FCC Test Report

FCC Part 15.247 for FHSS systems/ CANADA RSS-210

FOR:

Sound ID
Sound ID 300

FCC ID: U3N300
IC ID: 6975A-300

TEST REPORT #: EMC_SOUND_004_15.247

DATE: 2008-10-27

Certificate # 2135.01

Bluetooth Qualification Test Facility (BQTF)

LAB CODE 20020328-00

FCC listed
A2LA Accredited

IC recognized # 3462B

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecomusa.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

TABLE OF CONTENTS

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

Company	Description	Model #
Sound ID	**Bluetooth headset with advanced noise cancellation and signal processing**	**Sound ID 300**

This report is reviewed by:

Date	Section	Name	Signature
2008-10-27	**EMC & Radio**	**Satya Radhakrishna (EMC Project Engineer)**	Satya Radhakrishna I am approving this document

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

This report is prepared by:

Date	Section	Name	Signature
2008-10-27	**EMC & Radio**	**Marc Douat (EMC Project Engineer)**	Marc Douat I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	**CETECOM Inc.**
Department:	**EMC**
Address:	**411 Dixon Landing Road Milpitas, CA 95035 U.S.A.**
Telephone:	**+1 (408) 586 6200**
Fax:	**+1 (408) 586 6299**
Responsible Test Lab Manager:	**Lothar Schmidt**
Responsible Project Leader:	**Marc Douat**
Date of test:	**2008-5-29**

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	**Sound ID**
Street Address	**3430 West Bayshore Rd.**
City/Zip Code	**Palo Alto, CA 94303**
Country	**USA**
Contact Person	**Chas Pavlovic**
Telephone	**650-384-3006**
Fax	**650-320-8797**
e-mail	**cpavlovic@soundid.com**

2.3 Identification of the Manufacturer

Same as above

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	**Sound ID 300**
Description:	**Bluetooth headset with advanced noise cancellation and signal processing**
Model No:	**Sound ID 300**
Antenna Type:	**Integral / 2 dBi**
Type(s) of Modulation:	**GFSK, DQPSK, 8DPSK**
Frequency Band(s) of Operation:	**2400~2483.5MHz**
Numbers of Channels:	**79**
Equipment Classification: (CLASS)	☐FIXED ☐VEHICULAR ■PORTABLE ☐MODULE
Equipment Classification: (POWER(AC MAINS))	☐230VAC *(GROUND)* ☐230VAC *(NO GROUND)* ☐12VDC ■ **3.0/3.8/4.2VDC Li battery**

3.2 Identification of the Equipment Under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	EUT	**Sound ID**	**Sound ID 300**	**B10**
2	EUT	**Sound ID**	**Sound ID 300**	**B12**
3	EUT	**Sound ID**	**Sound ID 300**	**BFB**

3.3 Identification of Accessory equipment

None

4 Subject Of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

This test report is to support a request for new equipment authorization under the FCC ID **U3N300**and IC ID **6975A-300**. All testing was performed on the product referred to in Section 3 as EUT. This test report contains full radiated and conducted testing results as per FCC15.247.

During the testing process the EUT was tested on a single channel using PRBS9 payload using DH5, 2DH5 or 3DH5 packets, all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

This device does not permit Bluetooth radio operating while the internal battery is charging by the AC wall power supply; therefore no AC conducted emission requirement applies.

5 Measurements (Radiated)

5.1 MAXIMUM PEAK OUTPUT POWER

5.1.1 Test Result:

EIRP: GFSK

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	-0.16	0.83	1.94
Measurement uncertainty		±0.5dBm		

EIRP: π / 4 DQPSK

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	-0.45	0.32	1.13
Measurement uncertainty		±0.5dBm		

EIRP: 8DPSK
4

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	-0.31	0.48	1.33
Measurement uncertainty		±0.5dBm		

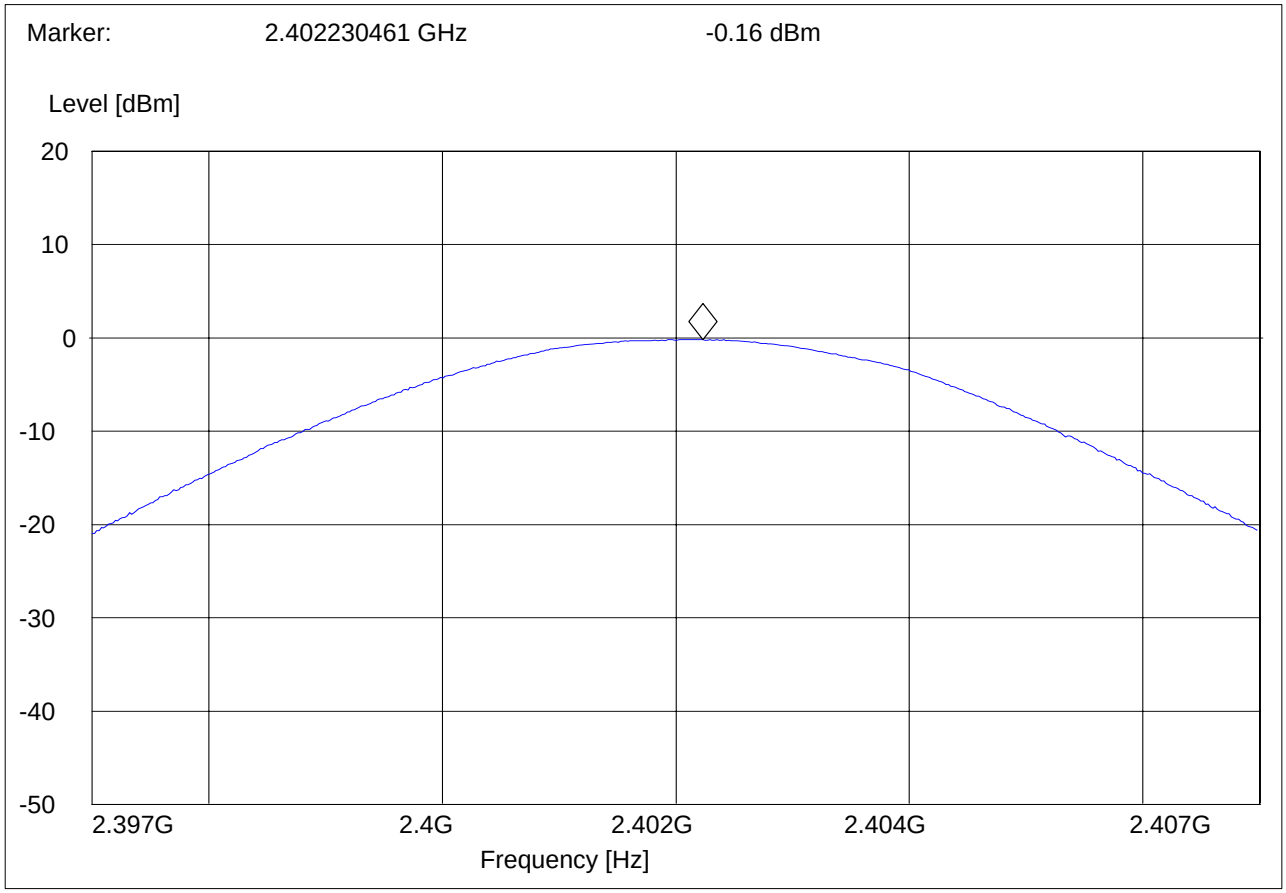
EIRP LOW CHANNEL-GFSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled MaxPeak	3 MHz	DUMMY-DBM



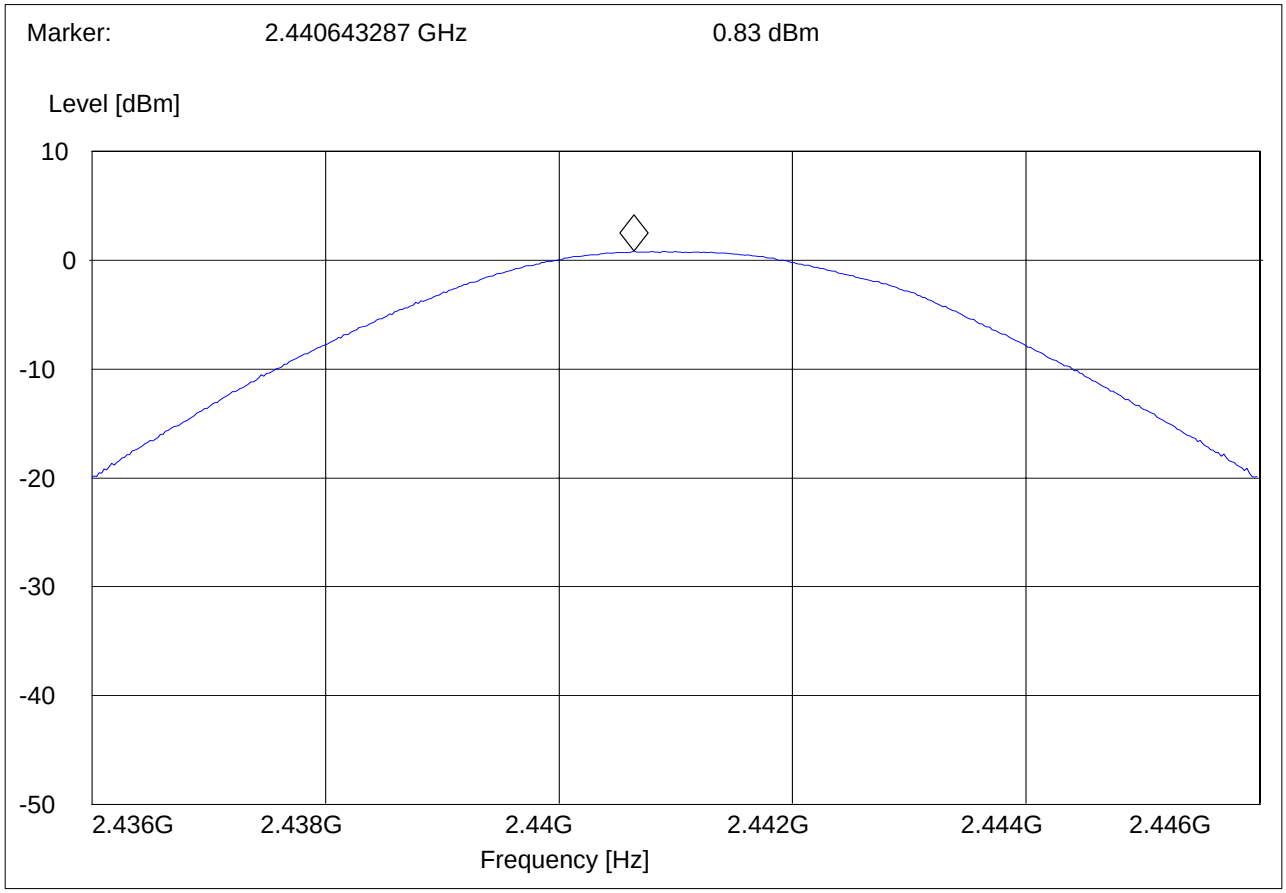
EIRP MIDDLE CHANNEL-GFSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH39
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "EIRP BT mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled MaxPeak	3 MHz	DUMMY-DBM



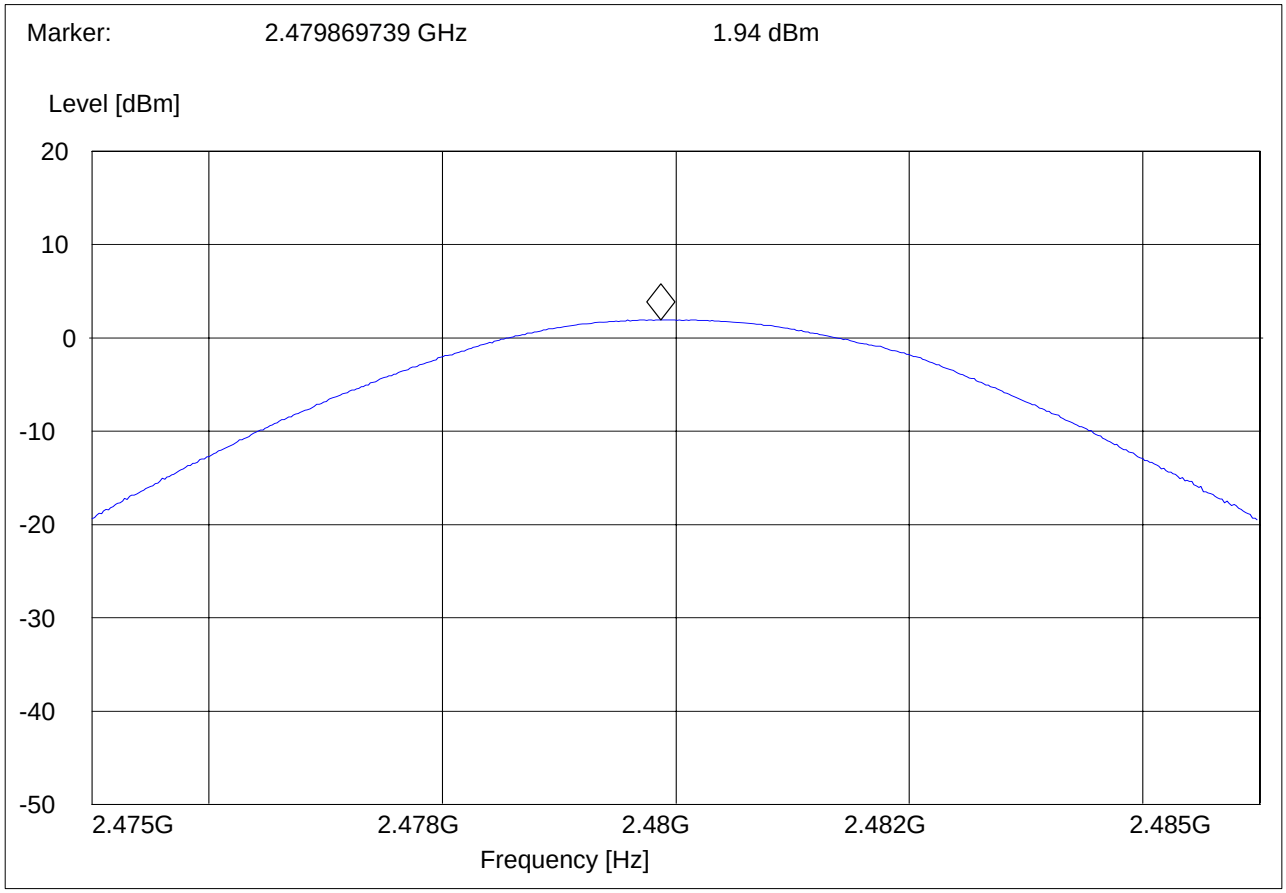
EIRP HIGH CHANNEL-GFSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@63°

SWEEP TABLE: "EIRP BT high channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



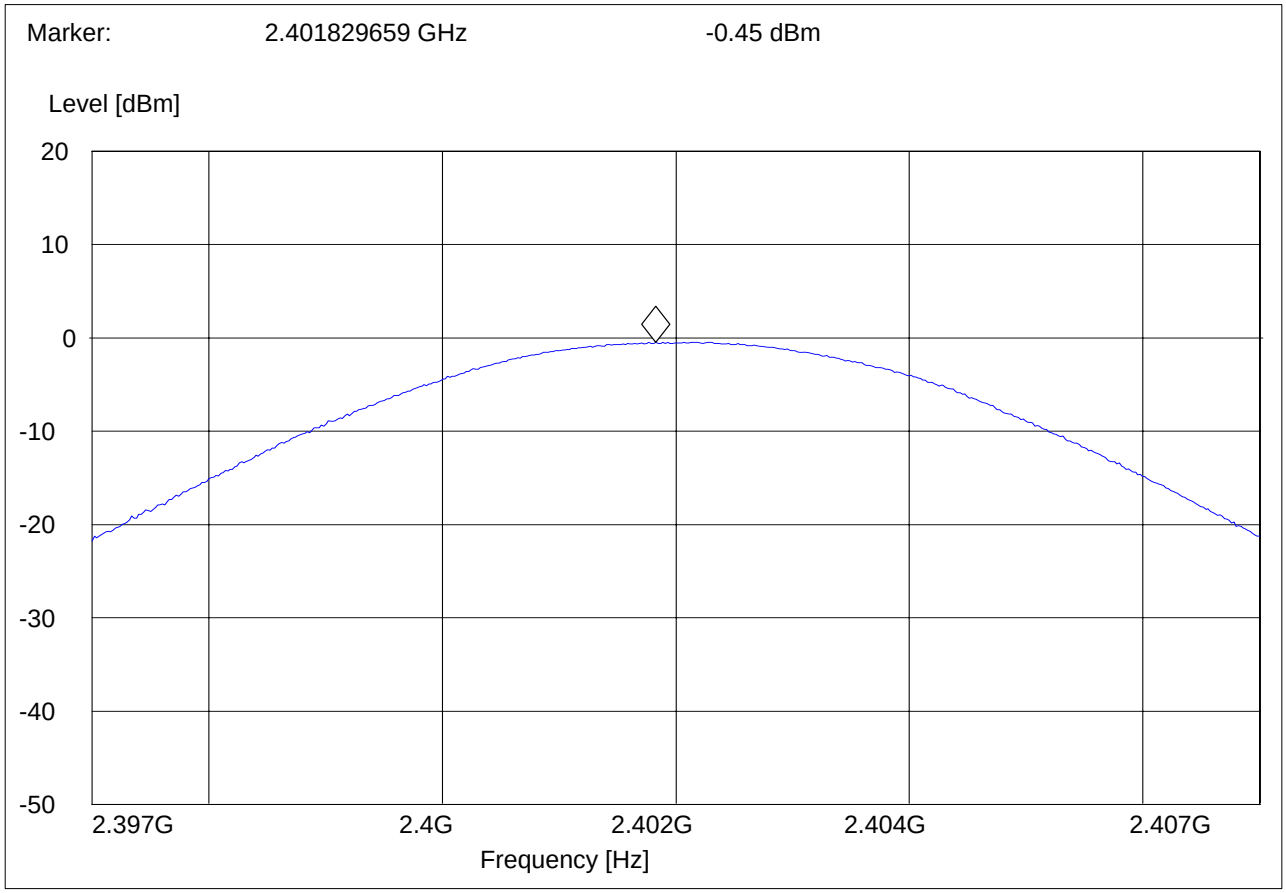
EIRP LOW CHANNEL- π / 4 DQPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



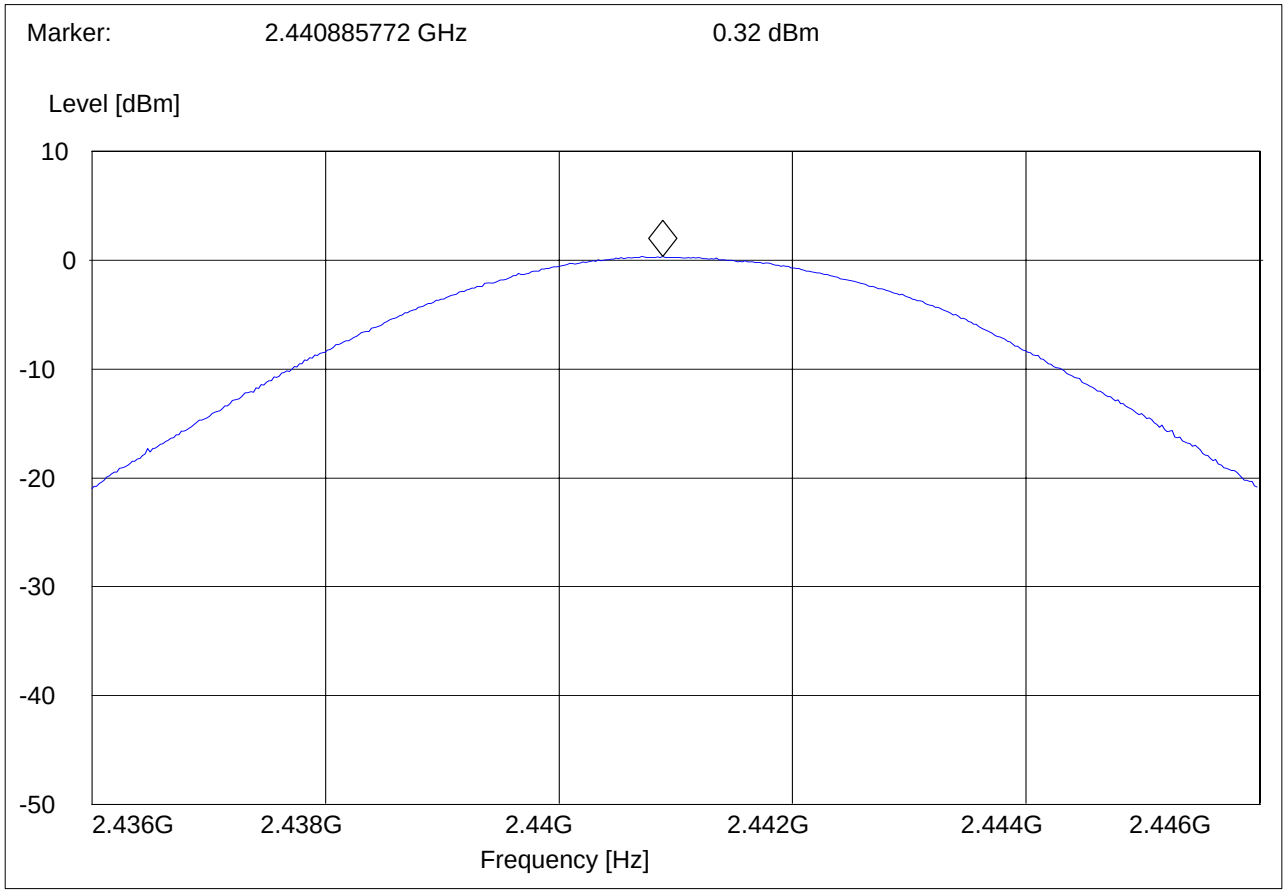
EIRP MIDDLE CHANNEL- π / 4 DQPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH39
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "EIRP BT mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled MaxPeak	3 MHz	DUMMY-DBM



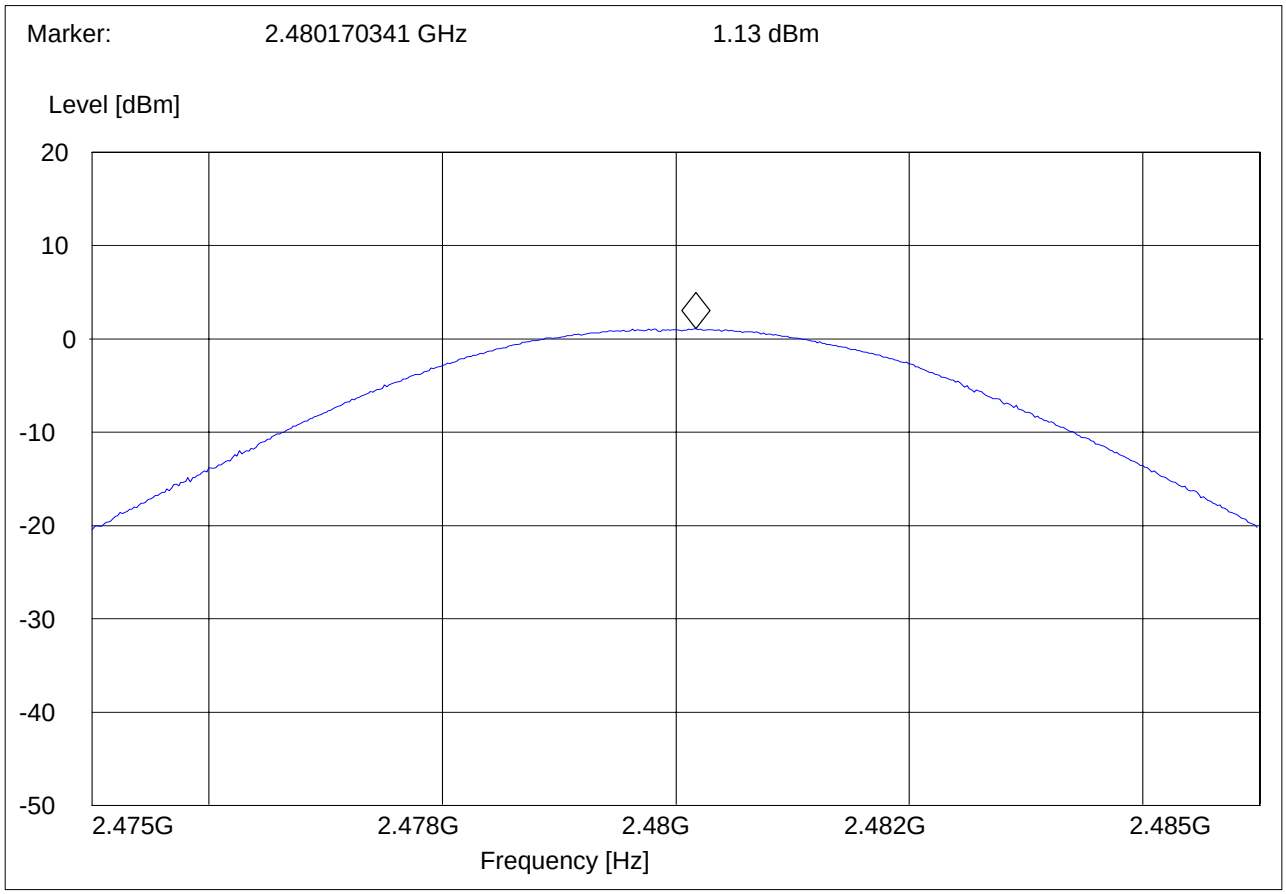
EIRP HIGH CHANNEL- π / 4 DQPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@63°

SWEEP TABLE: "EIRP BT high channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



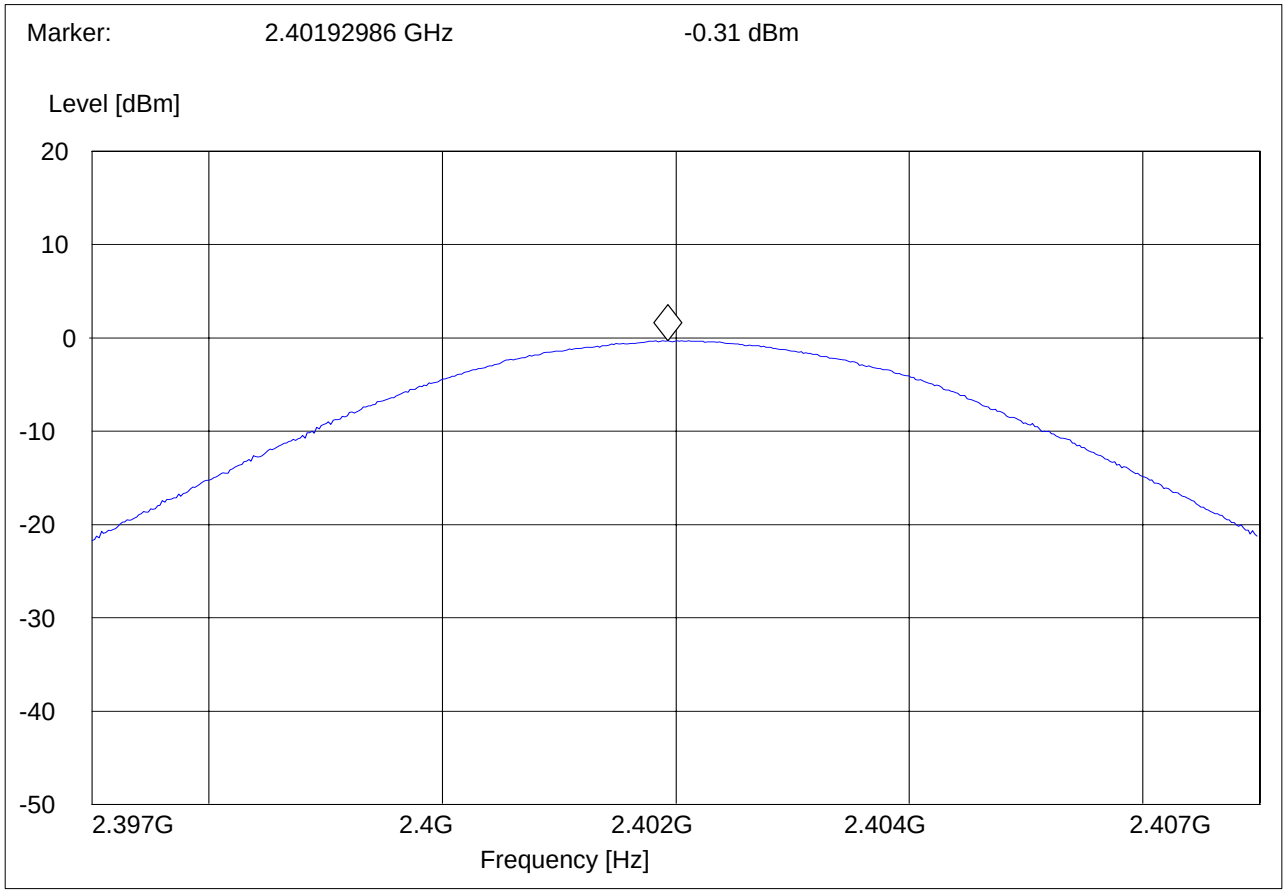
EIRP LOW CHANNEL- 8DPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



