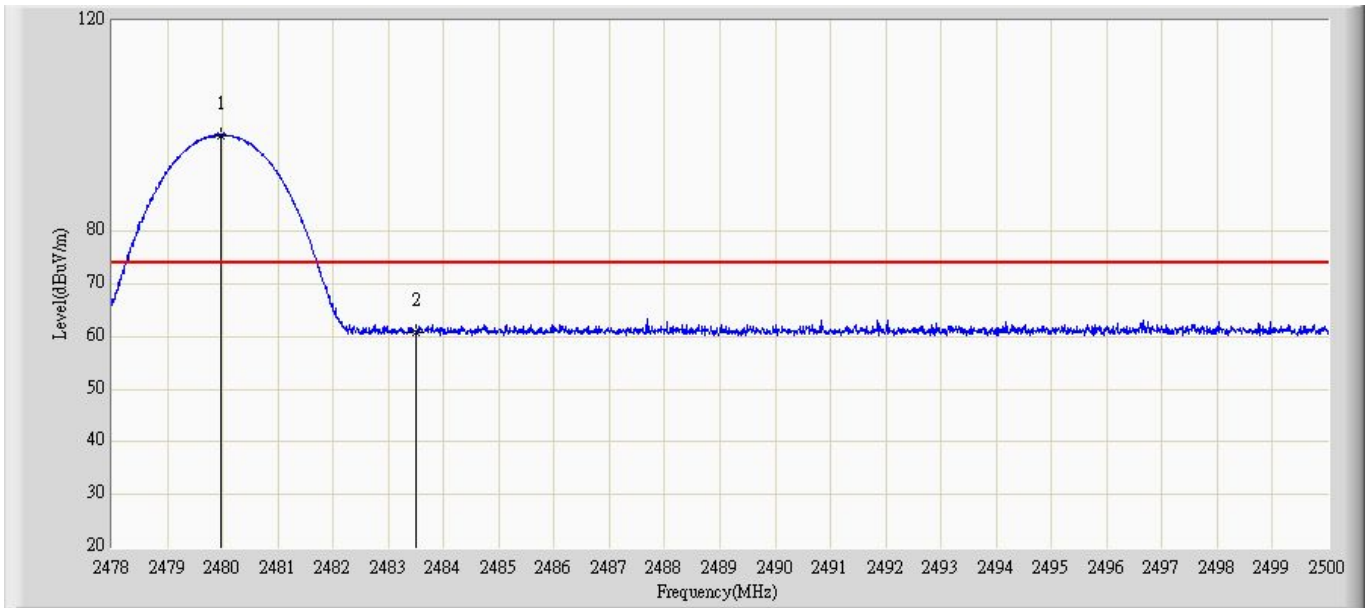
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.969	83.203	51.998	N/A	N/A	31.205	PK
2			2483.500	61.024	29.816	-12.976	74.000	31.208	PK

Profile: 125S089R	Page No.: 30
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2480 MHz by 3DH5	



