InterLab®
Final Report on
FC6050W
Bluetooth 3.0+HS / WLAN Module

Report Reference:	MDE_PARRO_1129_FCCb
	acc. Title 47 CFR chapter I part 15 subpart C
Date:	March 28, 2012

Test Laboratory:
7Layers AG
Borsigstr. 11
40880 Ratingen
Germany

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-12140-01-01

Reference: MDE_PARRO_1129_FCCb

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1 Administrative Data

1.1 Project Data

Project Responsible:	Carsten Steinröder
Date Of Test Report:	2012/03/27
Date of first test:	2012/02/01
Date of last test:	2012/02/16

1.2 Applicant Data

Company Name: Parrot S.A.

Street:	174 quai de Jemmapes
City:	75010 Paris
Country:	France

Contact Person: Mr. Belaid Dahmouchene

Phone:	+33 1 48 03 60 60
Fax:	+33 1 48 03 70 08
E-Mail:	belaid.dahmouchene@parrot.com

1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

7 layers DE

Company Name :	7 layers AG
Street :	Borsigstrasse 11
City :	40880 Ratingen
Country :	Germany
Contact Person :	Mr. Michael Albert
Phone :	+49 2102 749 201
Fax :	+49 2102 749 444
E Mail :	michael.albert@7Layers.de

Laboratory Details

Lab ID	Identification	Responsible	Accreditation Info
Lab 1	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAkkS-Registration no. D-PL-12140-01-01
Lab 2	Regulatory Bluetooth RF Test Solution	Mr. Jimmy Chatheril Mr. Sören Berentzen	DAkkS-Registration no. D-PL-12140-01-01

1.4 Signature of the Testing Responsible

Carsten Steinröder
responsible for tests performed in: Lab 1, Lab 2

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1.5   Signature of the Accreditation Responsible

B. Retk [B. RETKA]

Accreditation scope responsible person
responsible for Lab 1, Lab 2

2   Test Object Data

2.1   General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

OUT: FC6050W
Bluetooth 3.0+HS / WLAN Module

Manufacturer:
Company Name:	Please see applicant data
Contact Person:	Please see applicant data

Parameter List:

Parameter name	Value	
Parameter for Scope FCC_v2:		
Antenna Gain - Bluetooth Antenna	-2.34	(dBi)
highest channel (BT)	2480	(MHz)
lowest channel (BT)	2402	(MHz)
mid channel (BT)	2441	(MHz)

2.2   Detailed Description of OUT Samples

Sample : z01

OUT Identifier	FC6050W Bluetooth 3.0+HS / WLAN Module		
Sample Description	Sample#1		
HW Status	05		
SW Status	01.07.XX		
Low Voltage	3.1 V	Low Temp.	-40 °C
High Voltage	3.6 V	High Temp.	85 °C
Nominal Voltage	3.3 V	Normal Temp.	23 °C

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2.3   OUT Features

Features for OUT: FC6050W
Bluetooth 3.0+HS / WLAN Module

Designation	Description	Allowed Values	Supported Value(s)
Features for scope: FCC_v2			
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
DC	The OUT is powered by or connected to DC Mains		
Eant	removable antenna supplied and type tested with the radio equipment, designed as an indispensable part of the equipment		
EDR2	EUT supports Bluetooth using data rate of 2 Mbps with PI/4 DQPSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR3	EUT supports Bluetooth using data rate of 3 Mbps with 8DPSK modulation in the band 2400 MHz - 2483.5 MHz		
PantC	permanent fixed antenna connector, which may be built-in, designed as an indispensable part of the equipment		
Wb	EUT supports WLAN in mode b in the band 2400 MHz - 2483.5 MHz		
Wg	EUT supports WLAN in mode g in the band 2400 MHz - 2483.5 MHz		
WLAN	EUT supports WLAN channels 2412 MHz - 2462 MHz.		