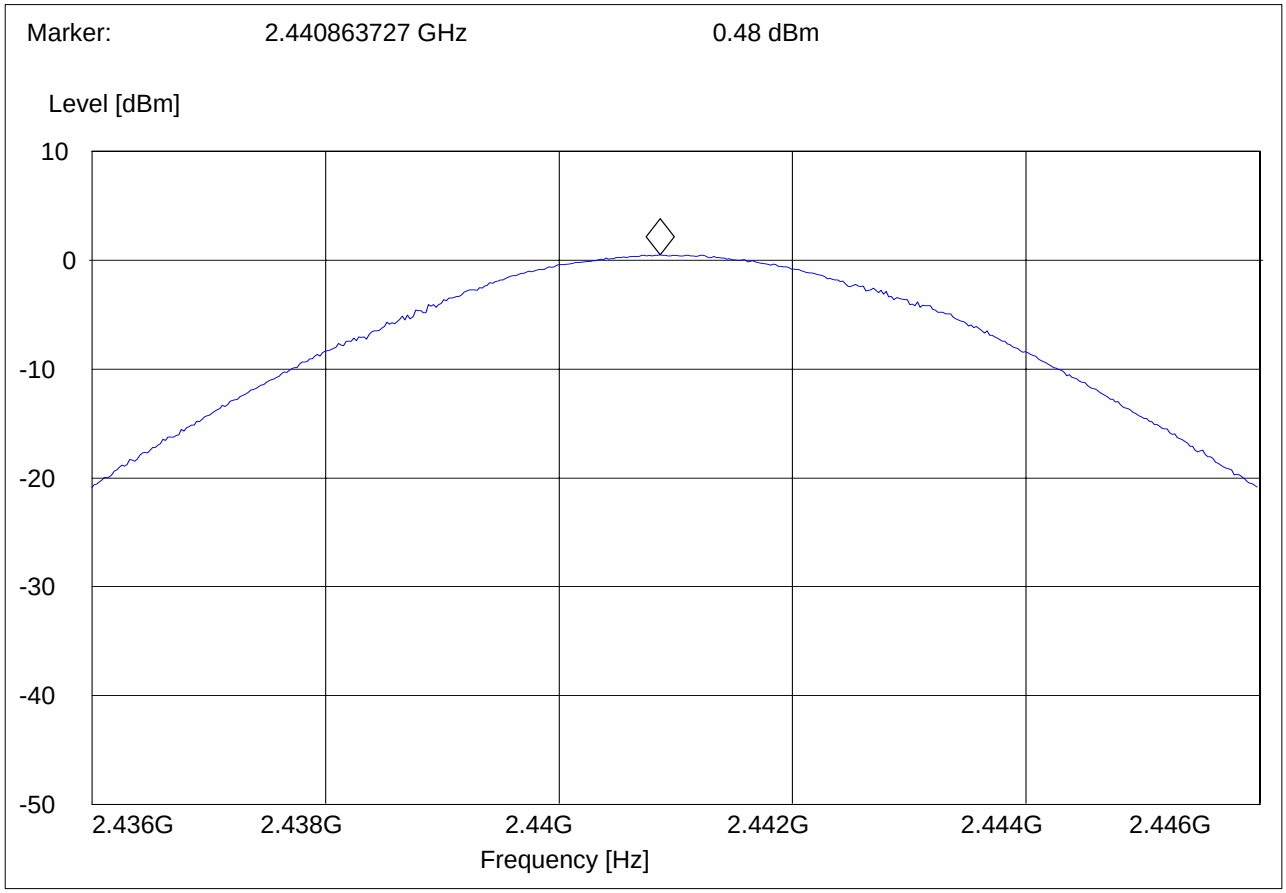
EIRP MIDDLE CHANNEL- 8DPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH39
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "EIRP BT mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled MaxPeak	3 MHz	DUMMY-DBM



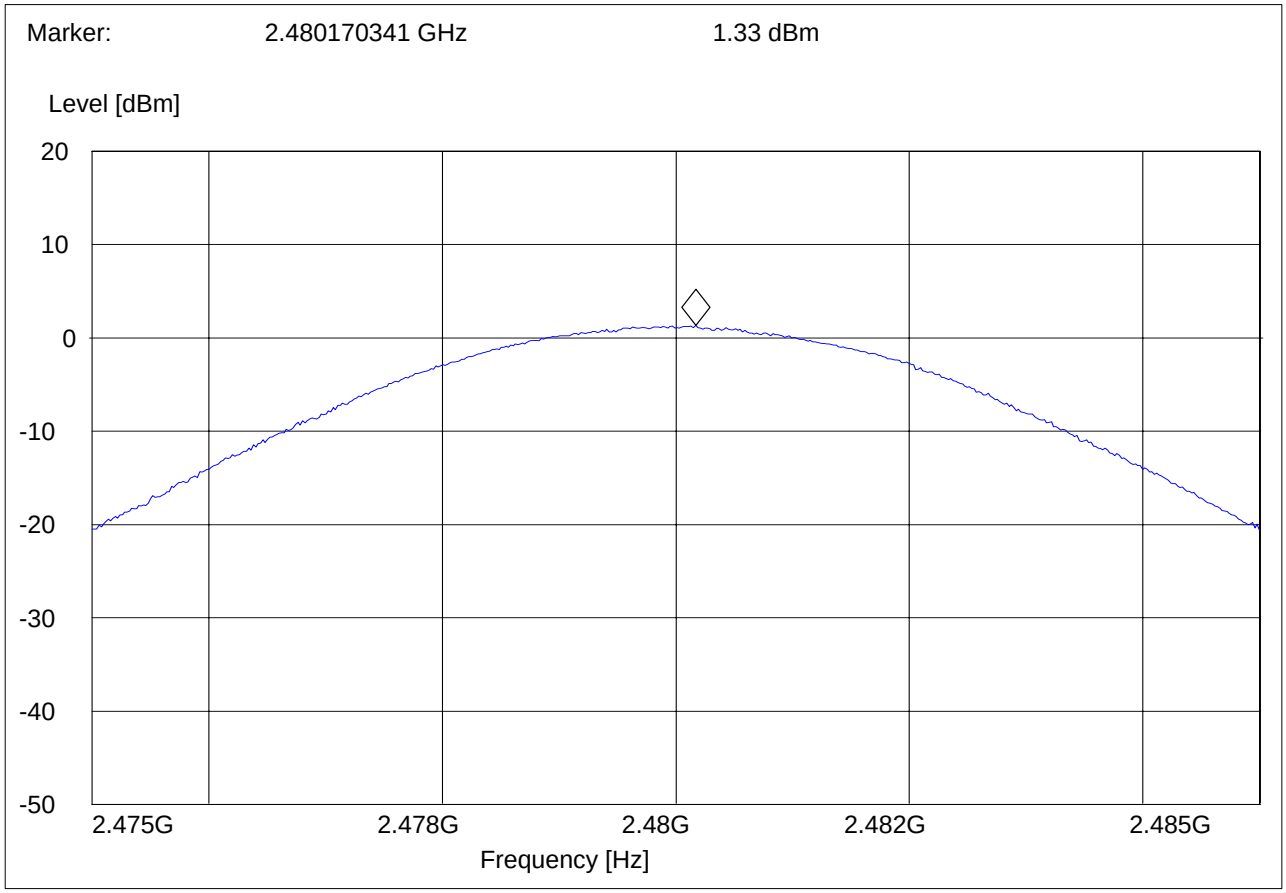
EIRP HIGH CHANNEL- 8DPSK

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@61°

SWEEP TABLE: "EIRP BT high channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			



5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

5.2.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

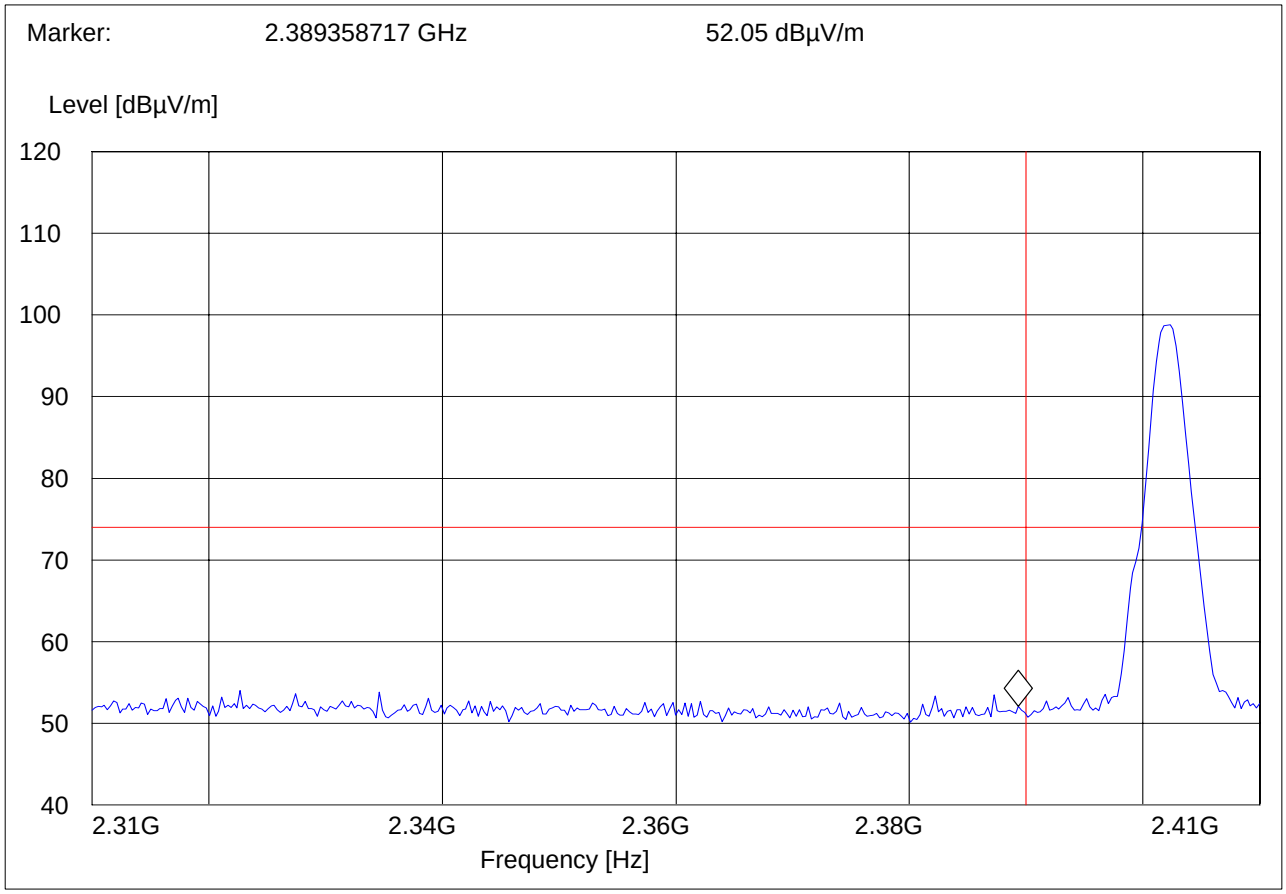
***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

5.2.2 RESULTS: GFSK
(2402MHz) LOWER BAND EDGE PEAK -GFSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert MaxPeak

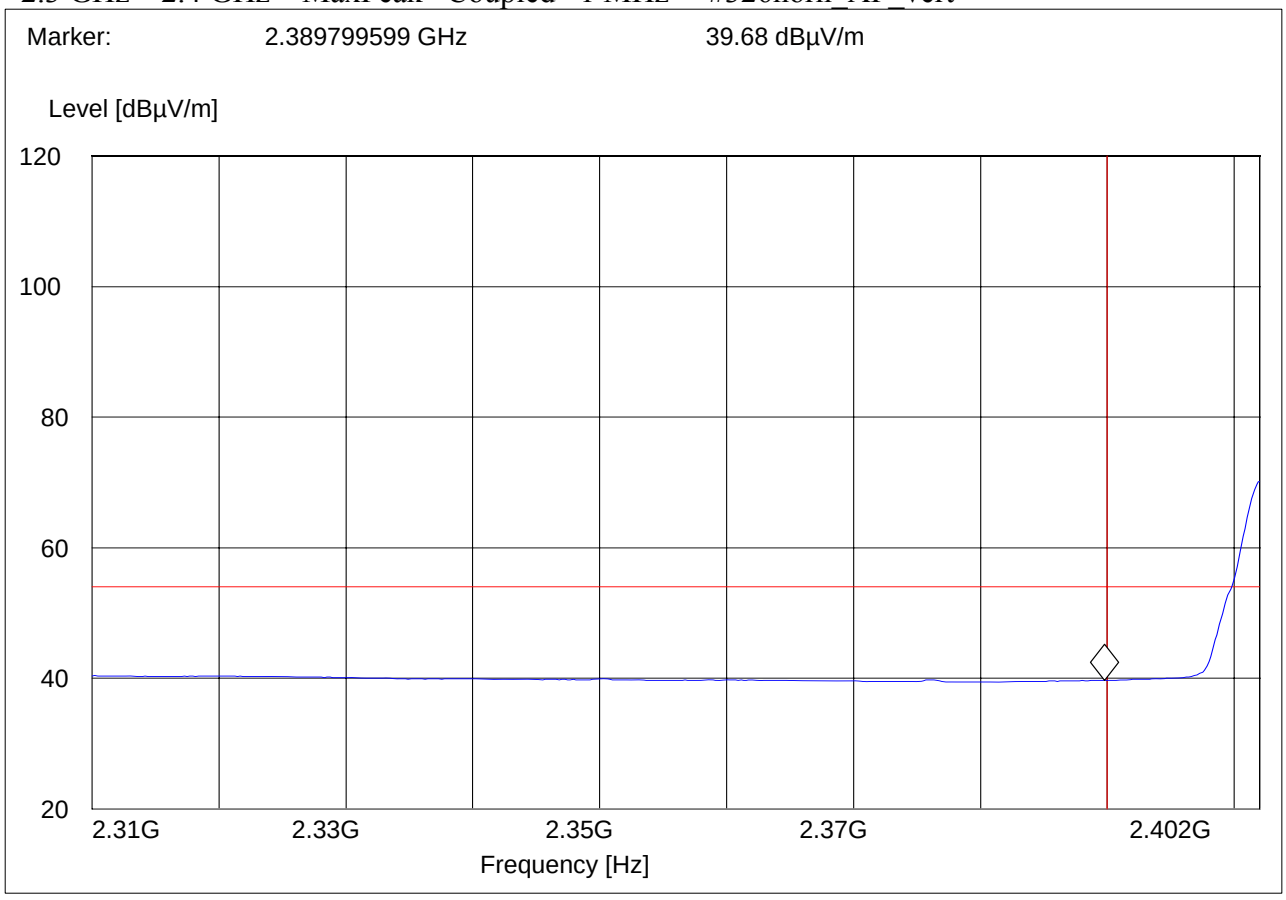


(2402MHz) LOWER BAND EDGE AVERAGE -GFSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

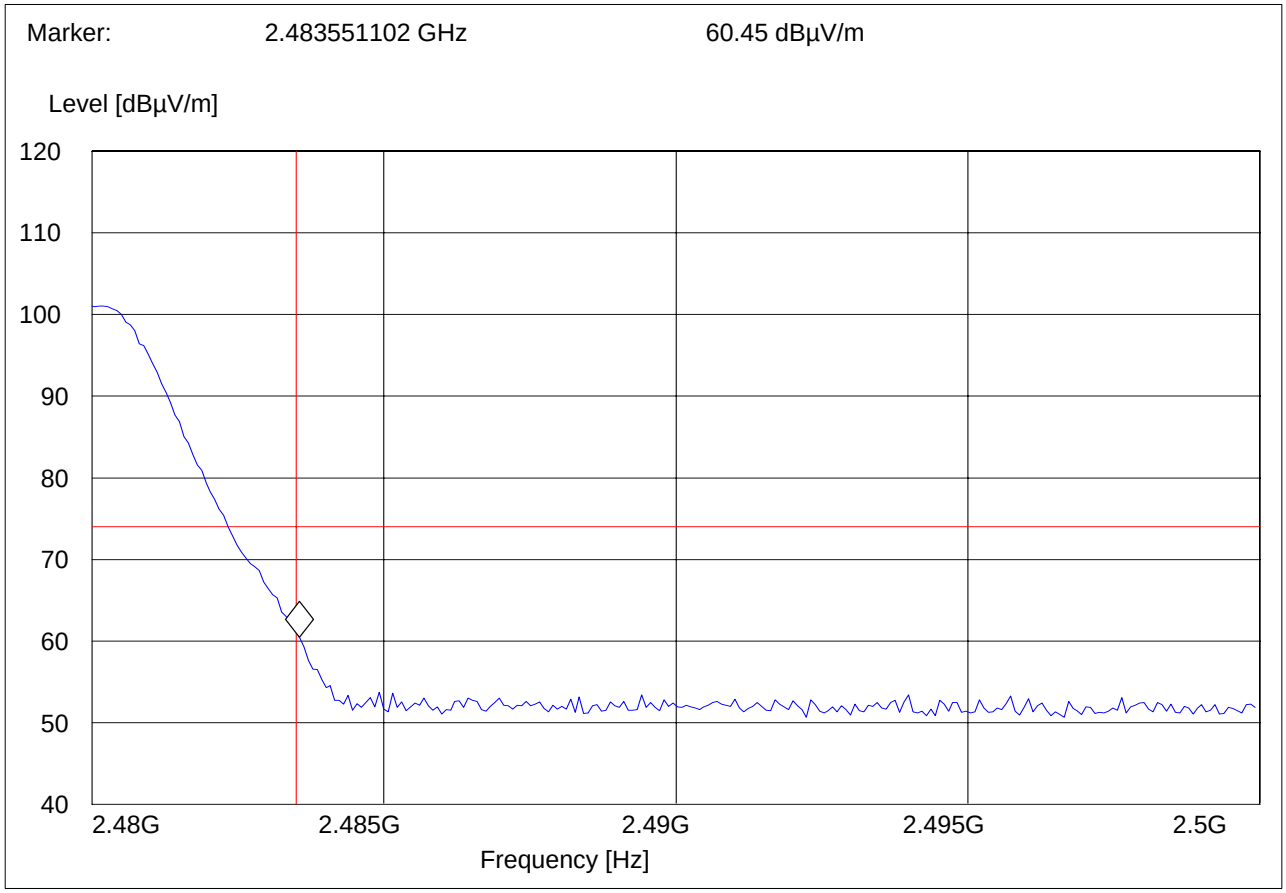


(2480MHz) HIGHER BAND EDGE PEAK -GFSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@63°

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert MaxPeak

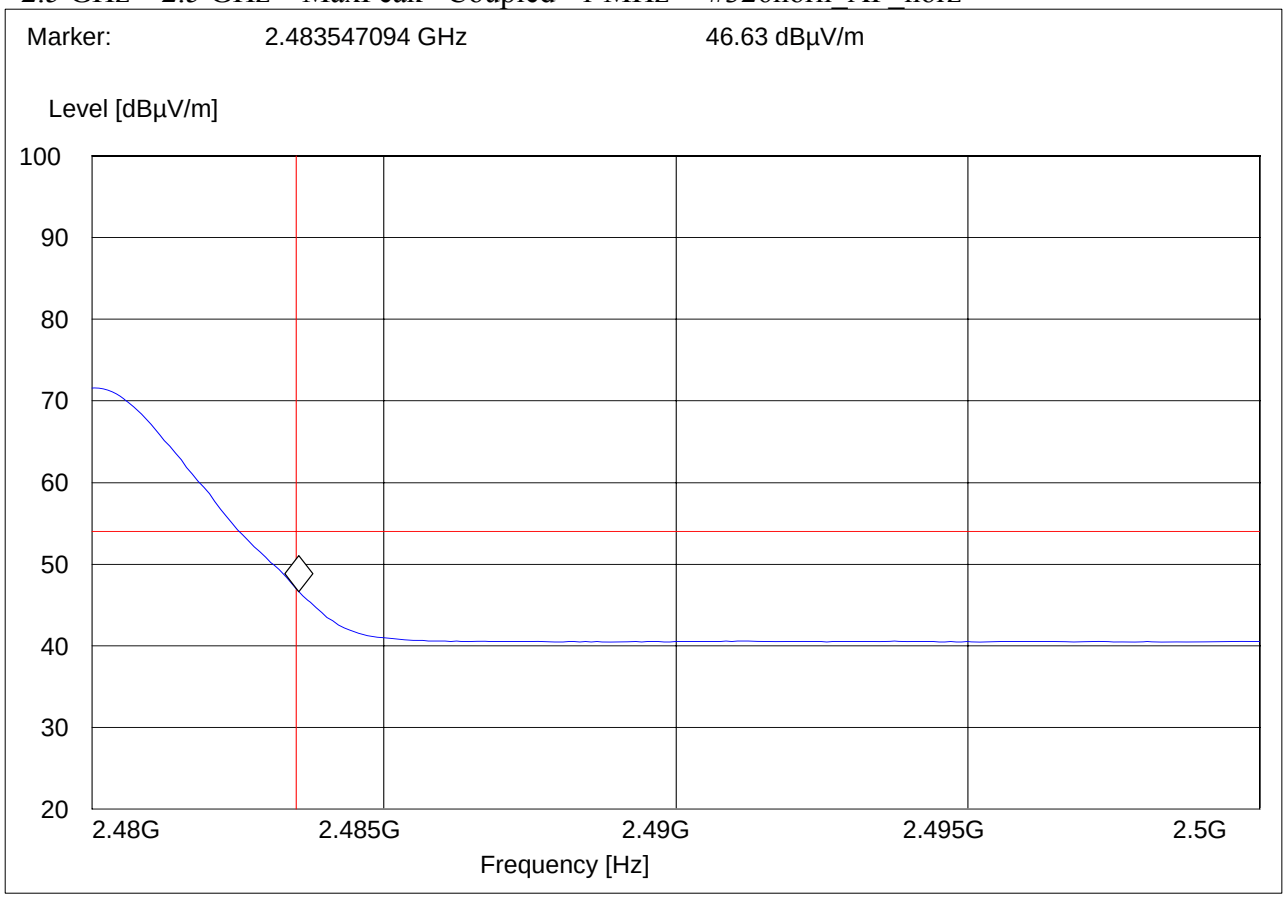


HIGHER BAND EDGE AVERAGE-GFSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@63°

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

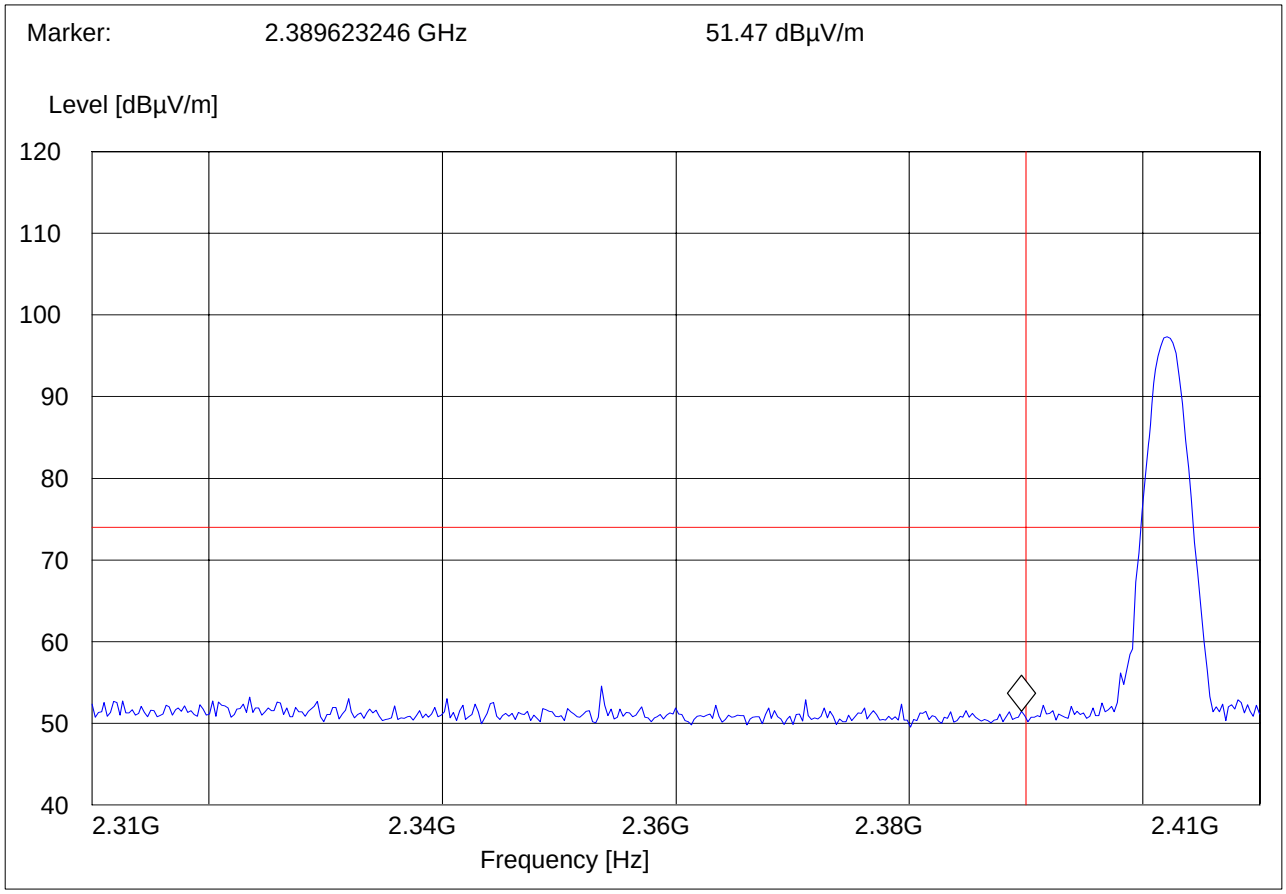


5.2.3 RESULTS: π/4 DQPSK
(2402MHz) LOWER BAND EDGE PEAK - π/4 DQPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
		MaxPeak			