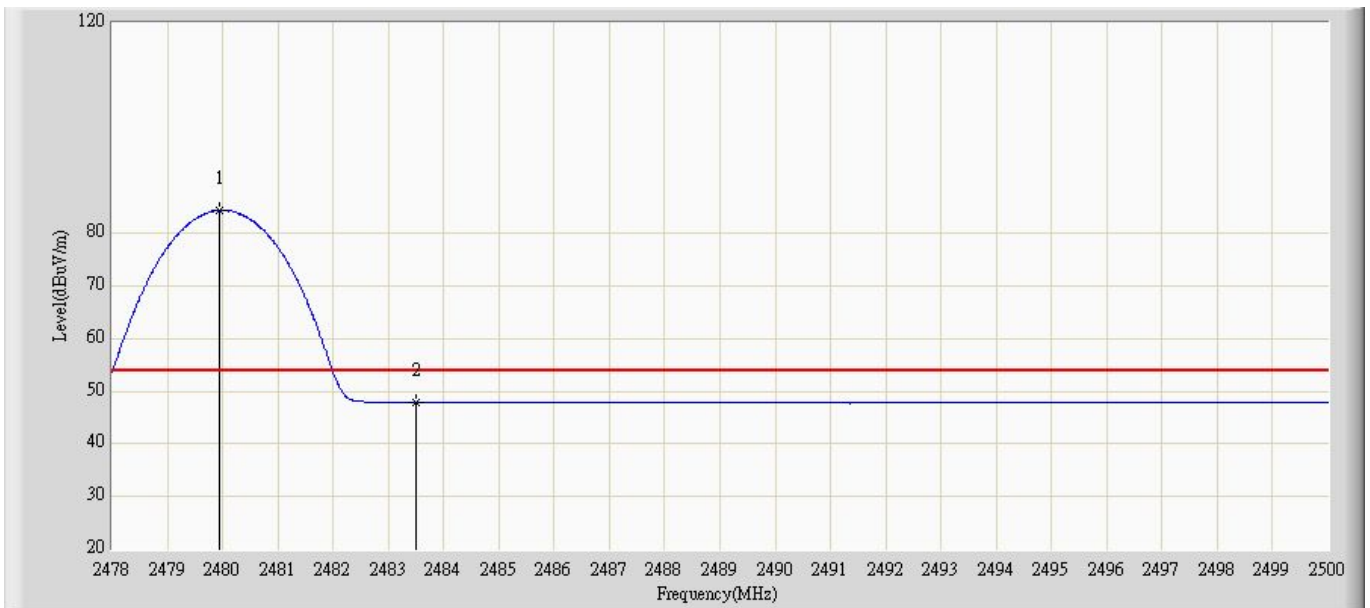
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.046	71.173	39.968	N/A	N/A	31.205	AV
2			2483.500	47.819	16.611	-6.181	54.000	31.208	AV

Profile: 125S089R	Page No.: 31
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2480 MHz by 3DH5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.969	98.267	67.062	N/A	N/A	31.205	PK
2			2483.500	60.741	29.533	-13.259	74.000	31.208	PK

Profile: 125S089R	Page No.: 32
Engineer: Aileen	
Site: AC5	Time: 2012/06/03 - 17:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Bluetooth headset	Power: DC 3.7V
Note: Mode 3: Transmit at channel 2480 MHz by 3DH5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.936	84.355	53.150	N/A	N/A	31.205	AV
2			2483.500	47.918	16.710	-6.082	54.000	31.208	AV

13. Receiver Spurious Emission for Industry Canada RSS-Gen Requirement

13.1. Test Equipment

Radiated Emission / AC-2

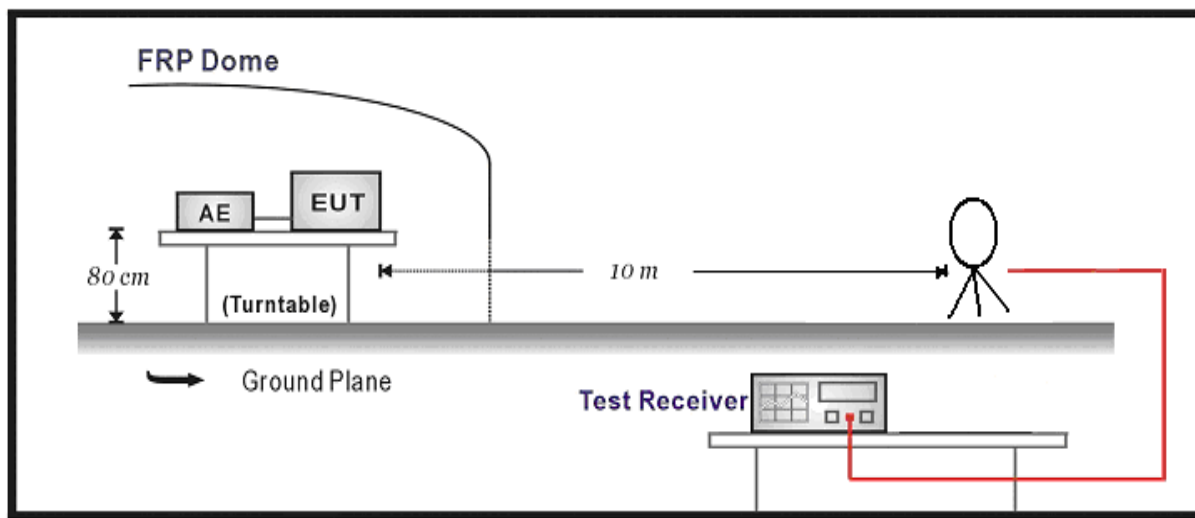
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Loop Antenna	R&S	HFH2-Z2	833799/003	2012.11.22
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2012.10.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.01.10

