



FCC Test Report

Test report no.: EMC_905FCC15.247_2005_CX75

FCC Part 15.247 for FHSS systems / CANADA RSS-210

Model: CX75

FCC ID: PWX-CX75

IC: 267E-CX75



TTI-P-G 081/94-A0

Accredited according to **ISO/IEC 17025**



**Bluetooth Qualification
Test Facility
(BQTF)**



FCC listed # 101450

IC recognized # 3925

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	General information
1.1	Notes
1.2	Testing laboratory
1.3	Details of applicant
1.4	Application details
1.5	Test item
1.6	Test standards
2	Technical test
2.1	Summary of test results
2.2	Test report

1 General information**1.1 Notes**

The test results of this test report relate exclusively to the test item specified in 1.5. 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.

TEST REPORT PREPARED BY:**EMC Engineer: Harpreet Sidhu****1.2 Testing laboratory****CETECOM Inc.****411 Dixon Landing Road, Milpitas, CA-95035, USA****Phone: +1 408 586 6200 Fax: +1 408 586 6299****E-mail: lothar.schmidt@cetecomusa.com****Internet: www.cetecom.com**

1.3 Details of applicant

Name : SIEMENS Information and Communication Mobile LLC
Street : 16745 West Bernardo Drive Suite 400
City / Zip Code : San Diego, CA 92127
Country : USA
Contact : Kevin Wolentarski
Telephone : 858-521-3352
Tele-fax : 858-521-3105
e-mail : kevin.wolentarski@siemens.com

1.4 Application details

Date of receipt test item : 2005-04-20
Date of test : 2005-04-20/22/25/28

1.5 Test item

Manufacturer : SIEMENS Communications, Inc.
Street Address : Sudstr. 9
City / Zip Code : D-47475 Kamp-Lintfort
Country : Germany
Marketing Name : CX75
Model No. : **CX75**
Description : GSM 1900 Mobile phone with BT
FCC-ID : PWX-CX75
IC ID : 267E-CX75

Additional information

Test Sample : IMEI: 00-4400-00-996575-5
Frequency : 2402MHz – 2480MHz for BT
Type of modulation : GFSK
Number of channels : 79
Antenna : External
Power supply : Battery or Charger (AC Adaptor)
Output power : 4.58dBm (2.87mW) max. conducted peak power
Extreme vol. Limits : 3.6VDC to 4.5VDC (nominal: 3.7VDC)
Extreme temp. Tolerance : -30°C to +50°C

1.6 Test standards: FCC Part 15 §15.247 (DA00-705) / RSS 210

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2 Technical test**2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests
Performed

Final Verdict:
(only “passed” if all single measurements are “passed”)

Passed

Technical responsibility for area of testing:

2005-05-13 EMC & Radio Lothar Schmidt (Manager)



Date

Section

Name

Signature

Responsible for test report and project leader:

2005-05-13 EMC & Radio Harpreet Sidhu (EMC Engineer)



Date

Section

Name

Signature

2.2 Test report

TEST REPORT

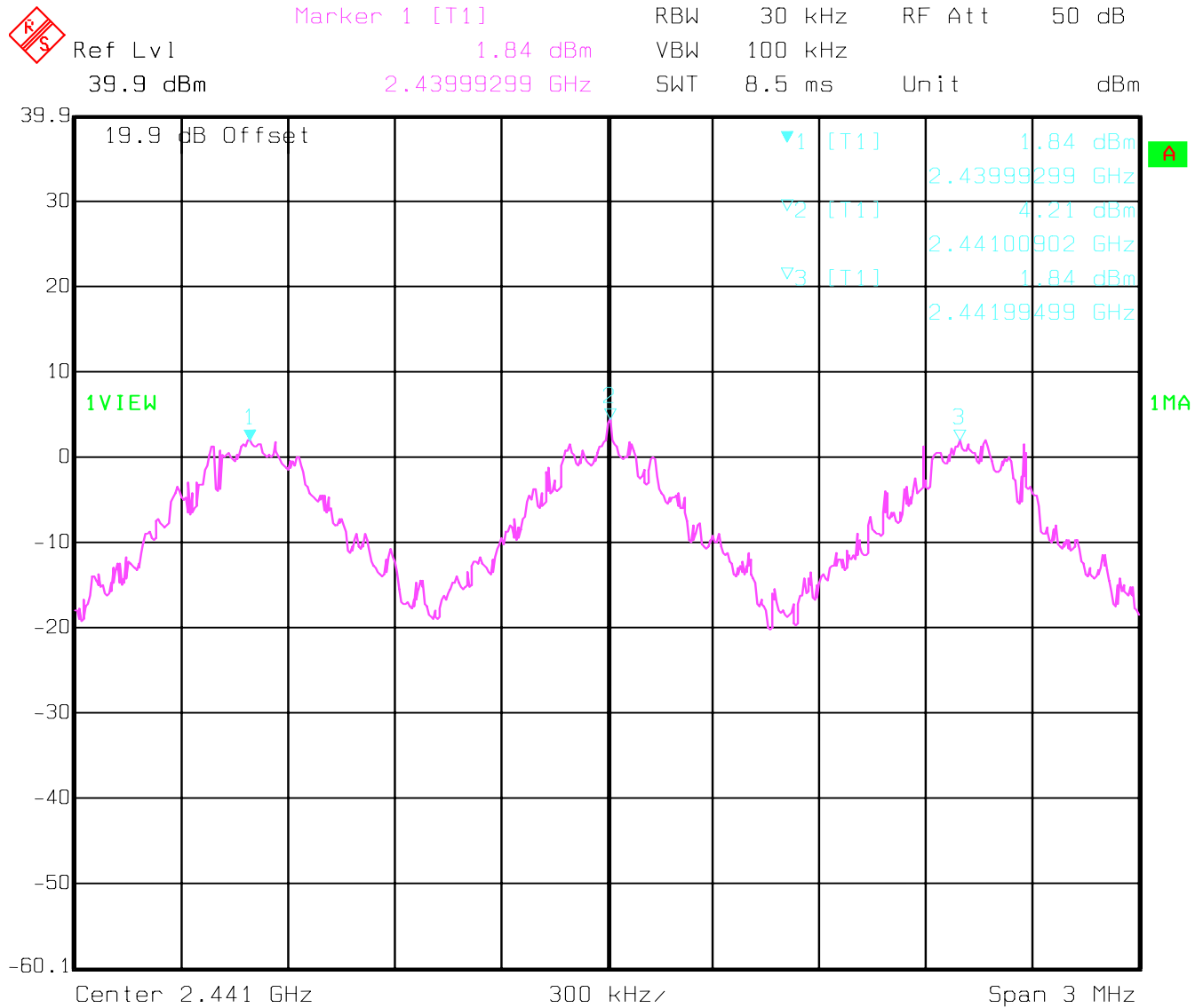
Test report no.: EMC_905FCC15.247_2005_CX75

TEST REPORT REFERENCE

LIST OF MEASUREMENTS	PAGE
CARRIER FREQUENCY SEPERATION §15.247(a)	7
NUMBER OF HOPPING CHANNELS §15.247(a)	8
TIME OF OCCUPANCY (DWELL TIME) §15.247(a)	12
SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(a)	15
MAXIMUM PEAK OUTPUT POWER (CONDUCTED) § 15.247 (b) (1)	19
MAXIMUM PEAK OUTPUT POWER (RADIATED) § 15.247 (b) (1)	23
BAND EDGE COMPLIANCE §15.247 (c)	27
EMISSION LIMITATIONS Transmitter (Conducted) § 15.247 (c) (1)	31
EMISSION LIMITATIONS Transmitter (Radiated) § 15.247 (c) (1)	35
CO-LOCATION – (Radiated) Transmitter	46
CONDUCTED EMISSIONS § 15.107/207	51
RECEIVER SPURIOUS RADIATION § 15.209	53
TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS	59
BLOCK DIAGRAMS	60

CARRIER FREQUENCY SEPERATION

§15.247(a)



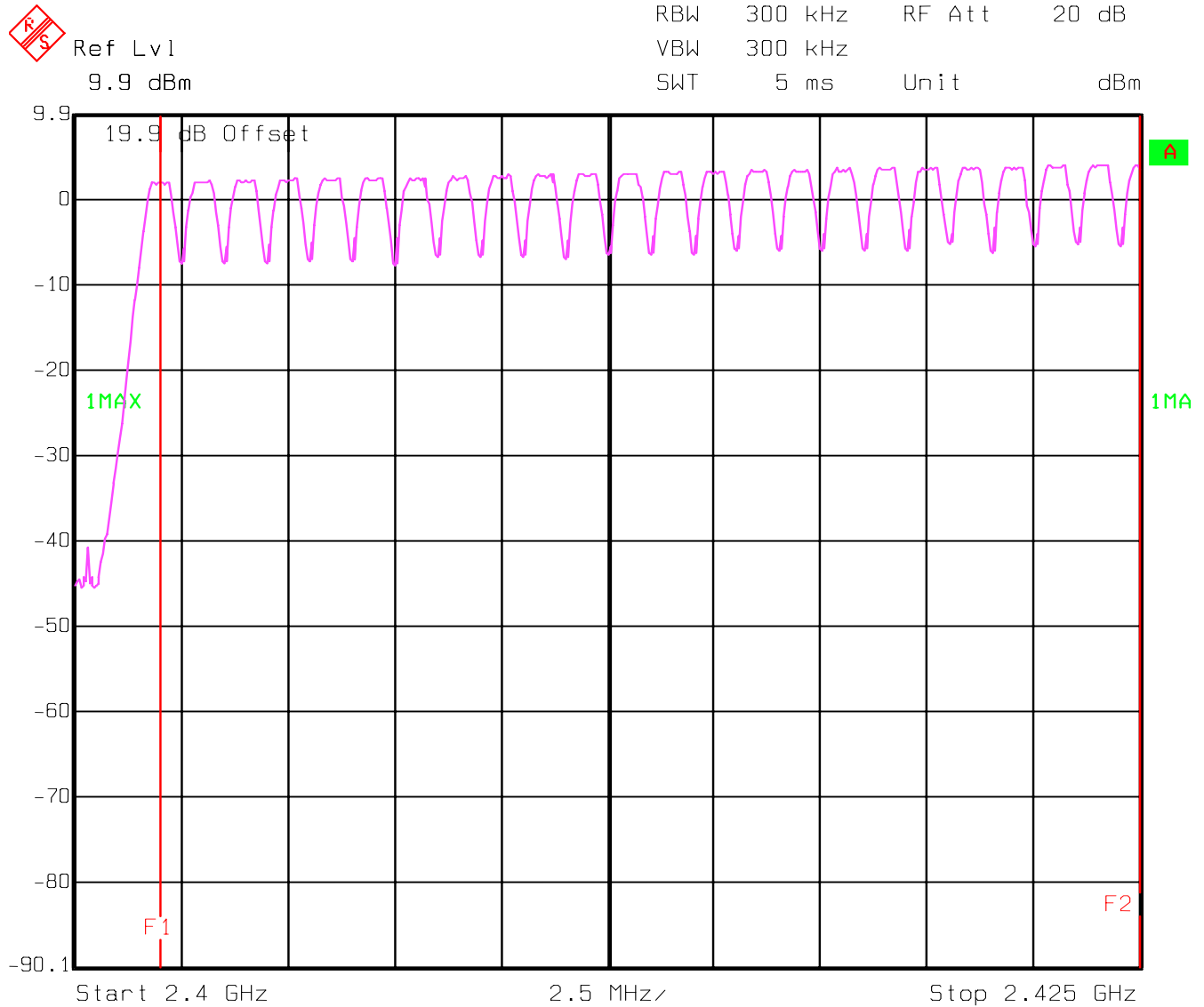
Date: 10.MAY 2005 13:40:58

NUMBER OF HOPPING CHANNELS

§15.247(a)

The number of hopping channels is 79 (see next 4 plots)
The F1 line corresponds to the F2 line from the next plot.

Plot 1: Total 24



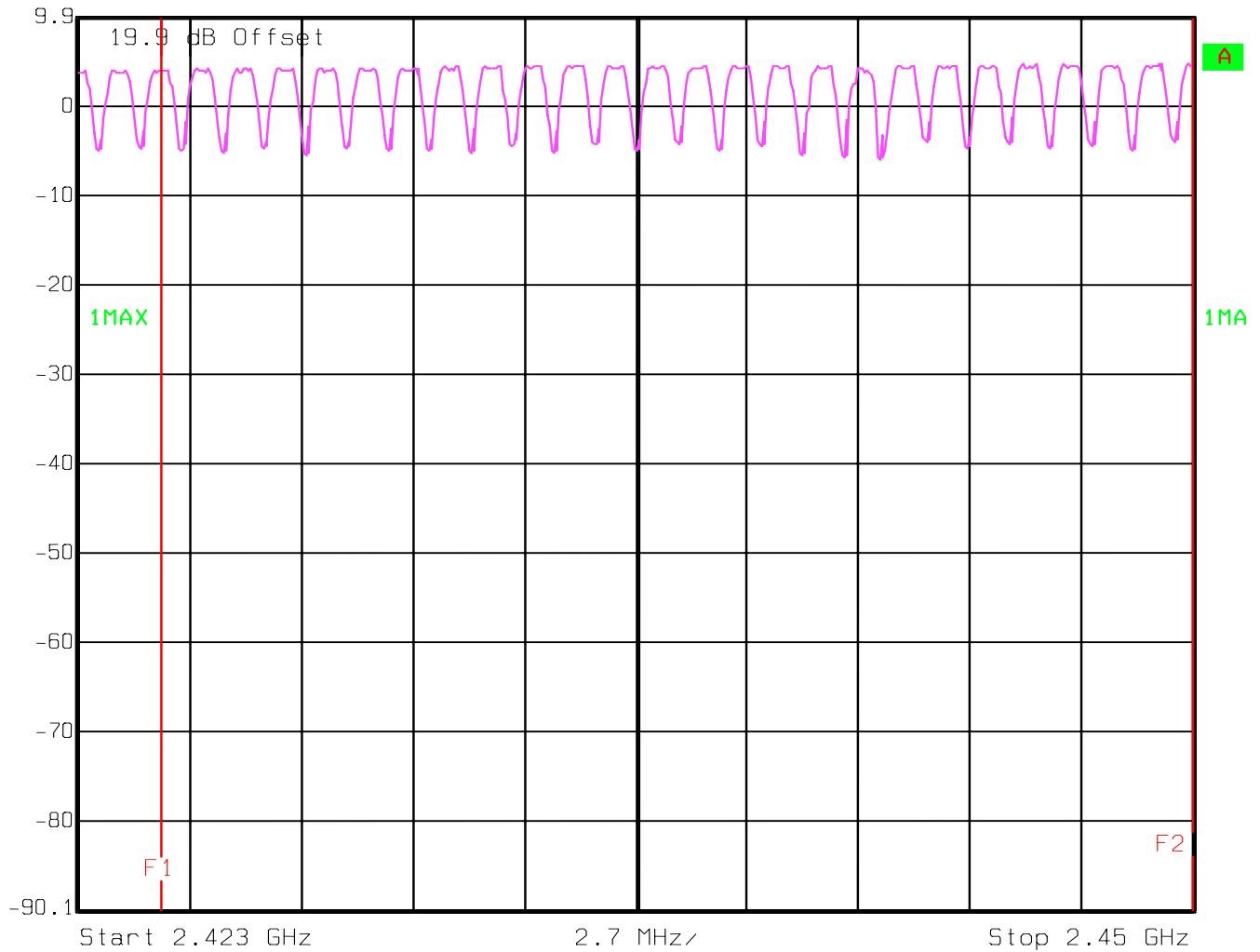
Date: 10.MAY 2005 13:43:32

Plot 2: Total 25



Ref Lvl
9.9 dBm

RBW 300 kHz RF Att 20 dB
VBW 300 kHz
SWT 5 ms Unit dBm



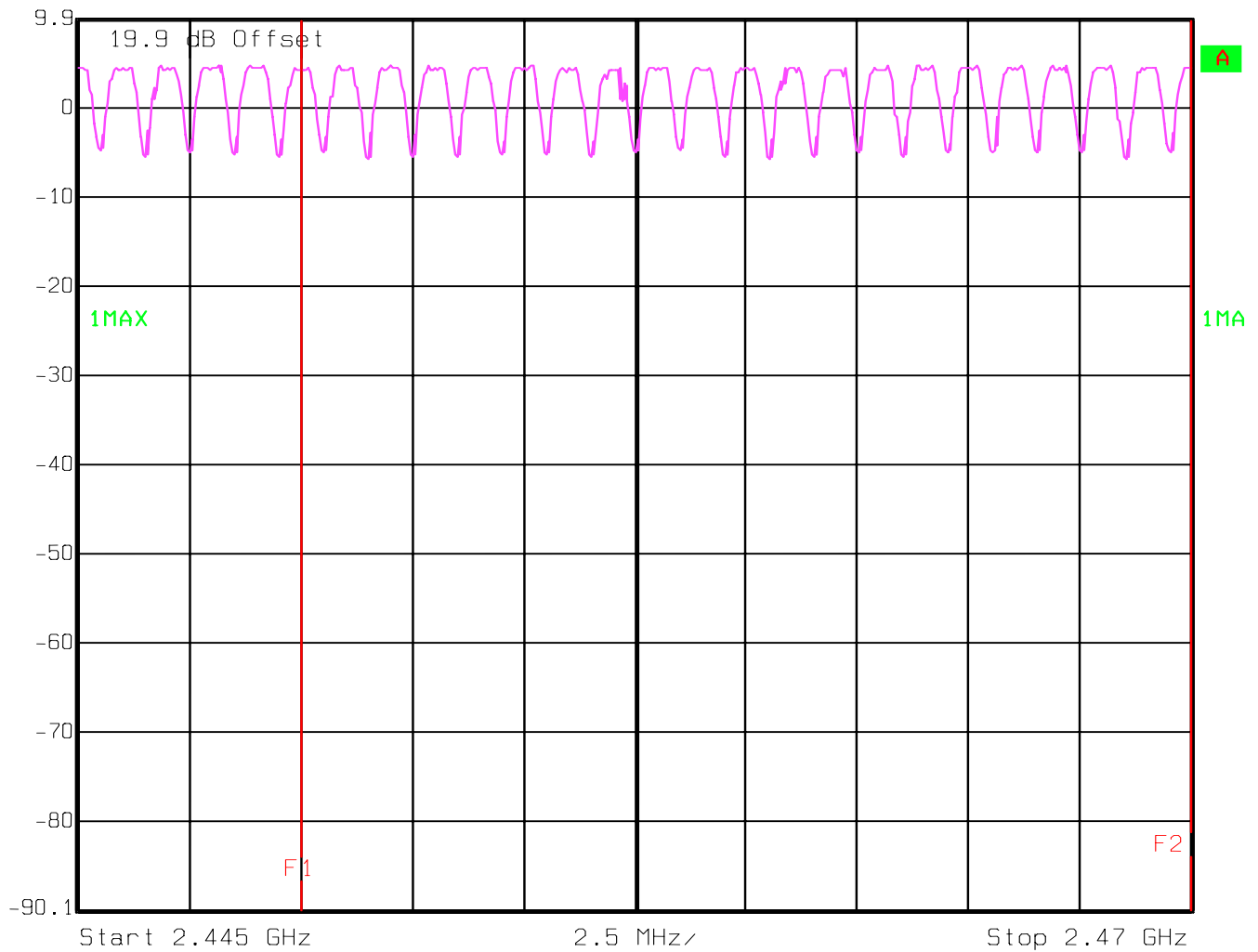
Date: 10.MAY 2005 13:44:49

Plot 3: Total 20



Ref Lvl
9.9 dBm

RBW 300 kHz RF Att 20 dB
VBW 300 kHz
SWT 5 ms Unit dBm



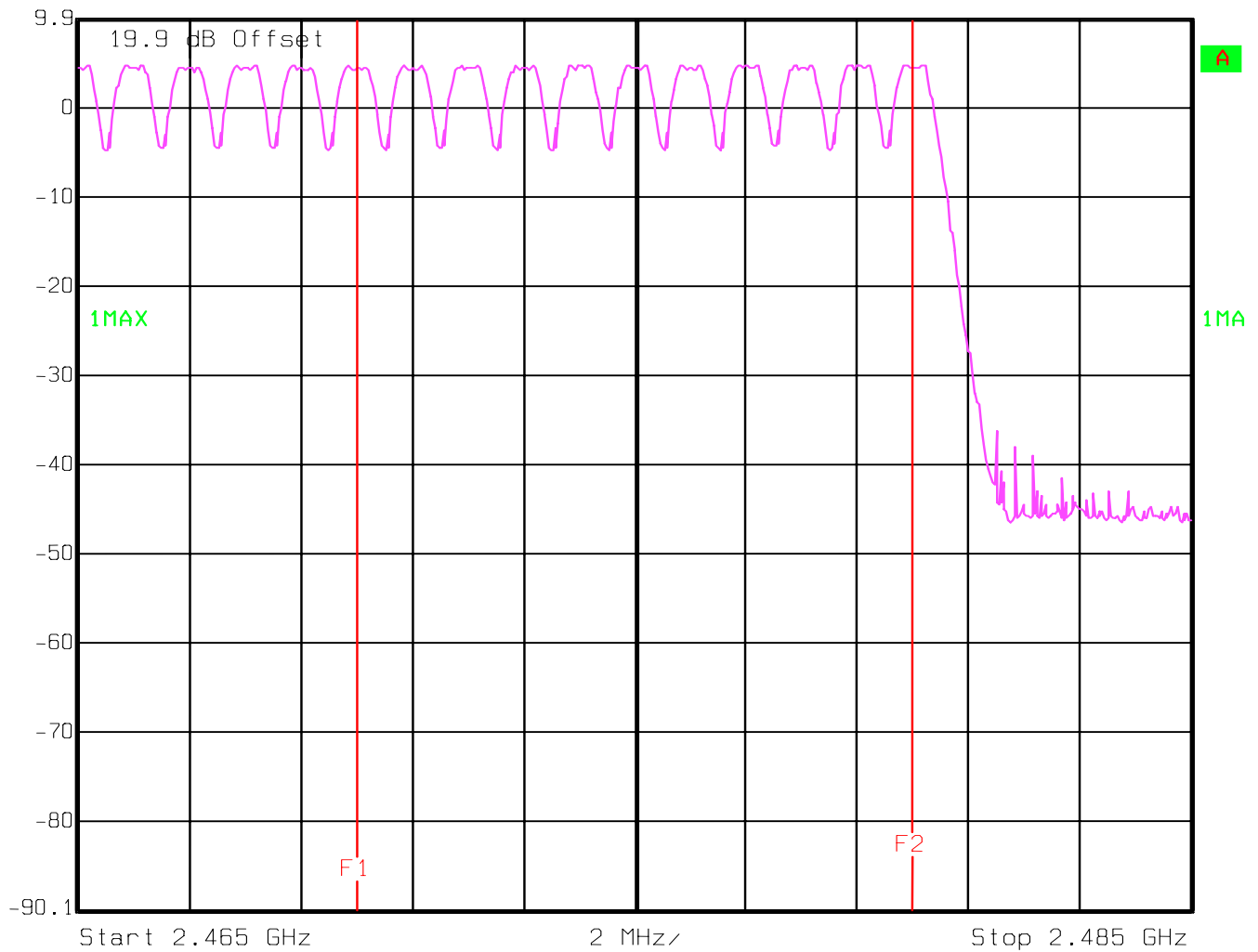
Date: 10.MAY 2005 13:45:51

Plot 4: Total 10



Ref Lvl
9.9 dBm

RBW 300 kHz RF Att 20 dB
VBW 300 kHz
SWT 5 ms Unit dBm



Date: 10.MAY 2005 13:47:06

TIME OF OCCUPANCY (DWEELL TIME)