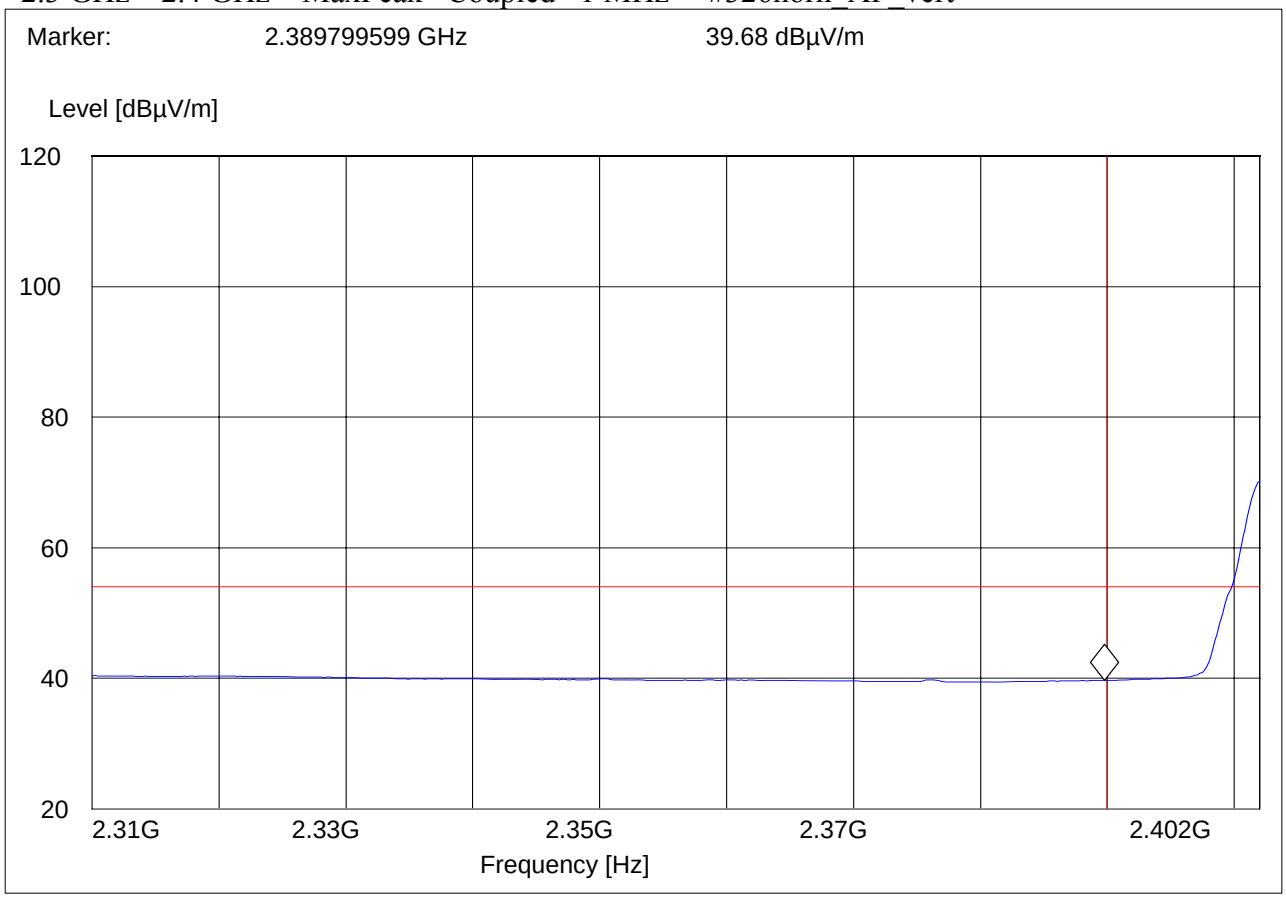


(2402MHz) LOWER BAND EDGE AVERAGE -π/4 DQPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

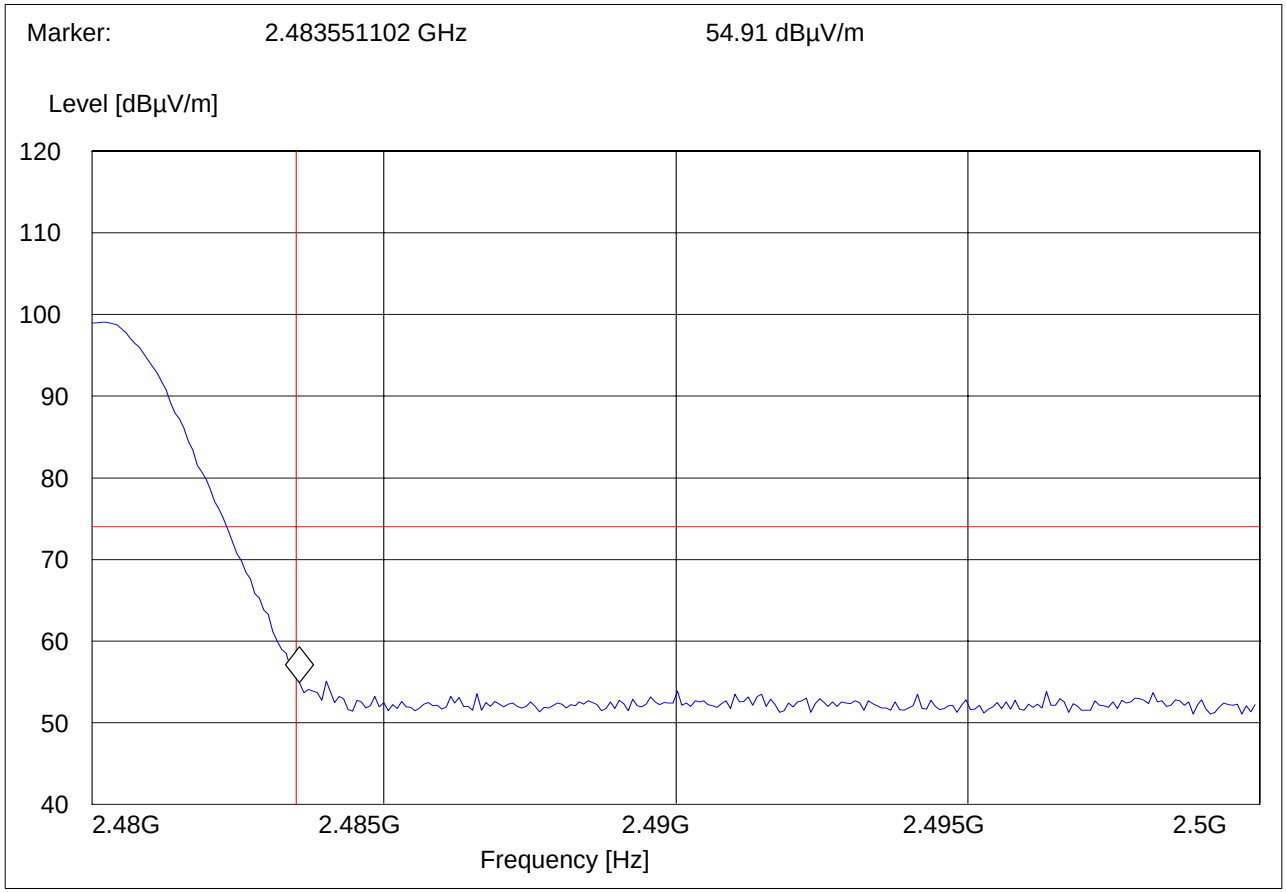


(2480MHz) HIGHER BAND EDGE PEAK -π/4 DQPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH79
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert MaxPeak

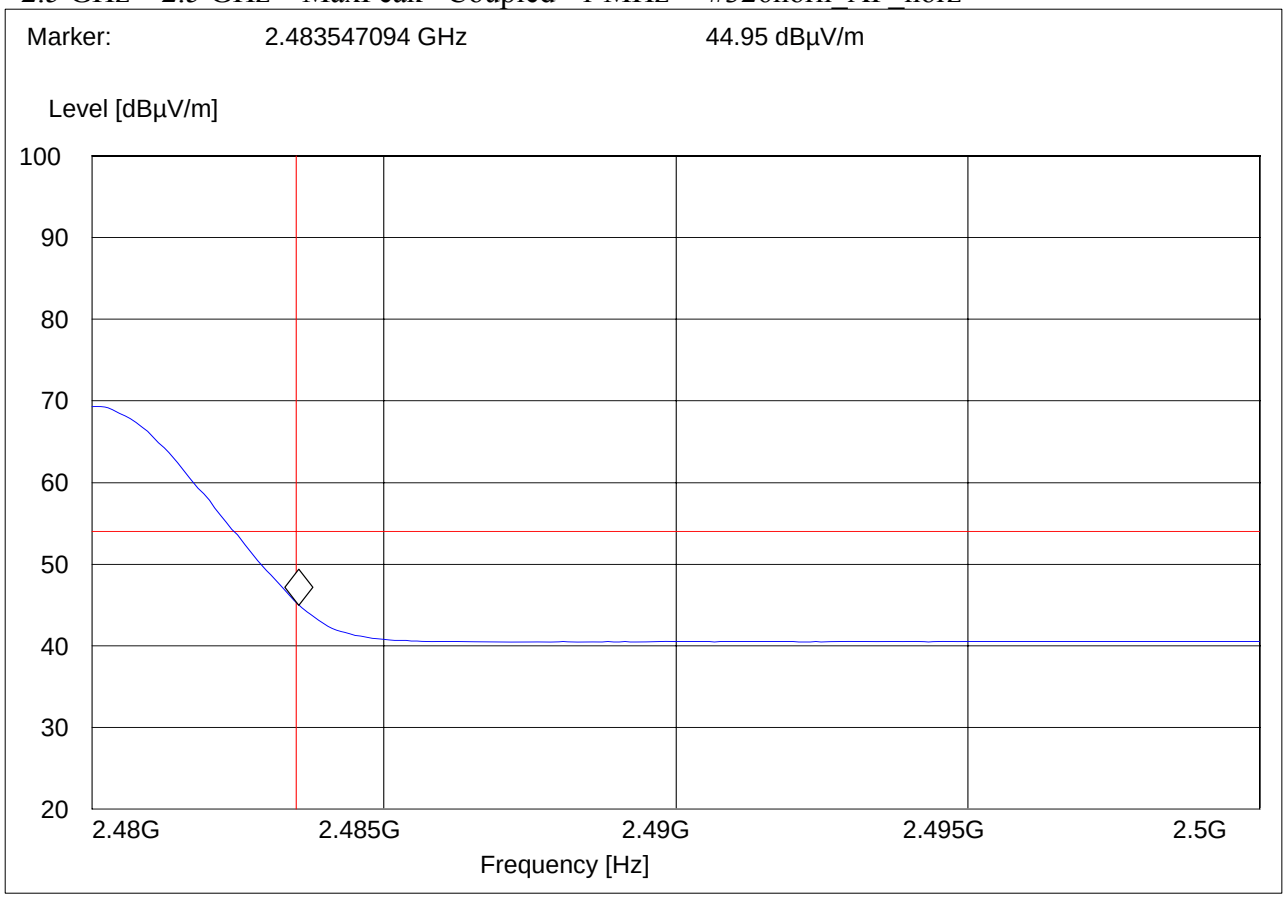


HIGHER BAND EDGE AVERAGE- π/4 DQPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 2-DH5 CH79
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

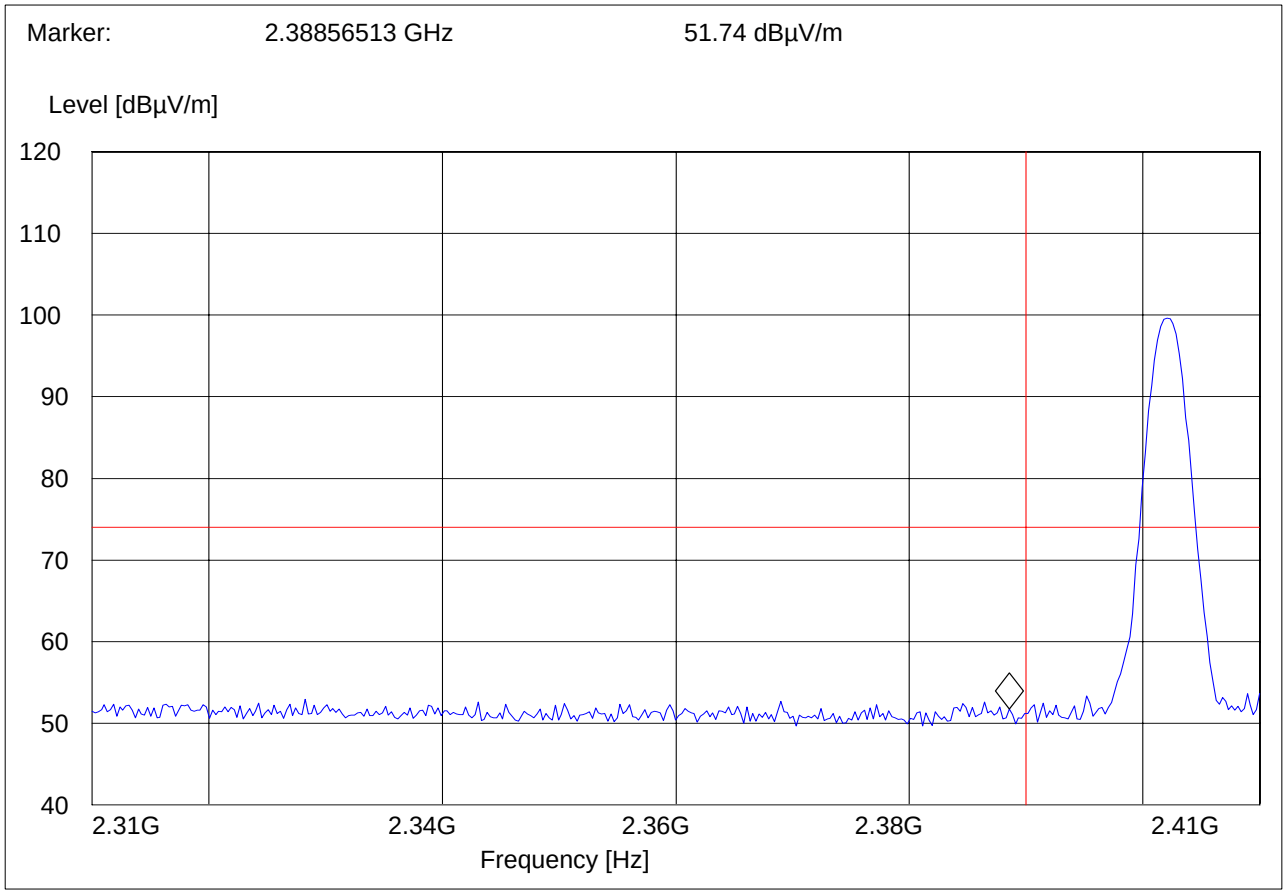


5.2.4 RESULTS: 8DPSK
(2402MHz) LOWER BAND EDGE PEAK - 8DPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
		MaxPeak			

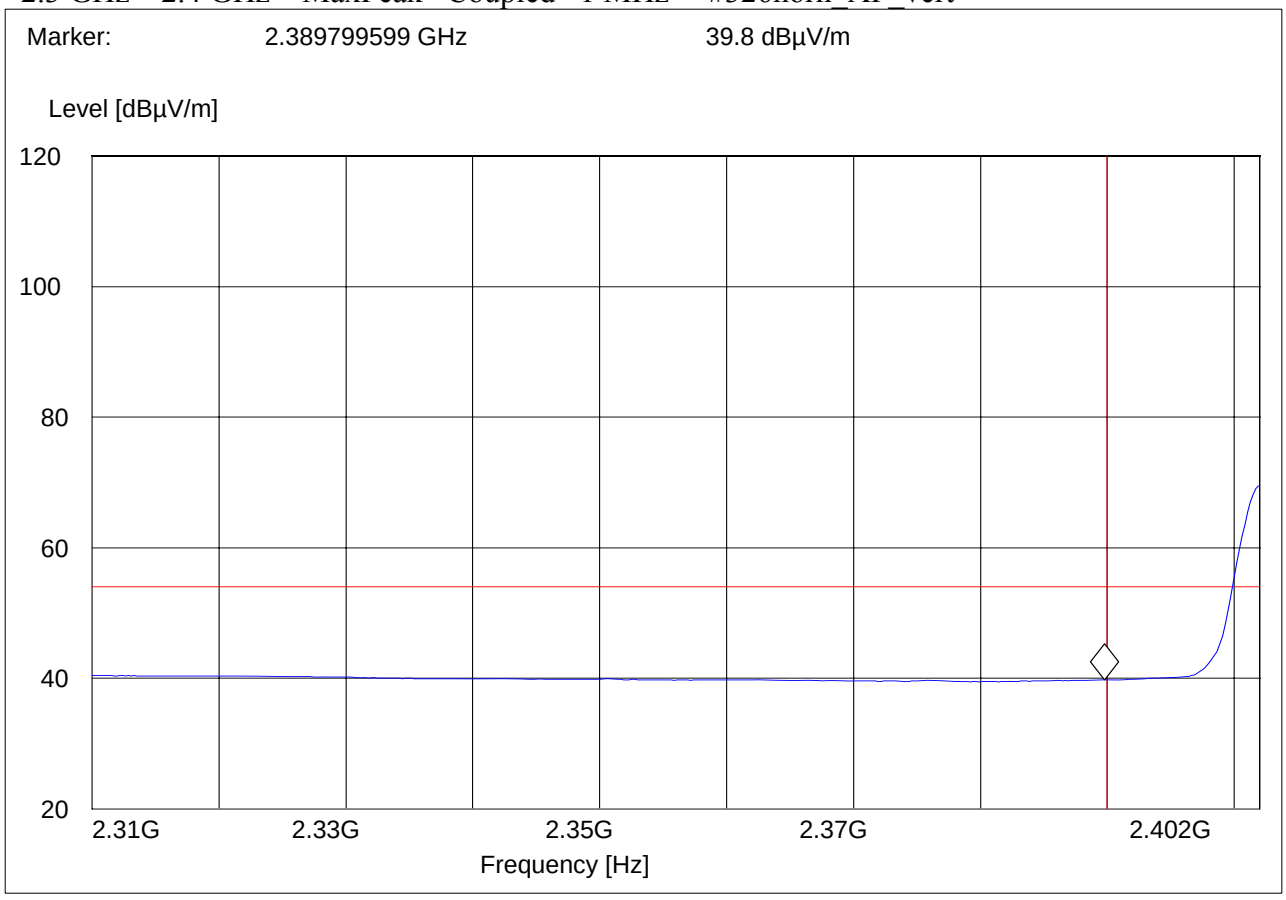


(2402MHz) LOWER BAND EDGE AVERAGE -8DPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

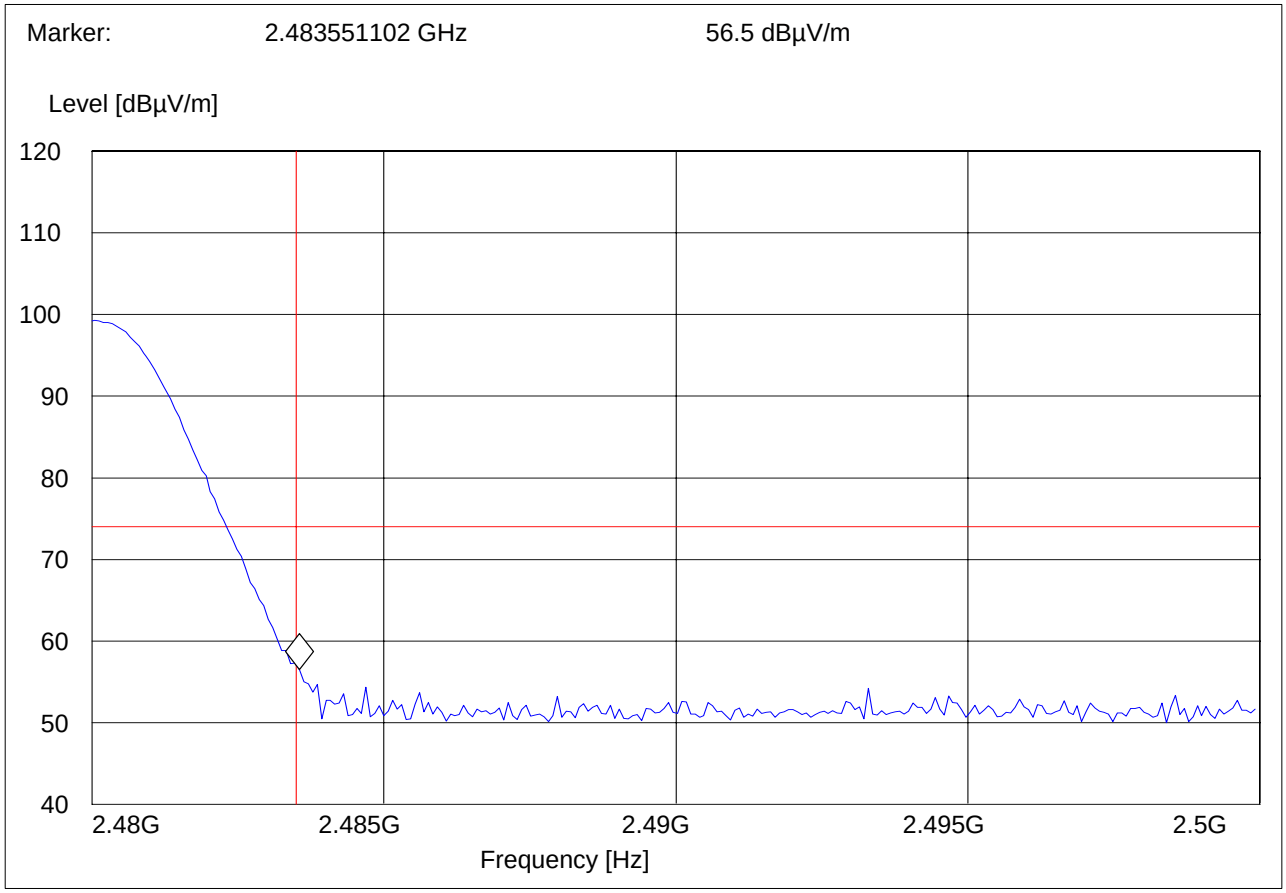


RESULTS (2480MHz) HIGHER BAND EDGE PEAK - 8DPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH79
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@53°

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert MaxPeak

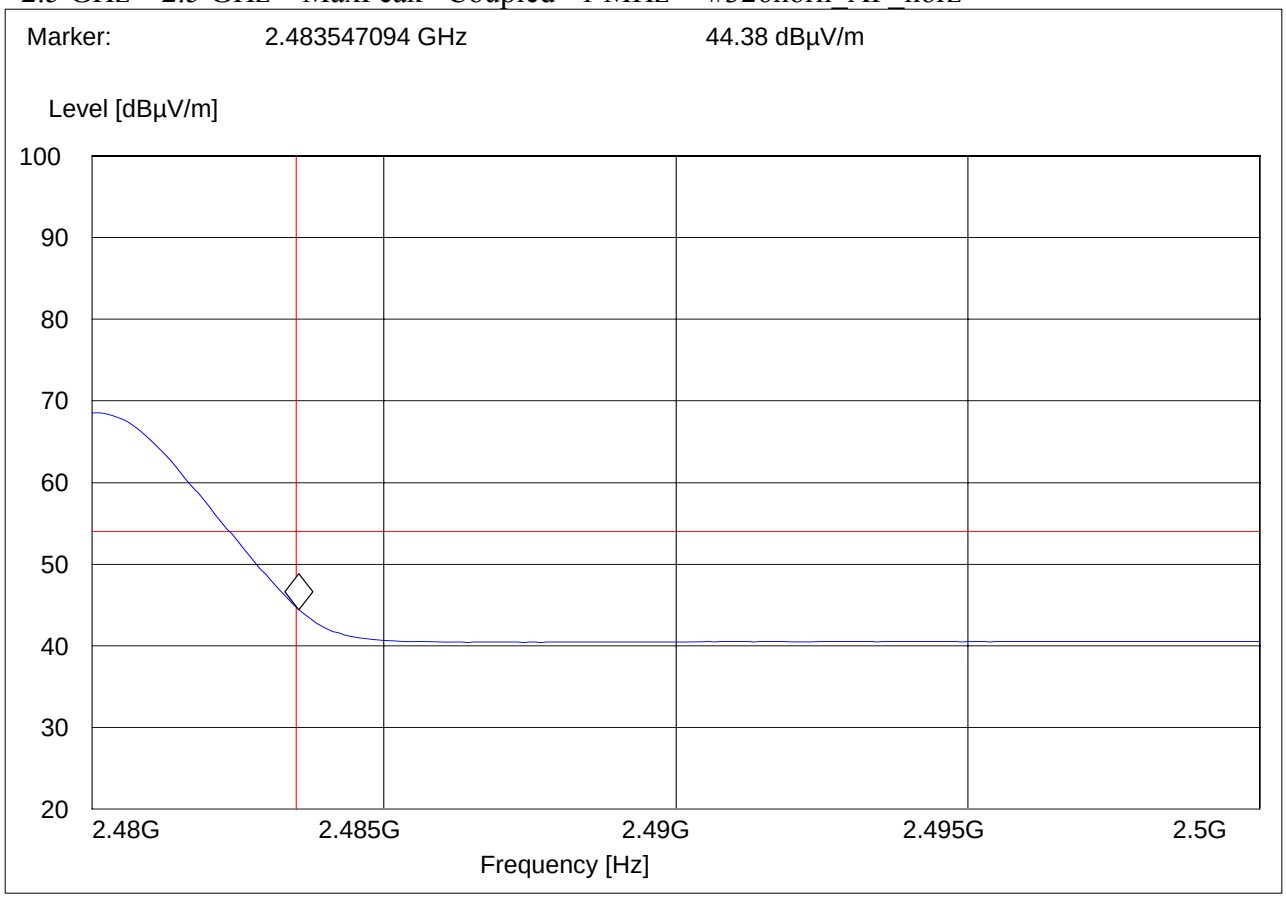


HIGHER BAND EDGE AVERAGE-8DPSK MODULATION

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT 3-DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: TT@41°

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

5.3.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

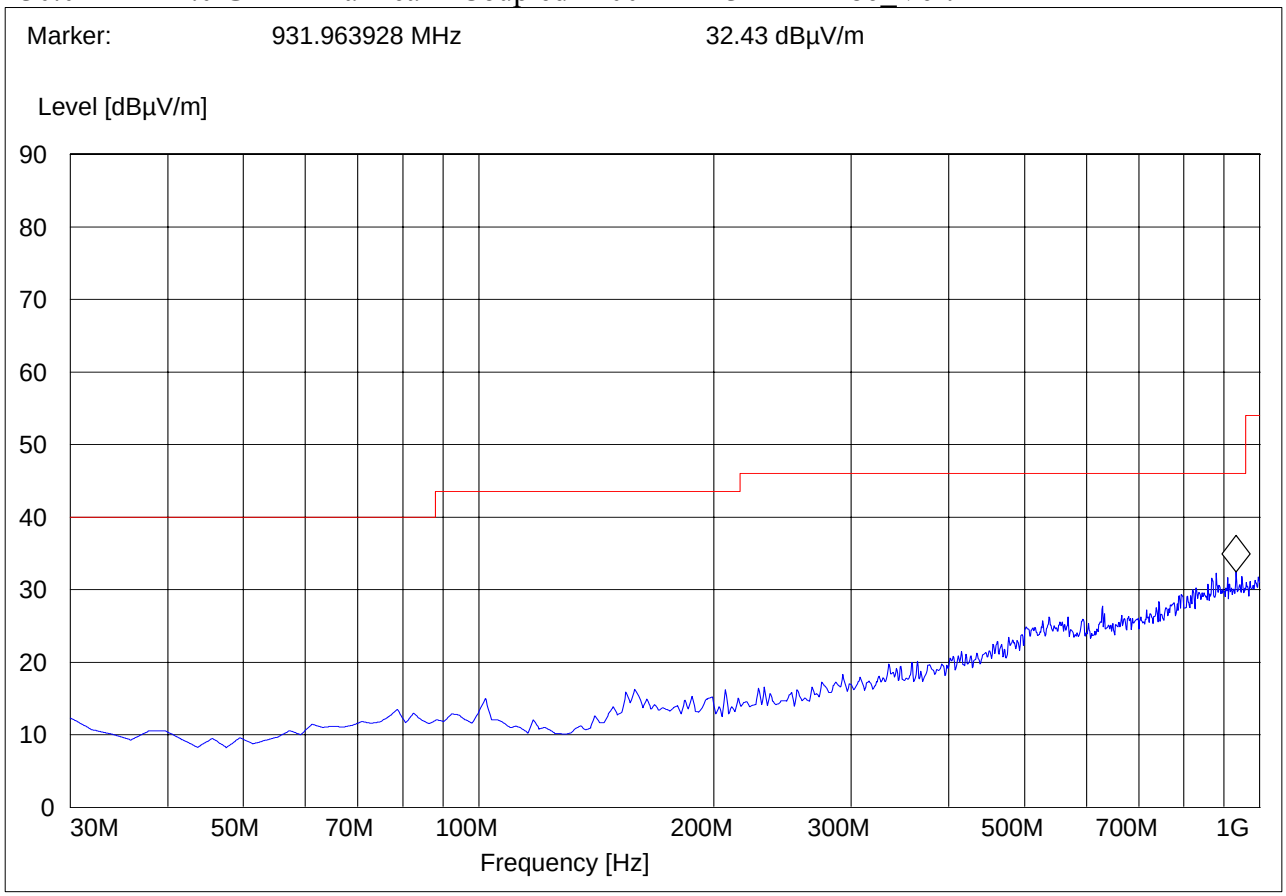
5.3.2 RESULTS

30MHz – 1GHz
Antenna: vertical
Note: Worse case representation for all channels.