Radiated Emission / AC-5

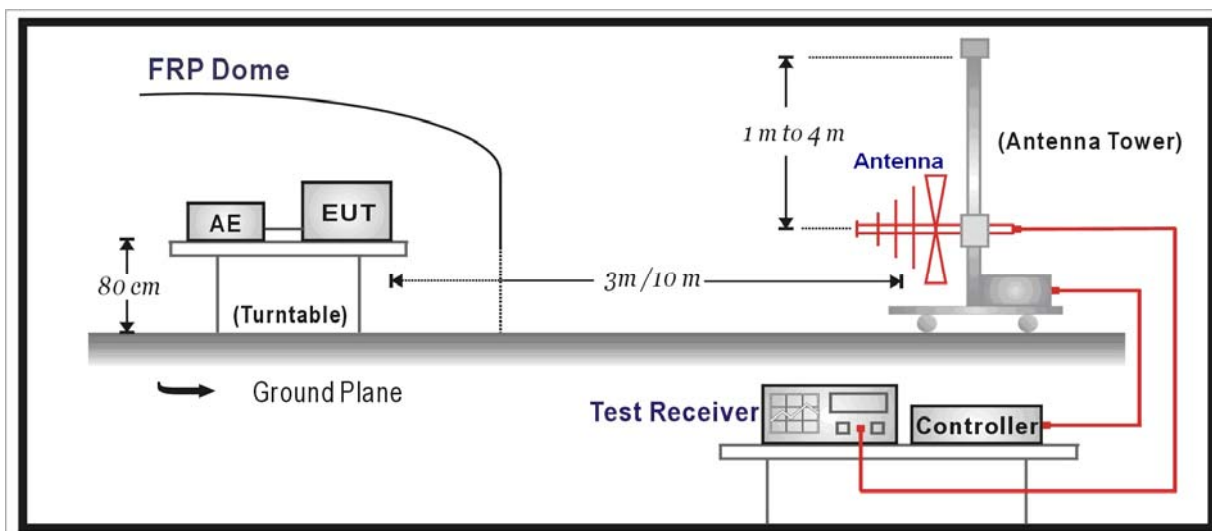
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	Quietek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2013.01.10