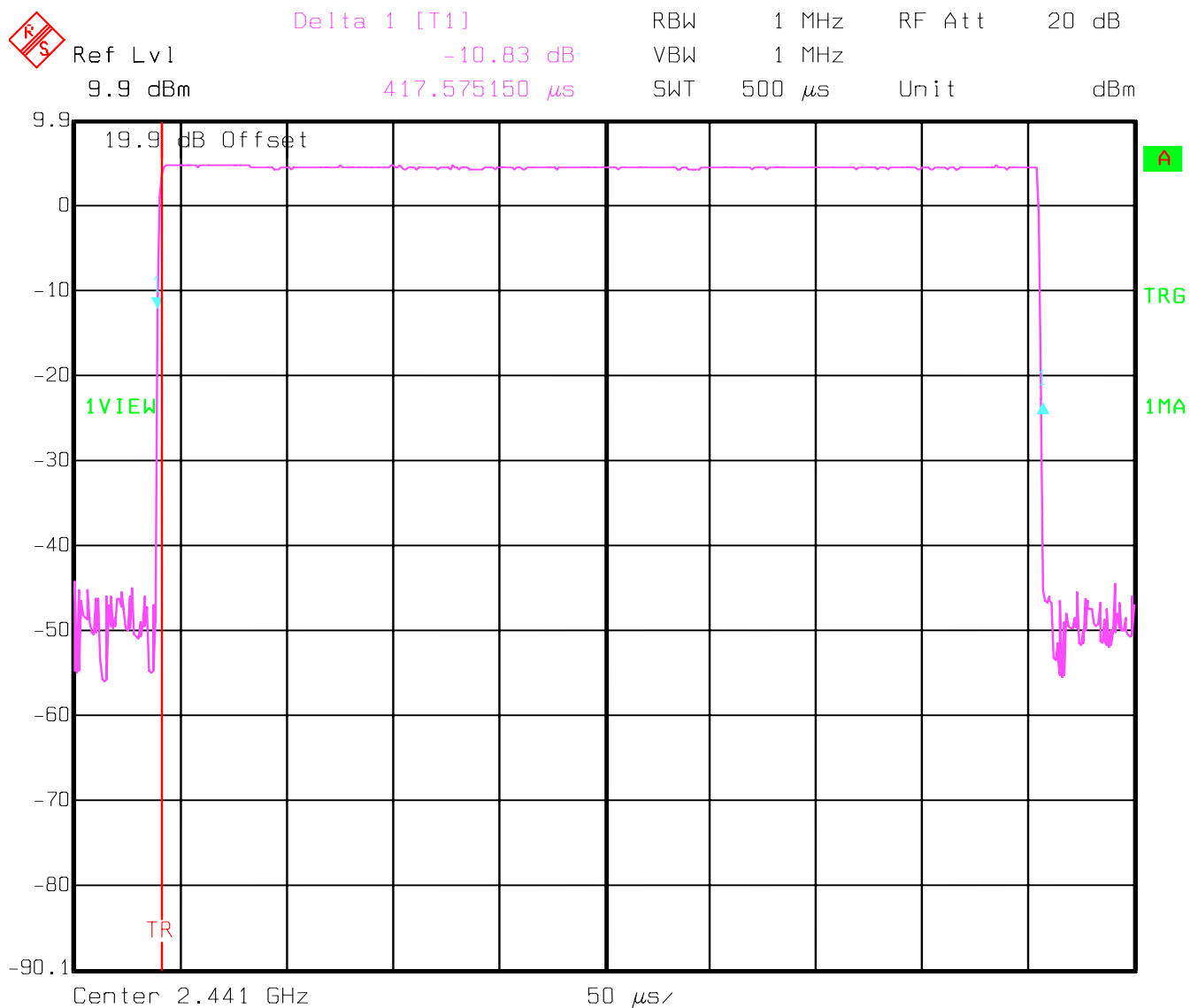
§15.247(a)

DH1 – Packet

The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 times per second and so for 31.6 seconds you have 320.108 times of appearance.

Each Tx-time per appearance is 417.57µs.

So we have $320.108 * 417.574\mu s = 133.6ms$ per 31.6 seconds.



Date: 10.MAY 2005 13:54:03

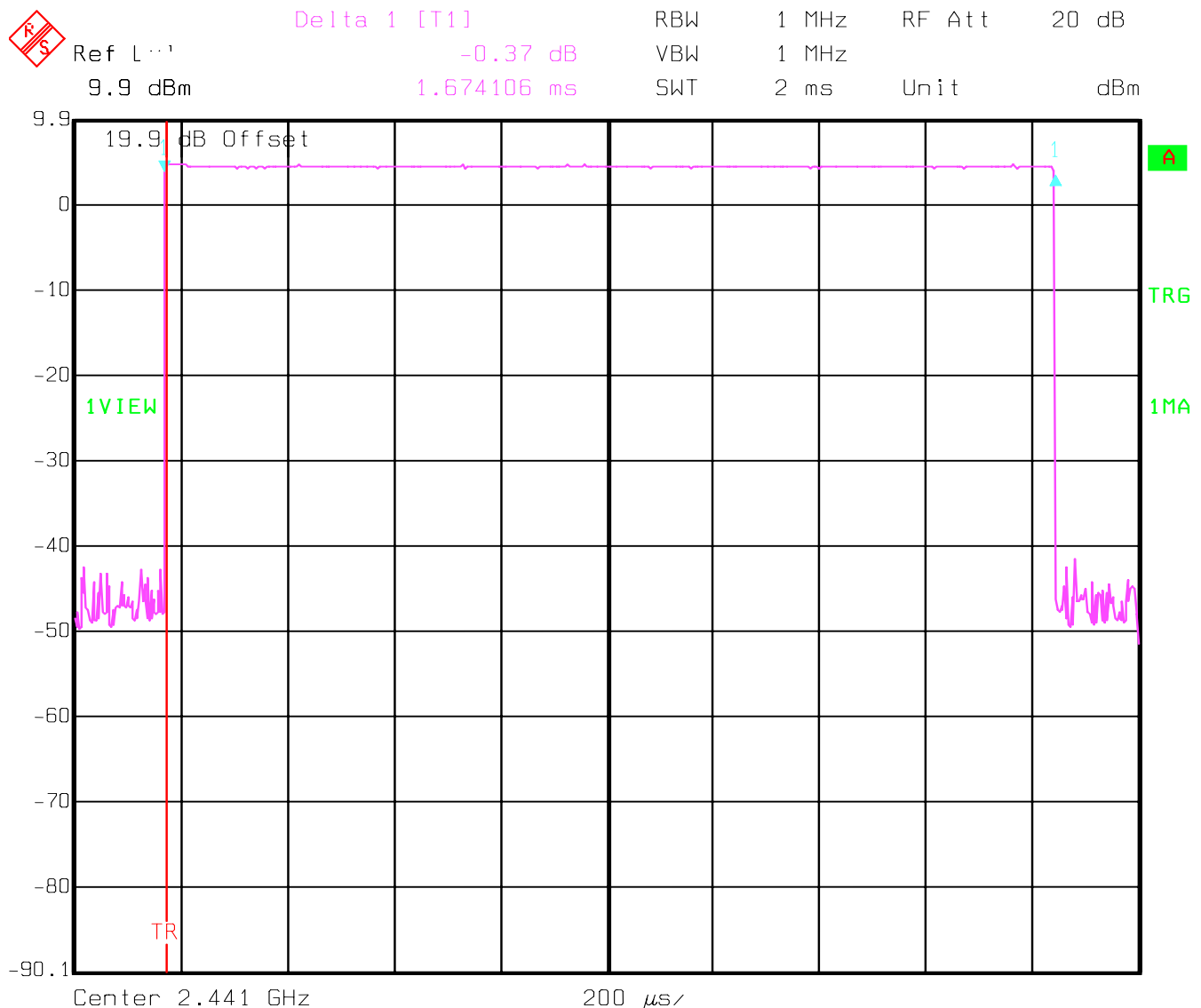
TIME OF OCCUPANCY (DWELL TIME) DH3 – Packet

§15.247(a)

A DH3 Packets need 3 time slots for transmit and 1 for receiving, then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 times per second and so for 31.6 seconds you have 161.16 times of appearance.

Each Tx-time per appearance is 1.674ms.

So we have $161.16 * 1.674\text{ms} = 269.79\text{ms}$ per 31.6 seconds.



Date: 10.MAY 2005 13:52:33

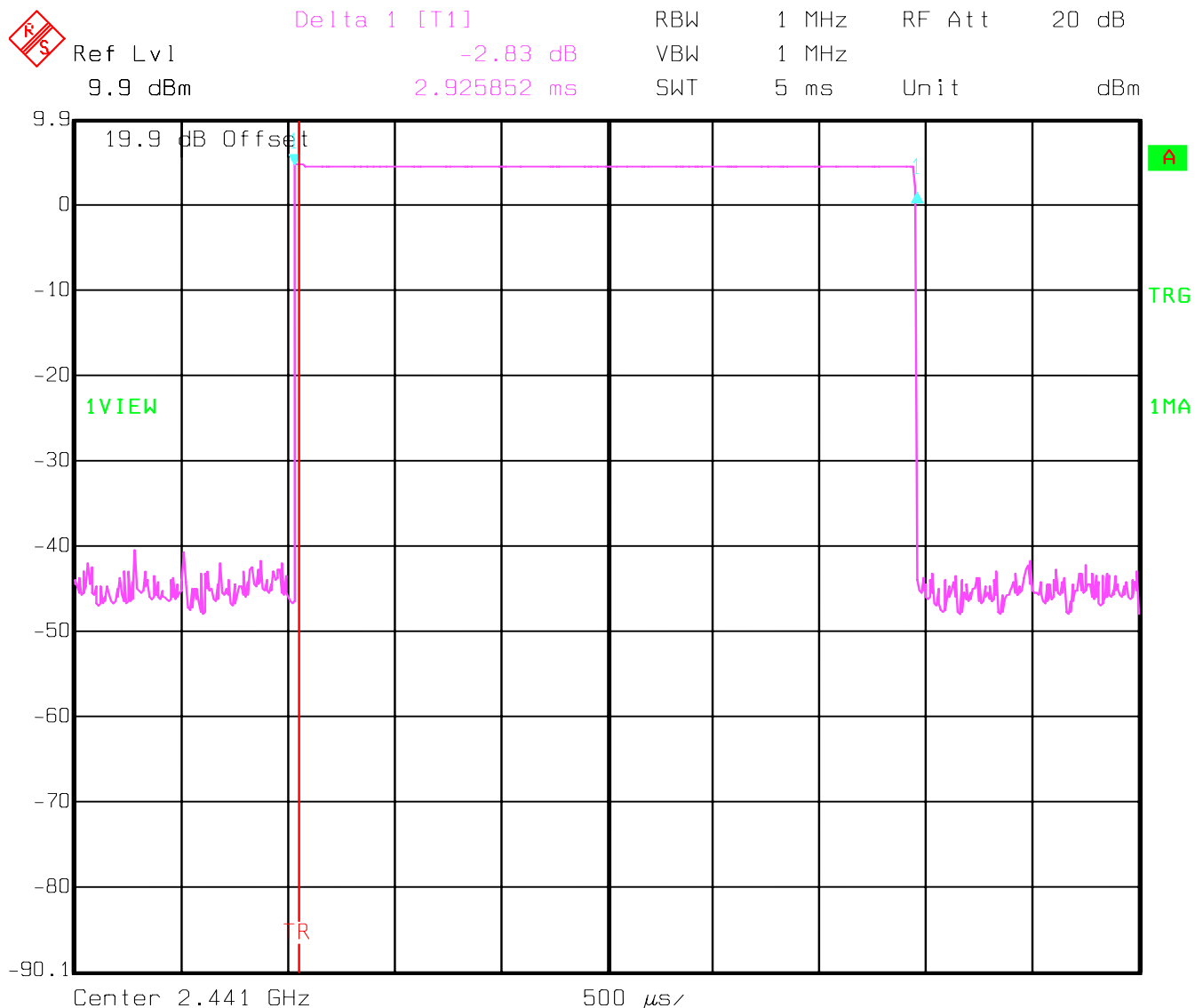
TIME OF OCCUPANCY (DWELL TIME) DH5 – Packet

§15.247(a)

At DH5 Packets you need 5 time slots for transmit and 1 for receiving, then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.36 times per second and so for 30 seconds you have 106.176 times of appearance.

Each Tx-time per appearance is 2.925ms.

So we have $106.176 * 2.925\text{ms} = 310.65\text{ms}$ per 31.6 seconds.



Date: 10.MAY 2005 13:50:53

SPECTRUM BANDWIDTH OF FHSS SYSTEM
20 dB bandwidth**§15.247(a)**

TEST CONDITIONS		20 dB BANDWIDTH (kHz)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} (2.5)VDC	925.85	925.85	925.85

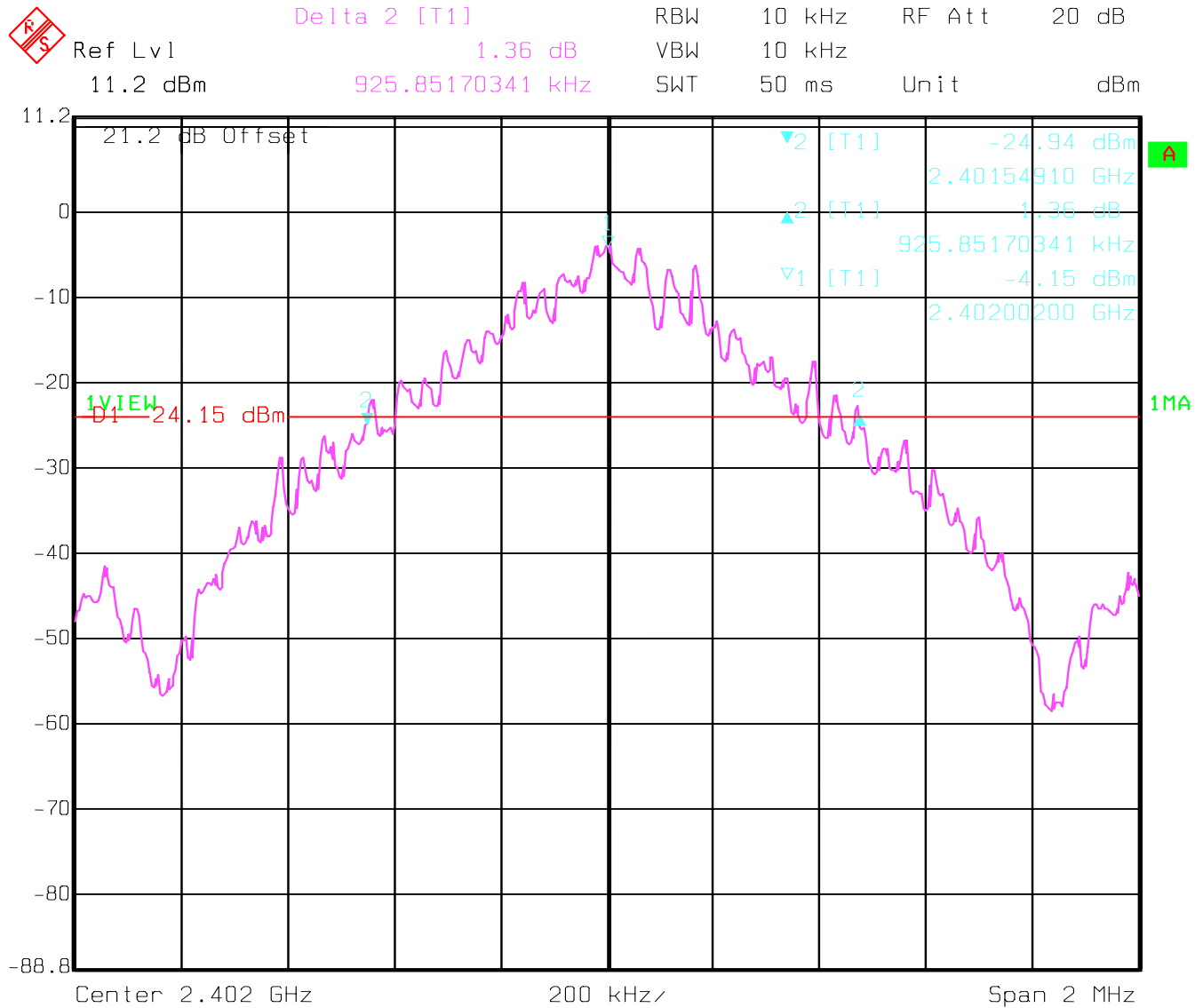
RBW / VBW as provided in the "Measurement Guidelines" (DA 00-705, March 30, 2000)

LIMIT**SUBCLAUSE §15.247(a) (1)****The maximum 20dB bandwidth shall be at maximum 1000 KHz**

SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Lowest Channel: 2402MHz

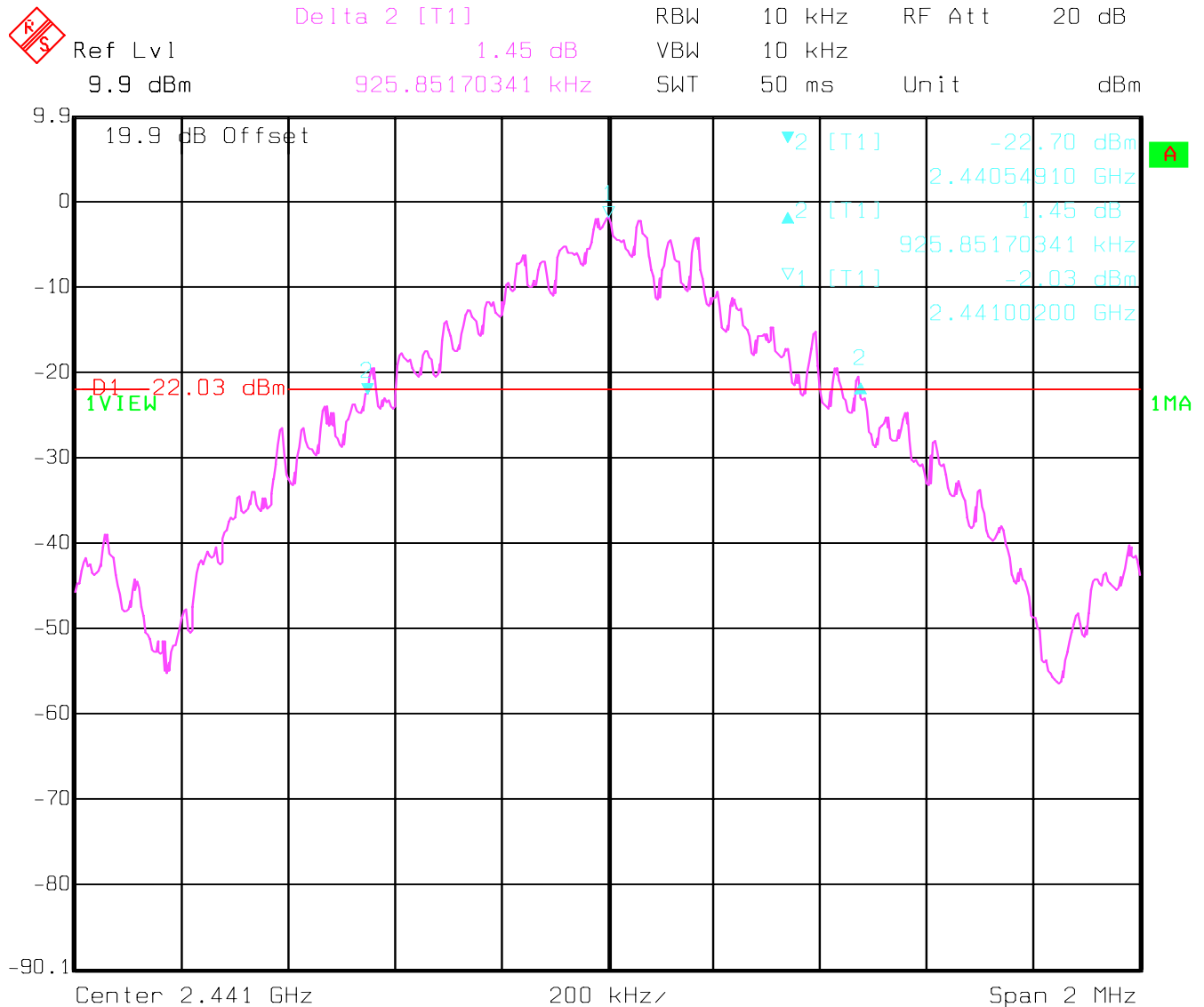


Date: 06.MAY 2005 12:30:34

SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Mid Channel: 2441MHz

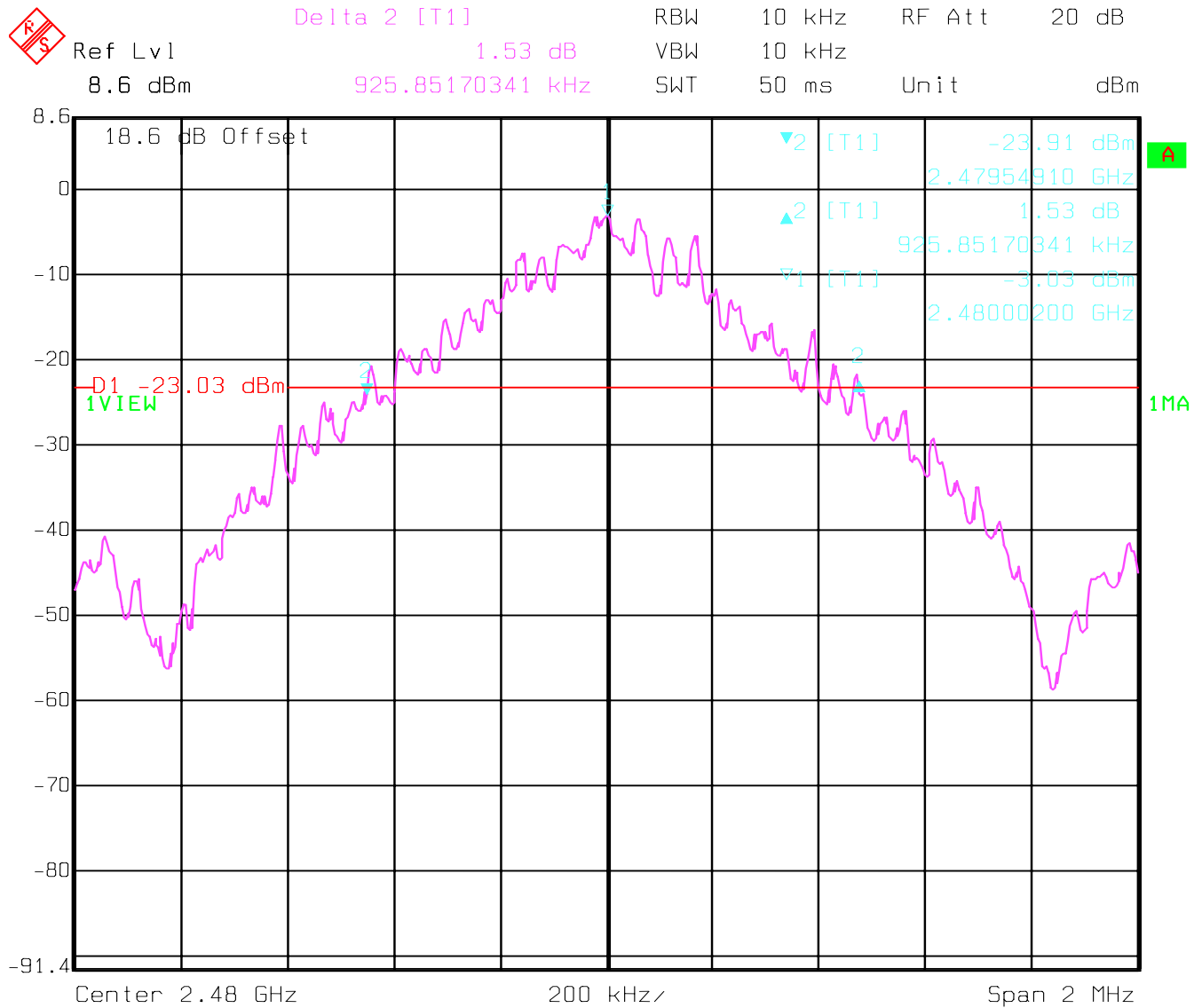


Date: 06.MAY 2005 12:32:32

SPECTRUM BANDWIDTH OF FHSS SYSTEM 20 dB bandwidth

§15.247(a)