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert

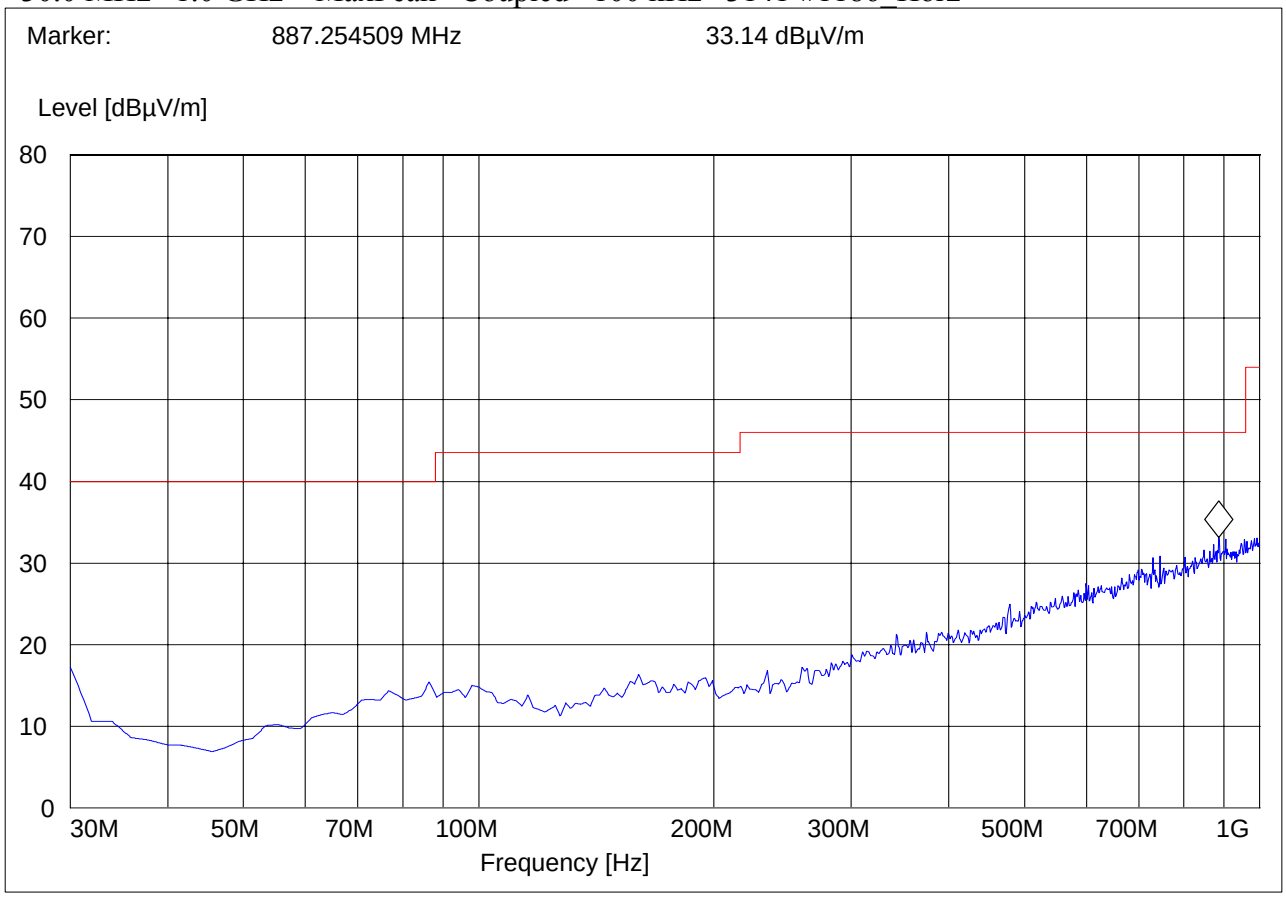


30MHz – 1GHz
Antenna: horizontal
Note: Worse case representation for all channels.

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz

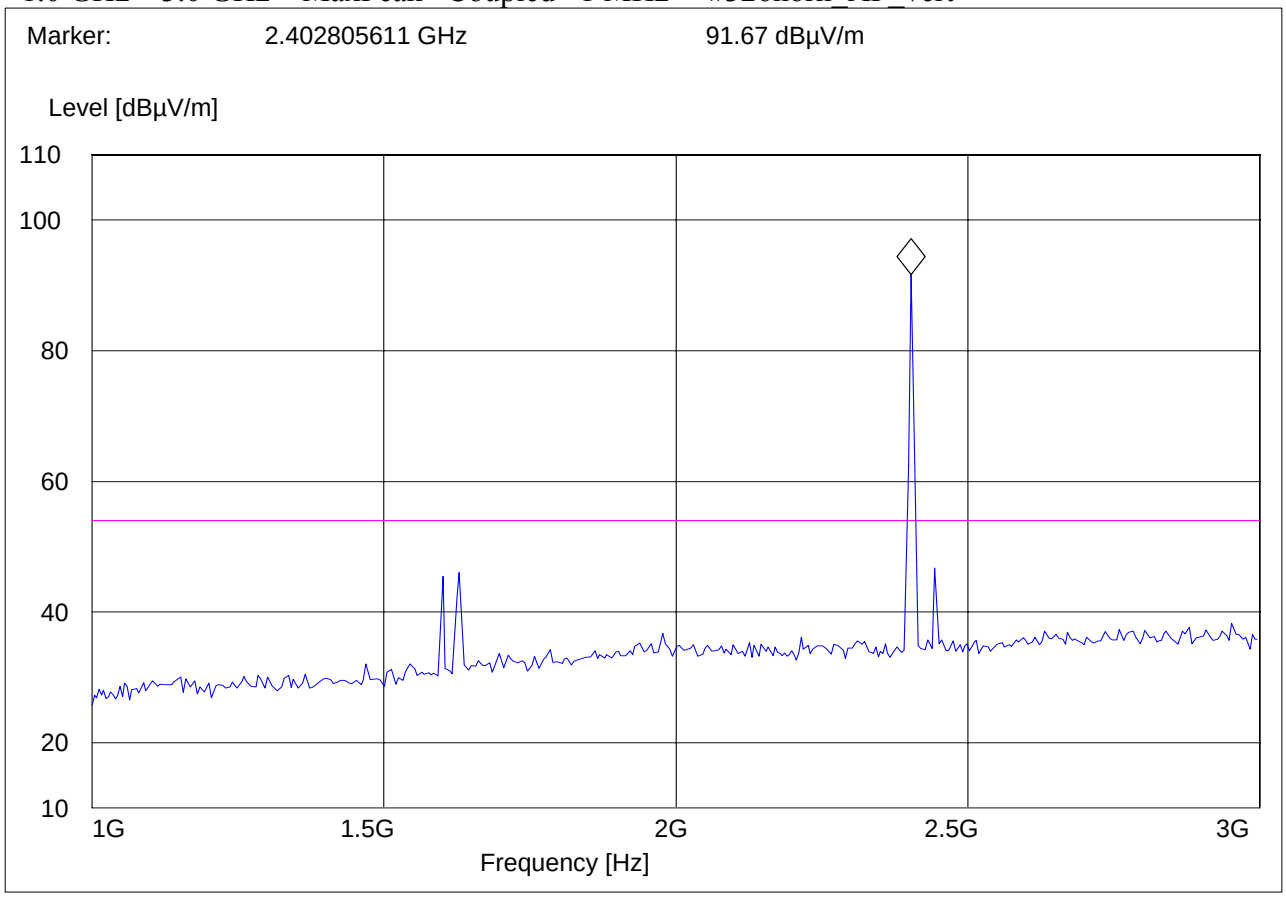


1-3GHz (2402MHz)
Note: The peak above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: marker placed on uplink

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

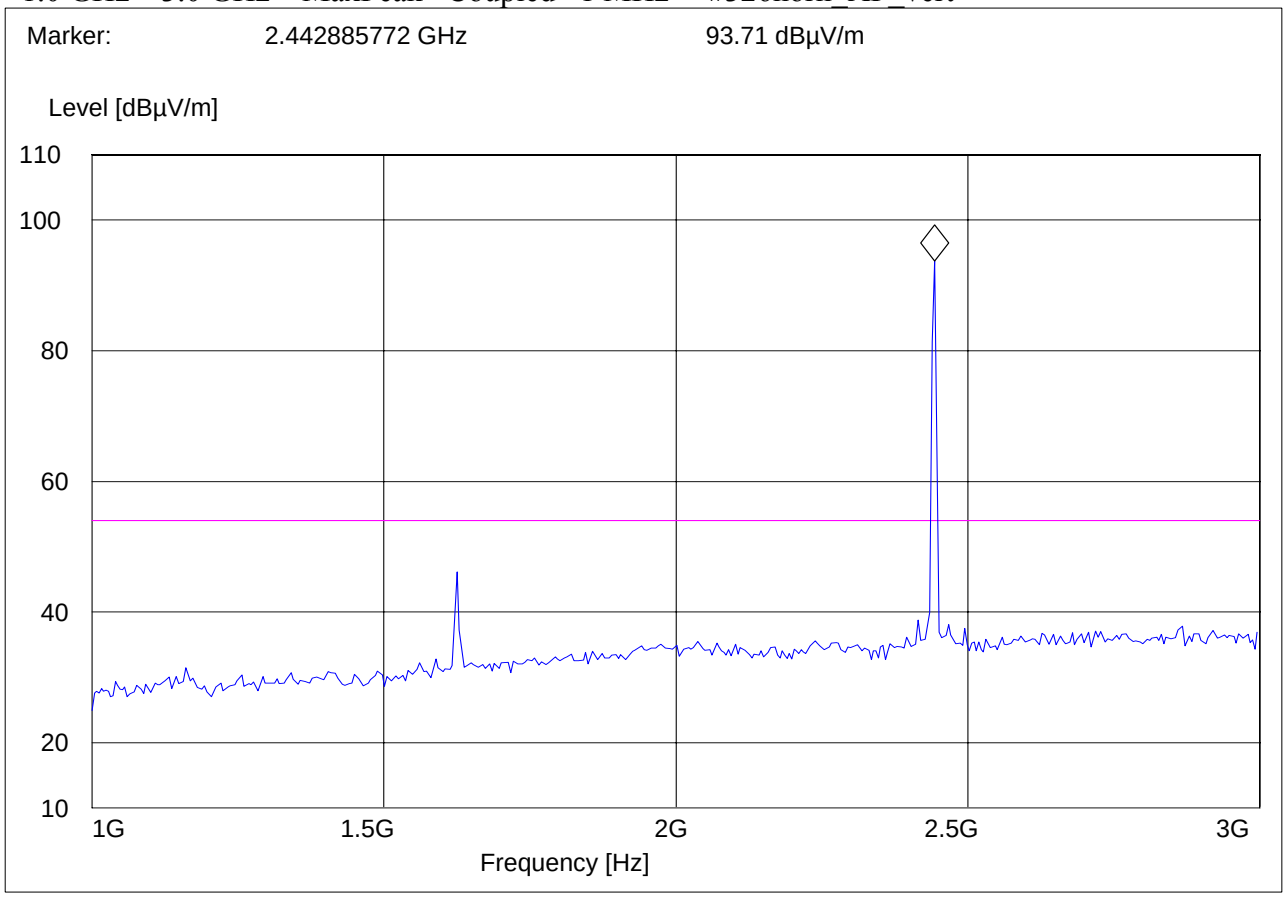


1-3GHz (2441MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH39
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: marker placed on uplink

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

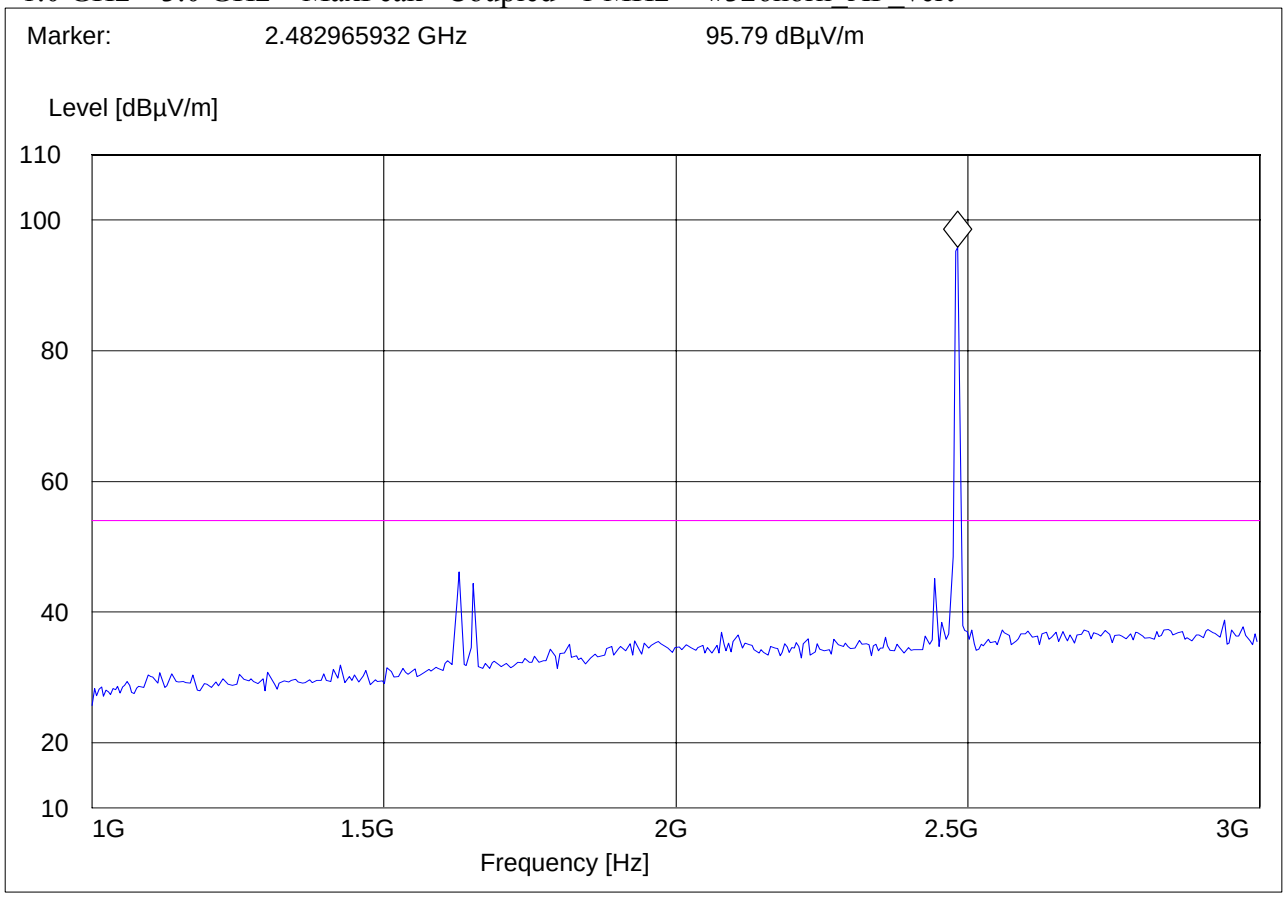


1-3GHz (2480MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments: marker placed on uplink

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

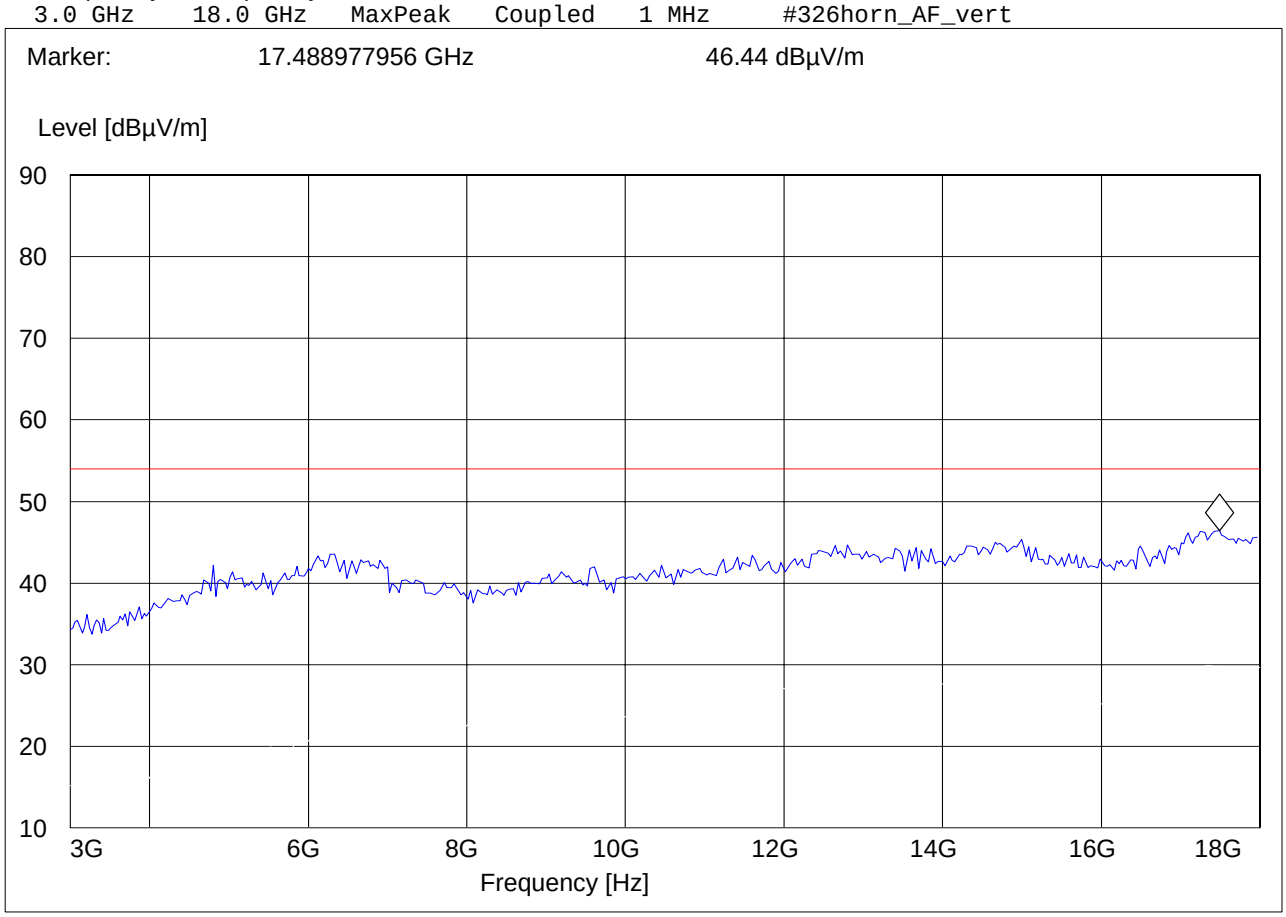


3-18GHz (2402MHz)
Note: Peak Reading vs. Average limit

```
EUT:             BT Headset
Customer::       Sound ID
Test Mode:       BT DH5 CH0
ANT Orientation: V
EUT Orientation: V
Test Engineer:   Sam
Voltage:         battery
Comments:
```

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

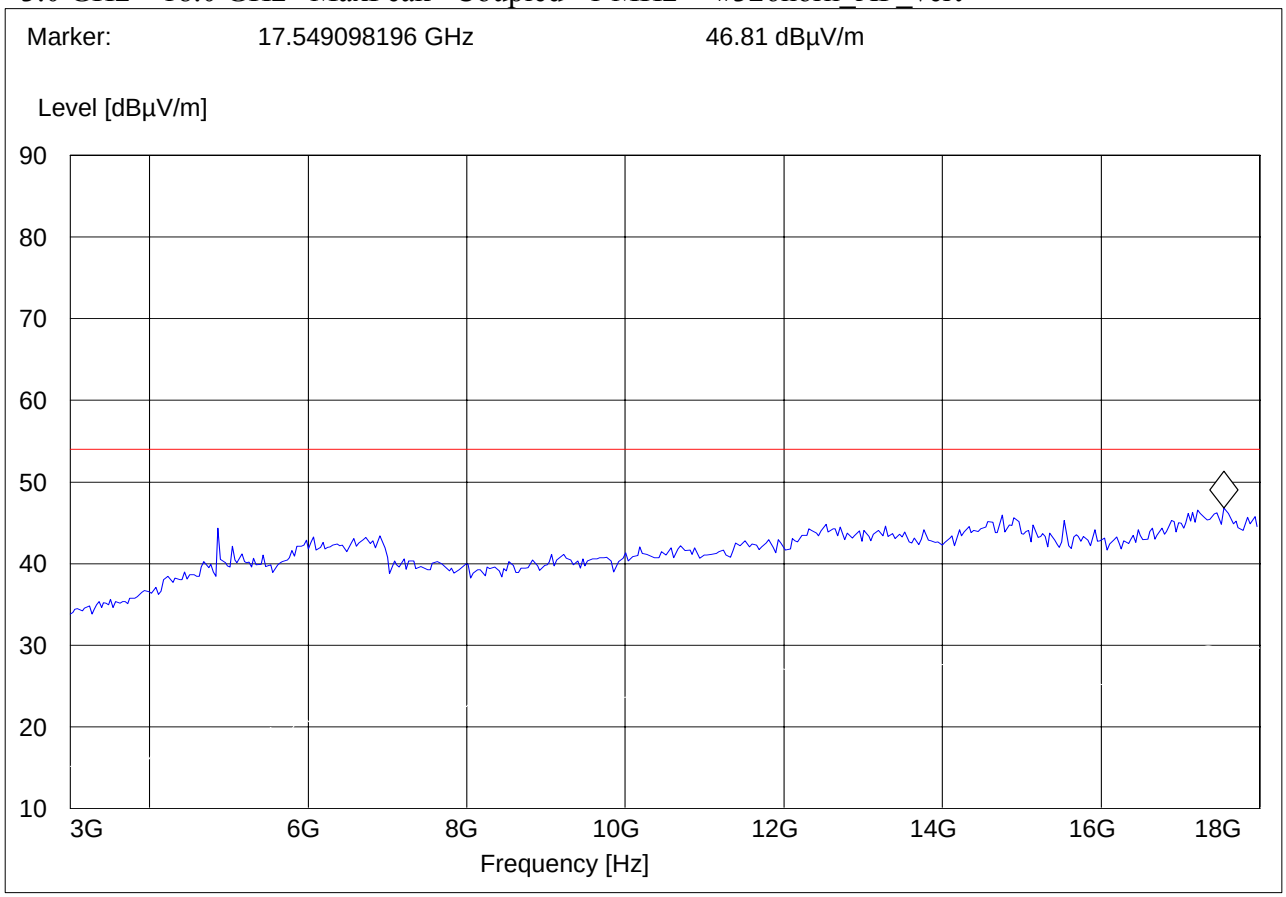


3-18GHz (2441MHz)
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH39
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

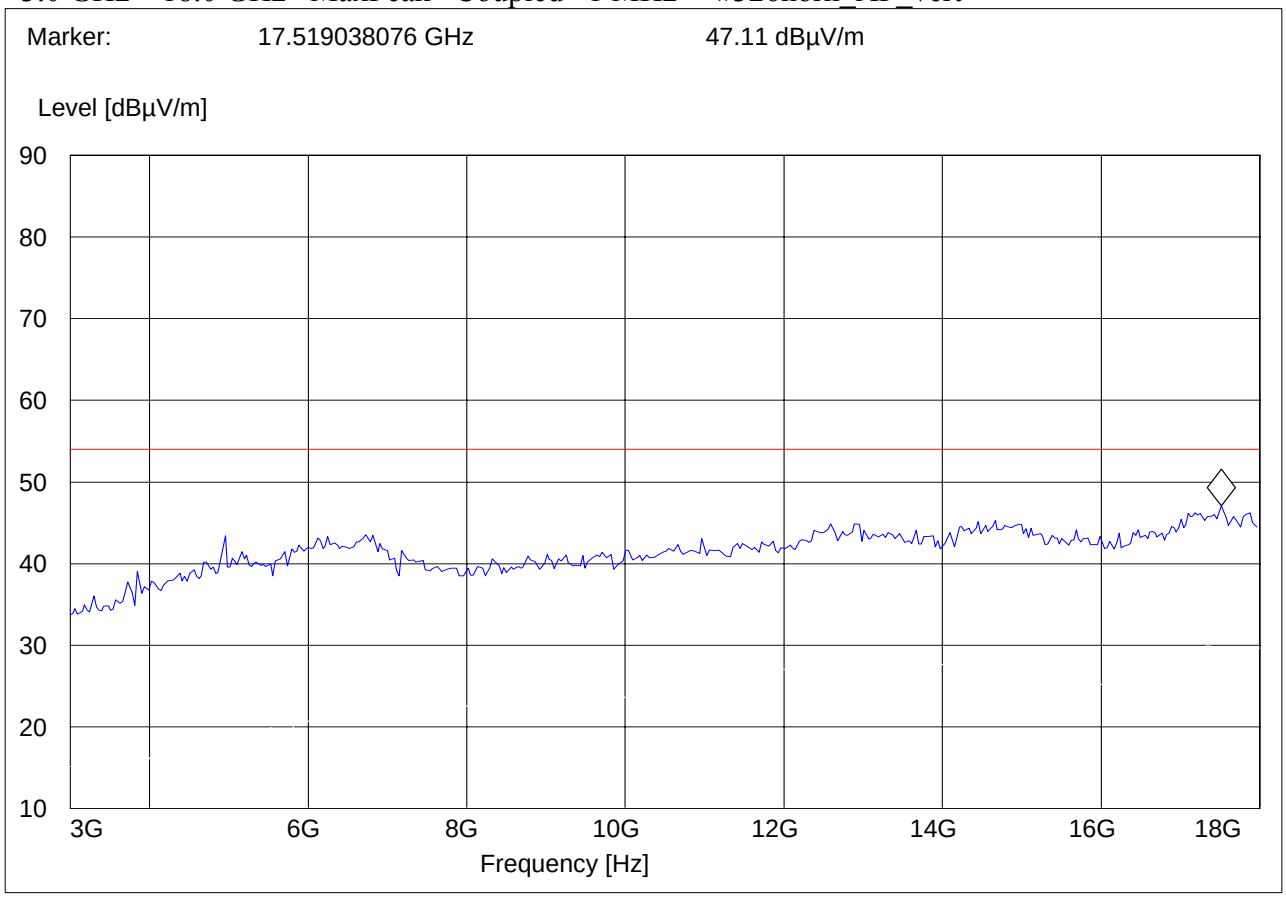


3-18GHz (2480MHz)
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

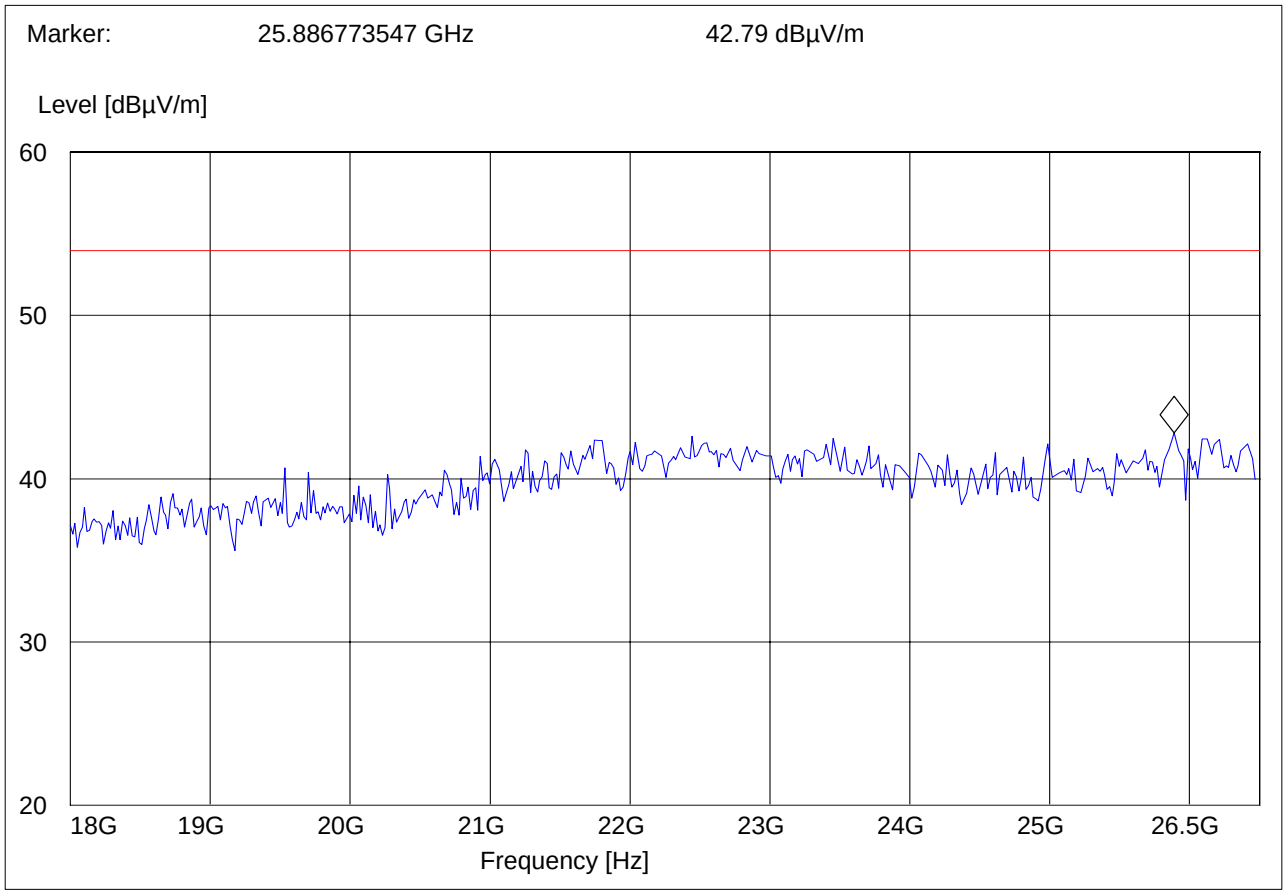


18-25GHz
Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 CH78
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G
		MaxPeak			