13.2. Test Setup

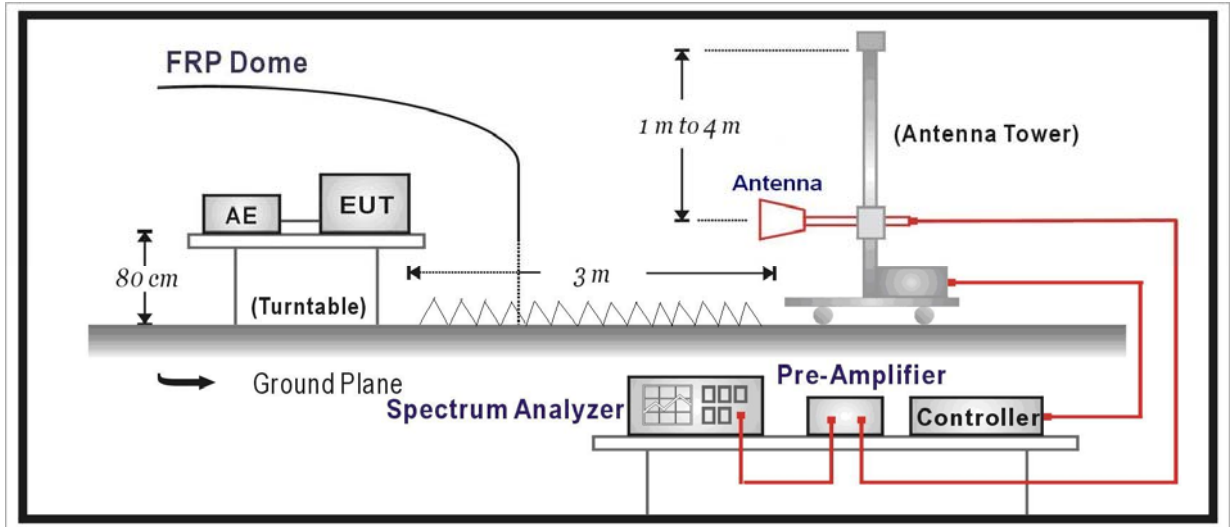
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



13.3. Limit

FCC Part 15 Subpart B Paragraph 15.109		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

13.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 9kHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

13.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
below 1G is defined as ± 3.8 dB

13.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preampifier Gain

Mode 1: Receive-1Mbps (GFSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
00	H	441.3	5.0	26.9	31.9	46	-14.1	QP
	V	124.7	5.1	23.7	28.8	43.5	-14.7	QP
	H	749.6	5.5	30.3	35.8	46	-10.2	QP
	V	471.7	6.7	26.9	33.6	46	-12.4	QP
	H	1068.0	67.7	-22.5	45.2	54(Note3)	-8.8	PK
	V	1331.5	64.3	-21.1	43.2	54(Note3)	-10.8	PK
	H	1331.5	64.8	-21.1	43.7	54(Note3)	-10.3	PK
	V	2394.0	62.5	-17.2	45.3	54(Note3)	-8.7	PK
39	H	93.2	5.1	19.2	24.3	43.5	-19.2	QP
	V	130.6	6.1	23.2	29.3	43.5	-14.2	QP
	H	513.1	5.3	28.0	33.3	46	-12.7	QP
	V	581.4	5.4	27.3	32.7	46	-13.3	QP
	H	1068.0	67.6	-22.5	45.1	54(Note3)	-8.9	PK
	V	1331.5	65.8	-21.1	44.7	54(Note3)	-9.3	PK
	H	3261.0	57.3	-16.0	41.3	54(Note3)	-12.7	PK
	V	2402.5	63.1	-17.2	45.9	54(Note3)	-8.1	PK
78	H	115.0	4.5	20.6	25.1	43.5	-18.4	QP
	V	127.2	4.6	23.5	28.1	43.5	-15.4	QP
	H	441.0	4.9	26.9	31.8	46	-14.2	QP
	V	582.9	6.3	27.3	33.6	46	-12.4	QP
	H	1068.0	66.1	-22.5	43.6	54(Note3)	-10.4	PK
	V	1331.5	66.0	-21.1	44.9	54(Note3)	-9.1	PK
	H	1331.5	61.5	-21.1	40.4	54(Note3)	-13.6	PK
	V	2394.0	64.8	-17.2	47.6	54(Note3)	-6.4	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz,