Highest Channel: 2480MHz



Date: 06.MAY 2005 12:34:18

MAXIMUM PEAK OUTPUT POWER (CONDUCTED)**§ 15.247 (b) (1)**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} (2.5)VDC	2.64	4.58	3.62
Measurement uncertainty		±0.5dBm		

RBW / VBW: 3 MHz

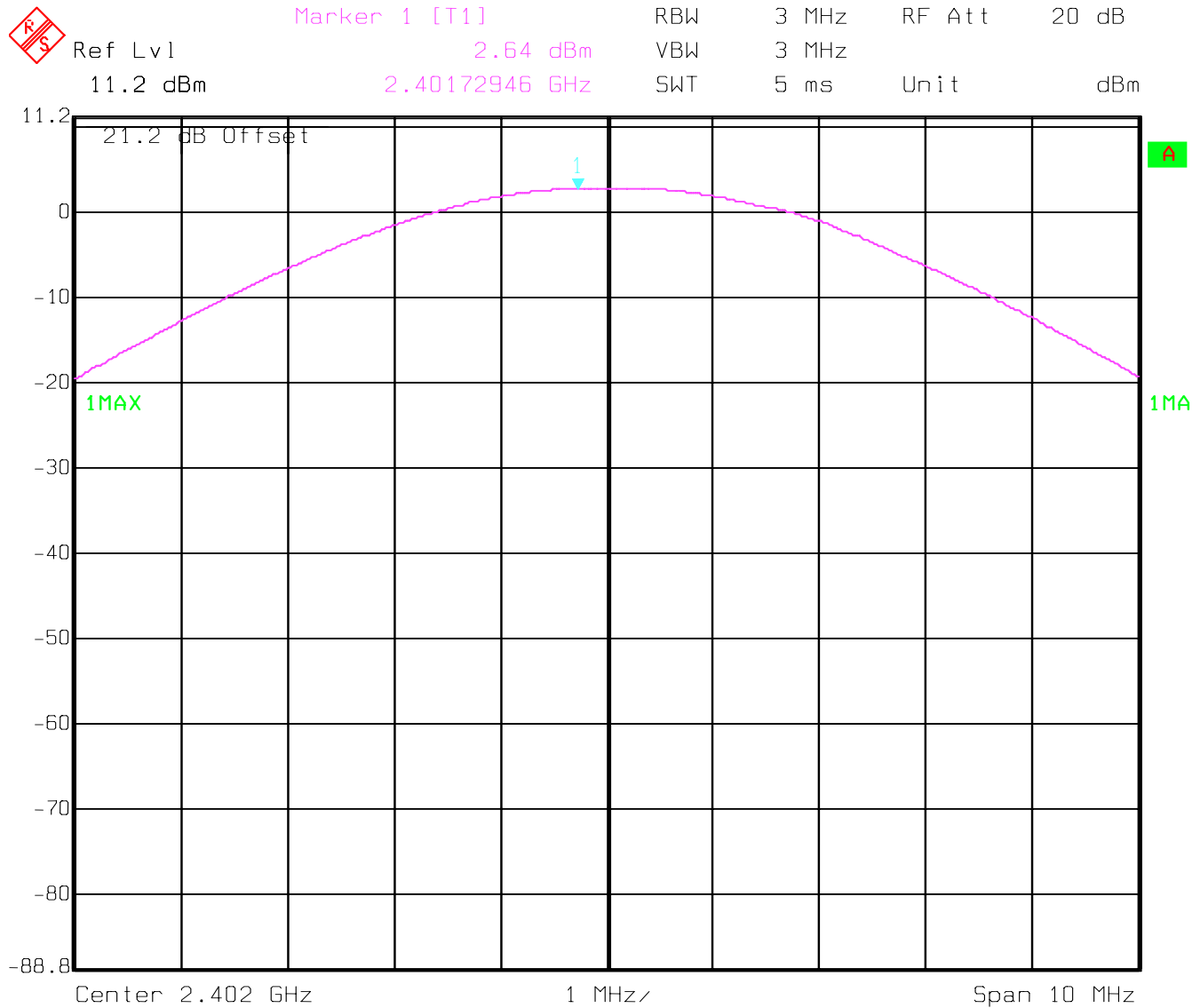
LIMIT**SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Lowest Channel: 2402MHz

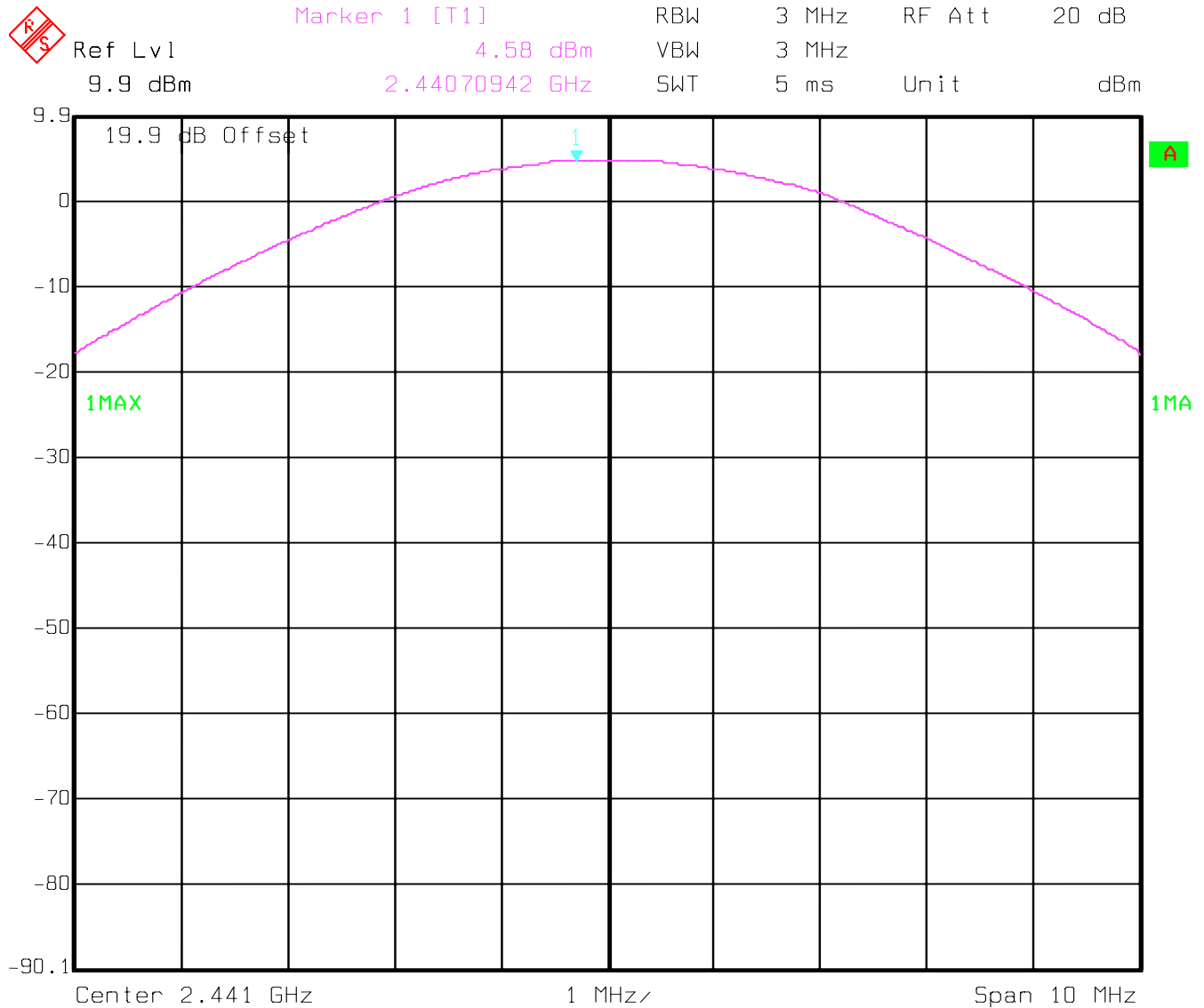


Date: 06.MAY 2005 12:25:30

PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Mid Channel: 2441MHz

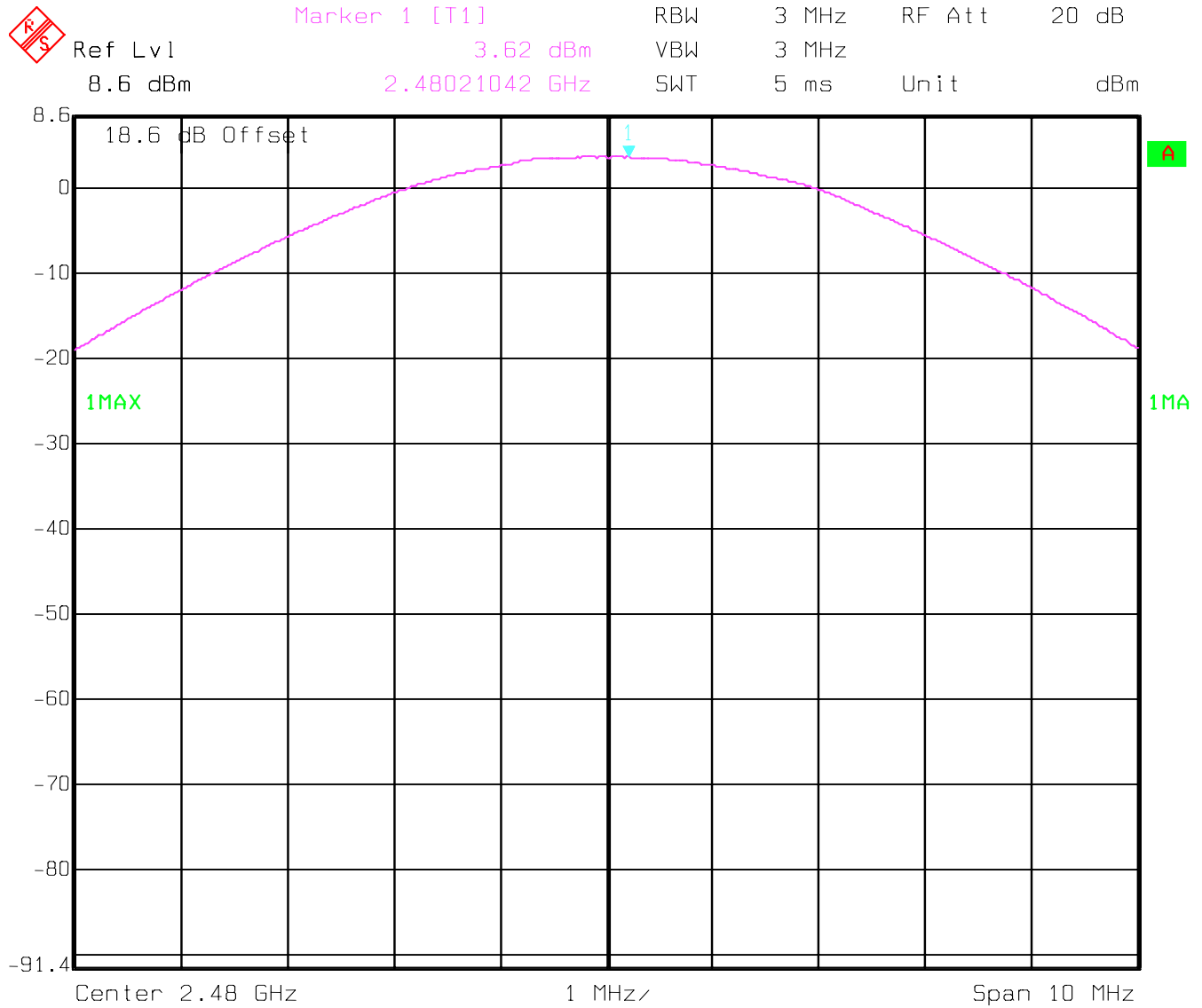


Date: 06.MAY 2005 12:26:39

PEAK OUTPUT POWER (CONDUCTED)

§15.247 (b)

Highest Channel: 2480MHz



Date: 06.MAY 2005 12:27:17

MAXIMUM PEAK OUTPUT POWER (RADIATED)**§ 15.247 (b) (1)****EIRP:**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} (2.5)VDC	-4.62	-1.32	-2.18
Measurement uncertainty		±0.5dBm		
Substitution Method				

RBW/VBW: 3 MHz

LIMIT**SUBCLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	1.0 Watt

PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

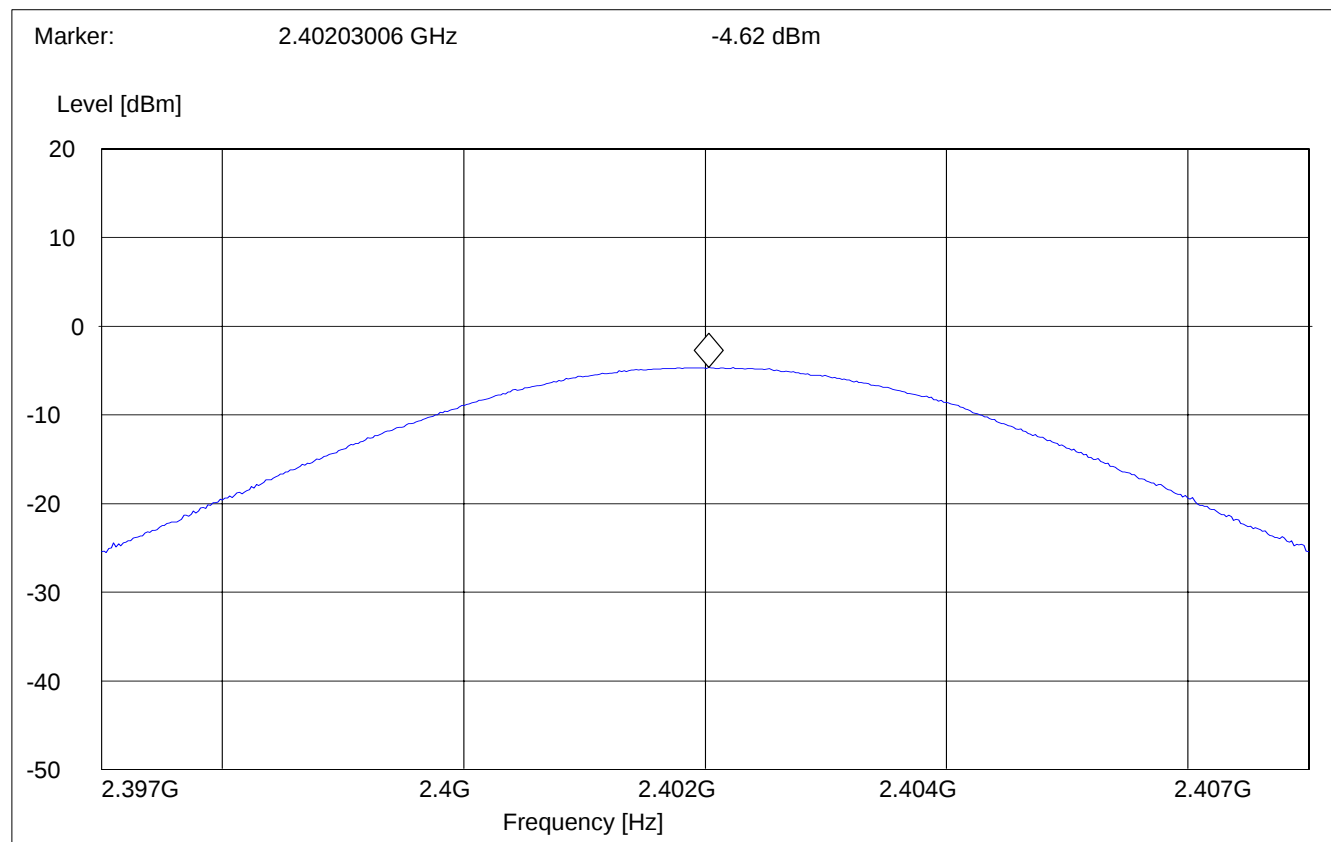
Lowest Channel: 2402MHz

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2402 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: EIRP

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.397GHz	2.407GHz	Max Peak	Coupled	3 MHz



PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

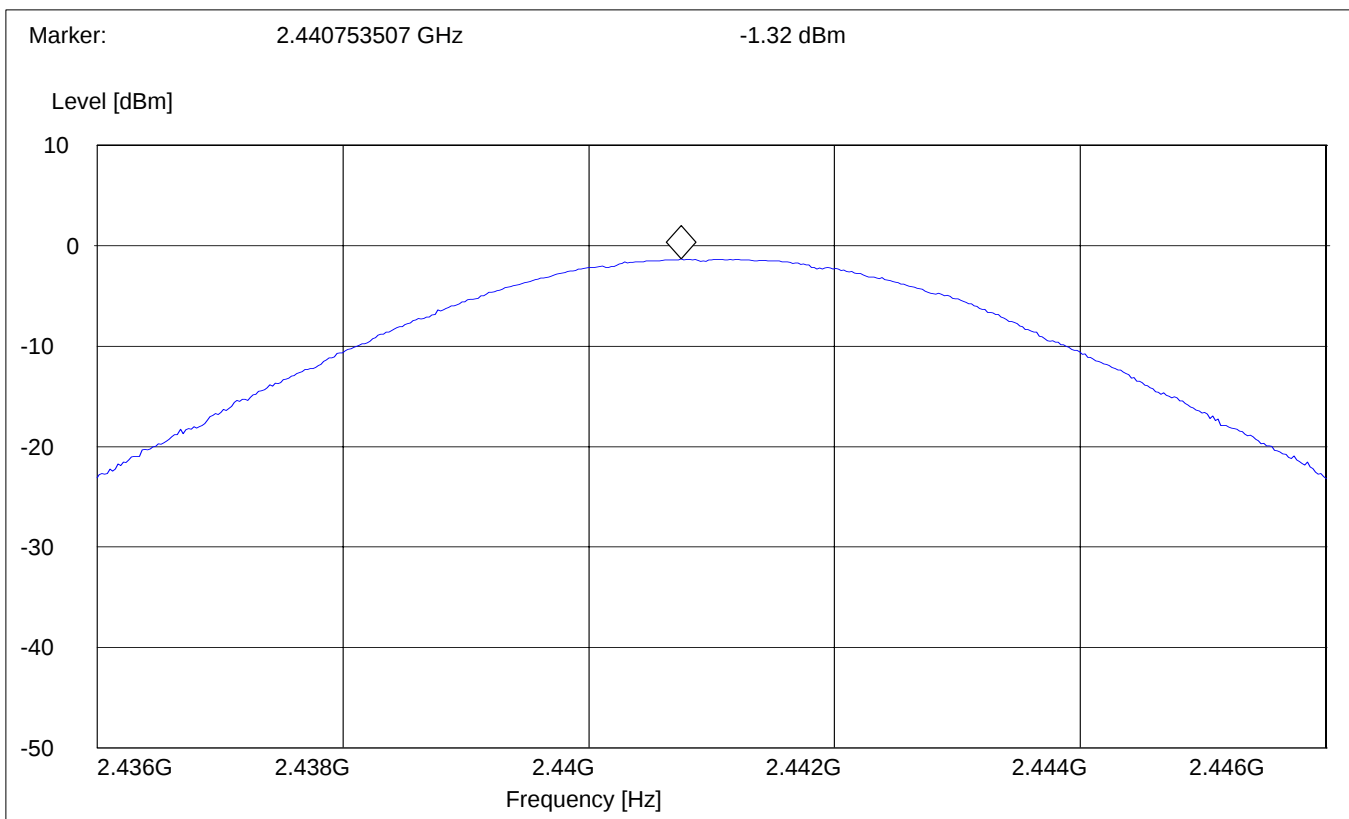
Mid Channel: 2441MHz

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2441 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: EIRP

SWEEP TABLE: "EIRP BT Mid channel"

Short Description: EIRP Bluetooth channel-2441MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.436GHz	2.446GHz	Max Peak	Coupled	3 MHz



PEAK OUTPUT POWER (RADIATED)

§15.247 (b) (1)