2.4   Auxiliary Equipment

AE No.	Type Designation	Serial No.	HW Status	SW Status	Description
AE 1	Parrot FC6050x Workbench				Test Board

2.5   Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used.
The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

Setup No. List of OUT samples		List of auxiliary equipment	
Sample No.	Sample Description	AE No.	AE Description
Z01			
Sample: z01	Sample#1	AE 1	Test Board

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3 Results

3.1 General

Documentation of tested devices:	Available at the test laboratory.
Interpretation of the test results:	The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.
	In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.
	In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.
Note:	1) The laboratory environmental conditions are available and recorded in the Interlab System.
	2) Special Software for testing: The OUT was connected to a Laptop via USB connection to set the test mode. The OUT could be set into Bluetooth Test Modes by using the program "WxSerial" provided by the applicant. The specific test modes could be set and controlled by the signalling unit "CBT" by Rohde&Schwarz over the air. The OUT was disconnected from the Laptop during testing.
	3) This test report focuses on the Bluetooth functionality of the device, without HS Mode.

3.2 List of the Applicable Body

(Body for Scope: FCC_v2)

Designation	Description
FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES	Subpart C - Intentional Radiators; 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

3.3 List of Test Specification

Test Specification:	**FCC part 2 and 15**
Version	10-1-11 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 15 - RADIO FREQUENCY DEVICES

Reference: MDE_PARRO_1129_FCCb

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3.4   Summary

Test Case Identifier / Name Test (condition)	Result	Date of Test	Lab Ref.	Setup
15c.2 Spurious radiated emissions §15.247 (d), §15.35 (b), §15.209				
15c.2; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = low	Passed	2012/02/05	Lab 1	Z01
15c.2; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.2; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.2; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = mid	Passed	2012/02/05	Lab 1	Z01
15c.2; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.2; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.2; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = highest	Passed	2012/02/05	Lab 1	Z01
15c.2; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.2; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/05	Lab 1	Z01
	footnote: 1			
15c.3 Occupied bandwidth §15.247 (a) (1)				
15c.3; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.3; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01

Reference: MDE_PARRO_1129_FCCb

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Test Case Identifier / Name Test (condition)	Result	Date of Test	Lab Ref.	Setup
15c.4 Peak power output §15.247 (b) (1)				
15c.4; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.4; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.5 Spurious RF conducted emissions §15.247 (d)				
15c.5; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01
15c.5; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed footnote: 2	2012/02/16	Lab 2	Z01

Reference: MDE_PARRO_1129_FCCb

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Test Case Identifier / Name Test (condition)	Result	Date of Test	Lab Ref.	Setup
15c.6 Band edge compliance §15.247 (d)				
15c.6; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = radiated	Passed	2012/02/01	Lab 1	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = radiated	Passed	2012/02/01	Lab 1	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = conducted	Passed	2012/02/16	Lab 2	Z01
15c.6; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = radiated	Passed	2012/02/01	Lab 1	Z01
15c.7 Dwell time §15.247 (a) (1) (iii)				
15c.7; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.7; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.7; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.8 Channel separation §15.247 (a) (1)				
15c.8; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.8; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.8; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.9 Number of hopping frequencies §15.247 (a) (1) (iii)				
15c.9; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.9; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation	Passed	2012/02/16	Lab 2	Z01
15c.9; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation	Passed	2012/02/16	Lab 2	Z01

3.5   Detailed Footnotes

No.	Description
1	This test case has been performed in the Frequency Range 1 to 8 GHz only, because pre-measurements have shown that no spurious emissions have been found outside this frequency range.
2	The reference plot and reference value for the spurious emissions limit is listed in the corresponding "Band edge compliance" test case.