5.4 RECEIVER RADIATED EMISSIONS § 2.1053 / RSS-132 & 133

NOTE:

1. **The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3GHz and 26.5GHz very short cable connections to the antenna was used to minimize the noise level.**

Limits **SUBCLAUSE § RSS-133**

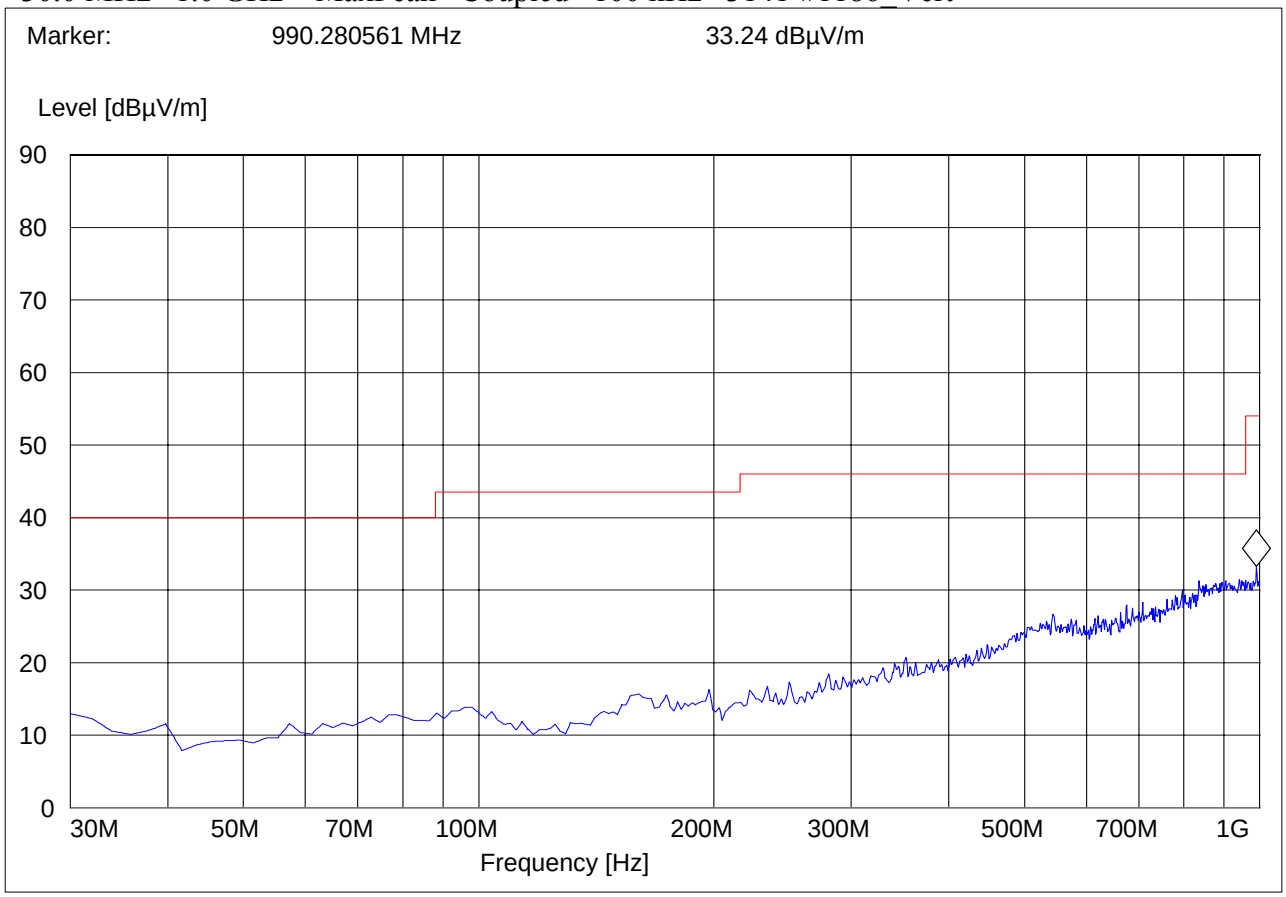
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

30MHz – 1GHz
Antenna: vertical

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 IDLE
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert

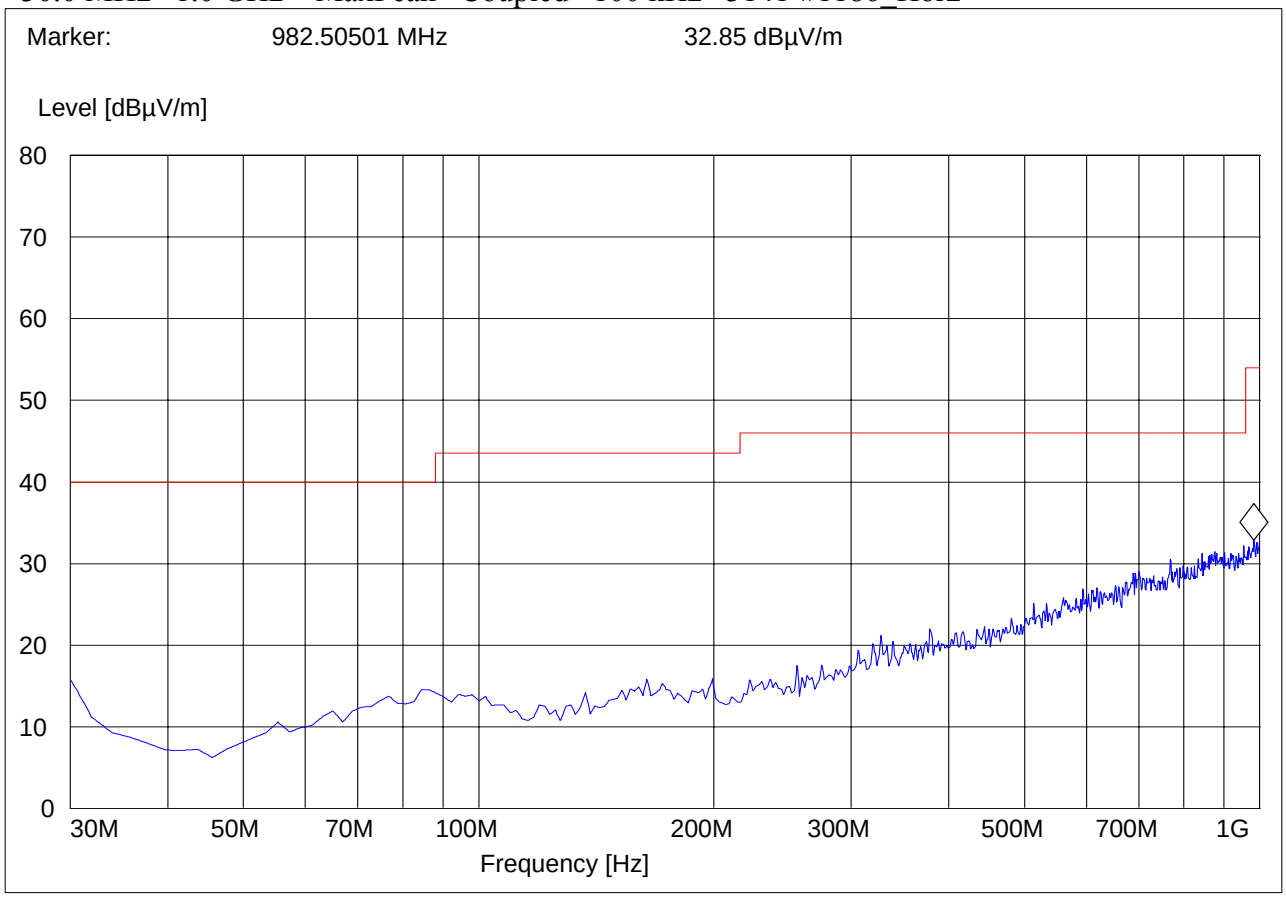


30MHz – 1GHz
Antenna: horizontal

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 IDLE
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz

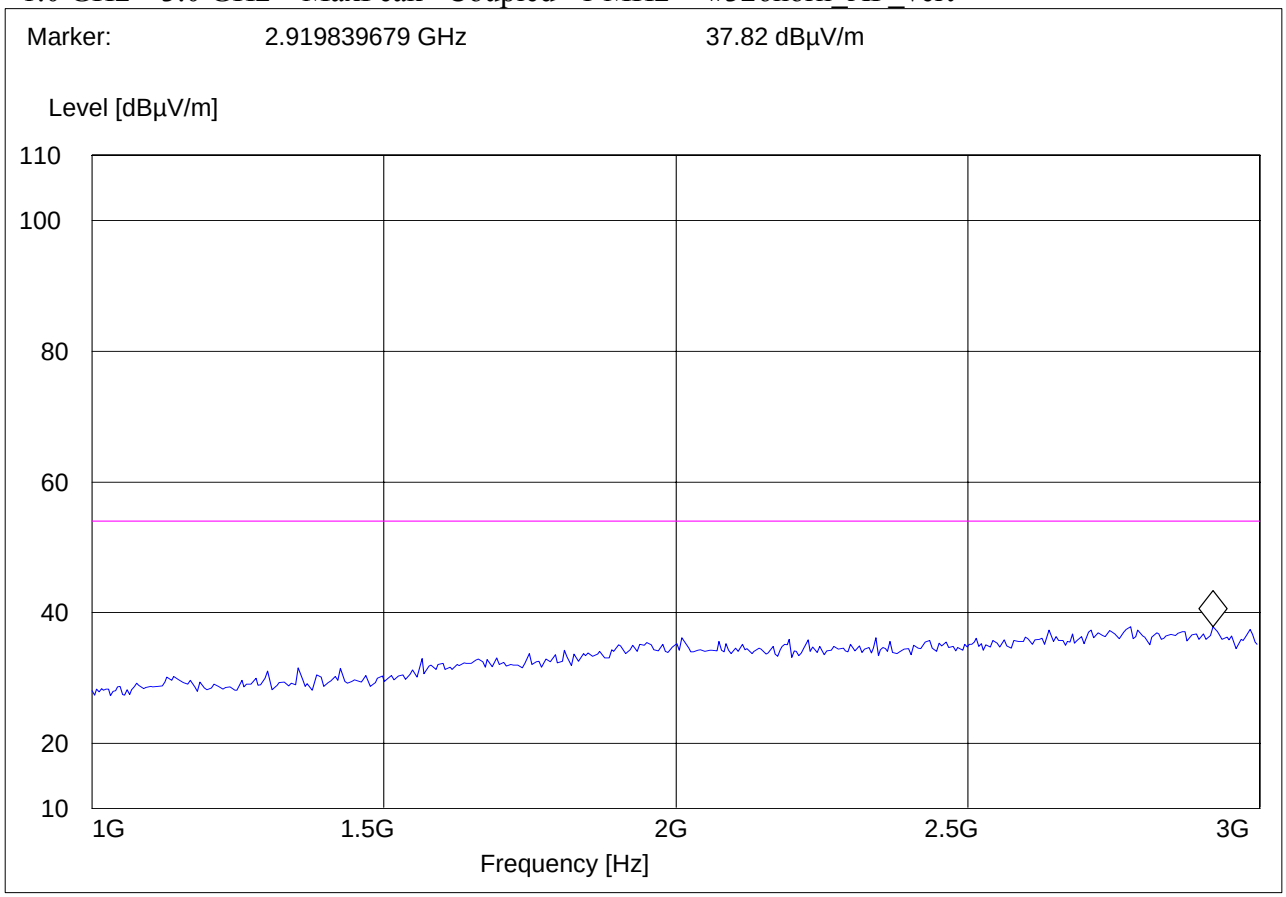


1-3GHz
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 IDLE
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

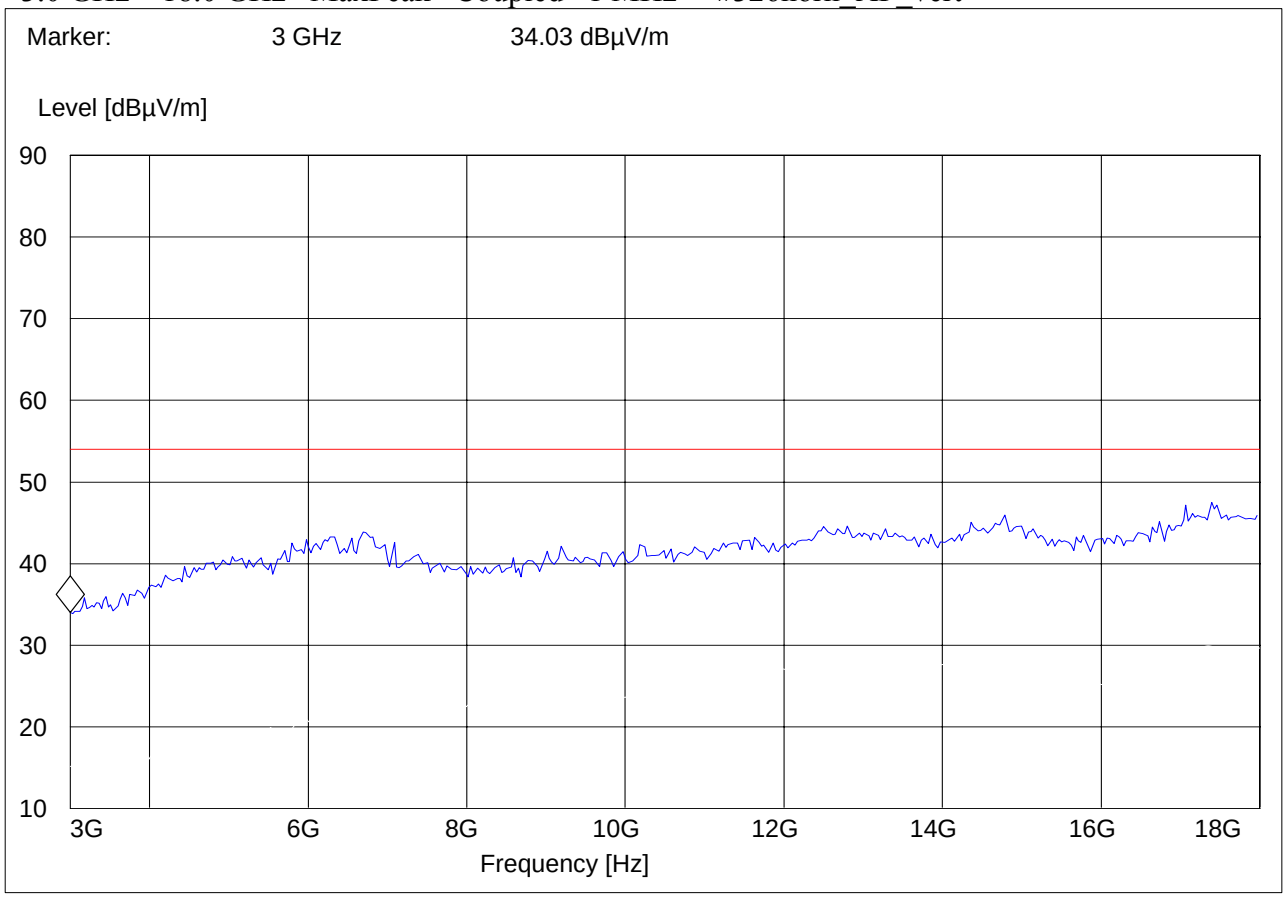


3-18GHz
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 IDLE
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

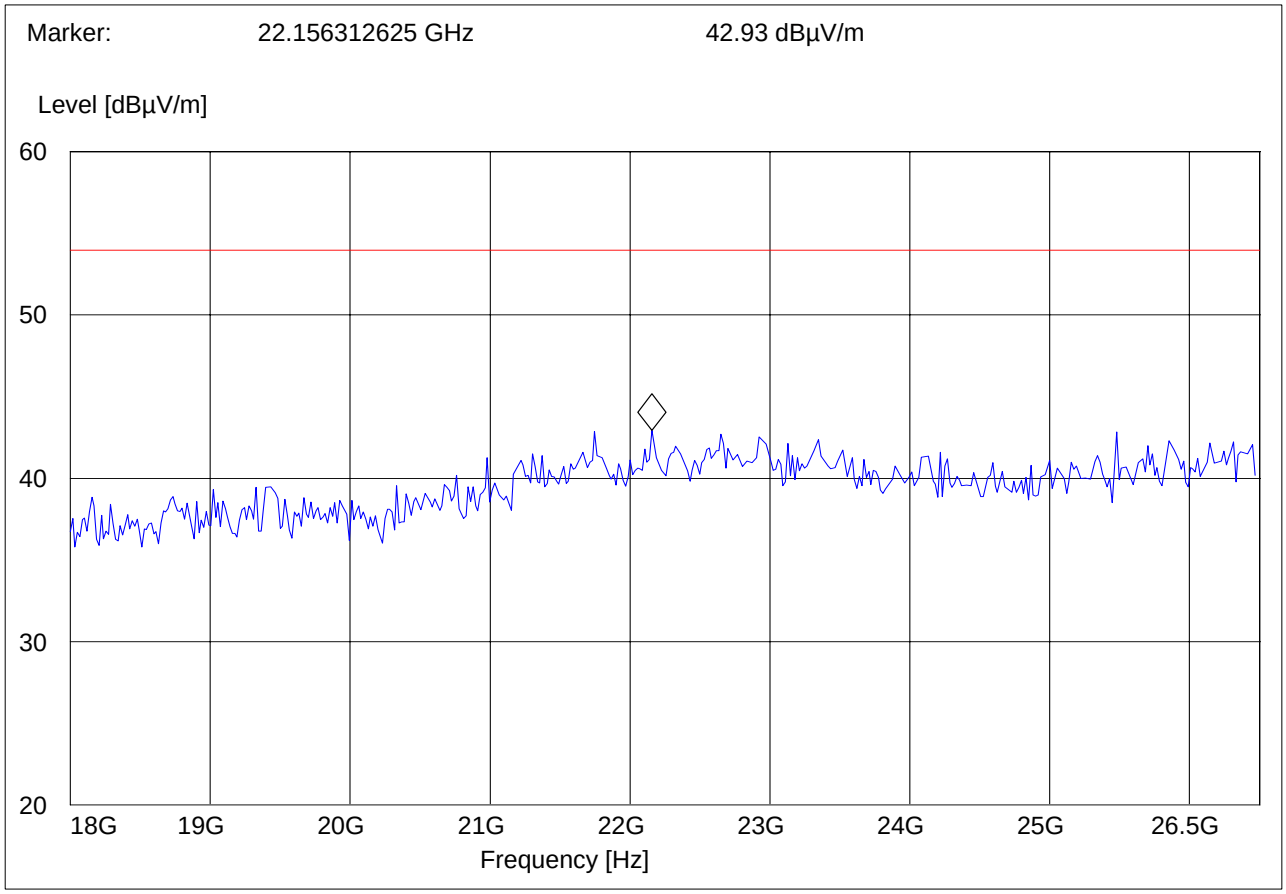


18-25GHz
Note: Peak Reading vs. Average limit

EUT: BT Headset
Customer:: Sound ID
Test Mode: BT DH5 IDLE
ANT Orientation: V
EUT Orientation: V
Test Engineer: Sam
Voltage: battery
Comments:

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G
		MaxPeak			



6 Measurements (Conducted)

6.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (CONDUCTED)

6.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	30dBm

***limit is based upon antenna gain of less than or equal to 6dBi.**

6.1.2 RESULTS:

Conducted Peak Power: GFSK

TEST CONDITIONS		Conducted Peak Power (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	4.3	4.3	3.9
Measurement uncertainty		±0.5dBm		

Conducted Peak Power: π / 4 DQPSK

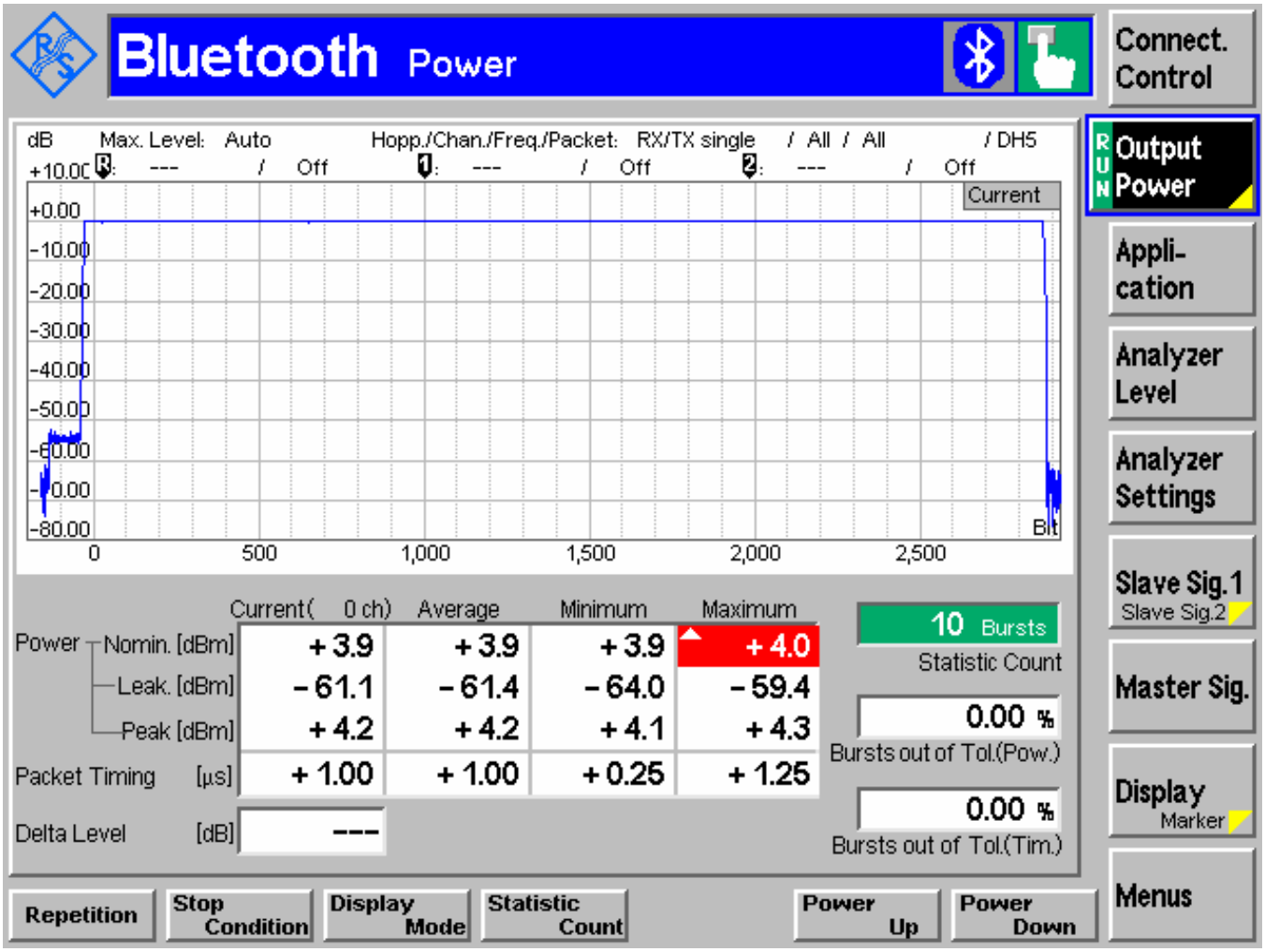
TEST CONDITIONS		Conducted Peak Power (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	4.7	4.5	3.8
Measurement uncertainty		±0.5dBm		

Conducted Peak Power: 8DPSK

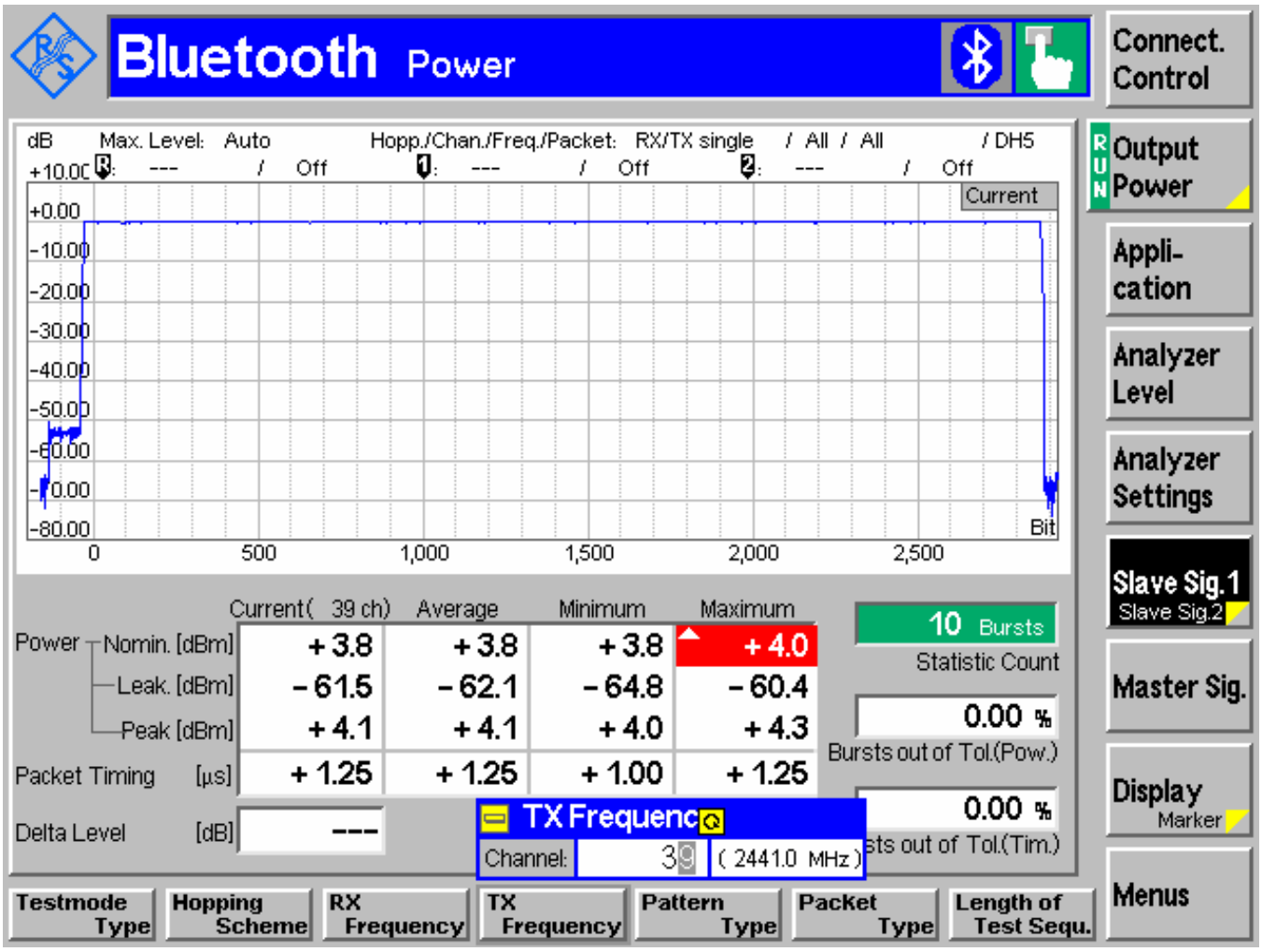
TEST CONDITIONS		Conducted Peak Power (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	4.7	4.7	3.9
Measurement uncertainty		±0.5dBm		