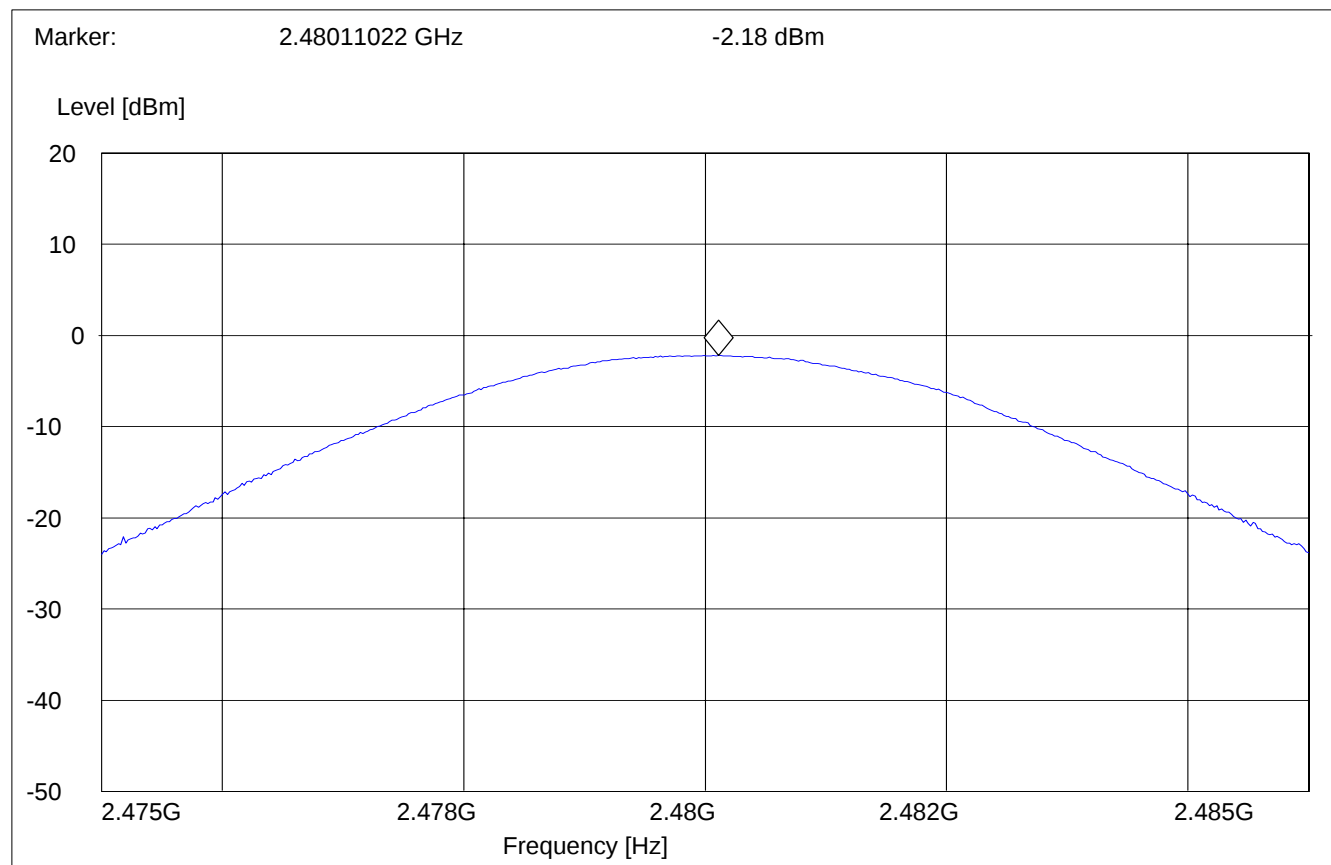
Highest Channel: 2480MHz

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: EIRP

SWEEP TABLE: "EIRP BT High channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2.475GHz	2.485GHz	Max Peak	Coupled	3 MHz



BAND EDGE COMPLIANCE

§15.247 (c)

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

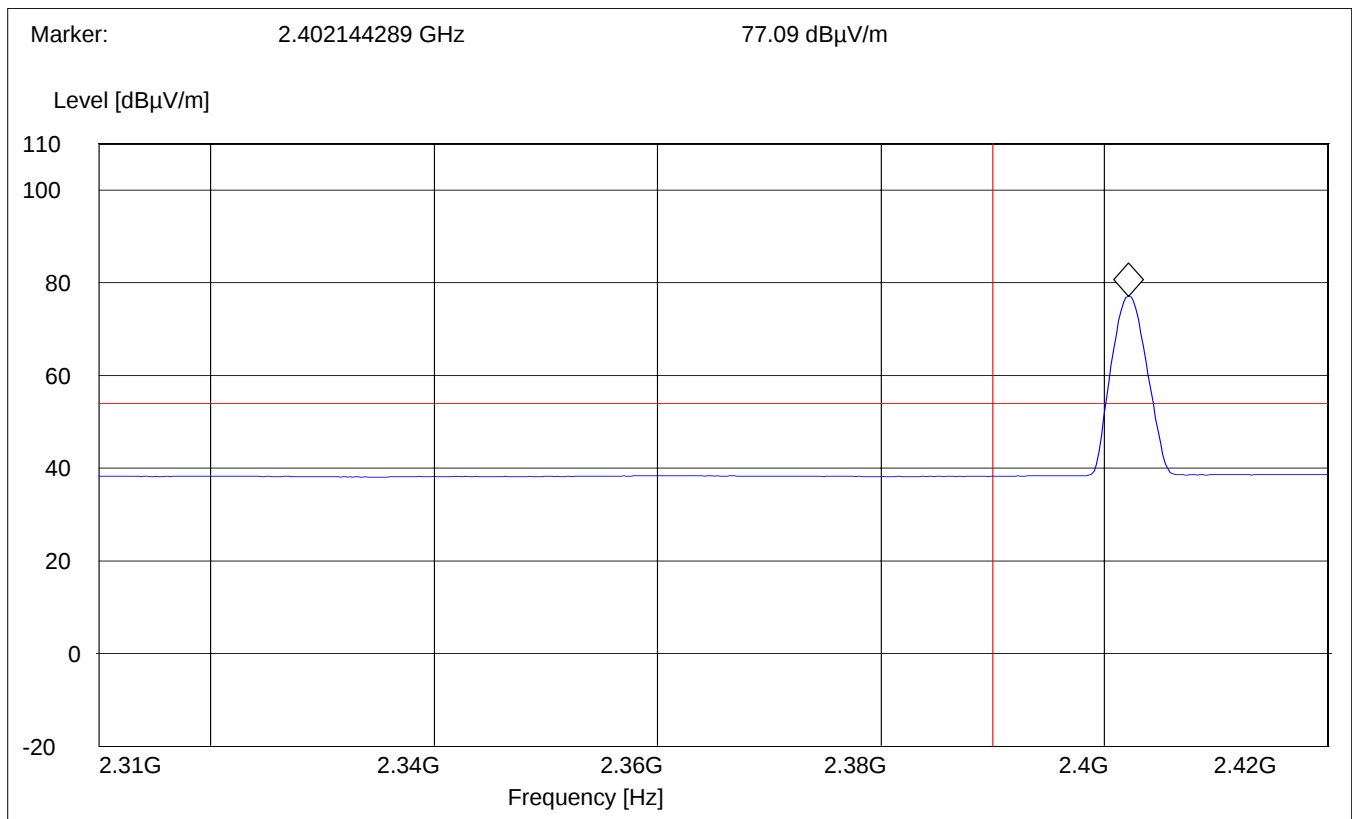
Average Measurement

(This plot is valid for both Hopping ON & OFF)

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2402 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: REST. BANDEDGE AVG

SWEEP TABLE: "FCC15.247 LBE_AVG"
Short Description: FCC15.247 BT Low-band-edge
Limit Line: 54dBμV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	Max Peak	Coupled	1 MHz	10 Hz	#326 horn (dBi)



BAND EDGE COMPLIANCE

§15.247 (c)

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

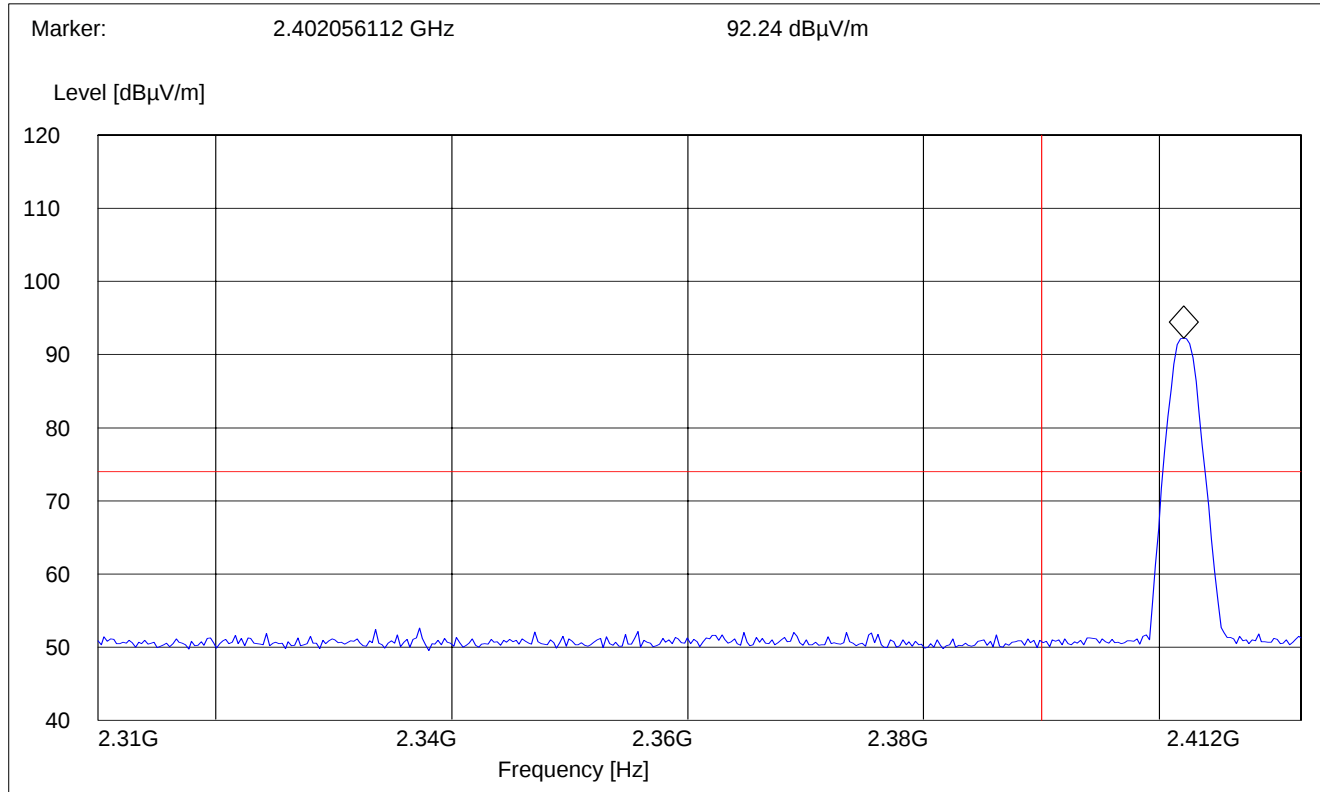
Peak Measurement

(This plot is valid for both Hopping ON & OFF)

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2402 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: REST. BANDEDGE PEAK

SWEEP TABLE: "FCC15.247 LBE_AVG"
Short Description: FCC15.247 BT Low-band-edge
Limit Line: 74dBμV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



BAND EDGE COMPLIANCE

§15.247 (c)

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

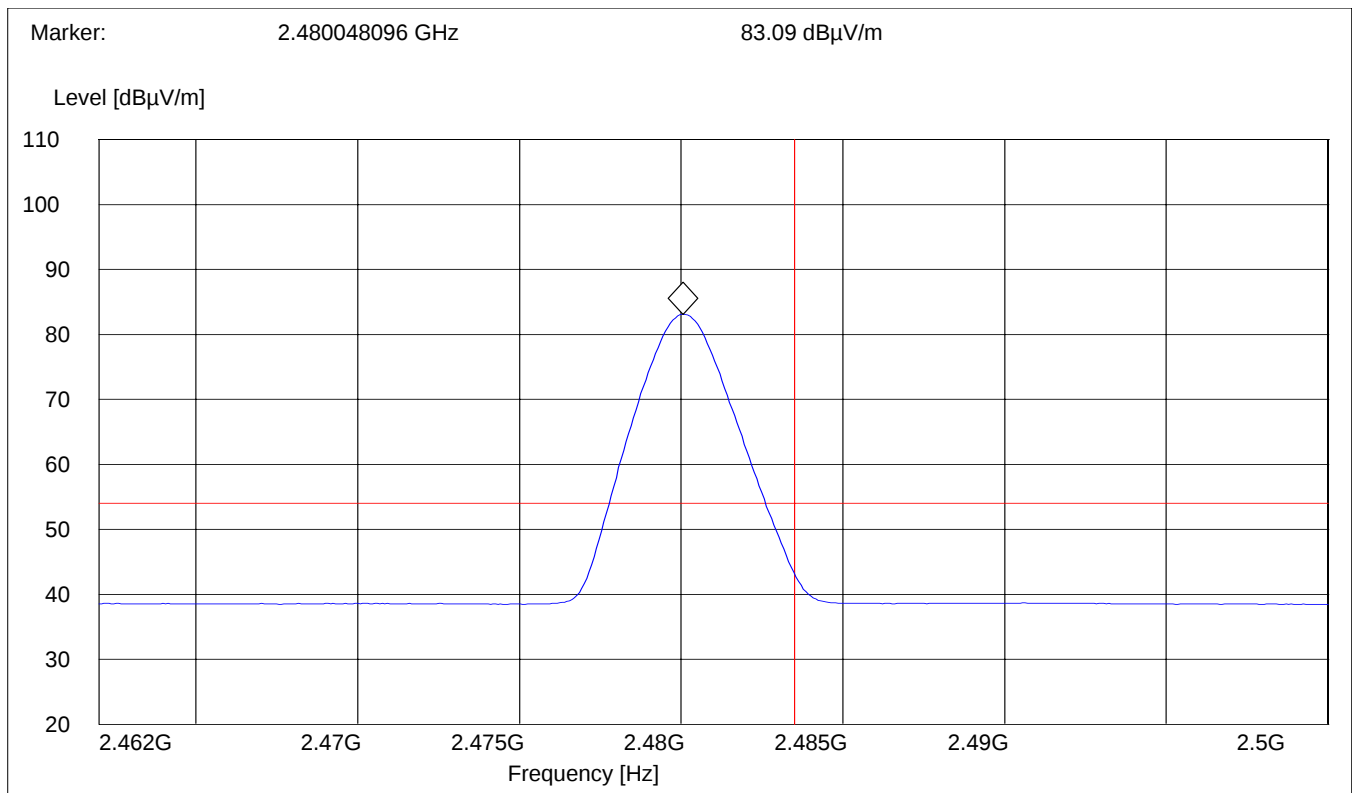
Average Measurement

(This plot is valid for both Hopping ON & OFF)

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: REST. BANDEDGE AVG

SWEEP TABLE: "FCC15.247 HBE_AVG"
Short Description: FCC15.247 BT High-band-edge
Limit Line: 54dBμV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	Max Peak	Coupled	1 MHz	10Hz	#326 horn (dBi)



BAND EDGE COMPLIANCE

§15.247 (c)

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

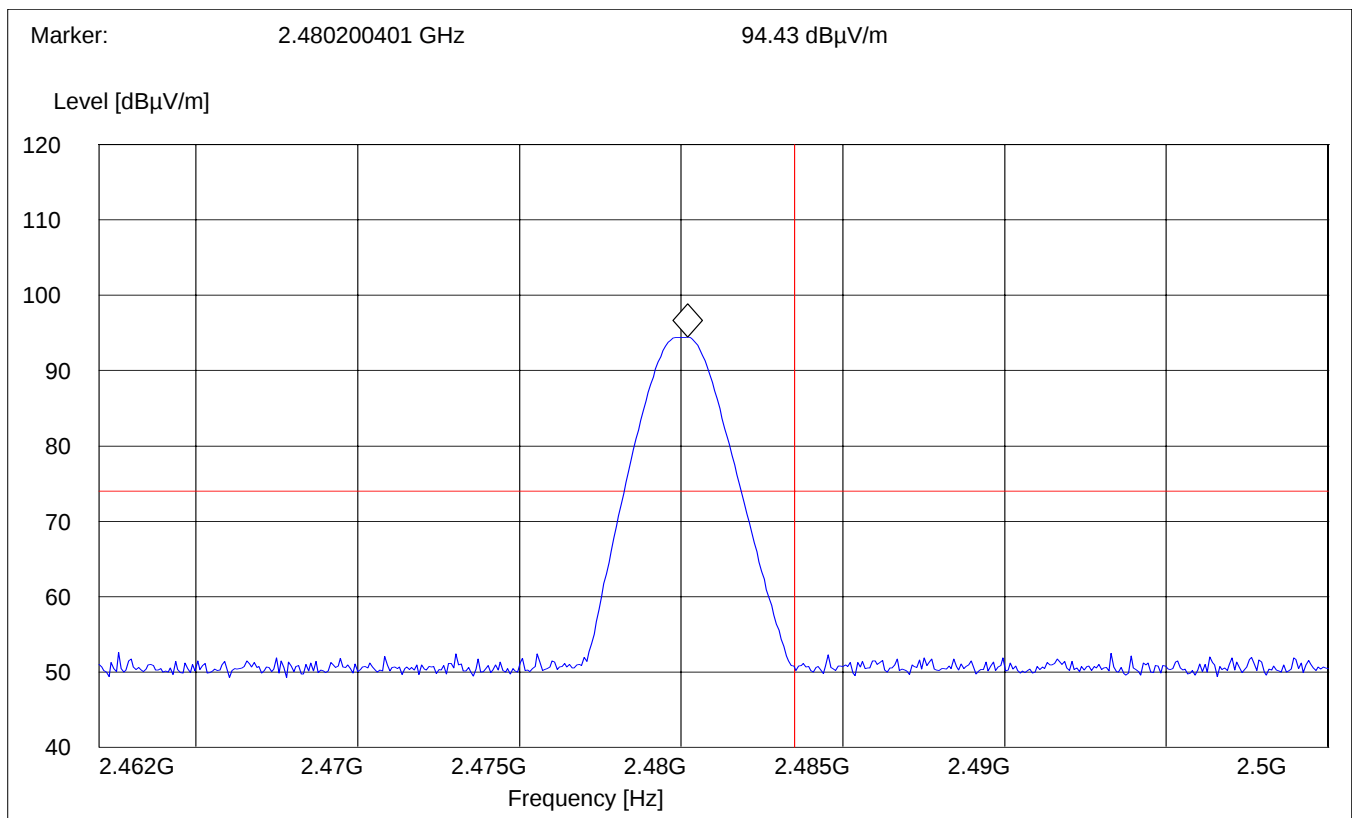
Peak Measurement

(This plot is valid for both Hopping ON & OFF)

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: REST. BANDEDGE PEAK

SWEEP TABLE: "FCC15.247 HBE_AVG"
Short Description: FCC15.247 BT High-band-edge
Limit Line: 74dBμV

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



**EMISSION LIMITATIONS Transmitter (Conducted)
LIMITS****§ 15.247 (c) (1)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

NOTE: Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

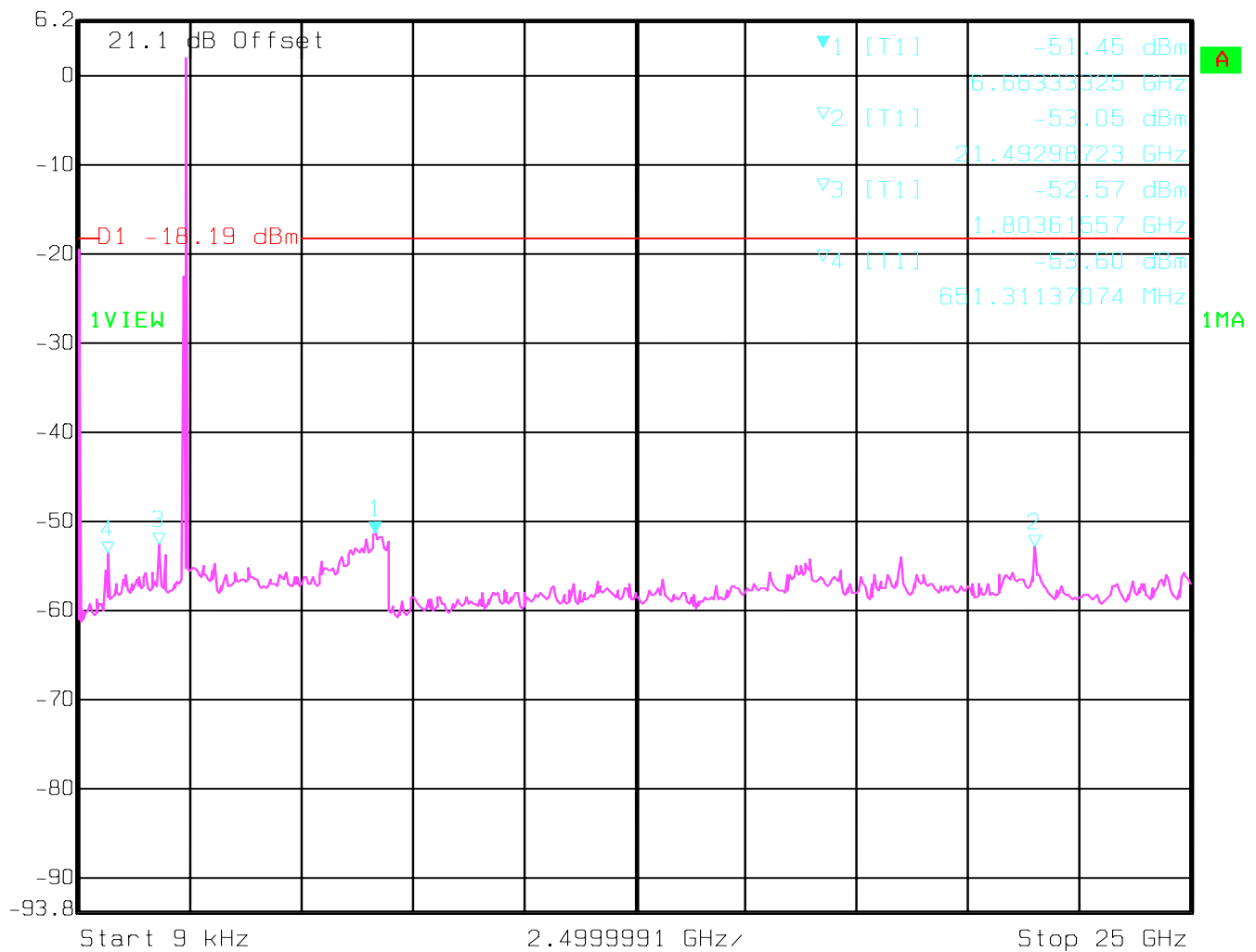
EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Lowest Channel (2402MHz): 9 KHz - 25GHz



Ref Lvl 6.2 dBm
 Marker 1 [T1] -51.45 dBm
 RBW 100 kHz RF Att 10 dB
 VBW 100 kHz
 6.66333325 GHz
 SWT 6.4 s Unit dBm