Reference: MDE_PARRO_1129_FCCb

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3.6 Detailed Results

3.6.1 15c.2 Spurious radiated emissions §15.247 (d), §15.35 (b), §15.209

Test: 15c.2; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = low

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:47
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)   TX on 2402 MHz   DH1

Frequency range 30 MHz – 1 GHz

Ant. Polar.	Limit QPK [dBµV]	Frequency [MHz]	Corrected value QPK [dBµV]	Margin QPK [dB]	Result
Ver + Hor					Passed

Frequency range 1 GHz – 25 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:57
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)   TX on 2402 MHz   2-DH1

Frequency range 1 GHz – 8 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Reference: MDE_PARRO_1129_FCCb

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Test: 15c.2; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 16:00
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)	TX on 2402 MHz	3-DH1

Frequency range 1 GHz - 8 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = mid

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:49
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)	TX on 2441 MHz	DH1

Frequency range 9 kHz - 1 GHz

Ant. Polar.	Limit QPK [dBµV]	Frequency [MHz]	Corrected value QPK [dBµV]	Margin QPK [dB]	Result
Ver + Hor					Passed

Frequency range 1 GHz - 25 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Reference: MDE_PARRO_1129_FCCb

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Test: 15c.2; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:58
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)		TX on 2441 MHz					2-DH1	
Frequency range 1 GHz - 8 GHz								
Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 16:03
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)		TX on 2441 MHz					3-DH1	
Frequency range 1 GHz - 8 GHz								
Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Channel = highest

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:54
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

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Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)			TX on 2480 MHz			DH1

Frequency range 30 MHz - 1 GHz

Ant. Polar.	Limit QPK [dBµV]	Frequency [MHz]	Corrected value QPK [dBµV]	Margin QPK [dB]	Result
Ver + Hor					Passed

Frequency range 1 GHz - 25 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 15:59
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)			TX on 2480 MHz			2-DH1

Frequency range 1 GHz - 8 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Test: 15c.2; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/05 16:03
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

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Detailed Results:

Traffic Mode FCC 15.247 (15.35b,15.209)			TX on 2480 MHz					3-DH1

Frequency range 1 GHz - 8 GHz

Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
Ver + Hor	74	54						Passed

Remark: No (further) spurious emissions in the range 20 dB below the limit found.

Reference: MDE_PARRO_1129_FCCb

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3.6.2   15c.3 Occupied bandwidth §15.247 (a) (1)

Test: 15c.3; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16   9:48

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
0.986

added by operator


```
                Marker 2 [T1]              RBW    30 kHz    RF Att    20 dB
    Ref Lvl                    -23.60 dBm  VBW    30 kHz
    10 dBm                 2.40246920 GHz  SWT    8.5 ms    Unit          dBm
```

Title: 20dB Bandwidth
Comment A: CH B: 2402 MHz; 20dB bandwidth (kHz):986.4
Date: 16.FEB.2012 10:27:00

added by operator

Reference: MDE_PARRO_1129_FCCb

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Test: 15c.3; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:38
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.240

added by operator

Title: 20dB Bandwidth
Comment A: CH B: 2402 MHz; 20dB bandwidth (kHz):1239.6
Date: 16.FEB.2012 12:25:18

added by operator

Reference: MDE_PARRO_1129_FCCb

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Test: 15c.3; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 14:10

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.246

added by operator

Title: 20dB Bandwidth
Comment A: CH B: 2402 MHz; 20dB bandwidth (kHz):1245.6
Date: 16.FEB.2012 13:57:21

added by operator

Reference: MDE_PARRO_1129_FCCb

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Test: 15c.3; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