NOTE: all conducted power measurements were done with 3MHz RBW/VBW

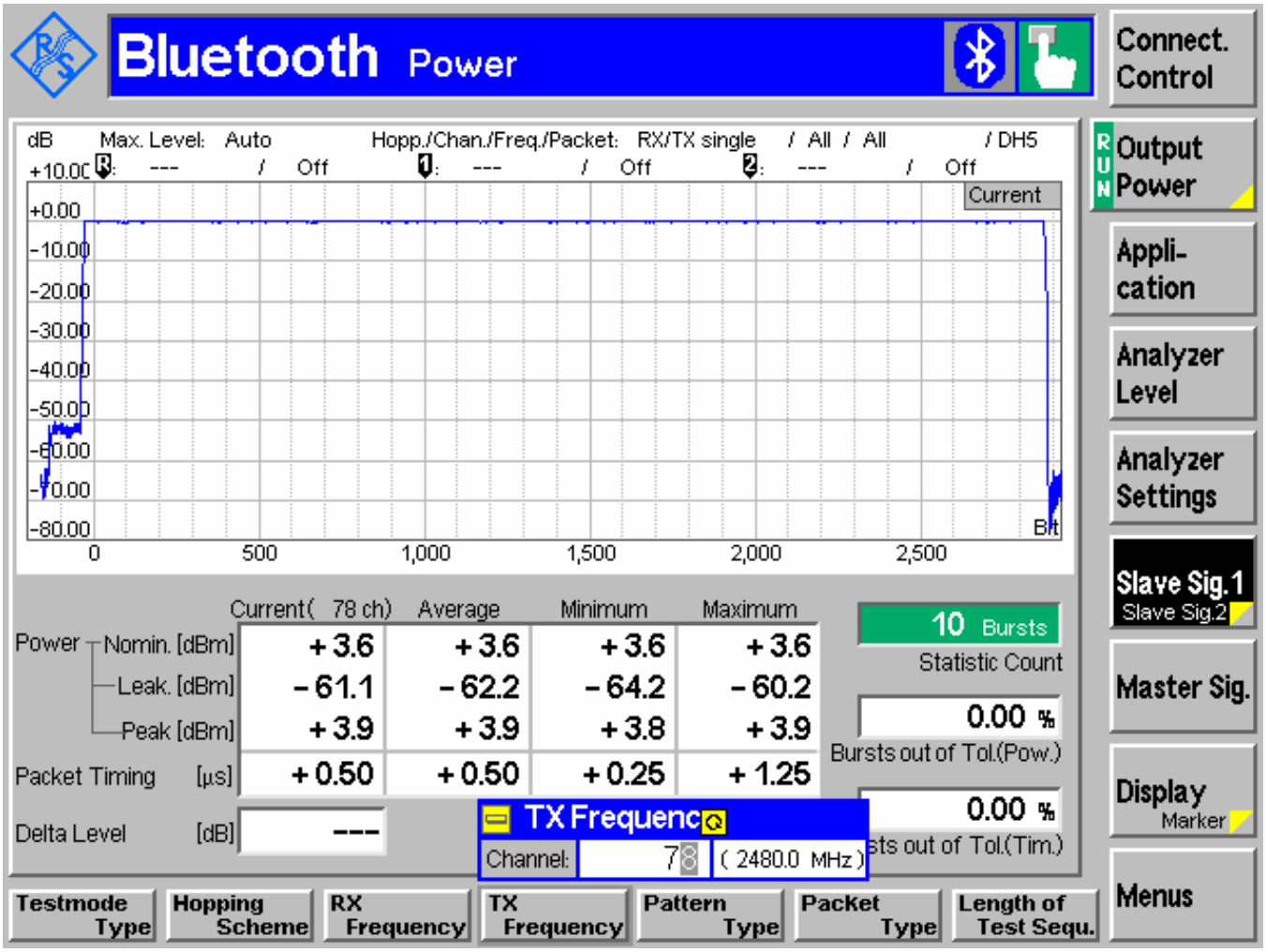
Conducted Peak Power GFSK 2402 MHz



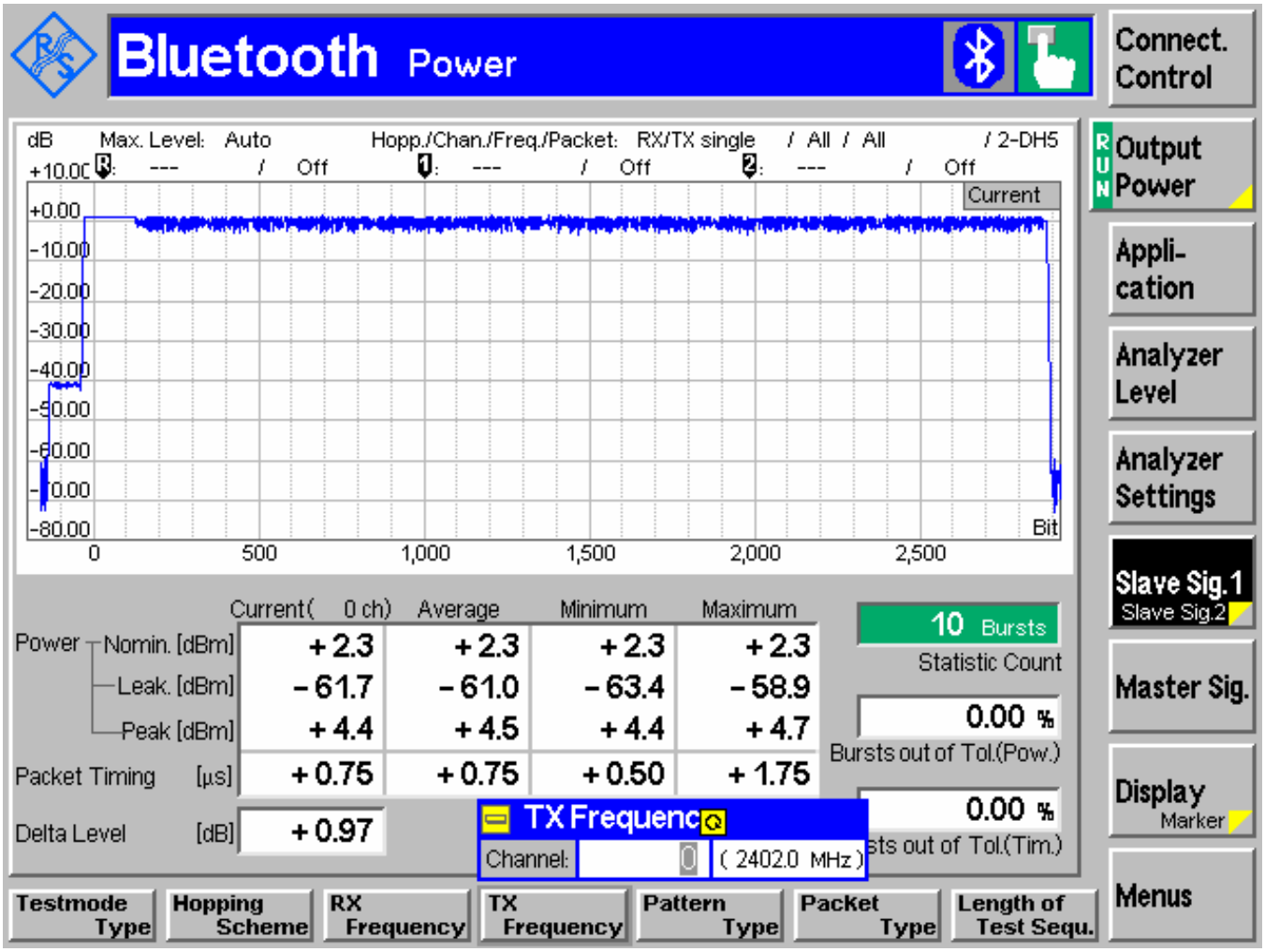
Conducted Peak Power GFSK 2441 MHz



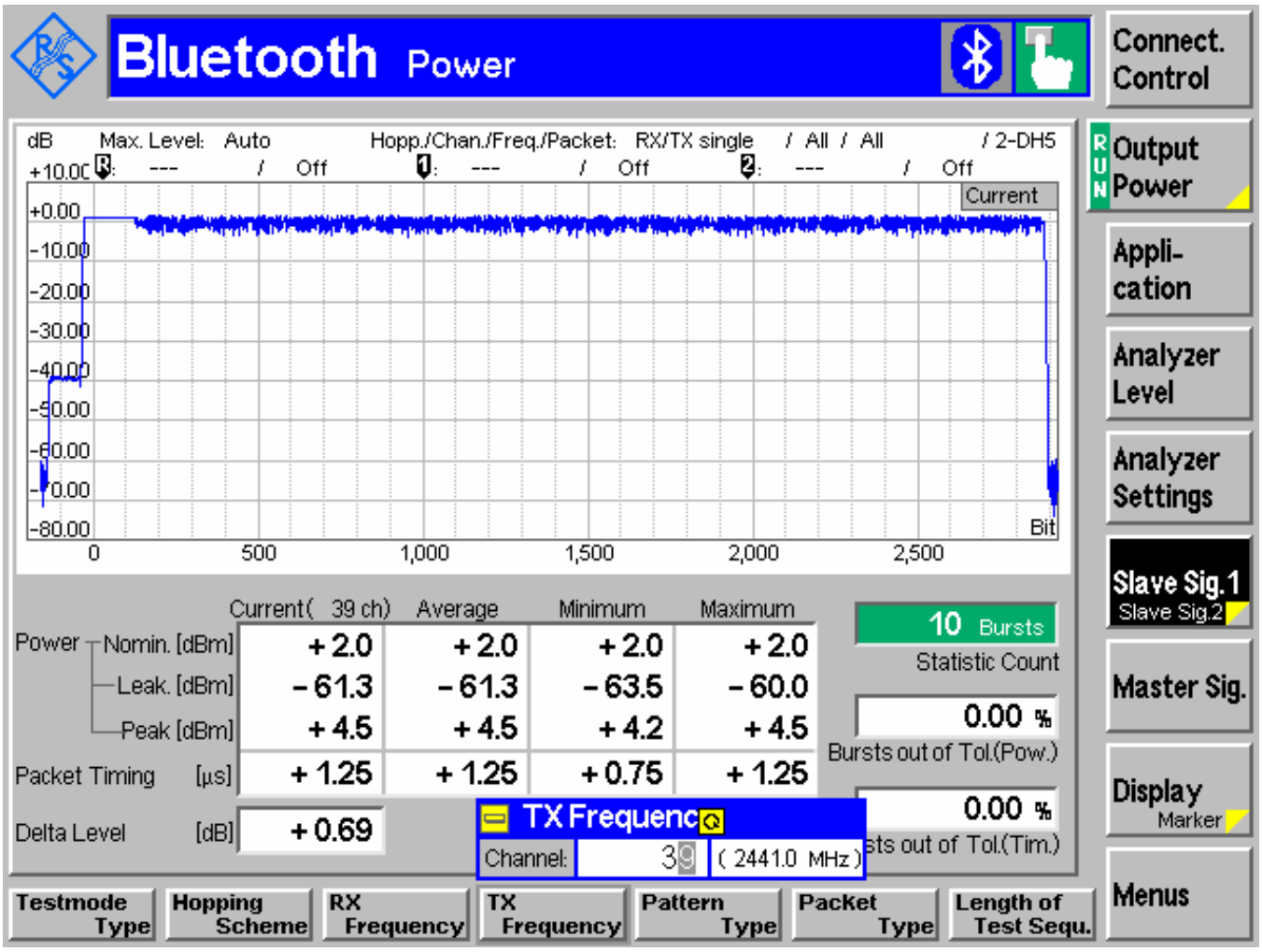
Conducted Peak Power GFSK 2480 MHz



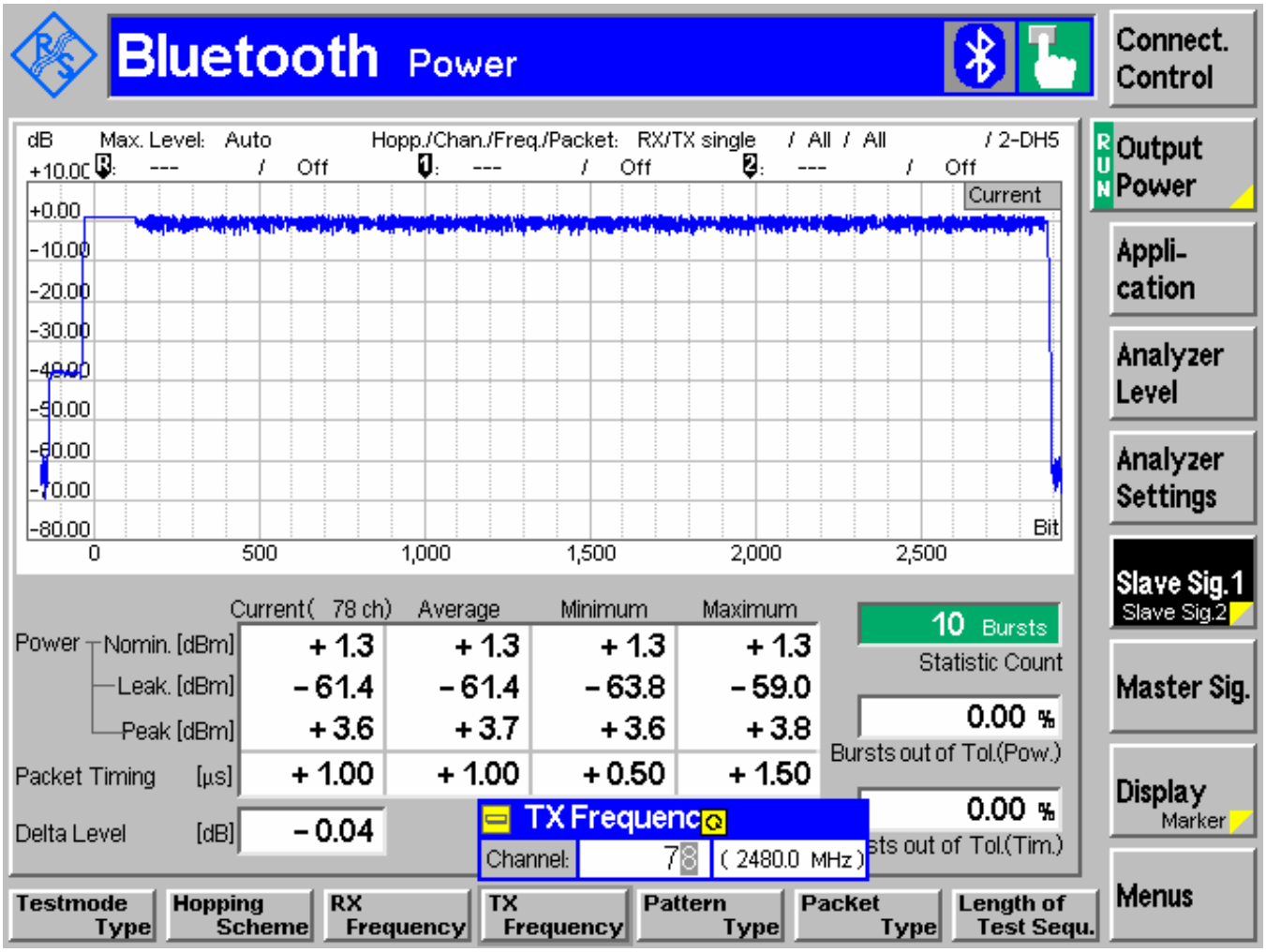
Conducted Peak Power π / 4 DQPSK 2402 MHz



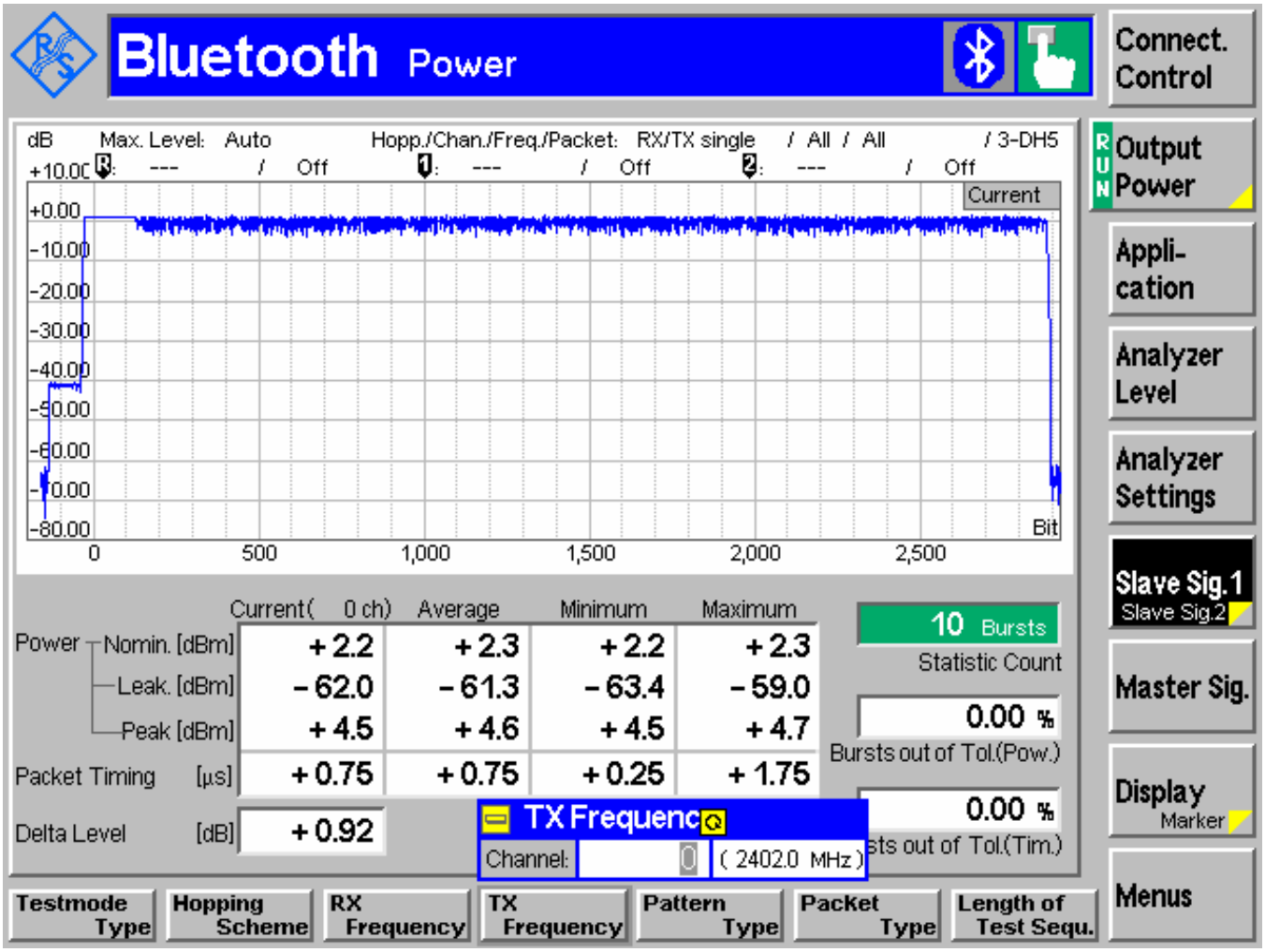
Conducted Peak Power π / 4 DQPSK 2441 MHz



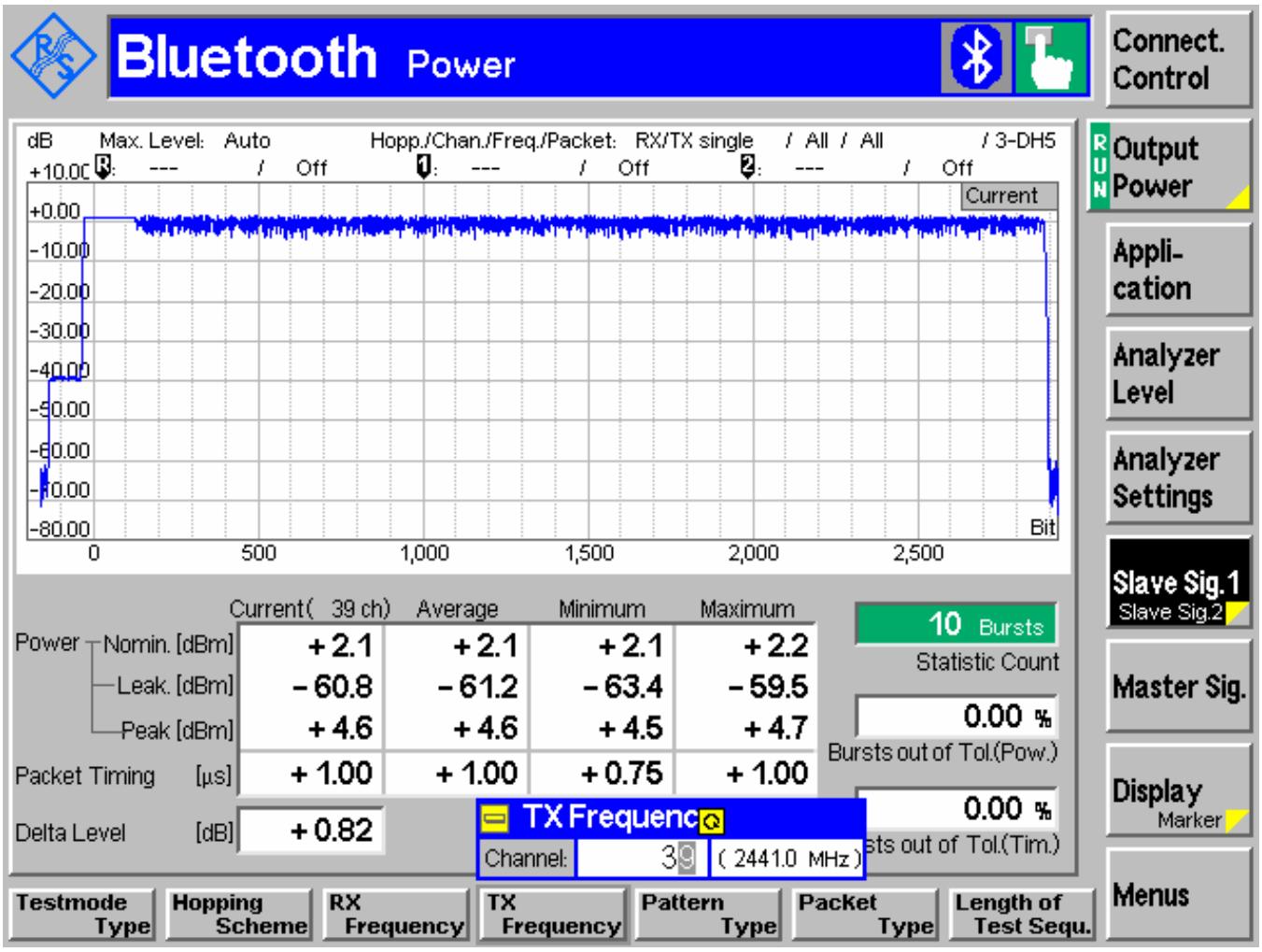
Conducted Peak Power π / 4 DQPSK 2480 MHz



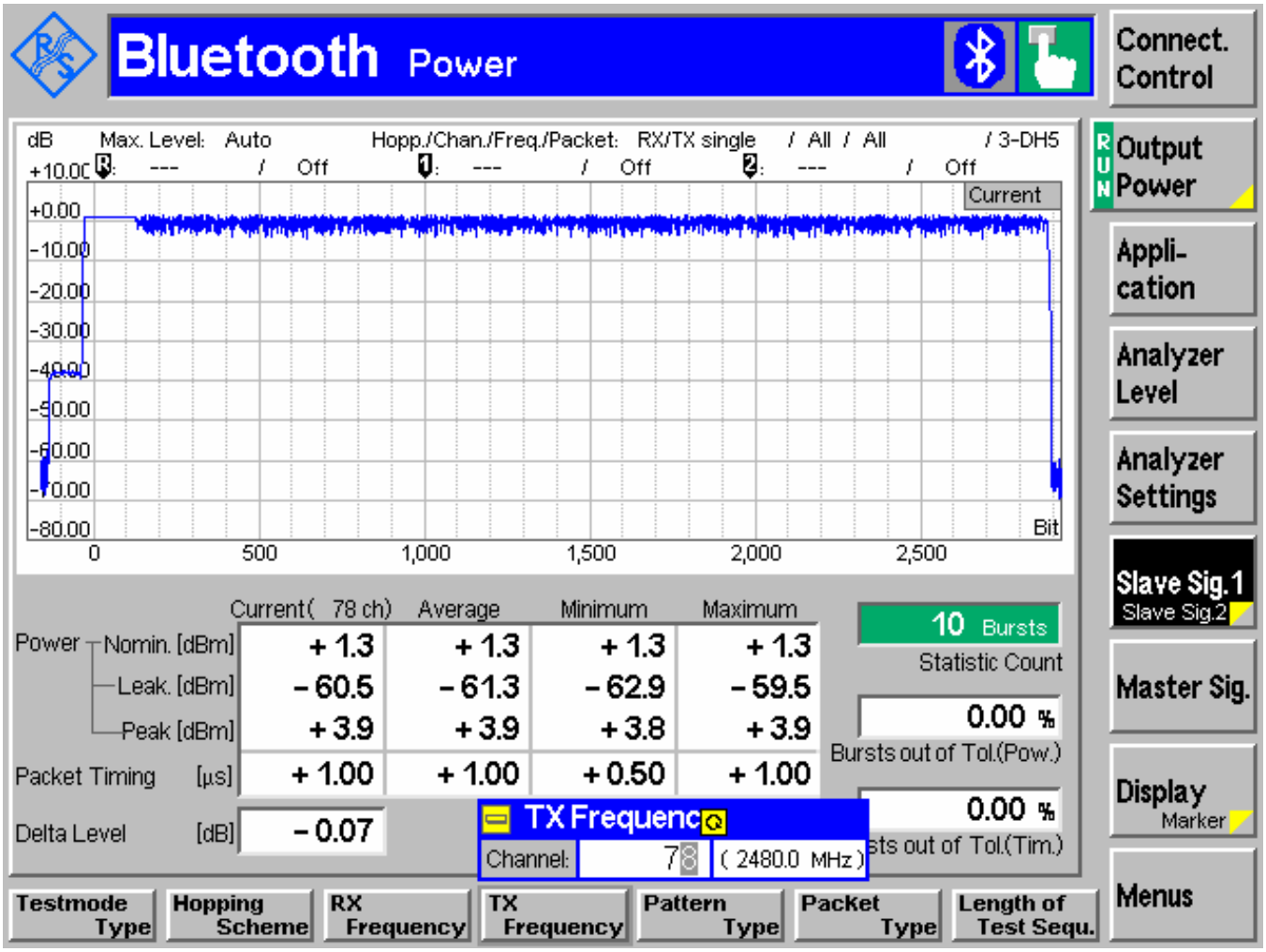
Conducted Peak Power 8DPSK 2402 MHz



Conducted Peak Power 8DPSK 2441 MHz



Conducted Peak Power 8DPSK 2480 MHz



6.2 20dB BANDWIDTH

6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

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 125 mW.