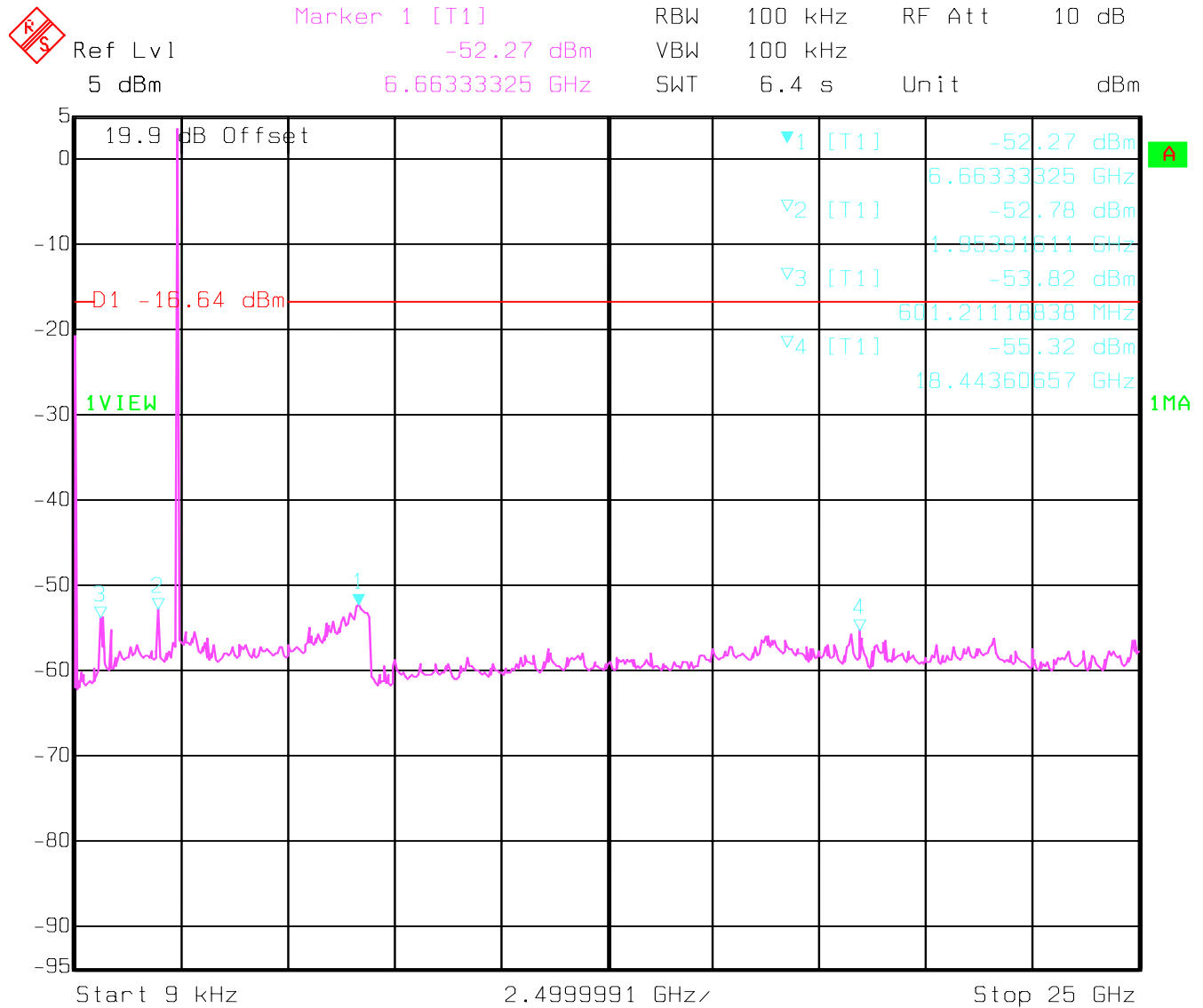


Date: 10.MAY 2005 14:10:26

EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Mid Channel (2441MHz): 9KHz - 25GHz

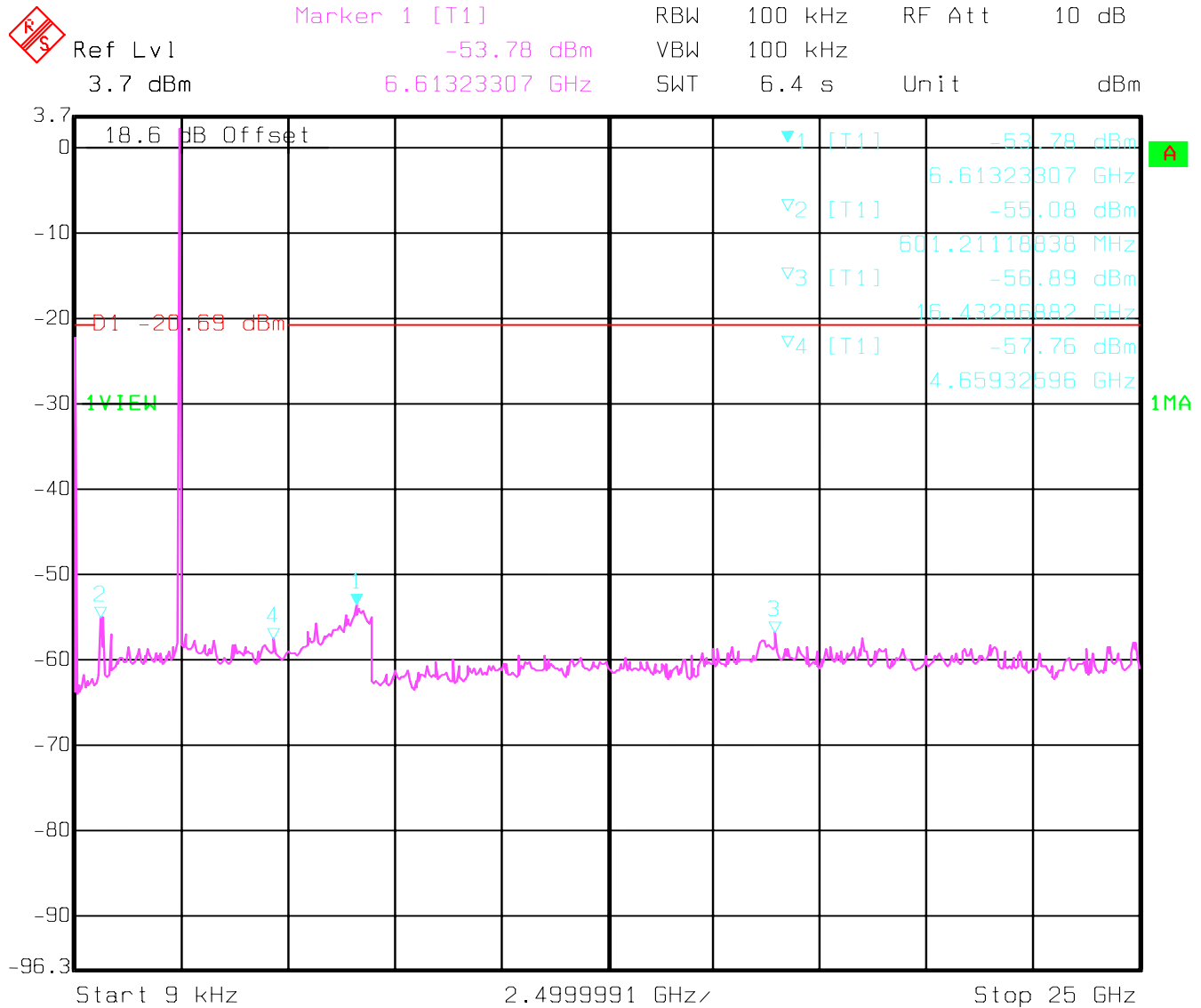


Date: 10.MAY 2005 14:02:56

EMISSION LIMITATIONS - Conducted (Transmitter)

§ 15.247 (c) (1)

Highest Channel (2480MHz): 9KHz - 25GHz



Date: 10.MAY 2005 14:12:30

EMISSION LIMITATIONS Transmitter (Radiated)**§ 15.247 (c) (1)****LIMITS**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions that fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
2. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.
3. All measurements are done in peak mode unless specified with 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

EMISSION LIMITATIONS - Radiated (Transmitter) § 15.247 (c) (1)

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

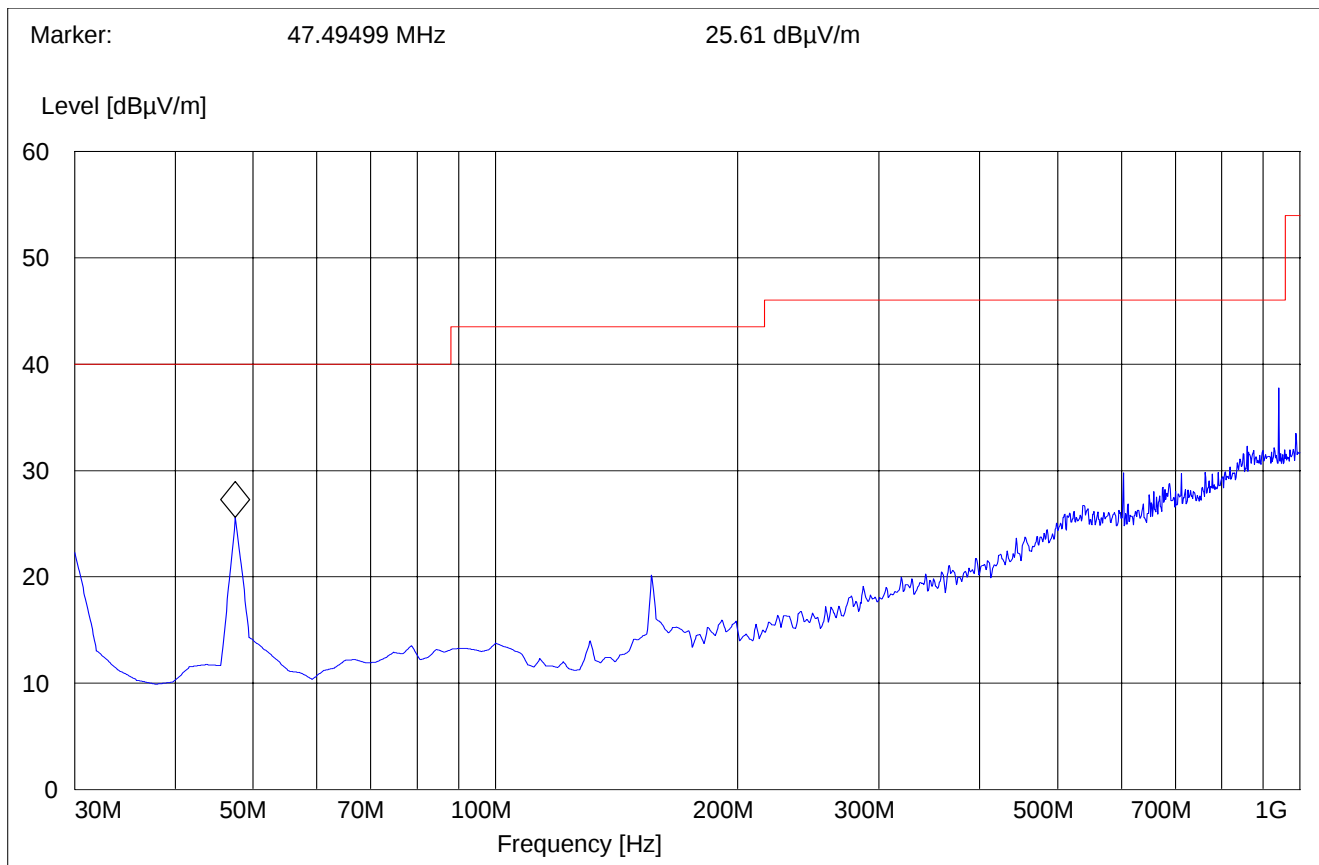
Transmit at Lowest channel Frequency 2402MHz			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
Noise floor			
Transmit at Middle channel Frequency 2441MHz			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
Noise floor			
Transmit at Highest channel Frequency 2480MHz			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
Noise floor			

EMISSION LIMITATIONS - Radiated (Transmitter)
§ 15.247 (c) (1)
30MHz – 1GHz
Antenna: vertical
Note: This plot is valid for low, mid & high channels (worst-case plot)

EUT / Description: TRI BAND GSM MOBILE PHONE
 Customer: SIEMENS
 Operating Mode: TX@2441MHz
 Antenna: V
 EUT: V
 Test Engineer: NEELESH
 Comment: 30MHz-1GHz PEAK

SWEEP TABLE: "BT Spuri hi 30-1G"
 Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

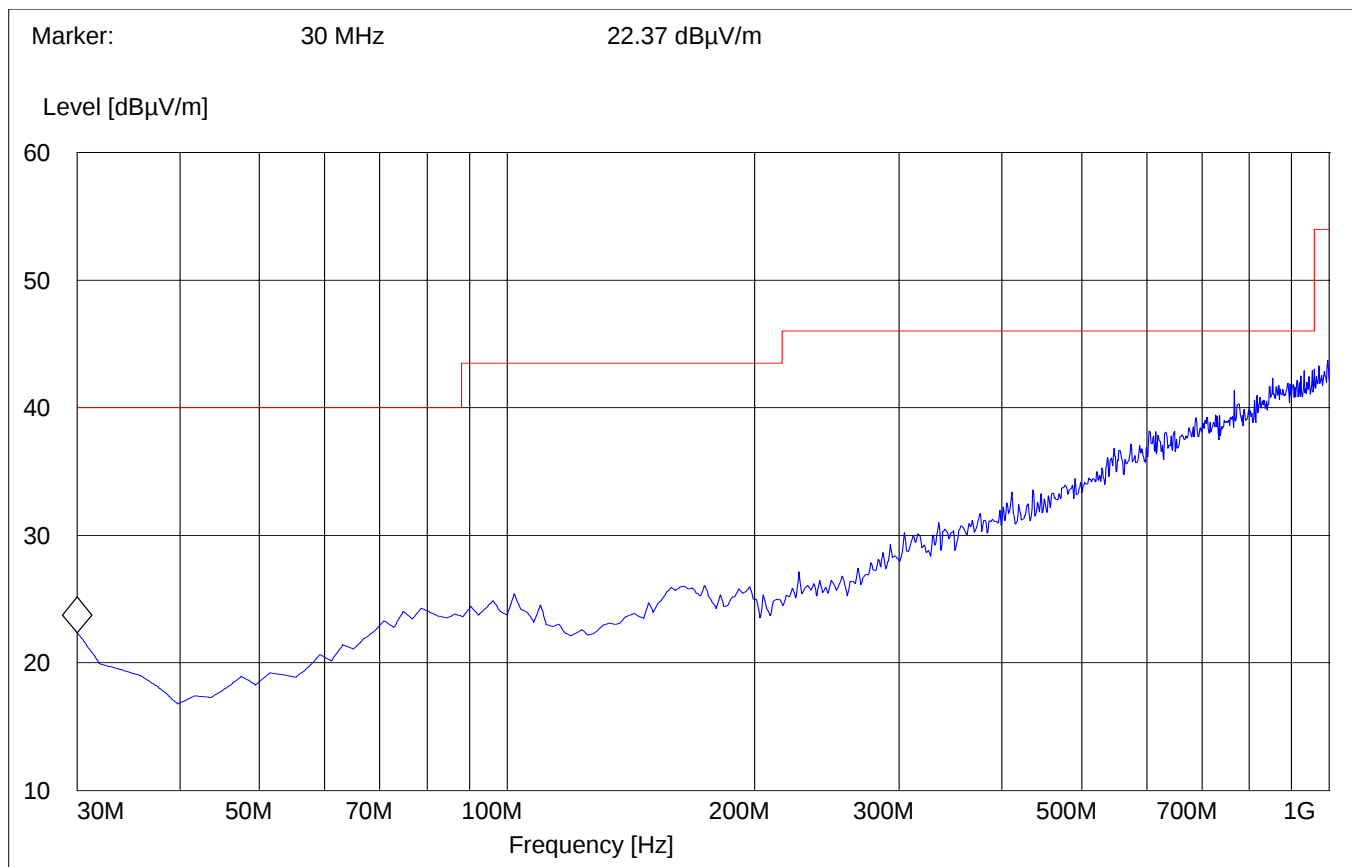


EMISSION LIMITATIONS - Radiated (Transmitter)
§ 15.247 (c) (1)
30MHz – 1GHz
Antenna: horizontal
Note: This plot is valid for low, mid & high channels (worst-case plot)

EUT / Description: TRI BAND GSM MOBILE PHONE
 Customer: SIEMENS
 Operating Mode: TX@2480MHz
 Antenna: H
 EUT: V
 Test Engineer: NEELESH
 Comment: 30MHz-1GHz PEAK

SWEEP TABLE: "BT Spuri hi 30-1G"
 Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186



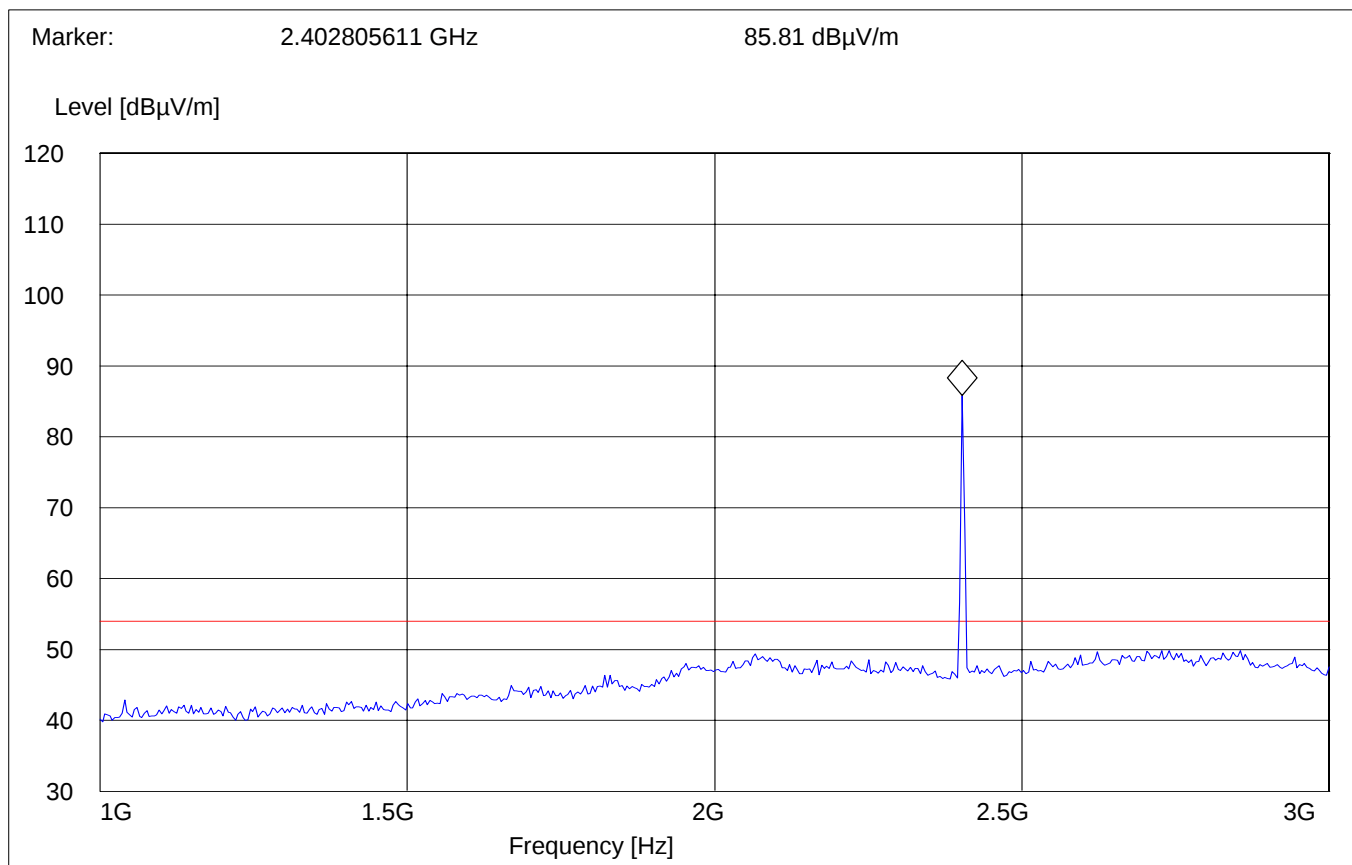
EMISSION LIMITATIONS - Radiated (Transmitter)
§ 15.247 (c) (1)
Lowest Channel (2402MHz): 1GHz – 3GHz
NOTE: The peak above the limit is the carrier frequency.

EUT / Description: TRI BAND GSM MOBILE PHONE
 Customer: SIEMENS
 Operating Mode: TX @ 2402 MHz
 Antenna: V
 EUT: Z
 Test Engineer: NEELESH
 Comment: 1-3GHz Peak

SWEEP TABLE: "BT Spuri hi 1-3G"

Short Description: Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)



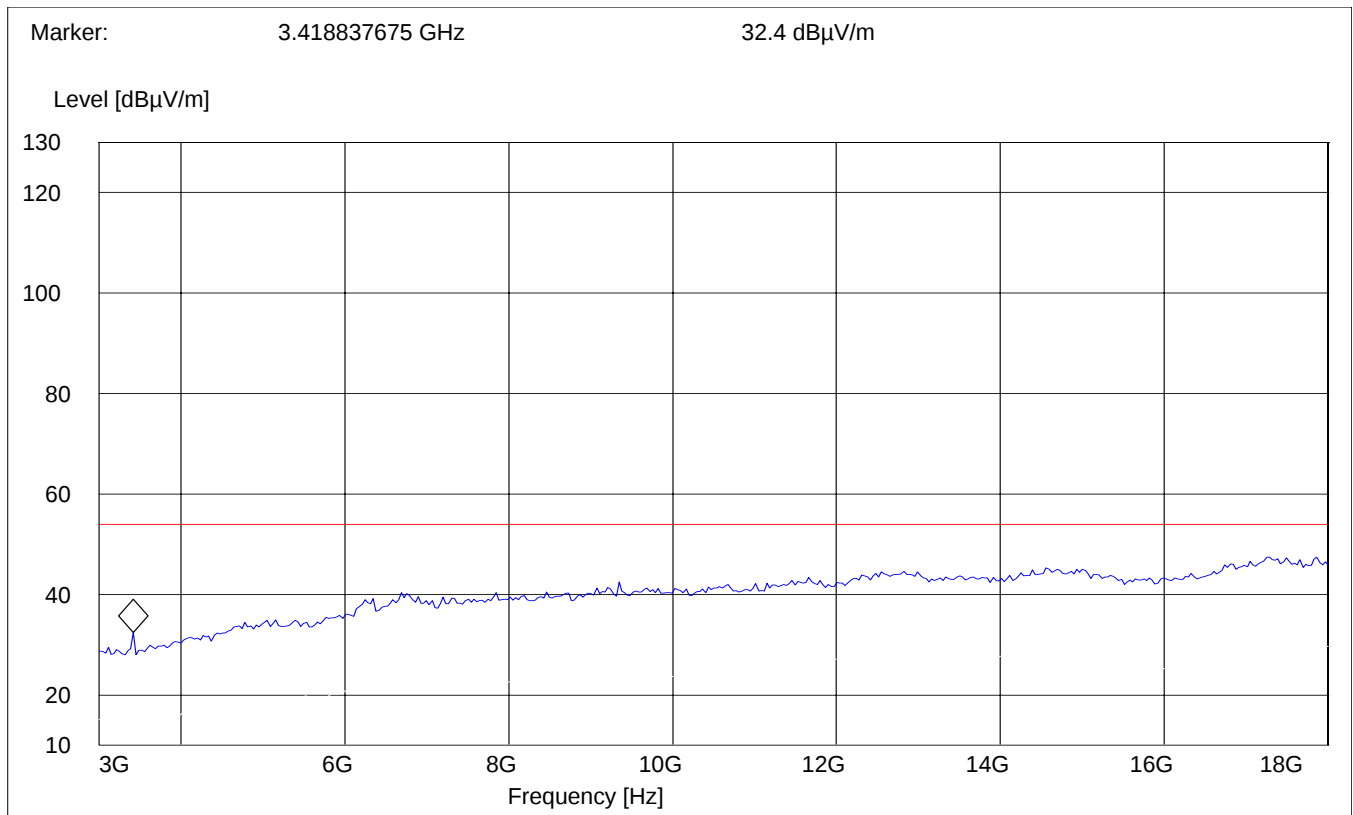
EMISSION LIMITATIONS - Radiated (Transmitter)
§ 15.247 (c) (1)
Lowest Channel (2402MHz): 3GHz – 18GHz
NOTE: Peak readings are below Average limit.