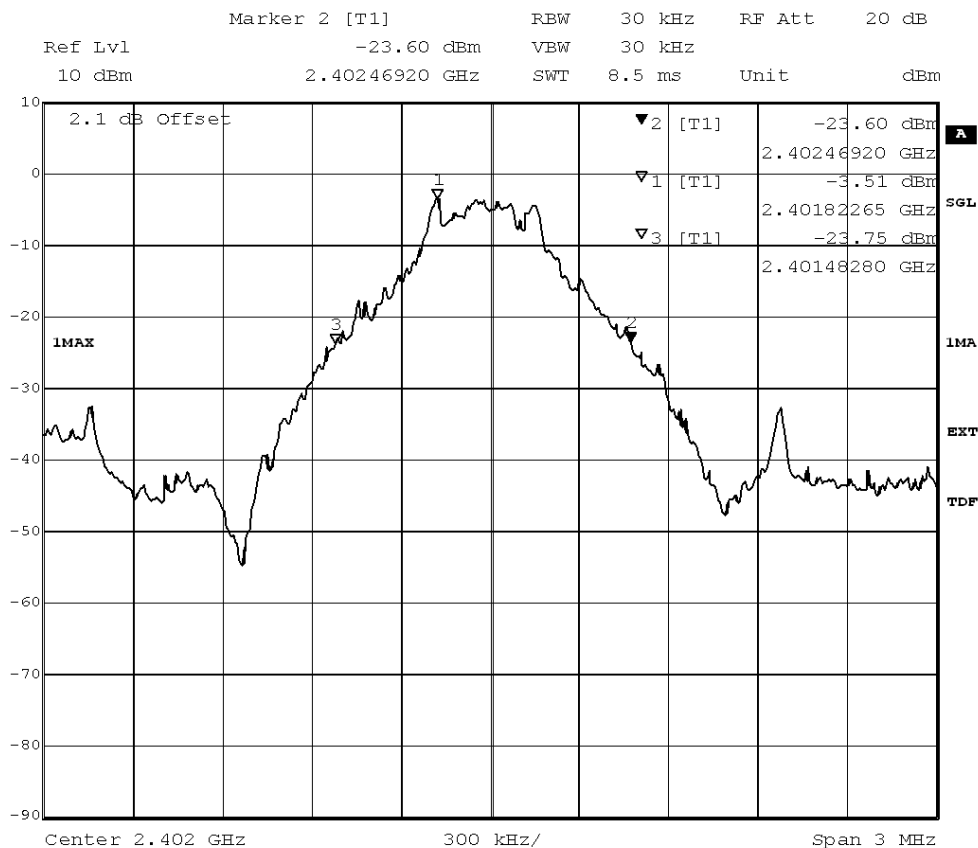*Setup No.:*   Z01

Date of Test: 2012/02/16 10:47

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
0.974

added by operator


```
              Marker 2 [T1]            RBW   30 kHz    RF Att    20 dB
    Ref Lvl                 -23.40 dBm  VBW   30 kHz
    10 dBm            2.44146920 GHz    SWT   8.5 ms    Unit      dBm
```

Title: 20dB Bandwidth
Comment A: CH M: 2441 MHz; 20dB bandwidth (kHz):974.4
Date: 16.FEB.2012 10:35:06