6.2.2 RESULTS:

20dB Bandwidth: GFSK

TEST CONDITIONS		**20dB Bandwidth (kHz)**		
Frequency (MHz)		**2402**	**2441**	**2480**
T_{nom}(23)°C	**V_{nom}VDC**	**922**	**922**	**922**

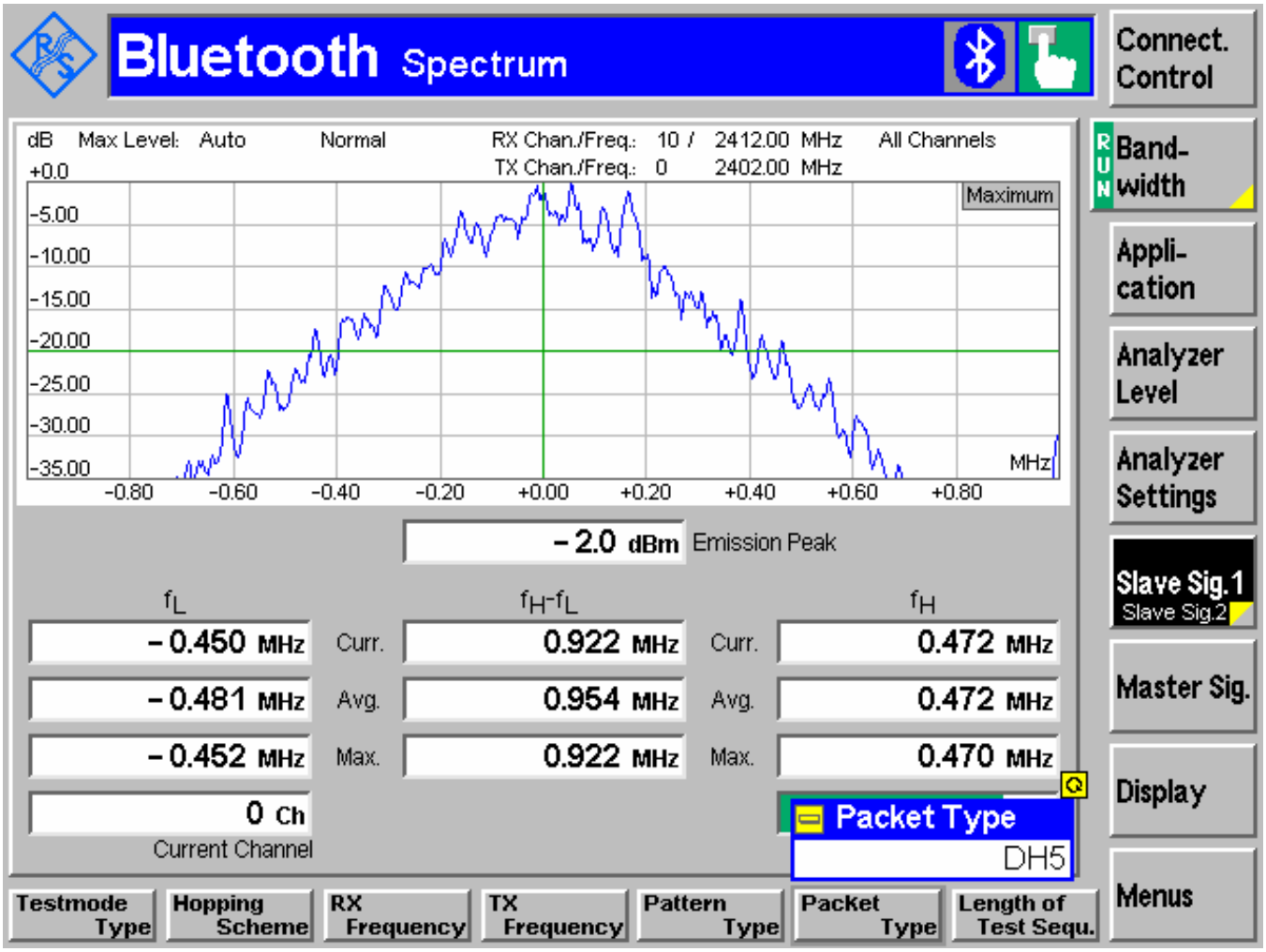
20dB Bandwidth: π / 4 DQPSK

TEST CONDITIONS		**20dB Bandwidth (kHz)**		
Frequency (MHz)		**2402**	**2441**	**2480**
T_{nom}(23)°C	**V_{nom}VDC**	**1315**	**1311**	**1309**

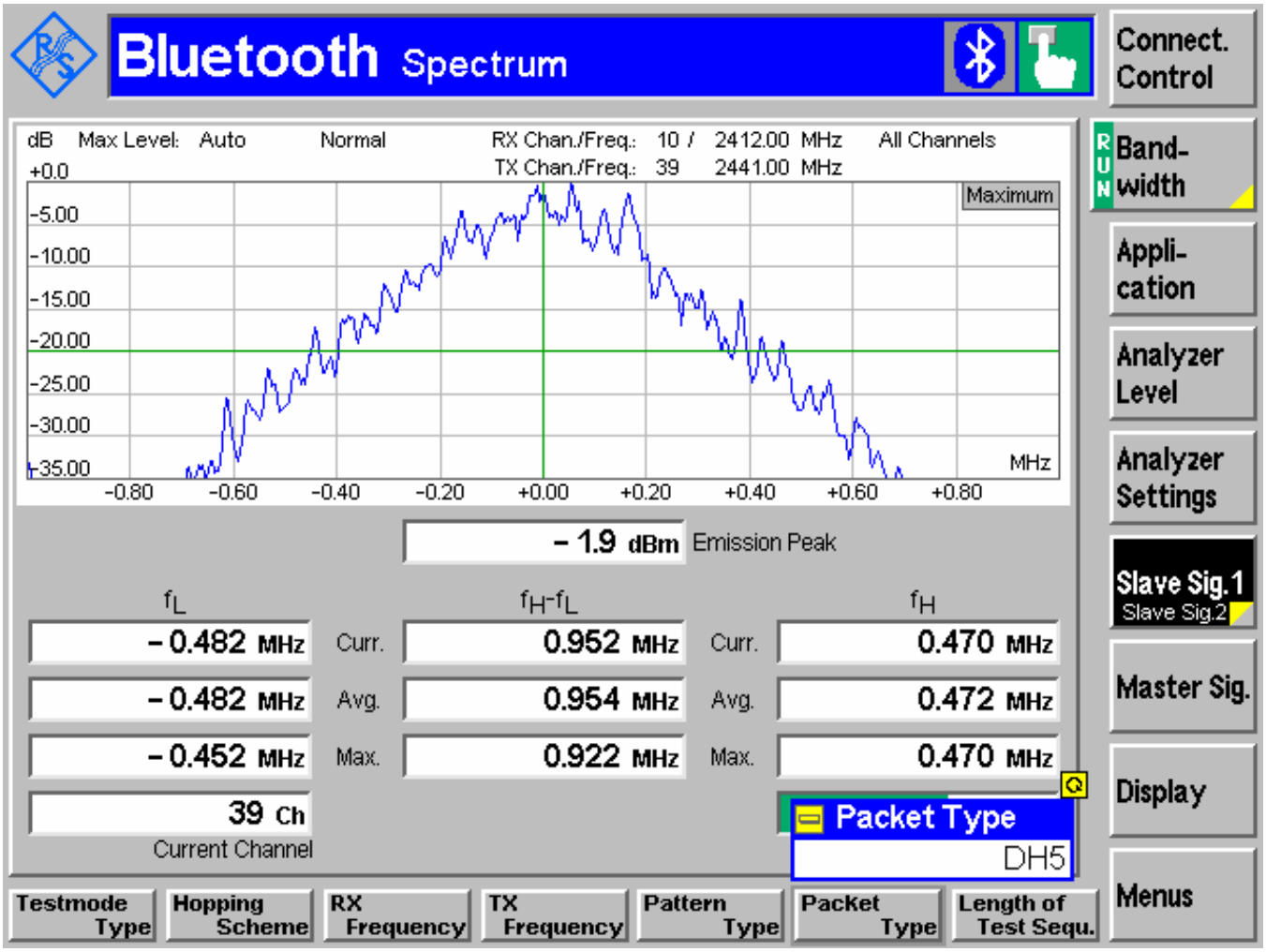
20dB Bandwidth: 8DPSK

TEST CONDITIONS		**20dB Bandwidth (kHz)**		
Frequency (MHz)		**2402**	**2441**	**2480**
T_{nom}(23)°C	**V_{nom}VDC**	**1281**	**1262**	**1262**