EUT / Description: TRI BAND GSM MOBILE PHONE
 Customer: SIEMENS
 Operating Mode: TX @ 2402 MHz
 Antenna: V
 EUT: V
 Test Engineer: NEELESH
 Comment: 3-18GHz PEAK

SWEEP TABLE: "BT Spuri hi 3-18G"

Short Description: Bluetooth Spurious 3-18 GHZ

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

Middle Channel (2441MHz): 1GHz – 3GHz

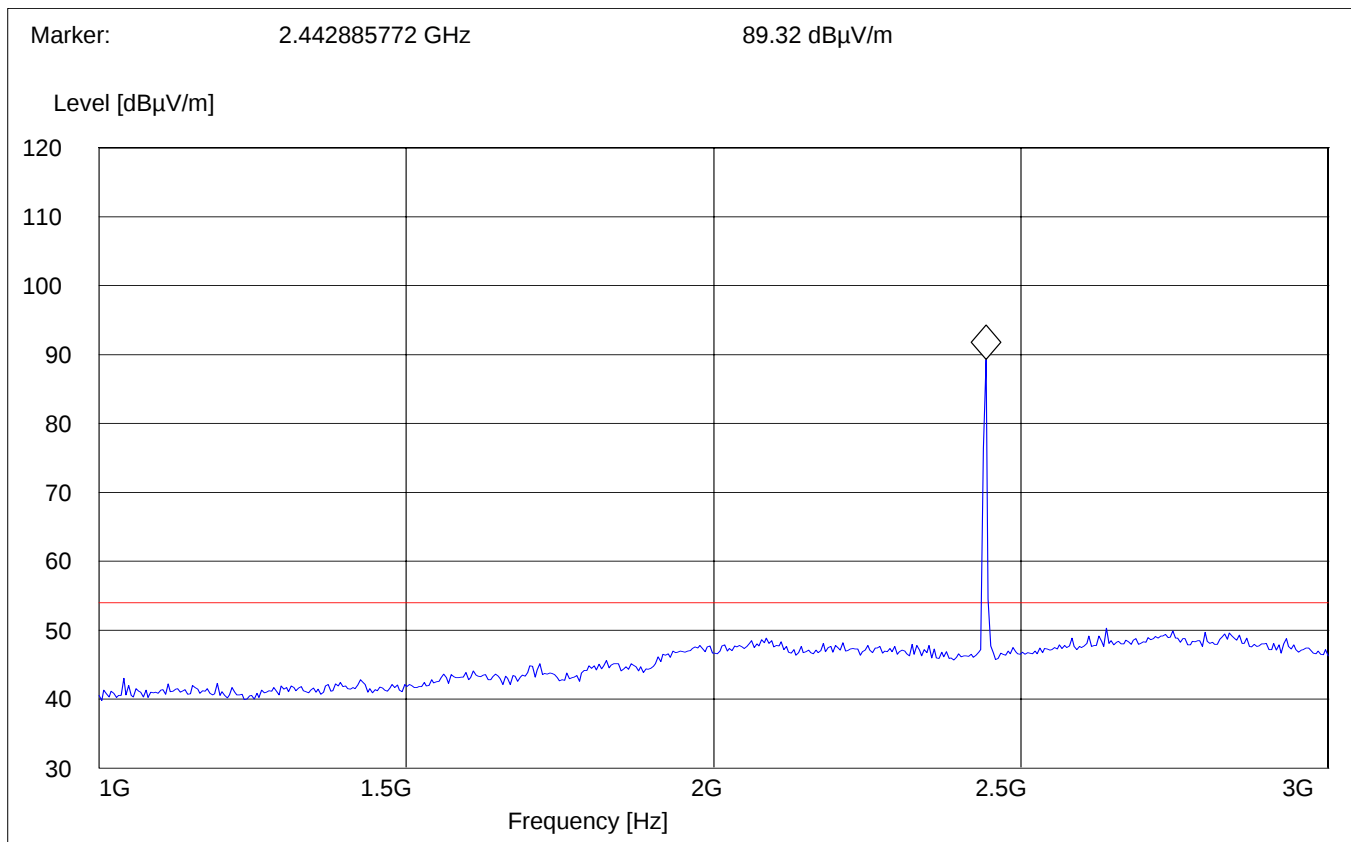
§ 15.247 (c) (1)

NOTE: The peak above the limit is the carrier frequency.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2441 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: 1-3GHz Peak

SWEEP TABLE: "BT Spuri hi 1-3G"
Short Description: Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

Middle Channel (2441MHz): 3GHz – 18GHz

§ 15.247 (c) (1)

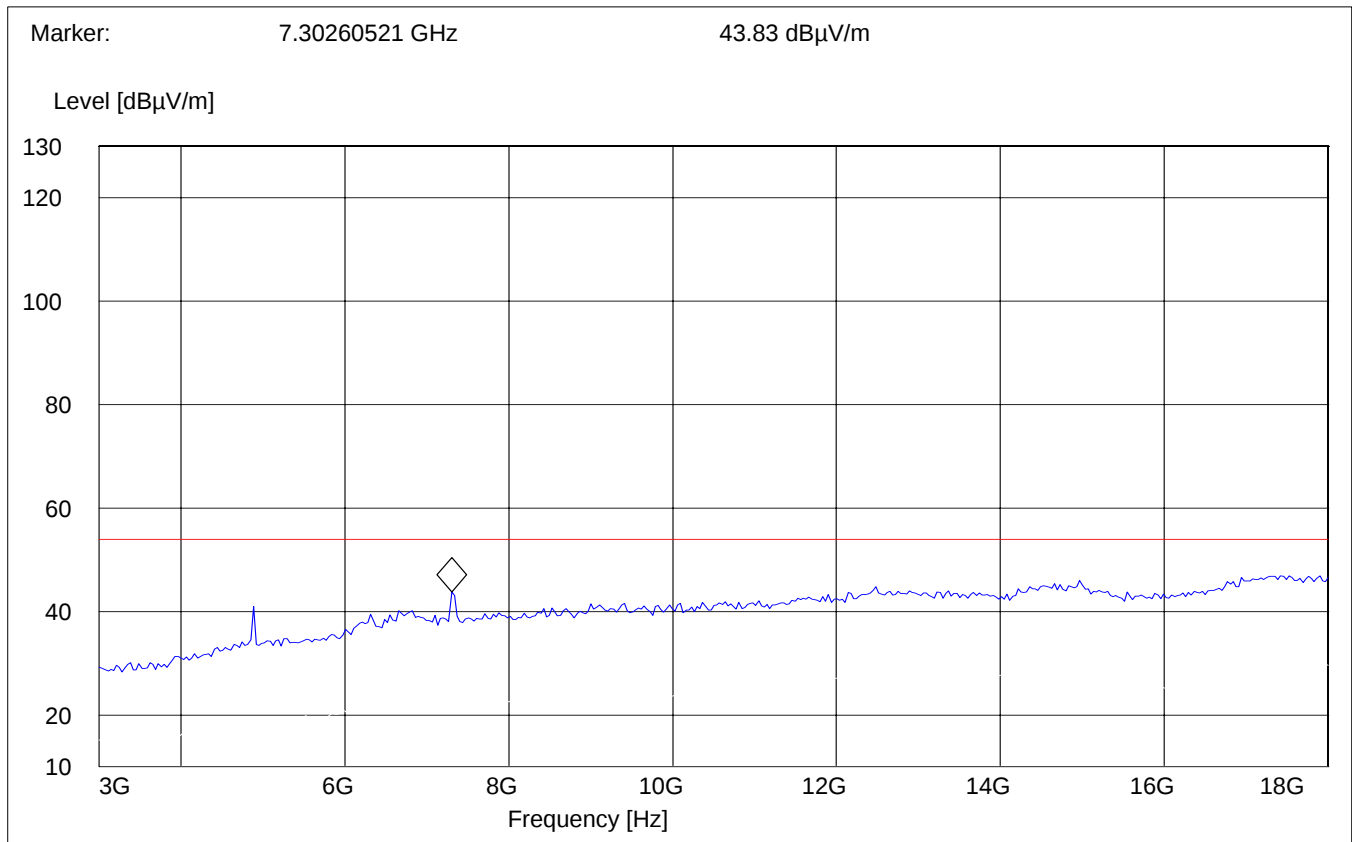
NOTE: Peak readings are below Average limit.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2441 MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 3-18GHz PEAK

SWEEP TABLE: "BT Spuri hi 3-18G"

Short Description: Bluetooth Spurious 3-18 GHZ

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

Highest Channel (2480MHz): 1GHz – 3GHz

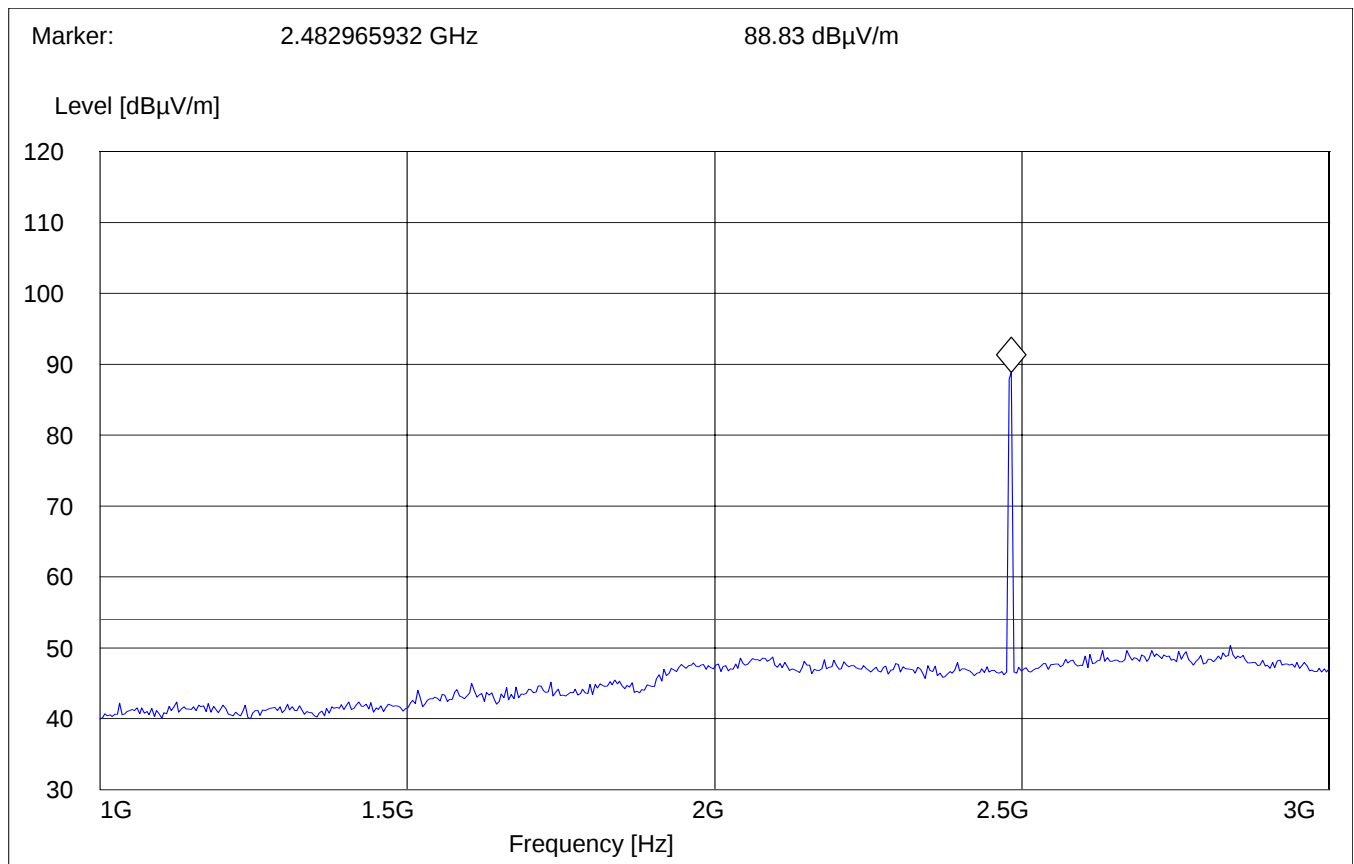
§ 15.247 (c) (1)

NOTE: The peak above the limit is the carrier frequency.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: 1-3GHz Peak

SWEEP TABLE: "BT Spuri hi 1-3G"
Short Description: Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

Highest Channel (2480MHz): 3GHz – 18GHz

§ 15.247 (c) (1)

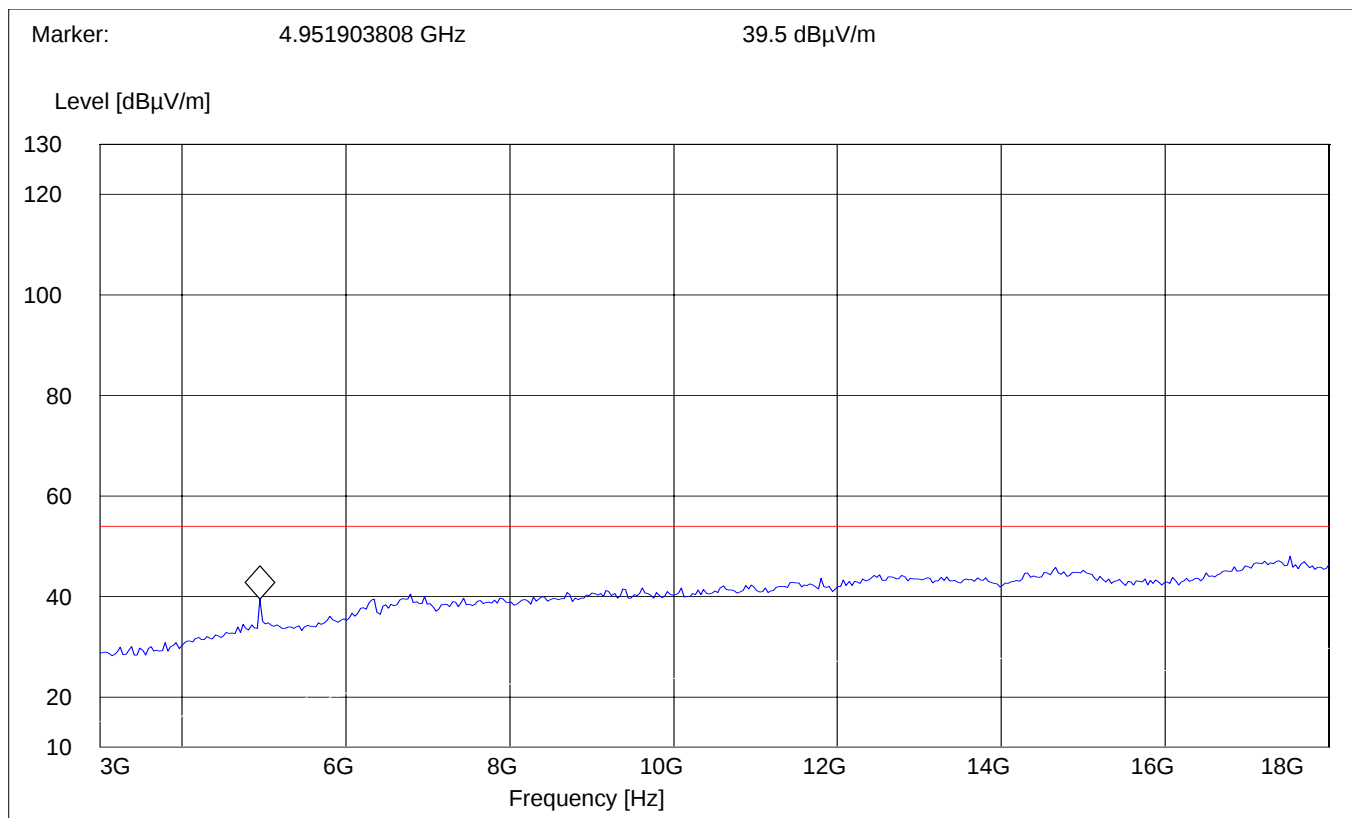
NOTE: Peak readings are below Average limit.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 3-18GHz PEAK

SWEEP TABLE: "BT Spuri hi 3-18G"

Short Description: Bluetooth Spurious 3-18 GHZ

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter) 18GHz – 26.5GHz

§ 15.247 (c) (1)

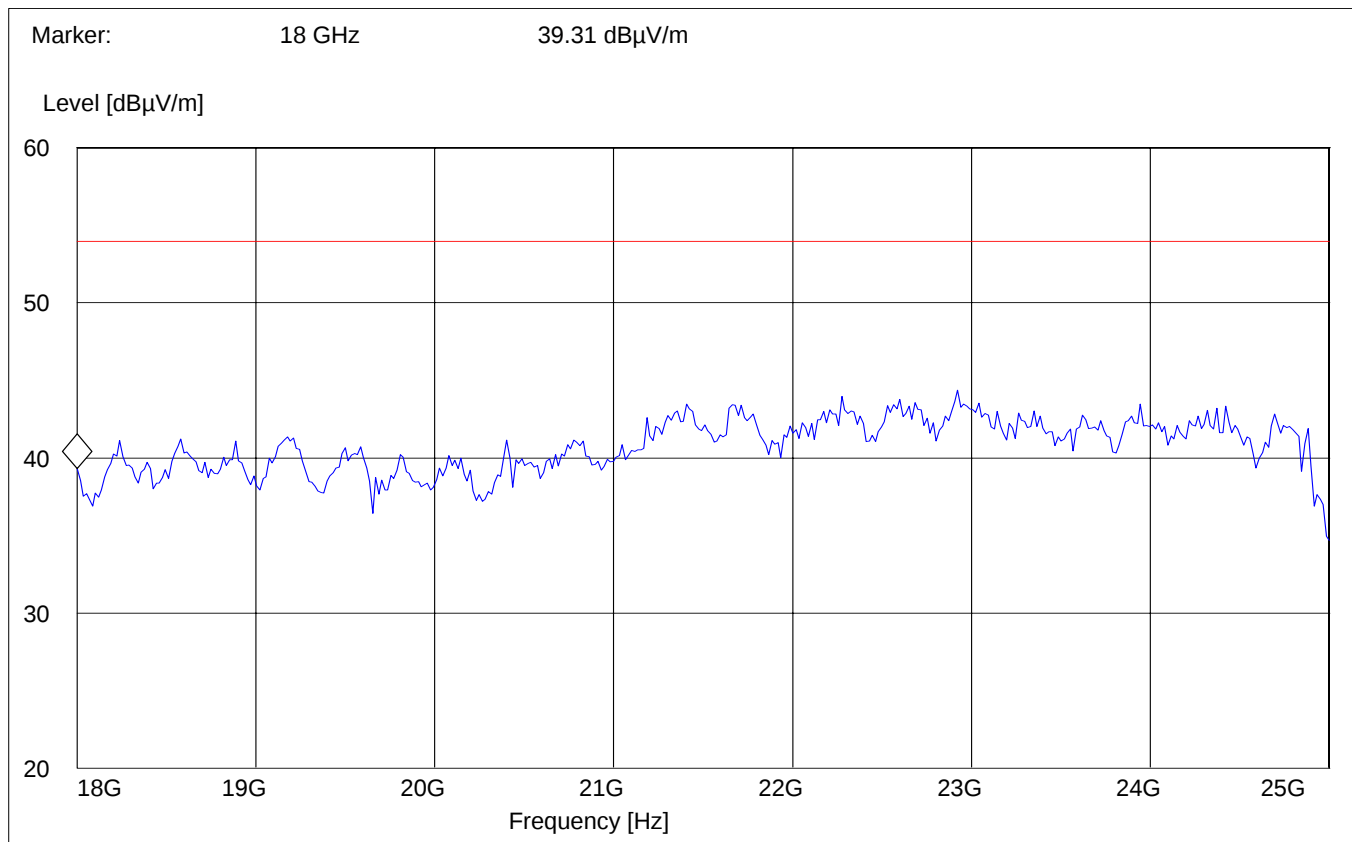
Note 1: This plot is valid for low, mid & high channels (worst-case plot)

Note 2: Peak readings are below Average limit

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: TX @ 2480 MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 18-26.5GHz PEAK

SWEEP TABLE: "BT Spuri hi 18-26.5G"
Short Description: Bluetooth Spurious 18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
18 GHz	26.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#141 horn (dBi)



CO-LOCATION – (Radiated) Transmitter

The Bluetooth transmitter was co-located with the GSM transmitter. The GSM transmitter was the dominant transmitter. FCC 15.247 limits/test method were used due to the fact FCC 15.247 limits are more stringent. The channels were selected according to the highest EIRP readings of each transmitter .

EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

30MHz – 1GHz

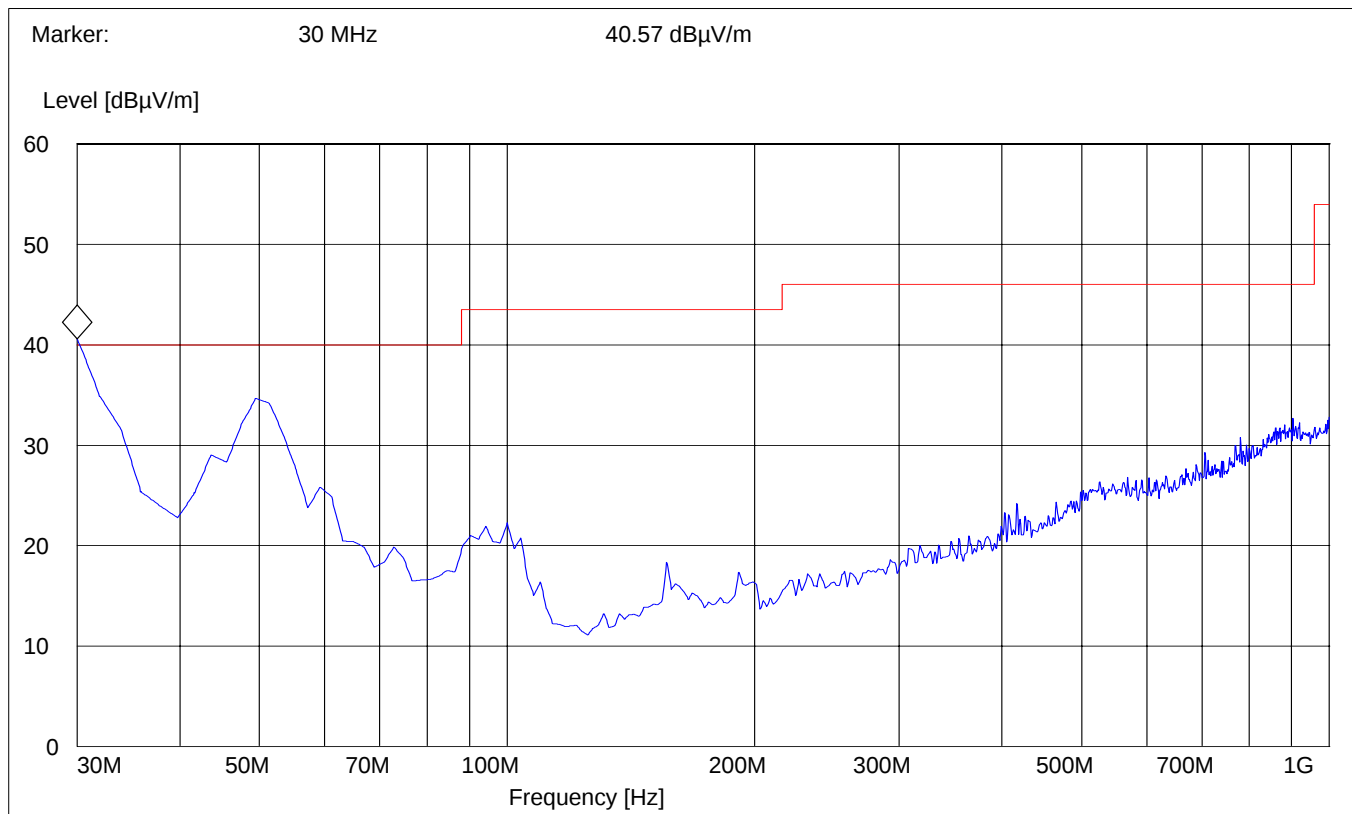
Antenna: vertical

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: GSM TX@1850.2MHz AND BLUTOOTH TX@2441MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 30MHz-1GHz PEAK

SWEEP TABLE: "BT Spuri hi 30-1G"
Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

→ marked frequency is 5dB less in QP than in Maxpeak.

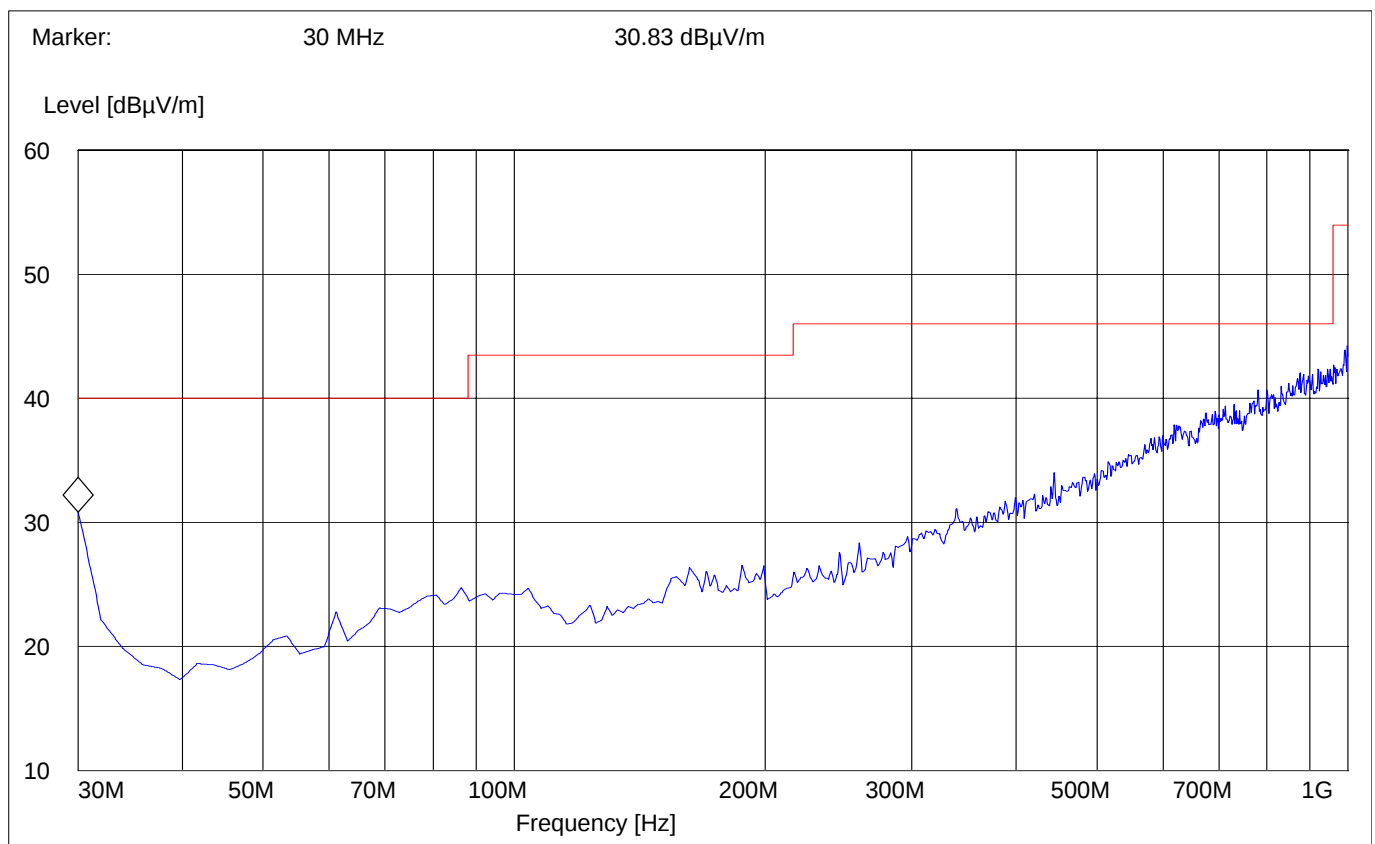


EMISSION LIMITATIONS - Radiated (Transmitter)
§ 15.247 (c) (1)
30MHz – 1GHz
Antenna: horizontal

EUT / Description: TRI BAND GSM MOBILE PHONE
 Customer: SIEMENS
 Operating Mode: GSM TX@1850.2MHz AND BLUETOOTH TX@2441MHz
 Antenna: H
 EUT: V
 Test Engineer: NEELESH
 Comment: 30MHz-1GHz PEAK

SWEEP TABLE: "BT Spuri hi 30-1G"
 Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186



EMISSION LIMITATIONS - Radiated (Transmitter)

1GHz – 3GHz

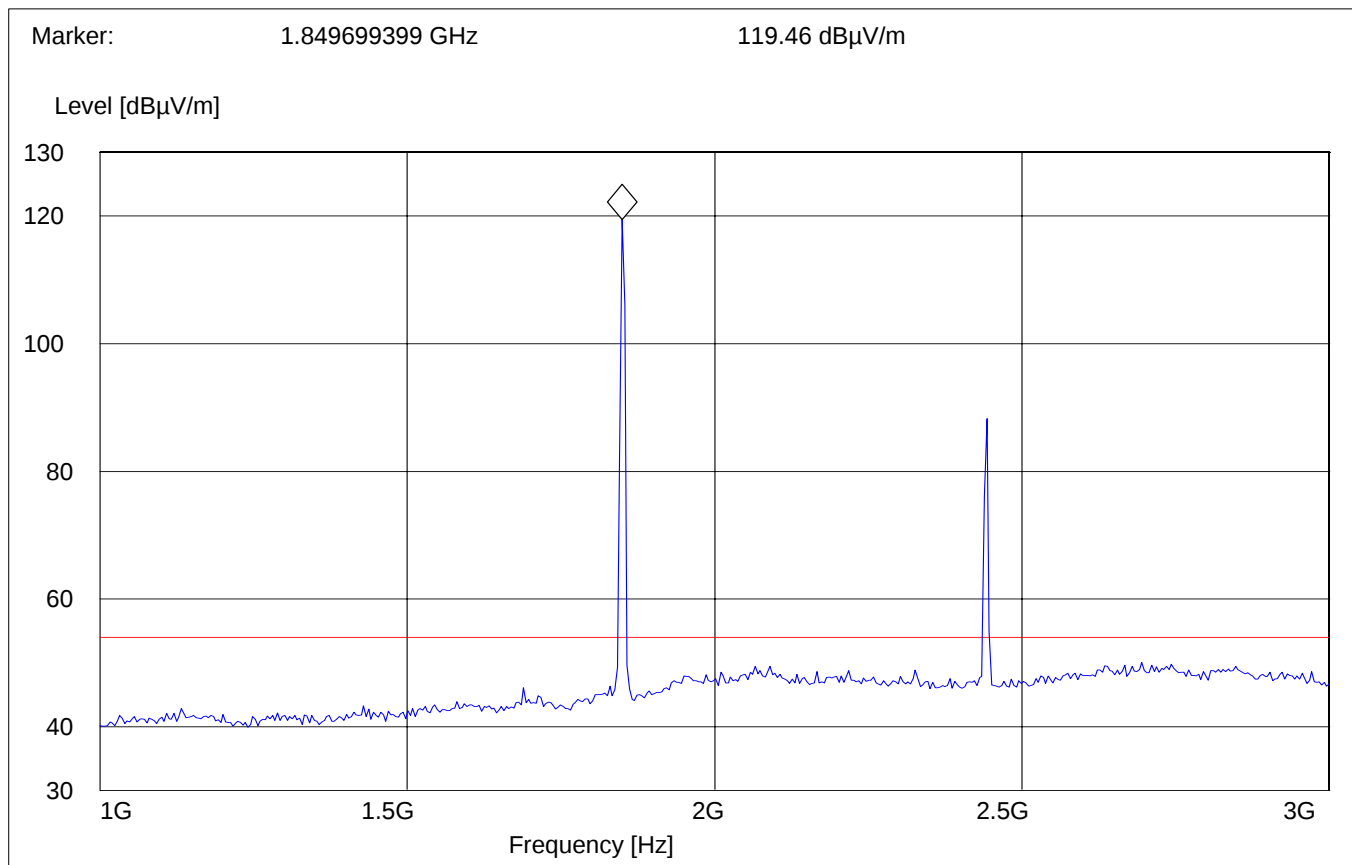
§ 15.247 (c) (1)

NOTE: The peaks above the limit are the carrier frequency of each transmitter.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: GSM TX@1850.2MHz AND BLUTOOTH TX@2441MHz
Antenna: V
EUT: Z
Test Engineer: NEELESH
Comment: 1-3GHz PEAK

SWEEP TABLE: "BT Spuri hi 1-3G"
Short Description: Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

3GHz – 18GHz

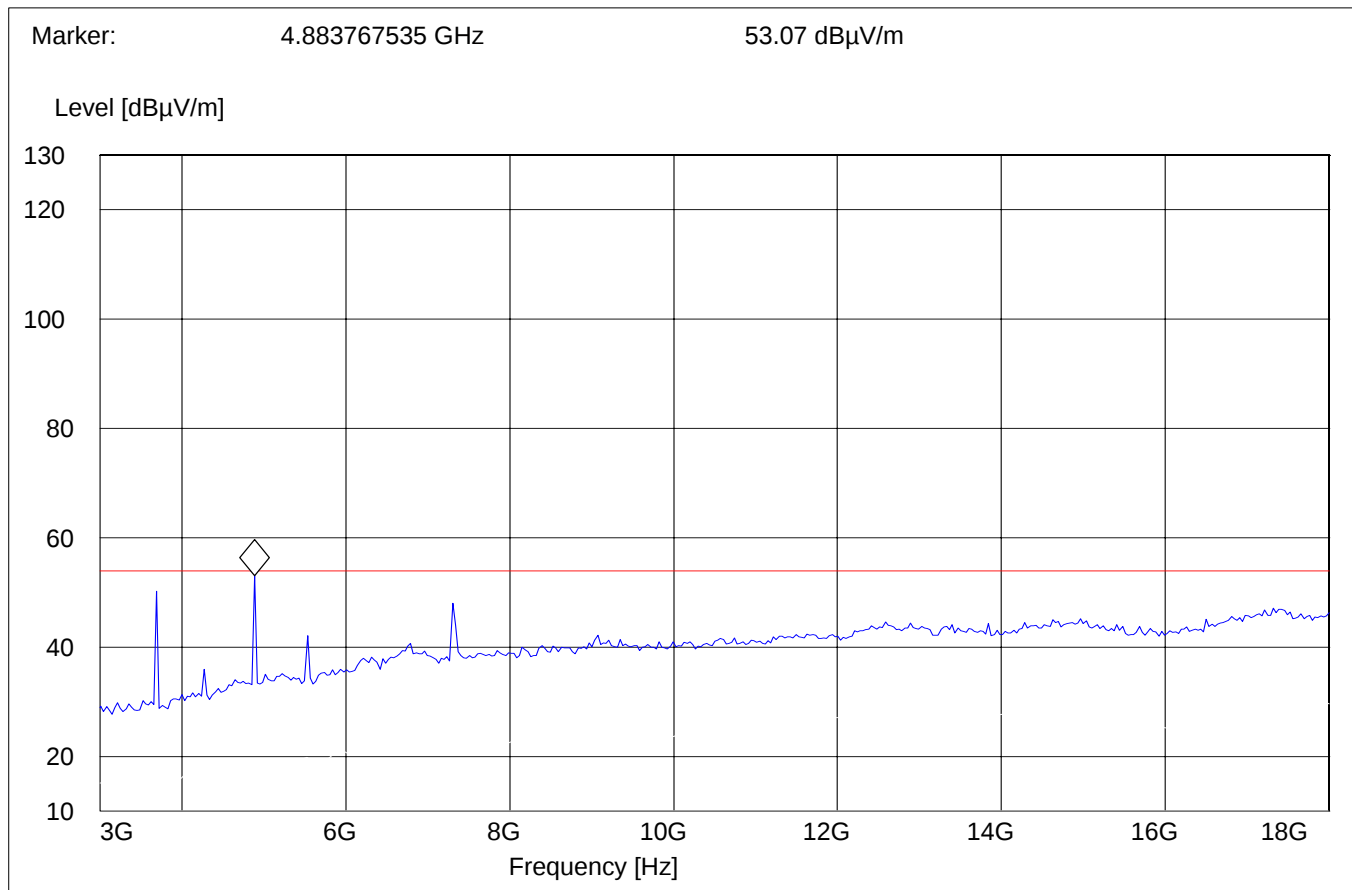
§ 15.247 (c) (1)

NOTE: Peak readings are below Average limit.

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: SIEMENS
Operating Mode: GSM TX@1850.2MHz AND BLUETOOTH TX@2441MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 3-18GHz PEAK

SWEEP TABLE: "BT Spuri hi 3-18G"
Short Description: Bluetooth Spurious 3-18 GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter) 18GHz – 26.5GHz

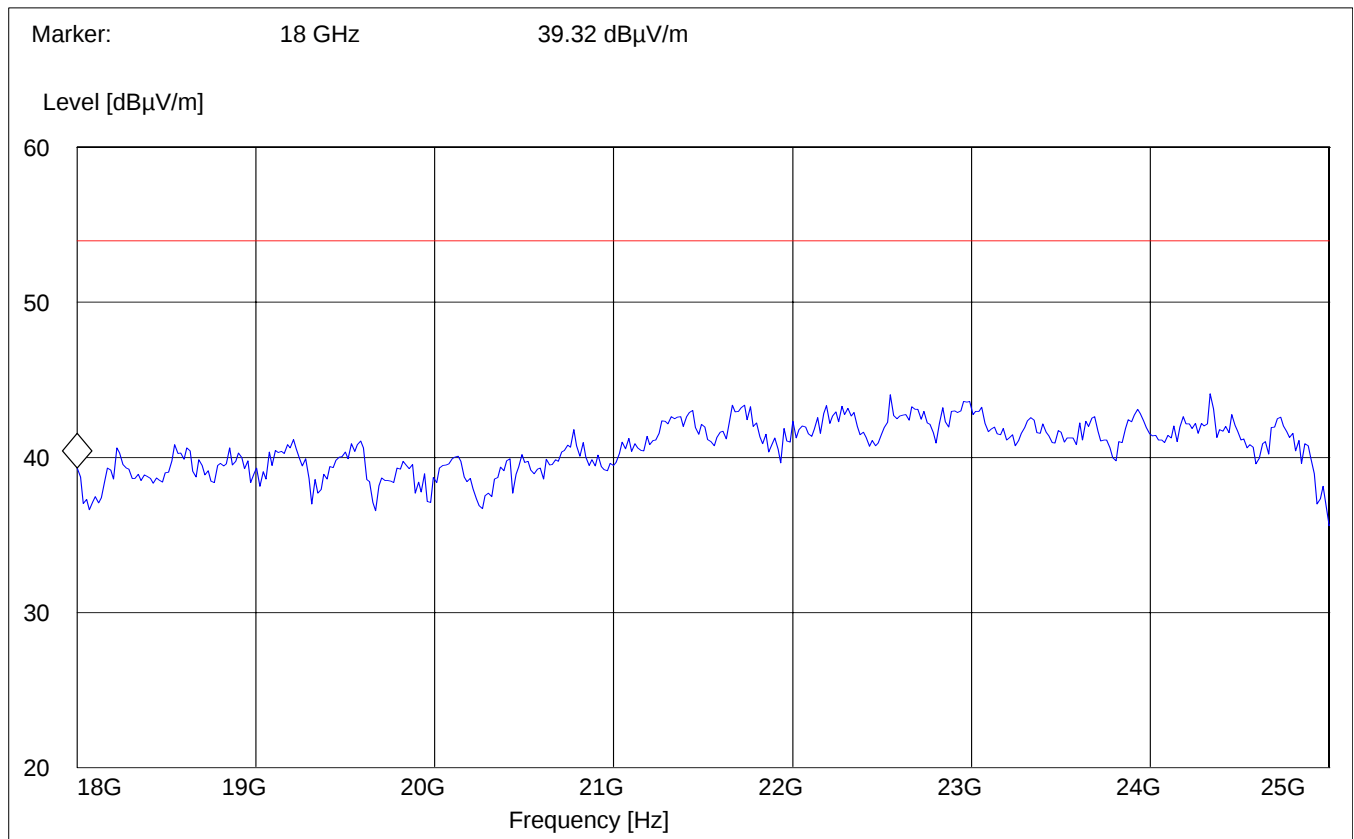
§ 15.247 (c) (1)

Note 1: Peak readings are below Average limit

EUT / Description: TRI BAND GSM MOBILE PHONE
Customer: IEMENS
Operating Mode: GSM TX@1850.2MHz AND BLUETOOTH TX@2480MHz
Antenna: V
EUT: V
Test Engineer: NEELESH
Comment: 18-26.5GHz PEAK

SWEEP TABLE: "BT Spuri hi 18-26.5G"
Short Description: Bluetooth Spurious 18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
18 GHz	26.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#141 horn (dBi)



CONDUCTED EMISSIONS

§ 15.107/207

Measured with AC/DC power adapter model# Siemens A5BHTN00116341

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

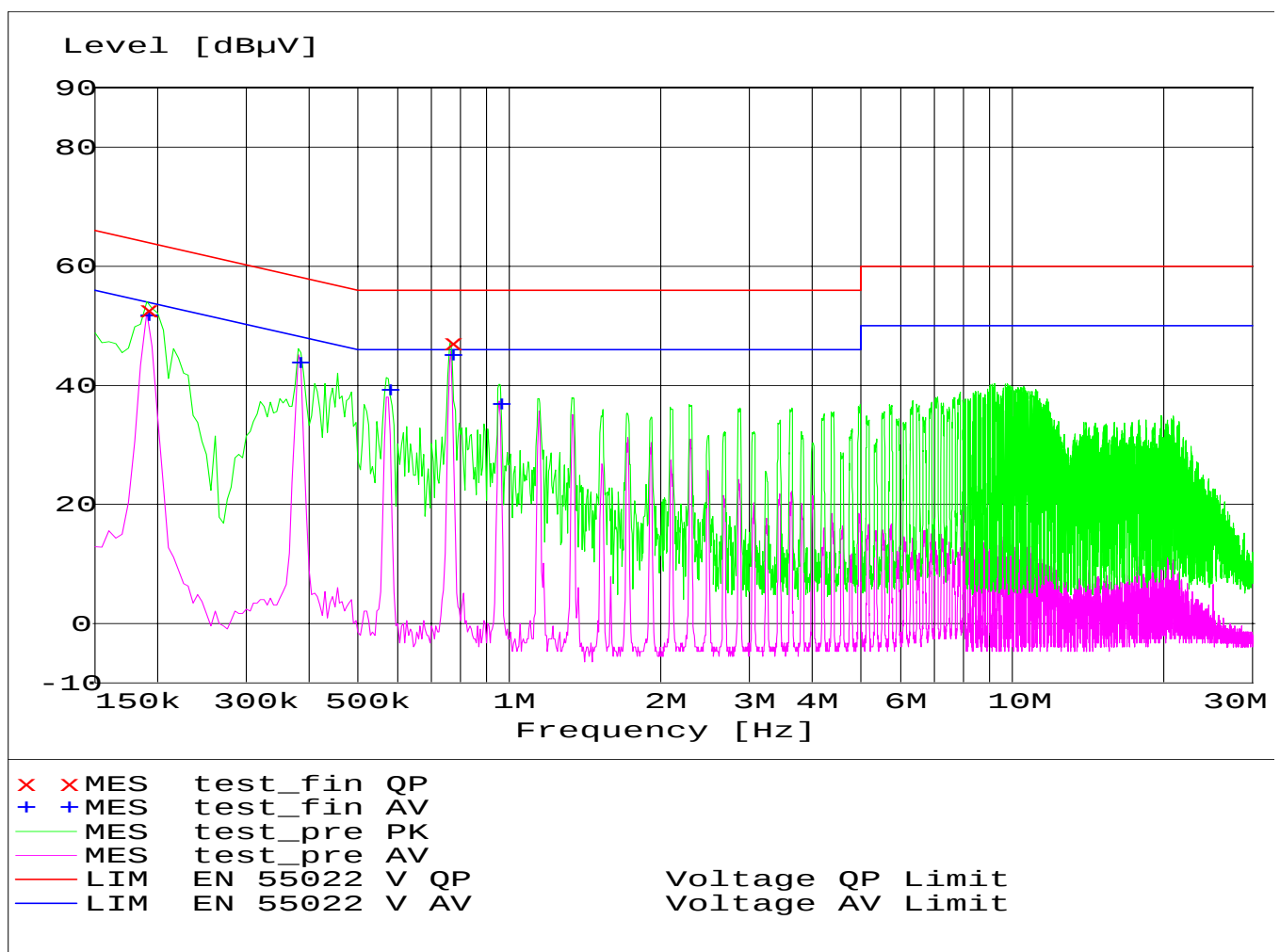
Limit

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



MEASUREMENT RESULT: "test_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	52.60	0.0	64	11.4	N	GND
0.765000	47.00	0.0	56	9.0	N	GND

MEASUREMENT RESULT: "test_fin AV"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.190000	51.60	0.0	54	2.5	N	GND
0.380000	43.80	0.0	48	4.5	N	GND
0.575000	39.10	0.0	46	6.9	L1	GND
0.765000	45.00	0.0	46	1.0	L1	GND
0.955000	36.80	0.0	46	9.2	N	GND

RECEIVER SPURIOUS RADIATION**§ 15.209****Limits**

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	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

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 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode unless specified with the plots. Worst case reported.