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

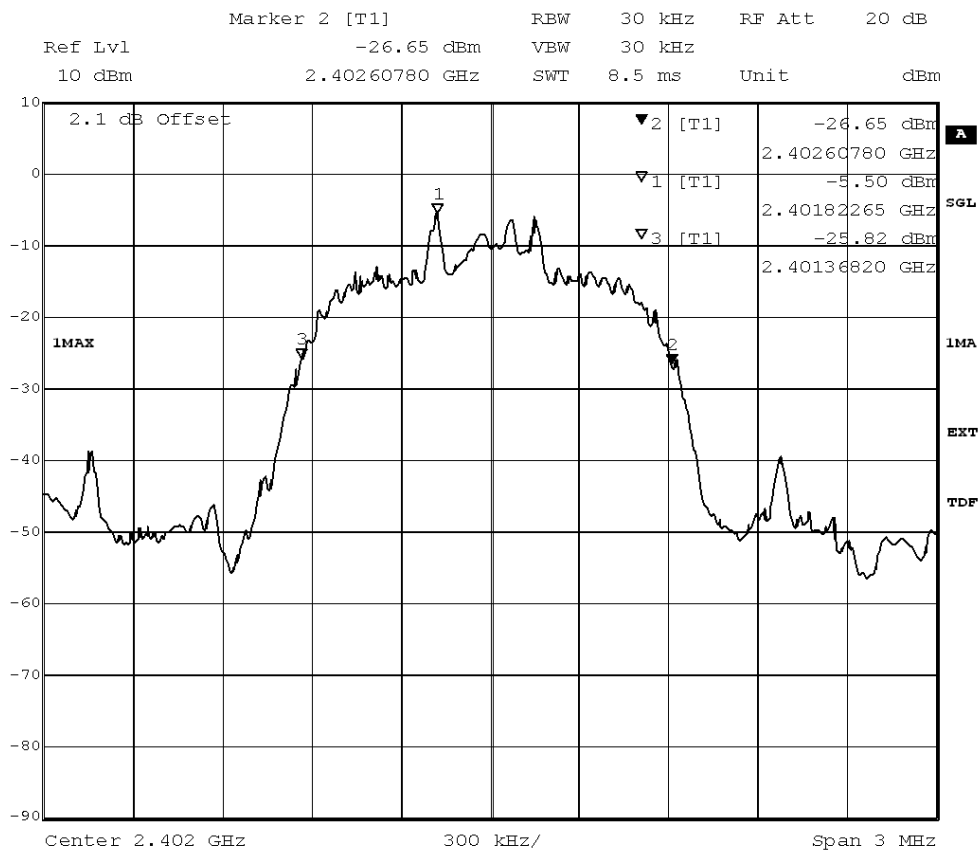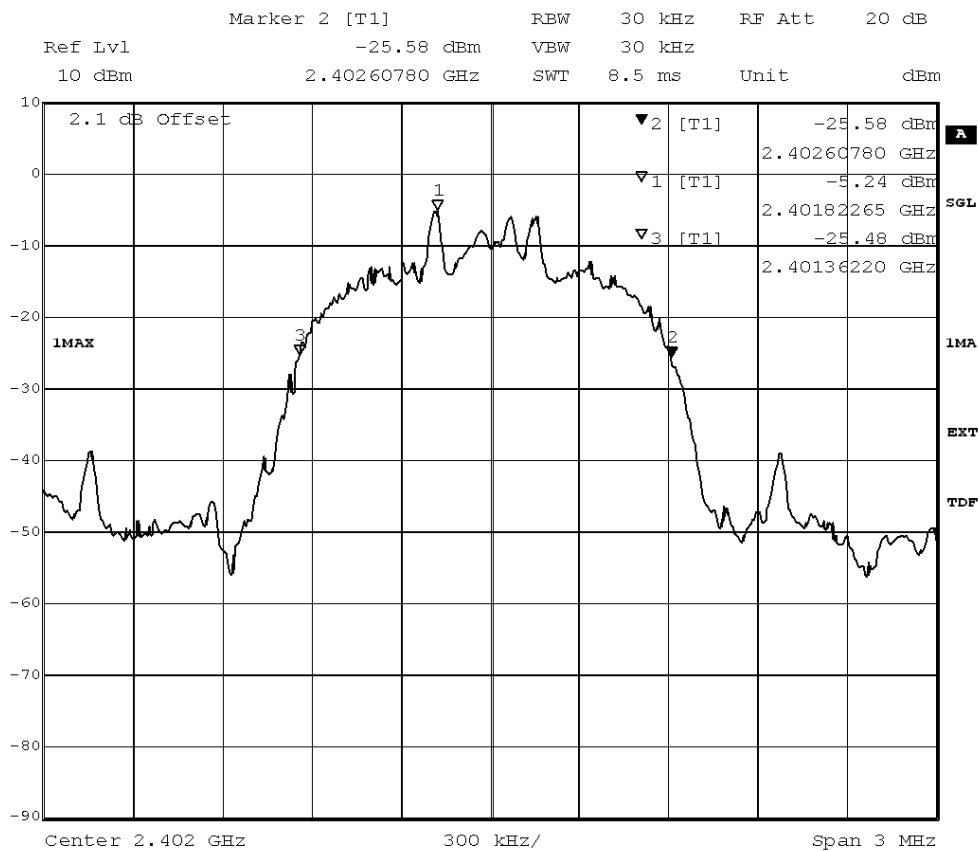**Test: 15c.3; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation**