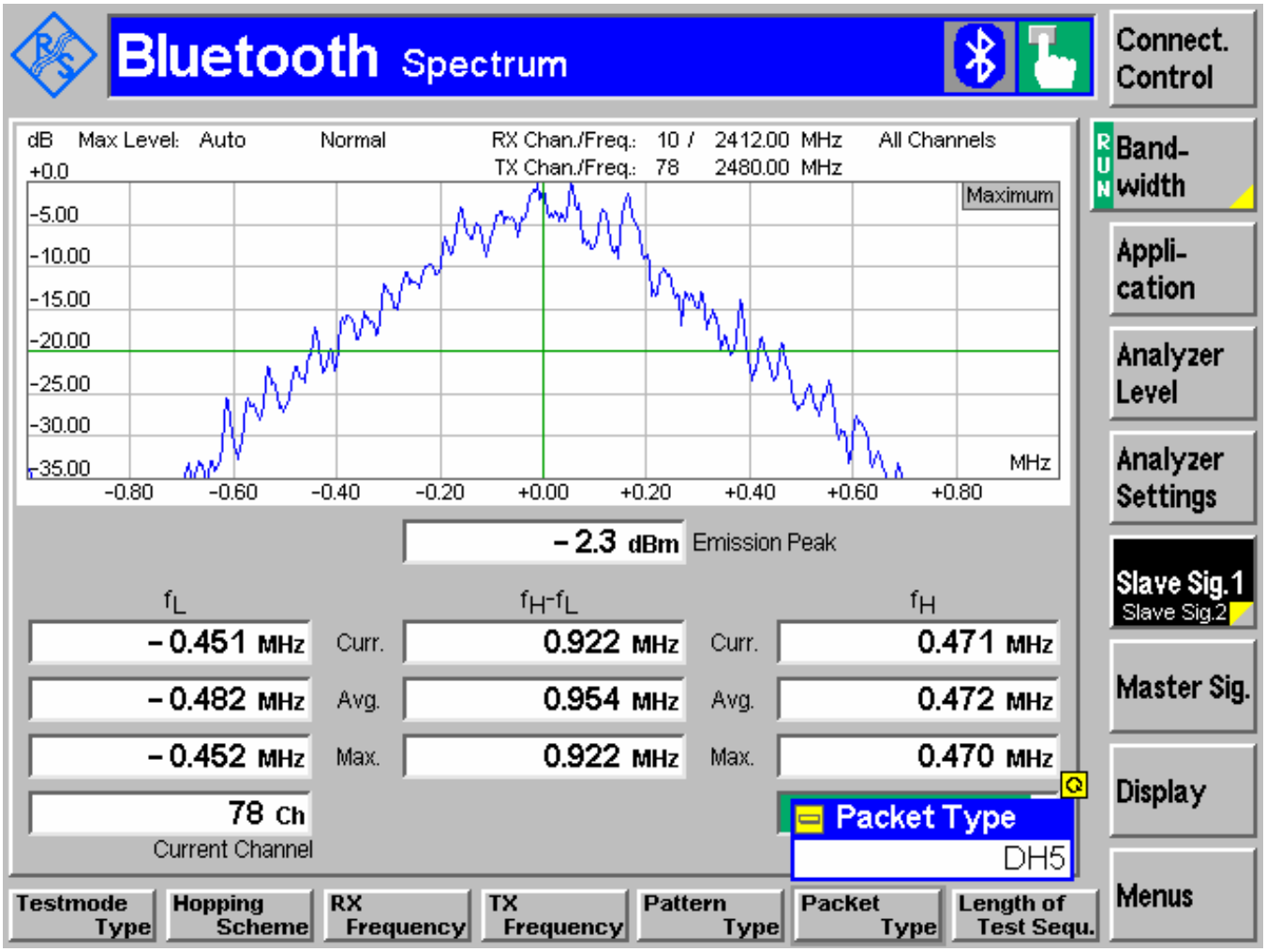
20dB Bandwidth GFSK 2402MHz



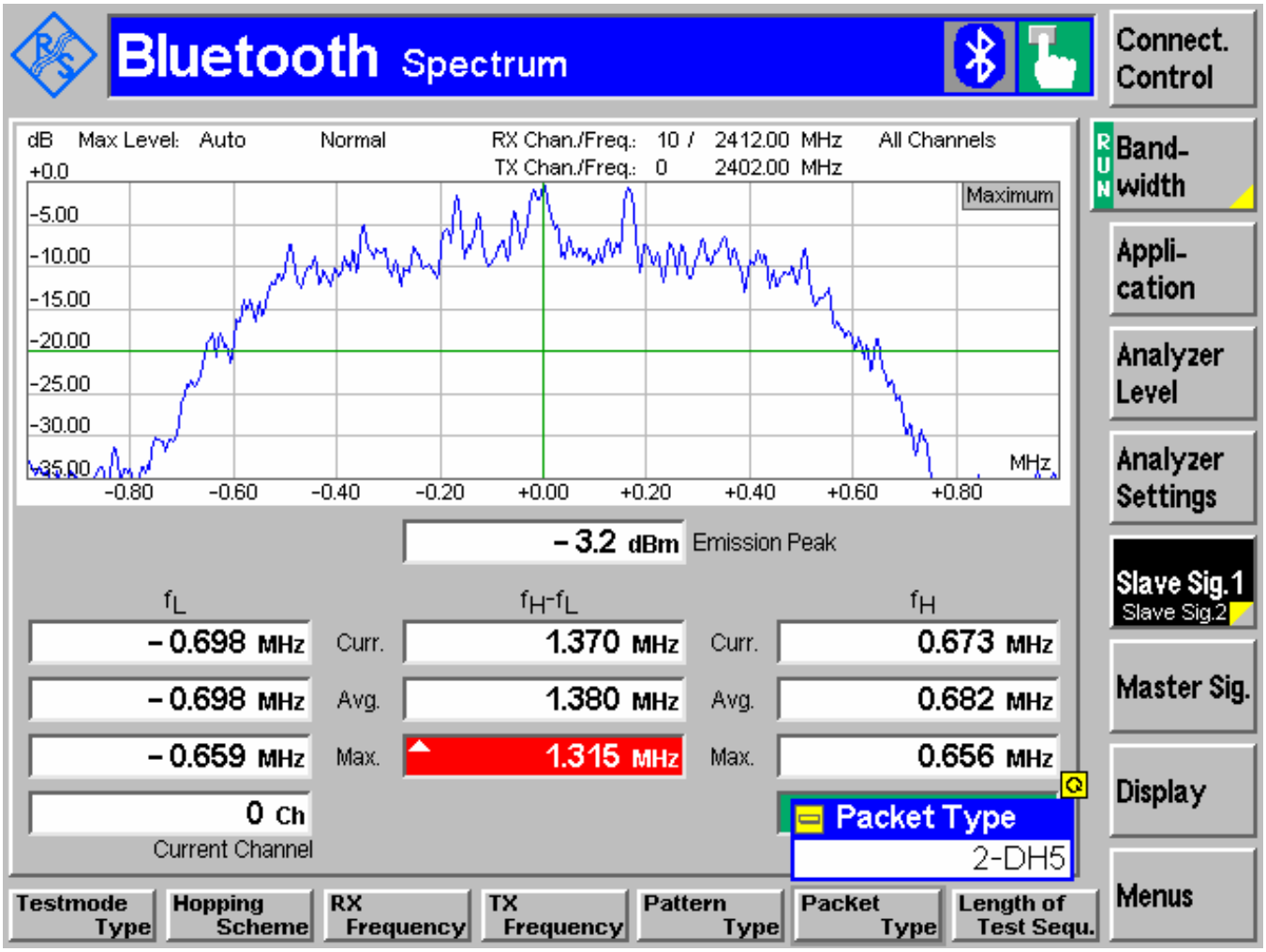
20dB Bandwidth GFSK 2441MHz



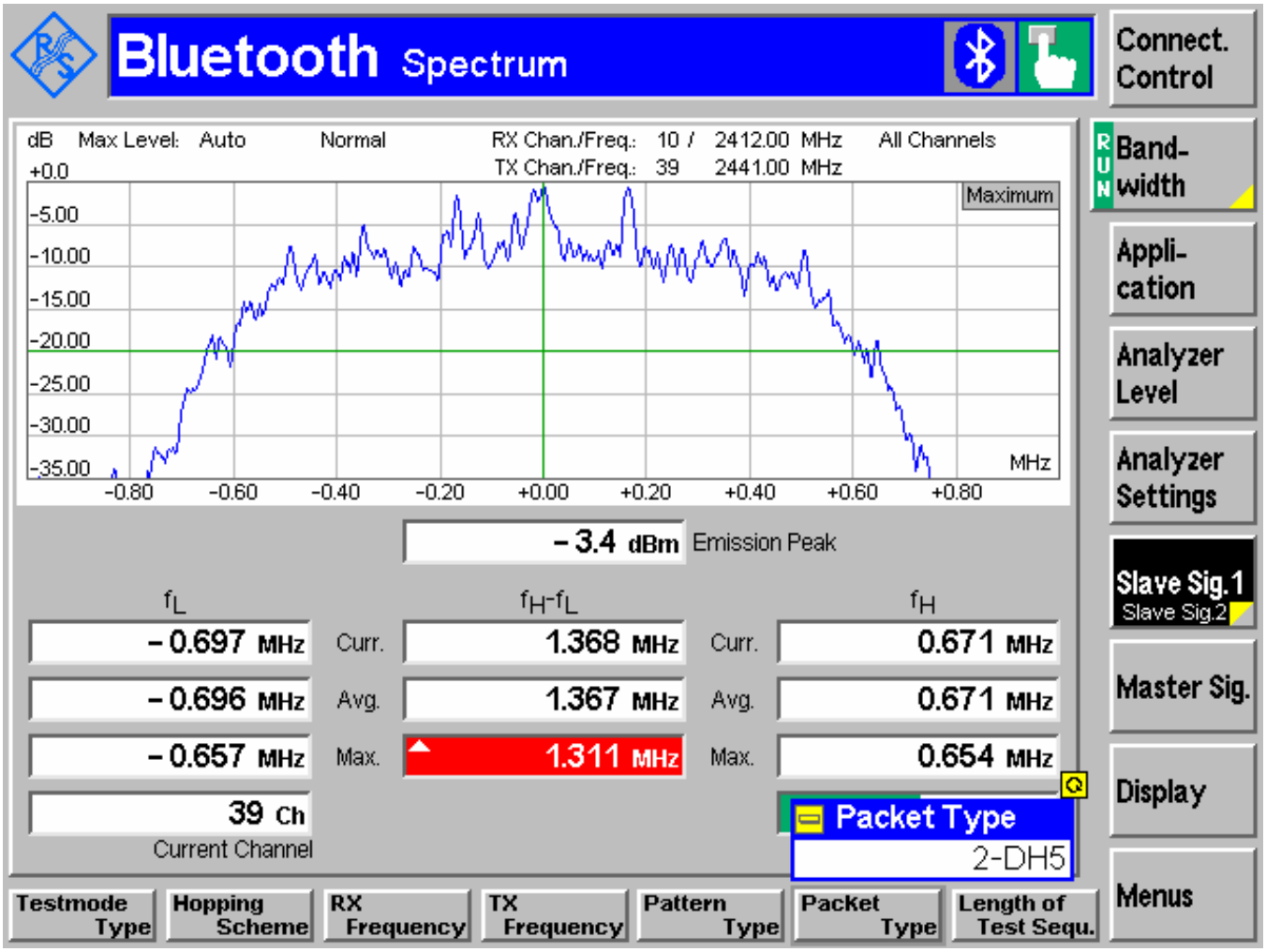
20dB Bandwidth GFSK 2480MHz



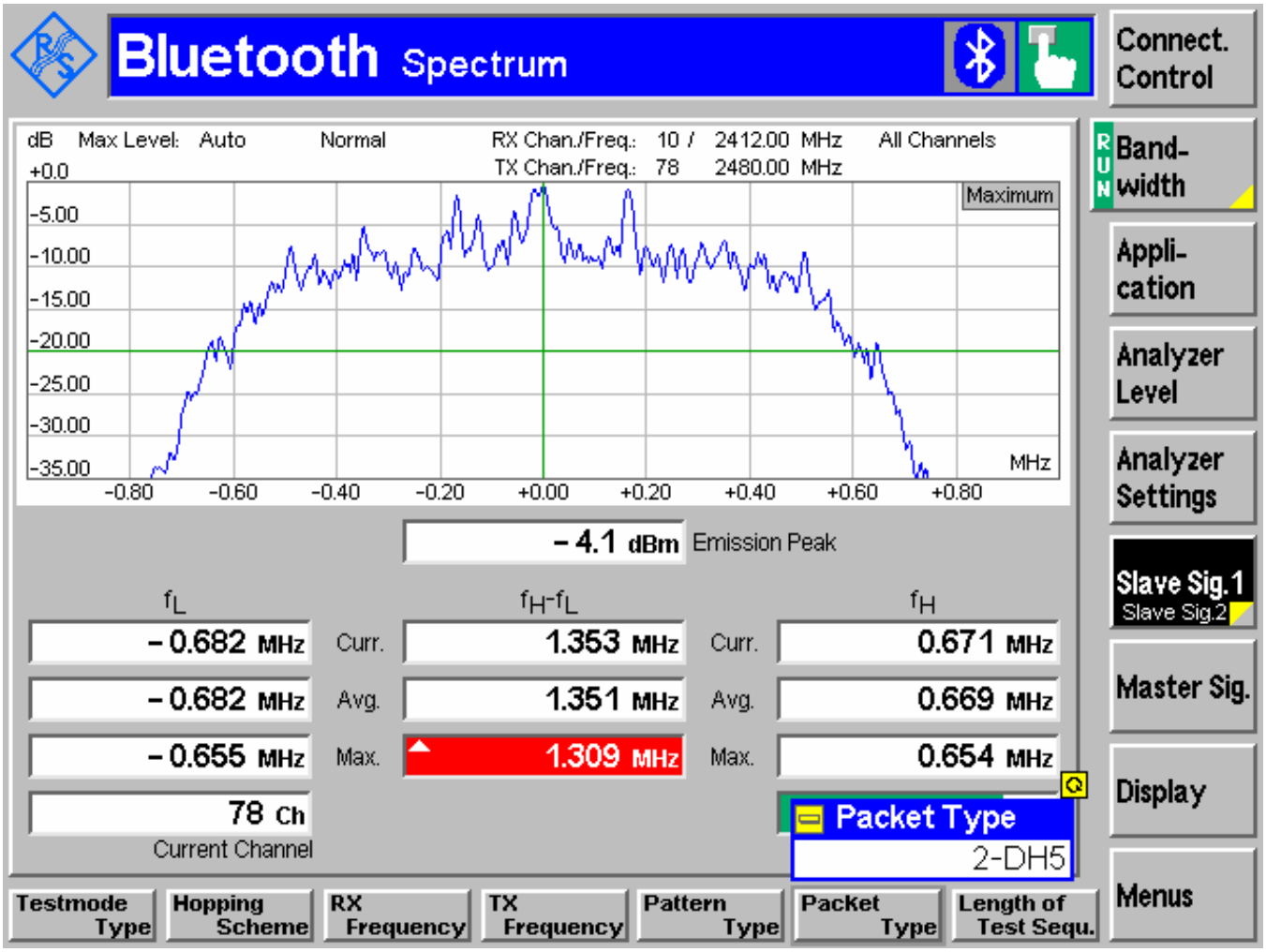
20dB Bandwidth π / 4 DQPSK 2402MHz



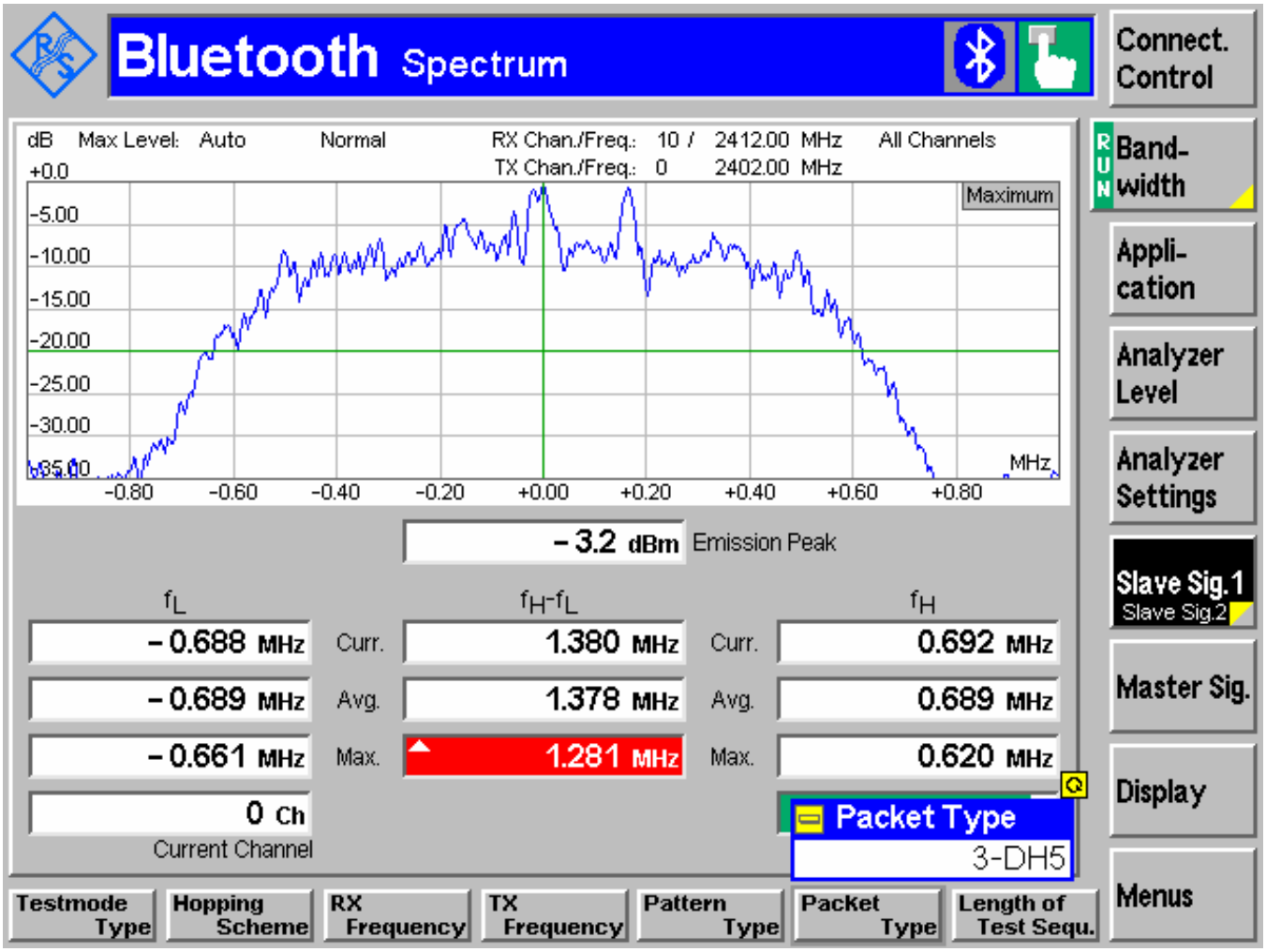
20dB Bandwidth π / 4 DQPSK 2441MHz



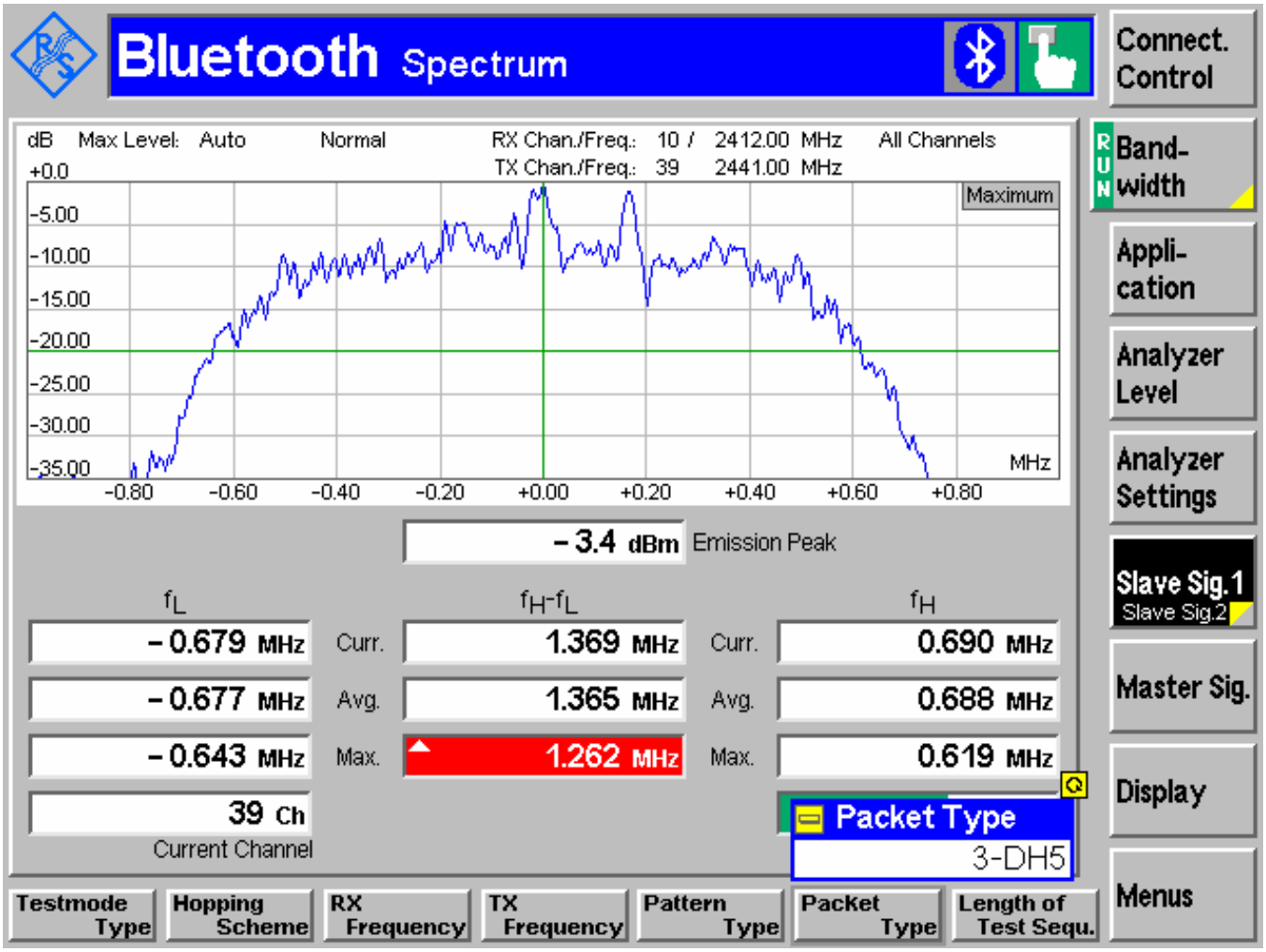
20dB Bandwidth π / 4 DQPSK 2480MHz



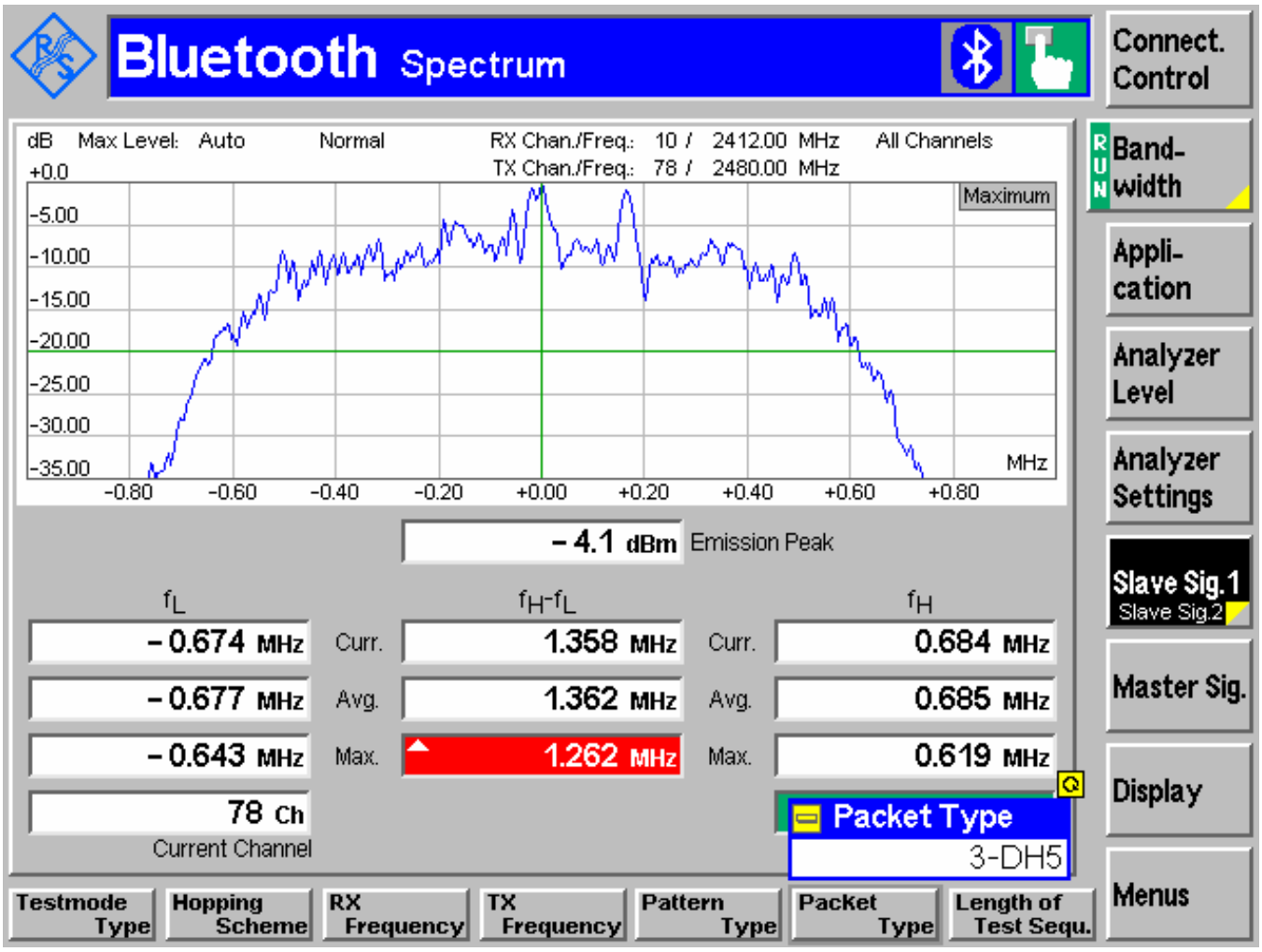
20dB Bandwidth 8PSK 2402MHz



20dB Bandwidth 8PSK 2441MHz



20dB Bandwidth 8PSK 2480MHz

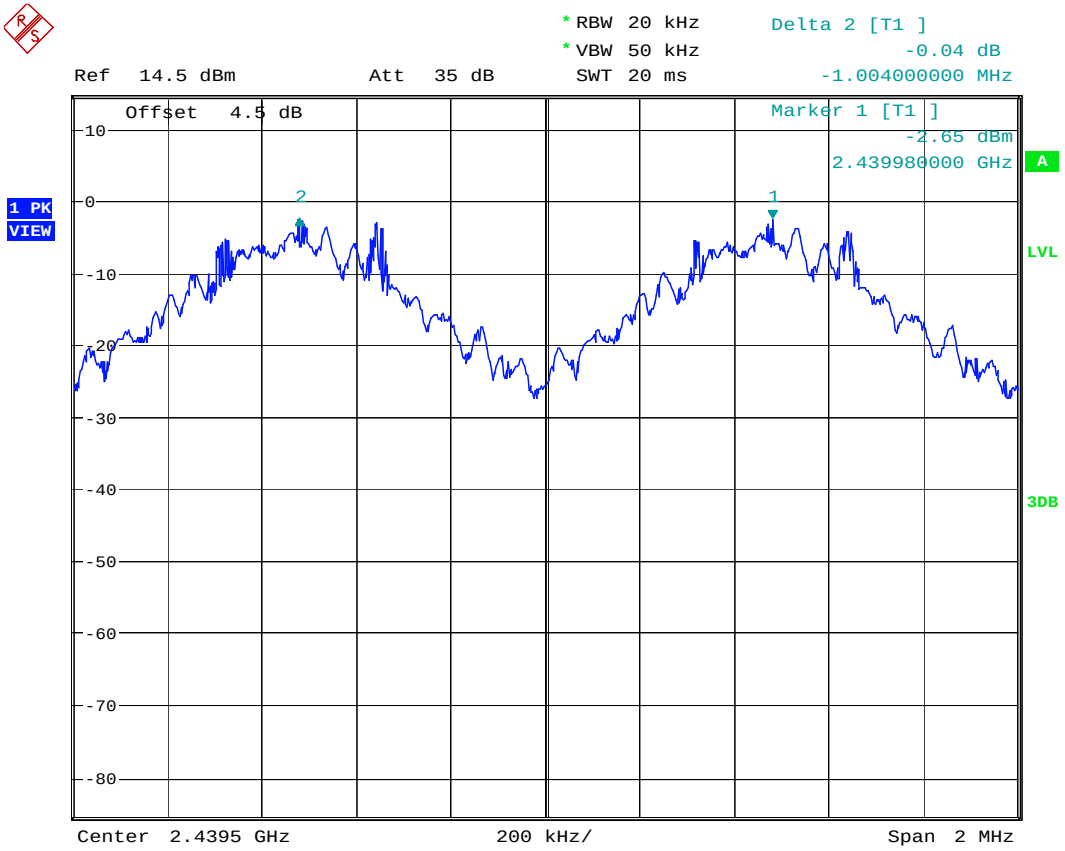


6.3 CARRIER FREQUENCY SEPARATION

6.3.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

SEPARATION
> 25 KHz or > 2/3 * 20 dB BANDWIDTH = 839kHz

6.3.2 RESULTS: 1.004MHz

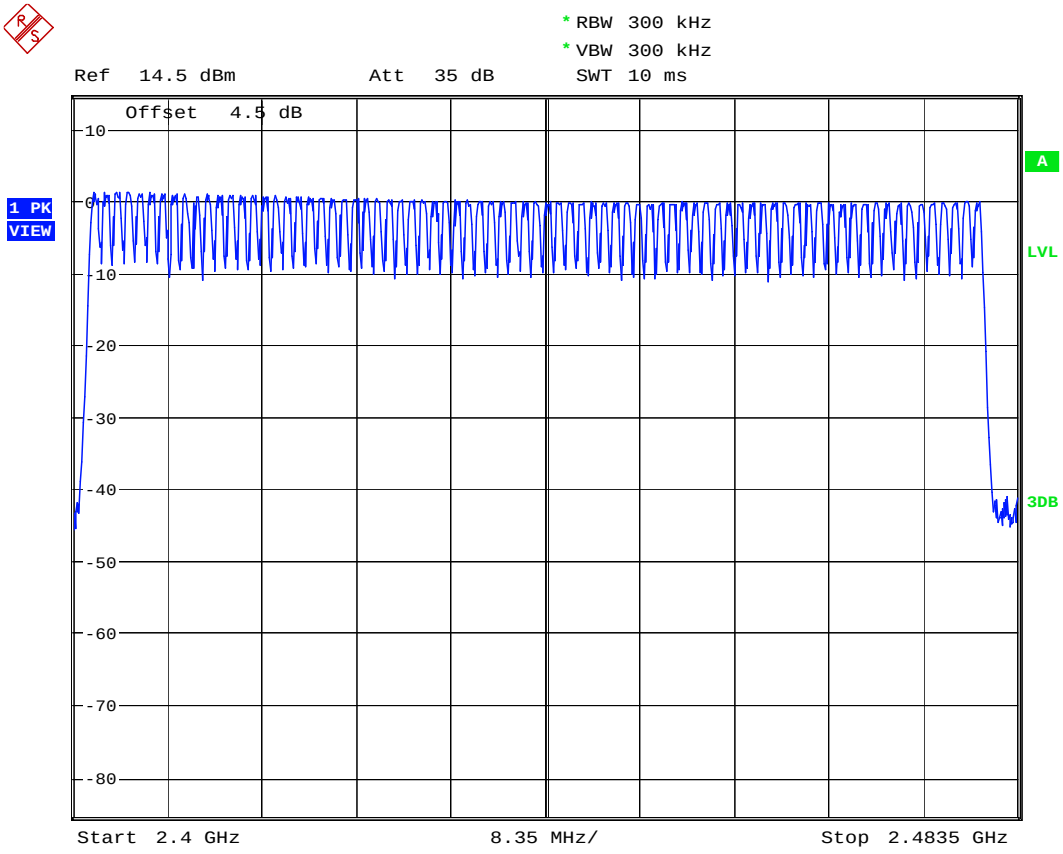


6.4 NUMBER OF HOPPING CHANNELS

6.4.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

NUMBER OF CHANNELS
> 15

6.4.2 RESULTS: 79



6.5 TIME OF OCCUPANCY (DWELL TIME)

6.5.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

FREQUENCY RANGE	AVERAGE TIME OF OCCUPANCY PER 31.6 SECONDS (LIMIT)
2400-2483.5	0.4 SECONDS

6.5.2 RESULTS:

T_{nom}(23)°C	V_{nom}VDC

For Bluetooth devices:

The dwell time of 0.4 s within a 31.6 second period in data mode is independent from the packet type (packet length). The calculation for a 31.6 second period is a follows:

Dwell time = time slot length * hop rate / number of hopping channels *31.6 s

Example for a DH1 packet (with a maximum length of one time slot)
Dwell time = 625 µs * 1600 1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

This is the same for all BT devices and therefore all BT devices satisfy FCC requirement on time of occupancy (dwell time).

6.6 CONDUCTED SPURIOUS EMISSION

6.6.1 LIMIT SUB CLAUSE § 15.247 (d)

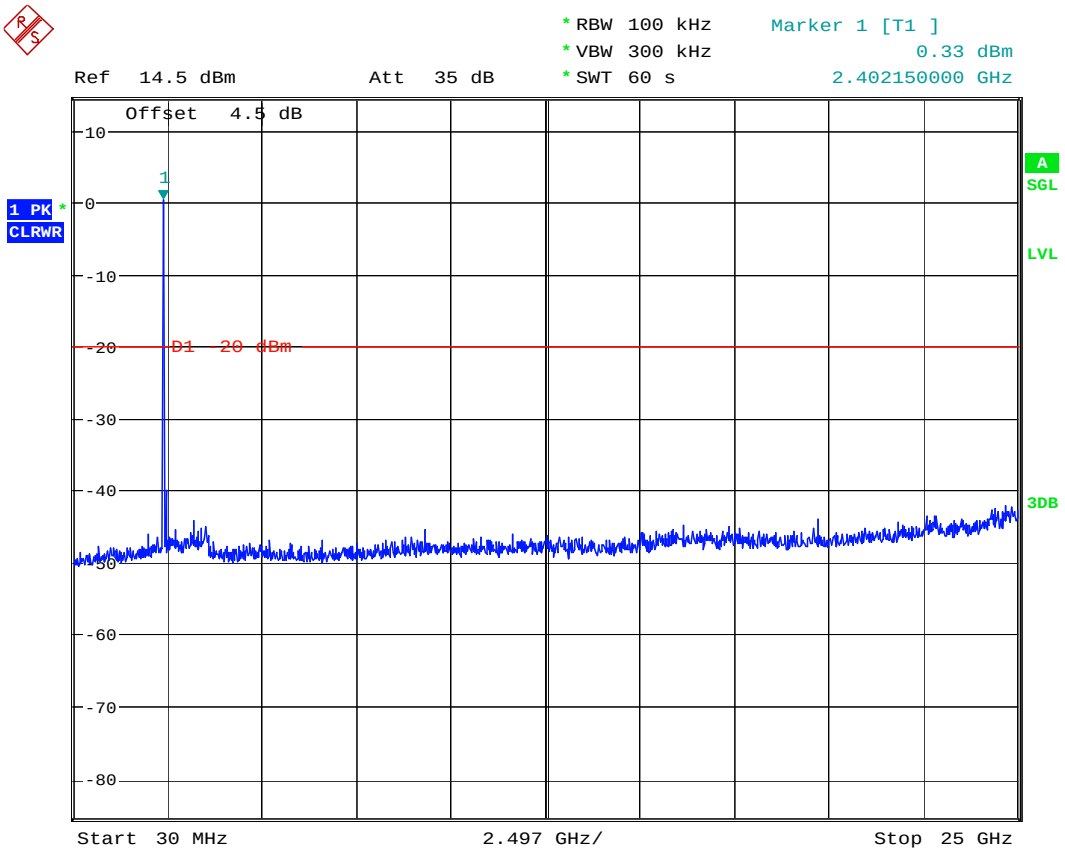
FREQUENCY RANGE	limit
30M-25GHz	-20dBc

6.6.2 RESULTS: Tnom(23)°C VnomVDC

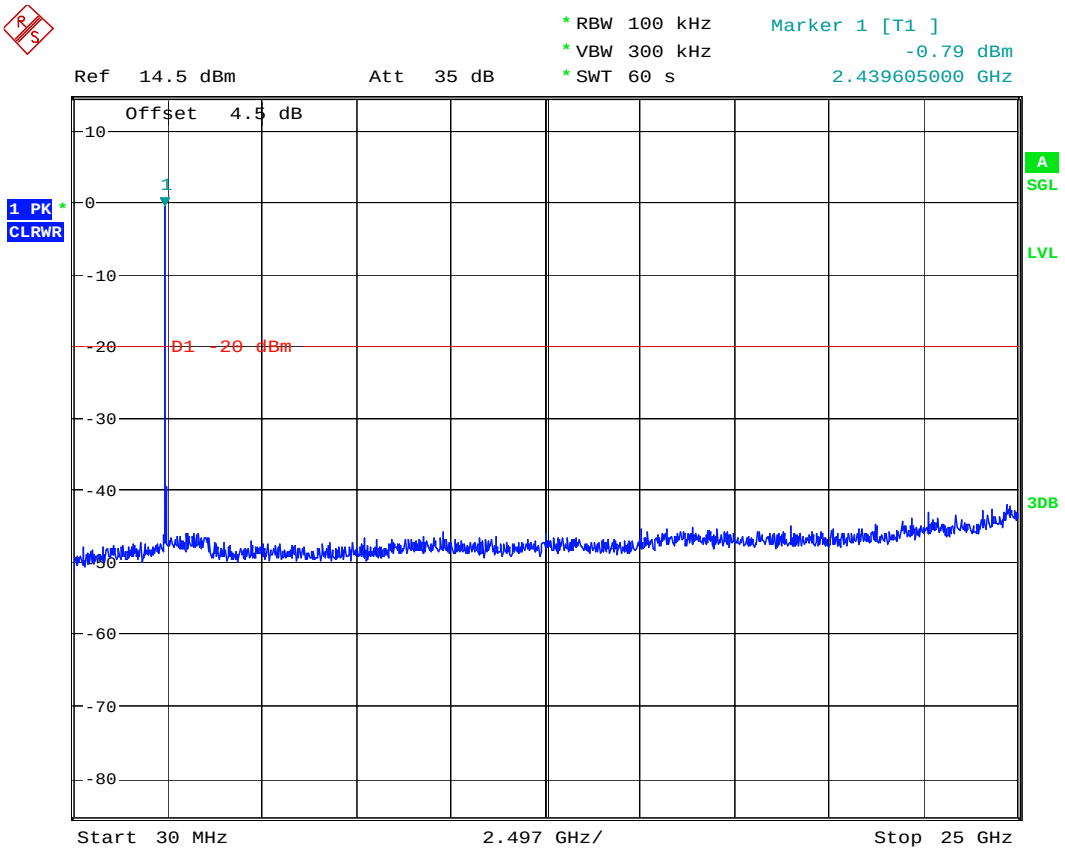
All tests conducted in GFSK mode which has the highest output power and EIRP.

Verfict: PASS

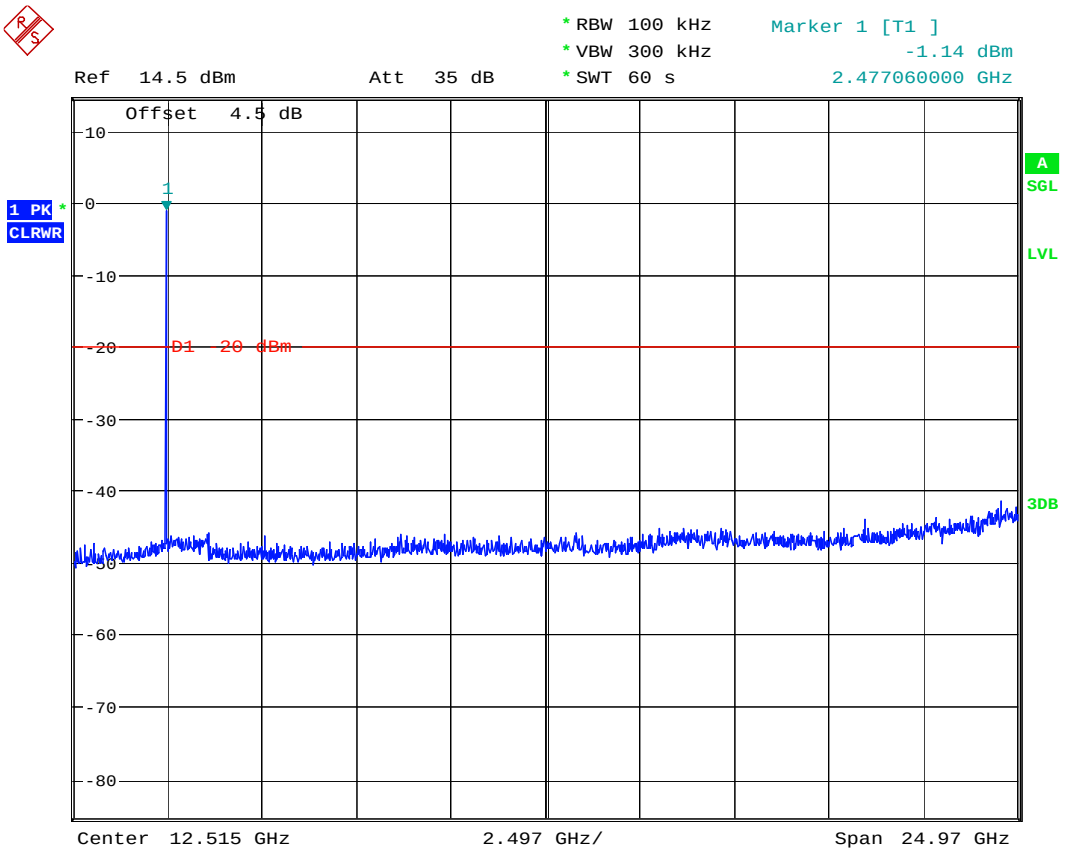
Conducted Spurious Emission 2402MHz



Conducted Spurious Emission 2441 MHz



Conducted Spurious Emission 2480MHz



6.7 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

6.7.1 LIMITS

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)
Limit

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

6.7.2 Test Results:

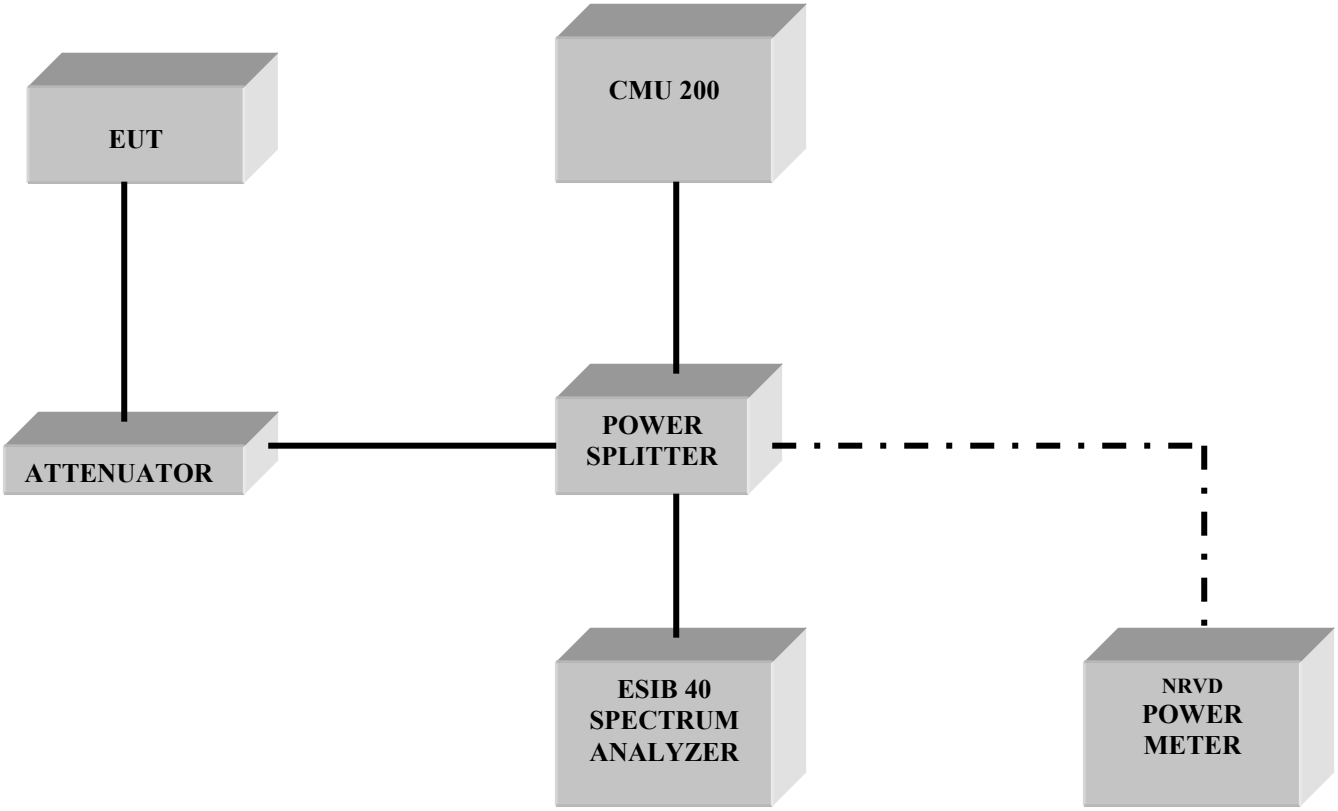
Test not conducted. EUT is battery operated device.

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2009	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2009	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2009	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2009	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2009	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2010	2 years

8 BLOCK DIAGRAMS

Conducted Testing



Radiated Testing