- 18GHz~25GHz), therefore no data appear in the report.
- This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 2: Receive-2Mbps (Pi/4 DQPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
00	H	125.7	5.1	19.5	24.6	43.5	-18.9	QP
	V	135.7	5.4	23.0	28.4	43.5	-15.1	QP
	H	428.7	5.7	26.8	32.5	46	-13.5	QP
	V	557.6	5.2	27.8	33.0	46	-13.0	QP
	H	1068.0	66.5	-22.5	44.0	54(Note3)	-10.0	PK
	V	1331.5	64.3	-21.1	43.2	54(Note3)	-10.8	PK
	H	3201.5	58.5	-15.9	42.6	54(Note3)	-11.4	PK
	V	2394.0	63.9	-17.2	46.7	54(Note3)	-7.3	PK
39	H	114.1	5.1	20.6	25.7	43.5	-17.8	QP
	V	126.2	3.8	23.6	27.4	43.5	-16.1	QP
	H	412.1	5.8	26.3	32.1	46	-13.9	QP
	V	745.9	5.3	31.4	36.7	46	-9.3	QP
	H	1068.0	68.5	-22.5	46.0	54(Note3)	-8.0	PK
	V	1331.5	66.2	-21.1	45.1	54(Note3)	-8.9	PK
	H	1391.0	60.9	-21.0	39.9	54(Note3)	-14.1	PK
	V	2402.5	64.0	-17.2	46.8	54(Note3)	-7.2	PK
78	H	94.4	4.4	19.6	24.0	43.5	-19.5	QP
	V	129.8	5.4	23.2	28.6	43.5	-14.9	QP
	H	631.3	6.5	29.3	35.8	46	-10.2	QP
	V	299.9	4.8	25.5	30.3	46	-15.7	QP
	H	1331.5	63.5	-21.1	42.4	54(Note3)	-11.6	PK
	V	1663.0	61.3	-20.9	40.4	54(Note3)	-13.6	PK
	H	2402.5	56.4	-17.2	39.2	54(Note3)	-14.8	PK
	V	2402.5	60.8	-17.2	43.6	54(Note3)	-10.4	PK

- Note: 1. Measure Level = Reading Level + Factor.
- The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.
 - This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 3: Receive-3Mbps (8DPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
00	H	100.9	5.5	18.6	24.1	43.5	-19.4	QP
	V	128.3	4.7	23.4	28.1	43.5	-15.4	QP
	H	559.4	5.8	28.5	34.3	46	-11.7	QP
	V	299.8	5.4	25.5	30.9	46	-15.1	QP
	H	1331.5	64.0	-21.1	42.9	54(Note3)	-11.1	PK
	V	1331.5	59.4	-21.1	38.3	54(Note3)	-15.7	PK
	H	2394.0	59.7	-17.2	42.5	54(Note3)	-11.5	PK
	V	2394.0	59.7	-17.2	42.5	54(Note3)	-11.5	PK
39	H	94.7	4.6	19.7	24.3	43.5	-19.2	QP
	V	125.2	4.6	23.8	28.4	43.5	-15.1	QP
	H	573.4	5.6	28.8	34.4	46	-11.6	QP
	V	305.5	5.8	25.1	30.9	46	-15.1	QP
	H	1331.5	63.7	-21.1	42.6	54(Note3)	-11.4	PK
	V	1994.5	66.1	-19.4	46.7	54(Note3)	-7.3	PK
	H	2462.0	58.2	-17.2	41.0	54(Note3)	-13.0	PK
	V	2402.5	60.4	-17.2	43.2	54(Note3)	-10.8	PK
78	H	115.1	5.0	20.6	25.6	43.5	-17.9	QP
	V	114.5	5.1	22.4	27.5	43.5	-16.0	QP
	H	418.0	5.3	26.8	32.1	46	-13.9	QP
	V	241.1	4.8	25.7	30.5	46	-15.5	QP
	H	1068.0	69.1	-22.5	46.6	54(Note3)	-7.4	PK
	V	1331.5	65.3	-21.1	44.2	54(Note3)	-9.8	PK
	H	1331.5	62.5	-21.1	41.4	54(Note3)	-12.6	PK
	V	2394.0	63.2	-17.2	46.0	54(Note3)	-8.0	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.