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 13:03

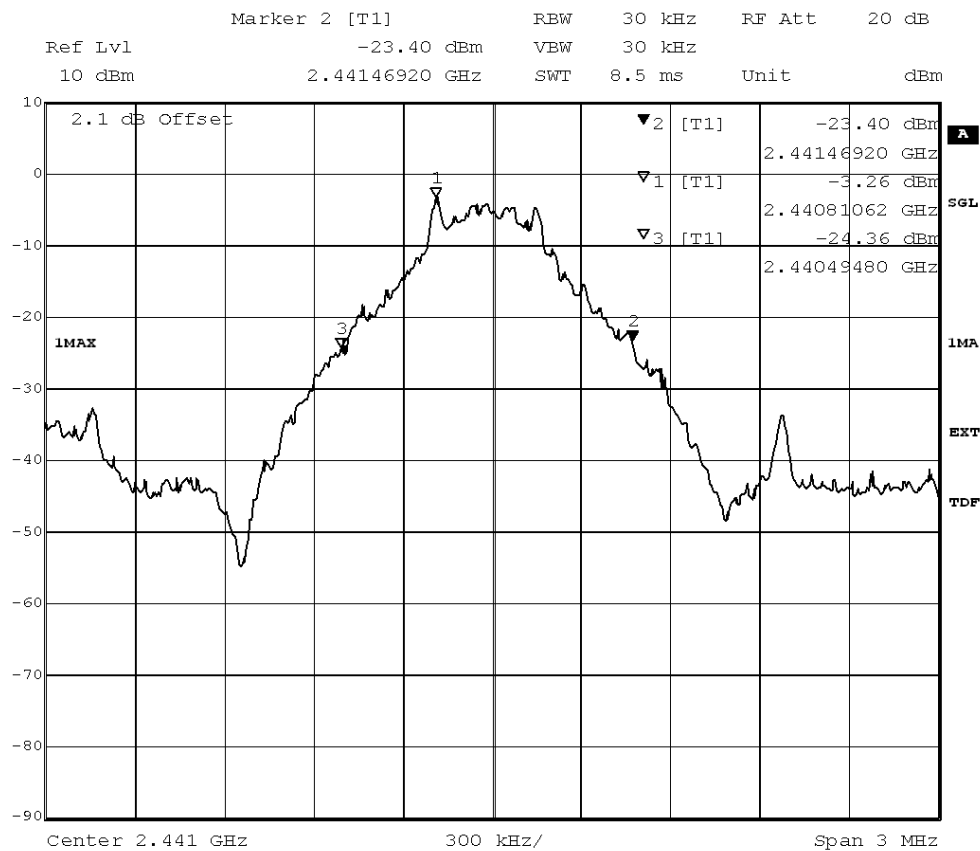*Body:*   FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.258

added by operator

Title: 20dB Bandwidth
Comment A: CH M: 2441 MHz; 20dB bandwidth (kHz):1257.6
Date: 16.FEB.2012 12:50:57

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.3; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 14:54