RECEIVER SPURIOUS RADIATION

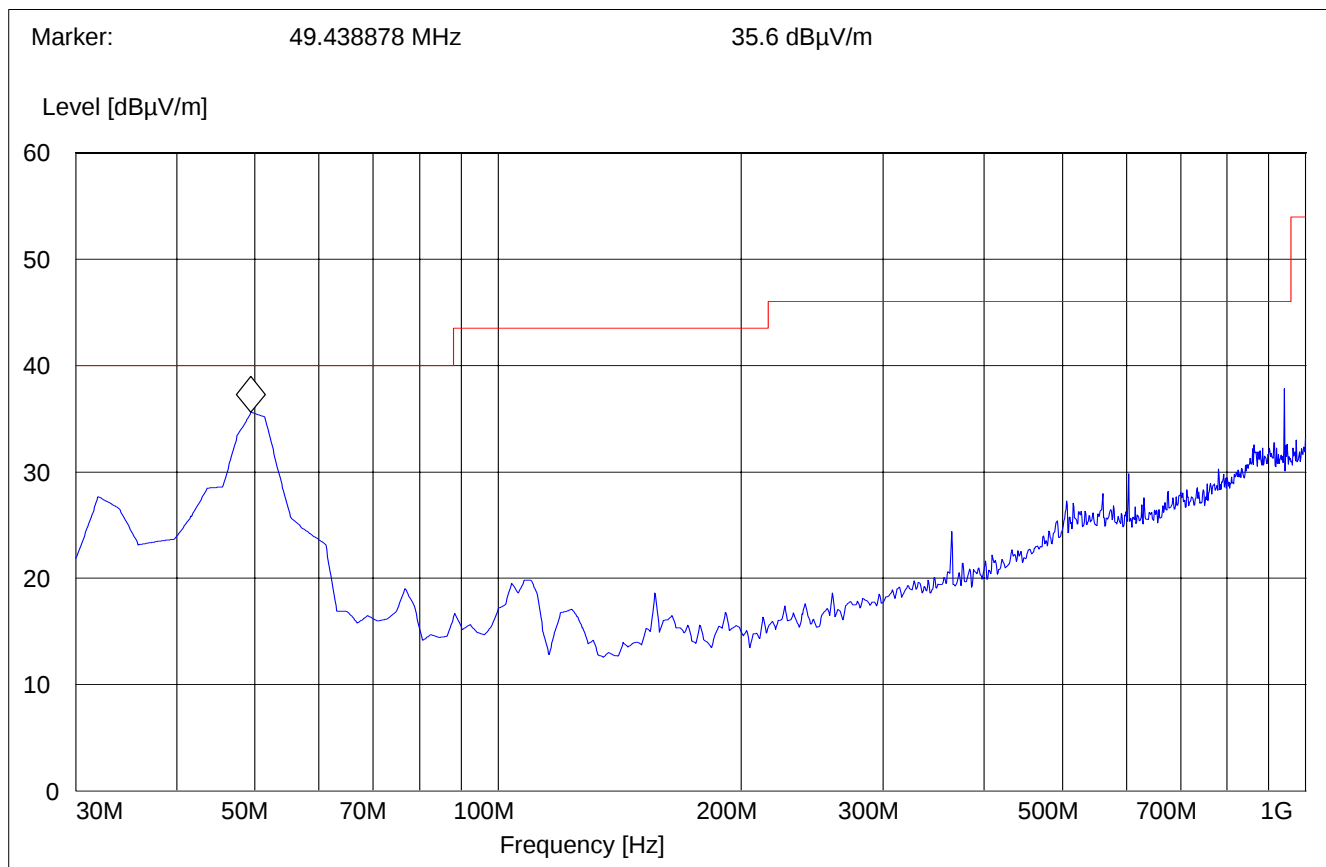
§ 15.209

30MHz – 1GHz

Antenna: vertical (worst-case plot)

SWEEP TABLE: "BT Spuri hi 30-1G"
Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186



RECEIVER SPURIOUS RADIATION

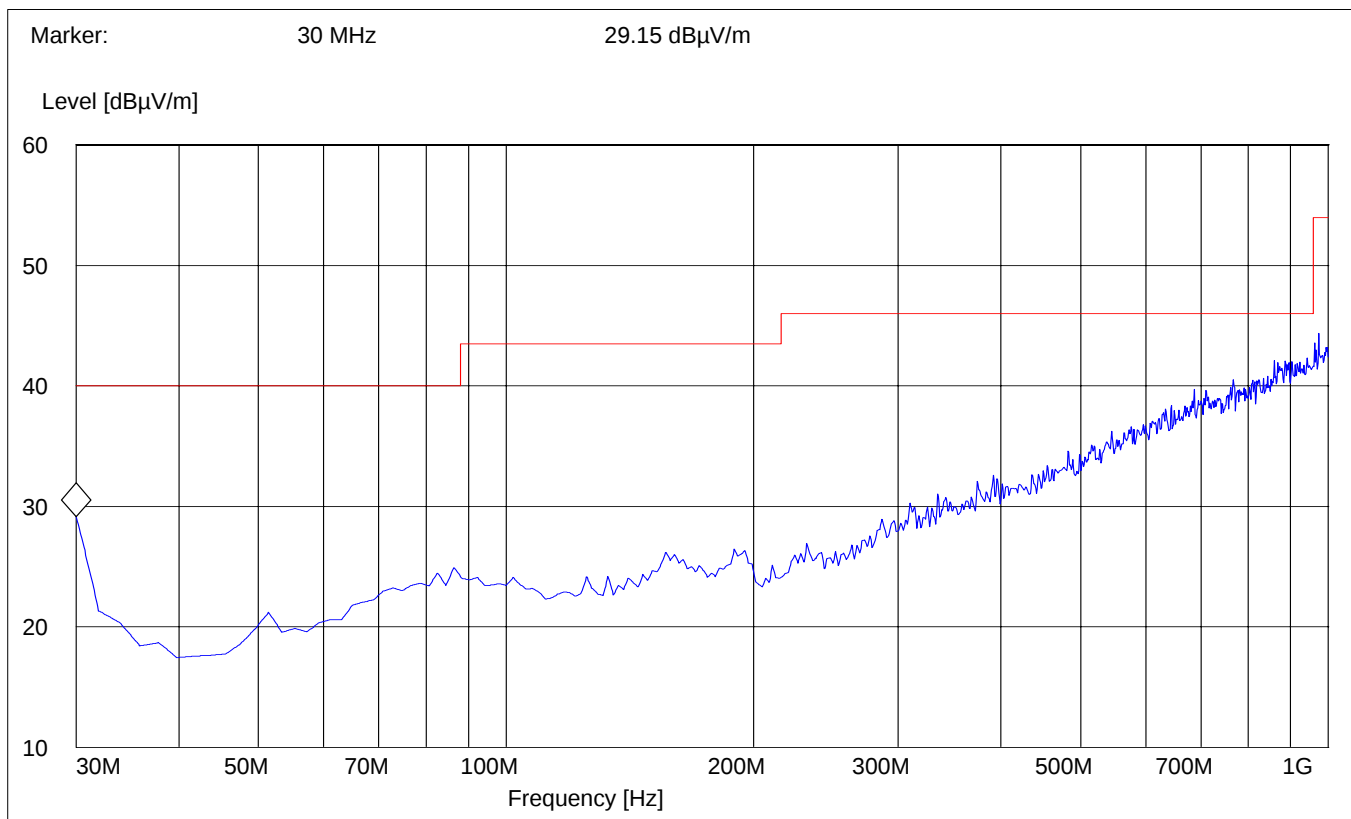
§ 15.209

30MHz – 1GHz

Antenna: horizontal (worst-case plot)

SWEEP TABLE: "BT Spuri hi 30-1G"
Short Description: Bluetooth 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
30.0 MHz	1.0 GHz	Max Peak	Coupled	100 kHz	3141-#1186

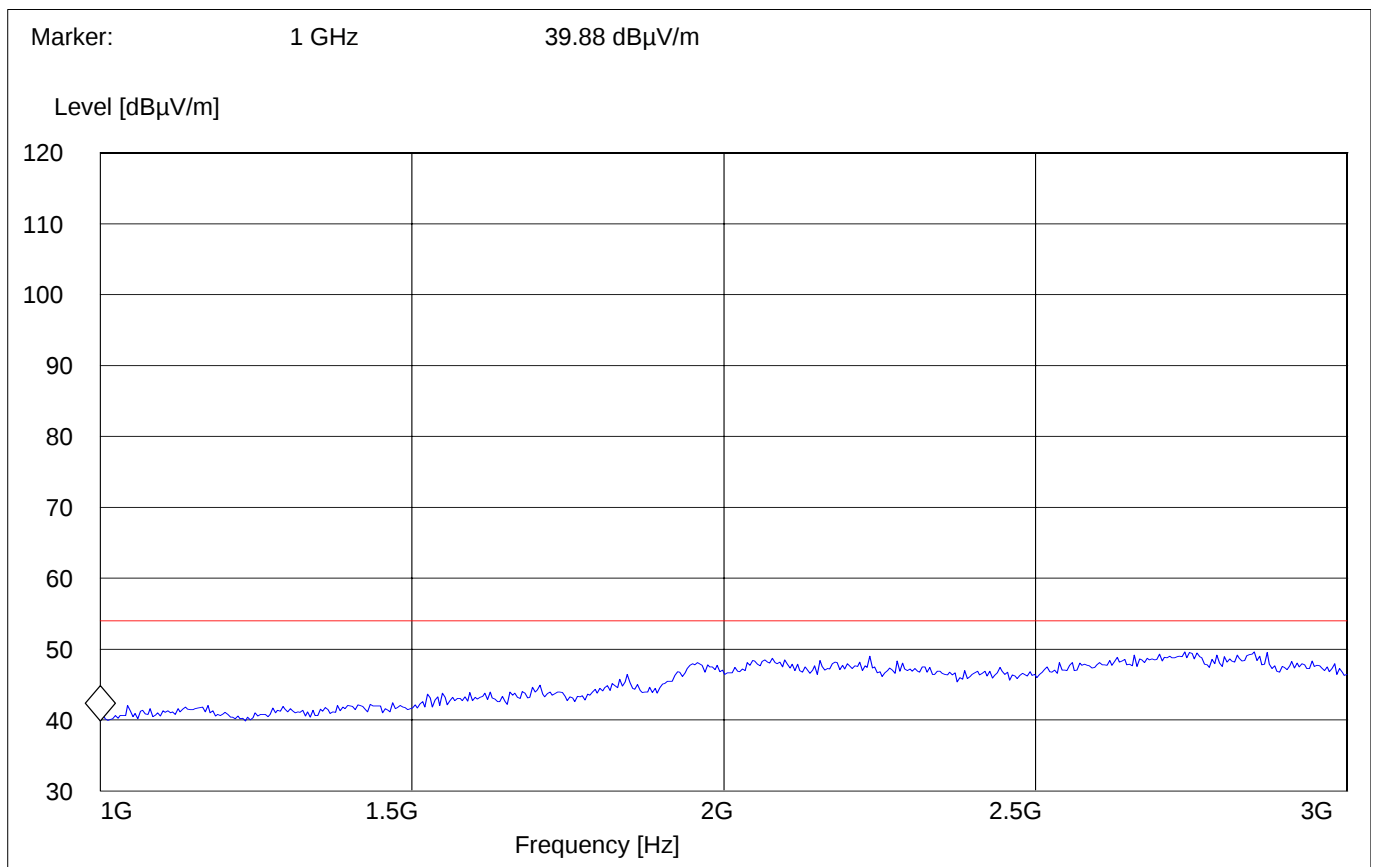


RECEIVER SPURIOUS RADIATION 1GHz – 3GHz

§ 15.209

SWEEP TABLE: "BT Spuri hi 1-3G"
Short Description: Bluetooth Spurious 1-3GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW=VBW	Transducer
1.0 GHz	3.0 GHz	Max Peak	Coupled	1 MHz	#326 horn (dBi)



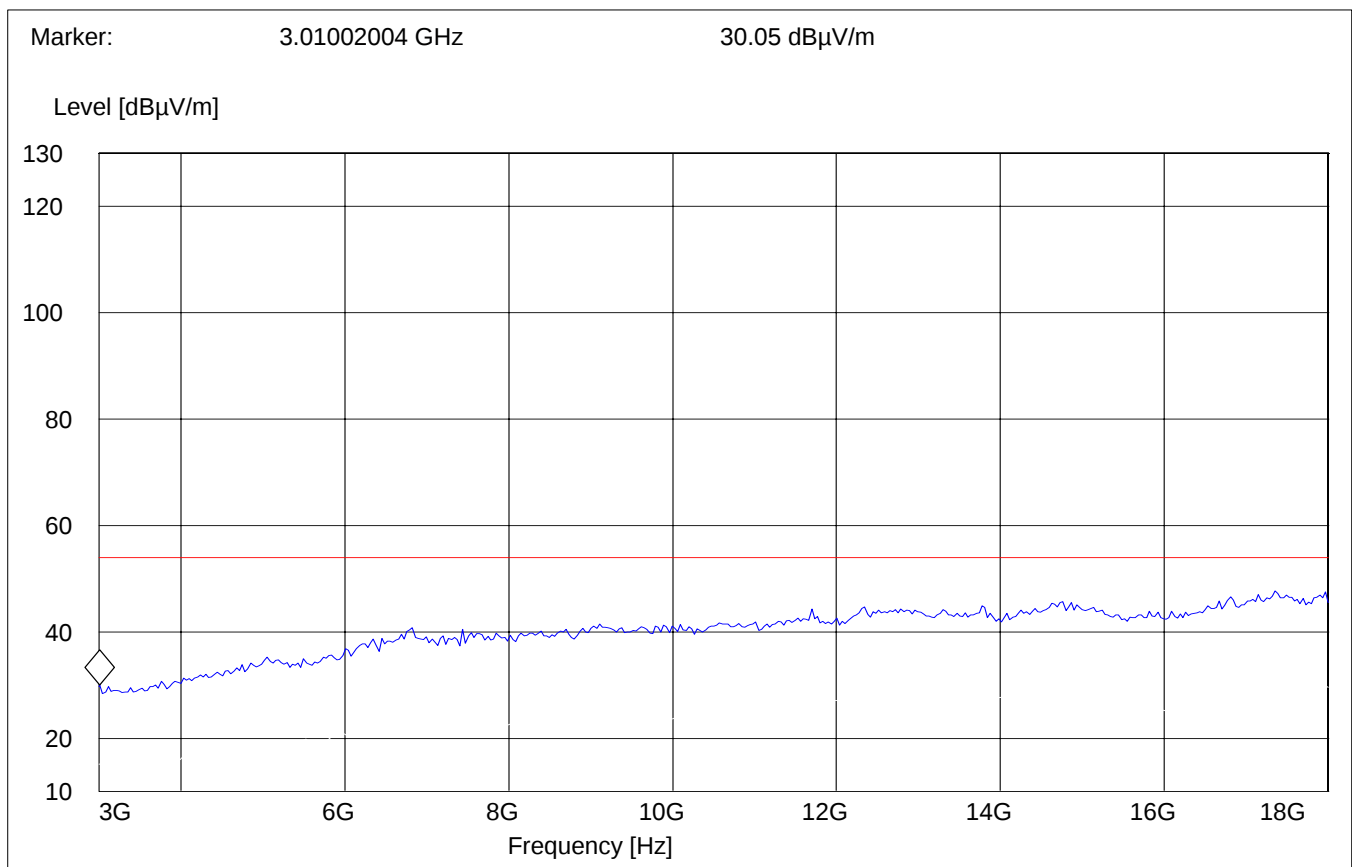
RECEIVER SPURIOUS RADIATION 3GHz – 18GHz

§ 15.209

SWEEP TABLE: "BT Spuri hi 3-18G"

Short Description: Bluetooth Spurious 3-18 GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	Max Peak	Coupled	1 MHz	1 MHz	#326 horn (dBi)



RECEIVER SPURIOUS RADIATION 18GHz – 26.5GHz

§ 15.209

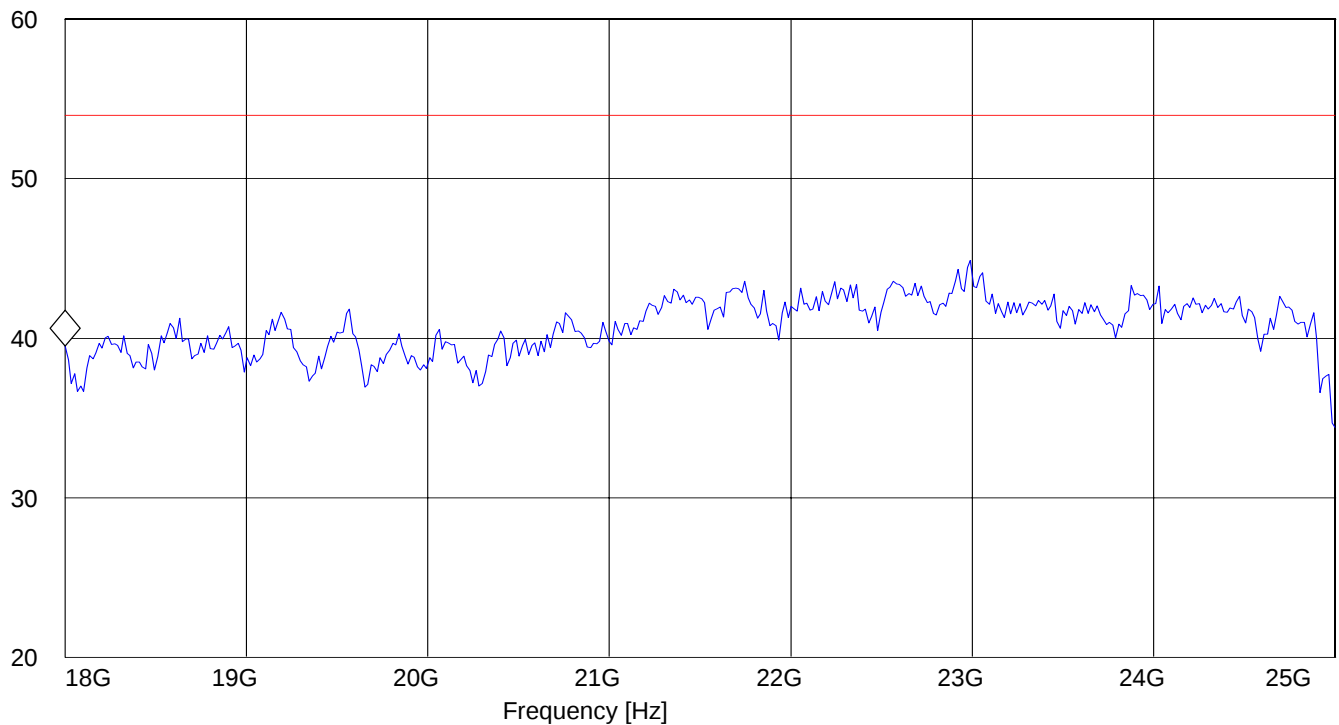
SWEEP TABLE: "BT Spuri hi 18-26.5G"

Short Description: Bluetooth Spurious 18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW	Transducer
18 GHz	26.5 GHz	Max Peak	Coupled	1 MHz	1 MHz	#141 horn (dBi)

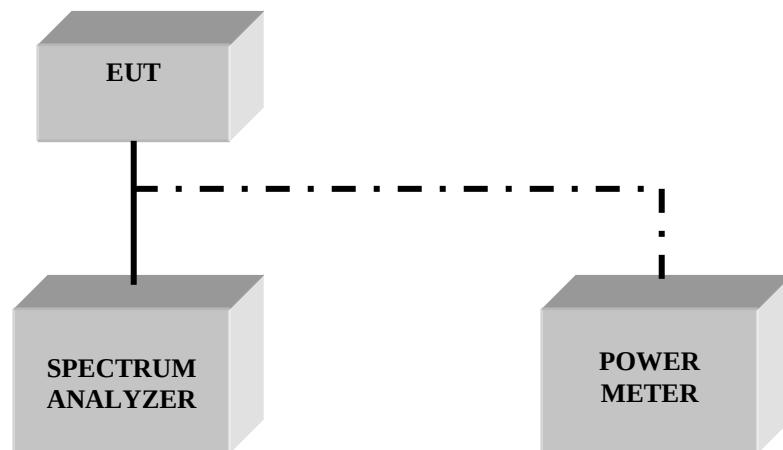
Marker: 18 GHz 39.51 dBμV/m

Level [dBμV/m]



TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Biconilog Antenna	3141	EMCO	0005-1186
04	Horn Antenna (700M-18GHz)	SAS-200/571	AH Systems	325
05	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
06	2-3GHz Band reject filter	BRM50701	Microtronics	6
07	Pre-Amplifier	TS-ANA	Rohde & Schwarz	--
08	Pre-Amplifier	JS4-00102600	Miteq	00616

BLOCK DIAGRAMS
Conducted Testing

Radiated Testing**ANECHOIC CHAMBER**