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.178

added by operator


```
                    Marker 2 [T1]            RBW    30 kHz     RF Att     20 dB
    Ref Lvl                    -24.10 dBm    VBW    30 kHz
    10 dBm                 2.44158320 GHz    SWT    8.5 ms     Unit          dBm
```

```
Title:      20dB Bandwidth
Comment A:  CH M: 2441 MHz; 20dB bandwidth (kHz):1178.4
Date:       16.FEB.2012  14:42:07
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

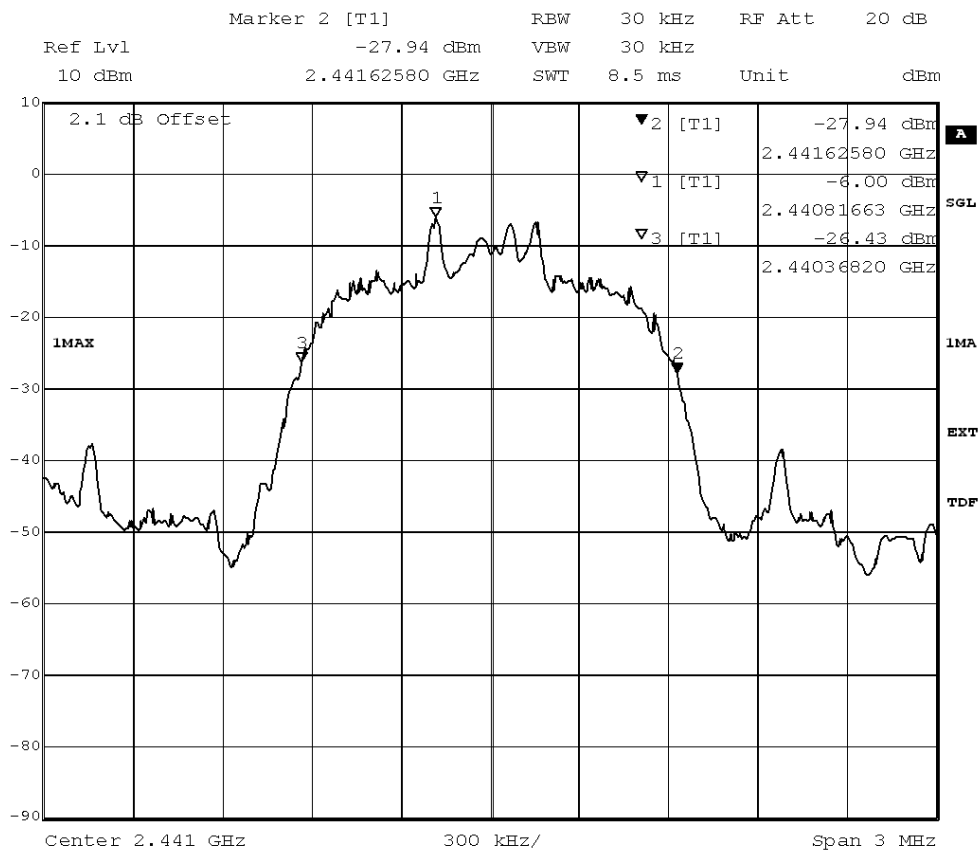**Test: 15c.3; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation**

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 11:53

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
0.968

added by operator

Title: 20dB Bandwidth
Comment A: CH T: 2480 MHz; 20dB bandwidth (kHz):968.4
Date: 16.FEB.2012 11:39:20

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.3; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:16
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.258

added by operator

```
              Marker 2 [T1]              RBW    30 kHz    RF Att    20 dB
   Ref Lvl                   -29.53 dBm   VBW    30 kHz
   10 dBm                2.48062580 GHz   SWT   8.5 ms    Unit        dBm
```



```
Title:      20dB Bandwidth
Comment A:  CH T: 2480 MHz; 20dB bandwidth (kHz):1257.6
Date:       16.FEB.2012  12:03:35
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.3; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 14:34
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

20 dB bandwidth MHz
1.197

added by operator

Title: 20dB Bandwidth
Comment A: CH T: 2480 MHz; 20dB bandwidth (kHz):1197
Date: 16.FEB.2012 14:22:12

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.3   15c.4 Peak power output §15.247 (b) (1)

Test: 15c.4; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01
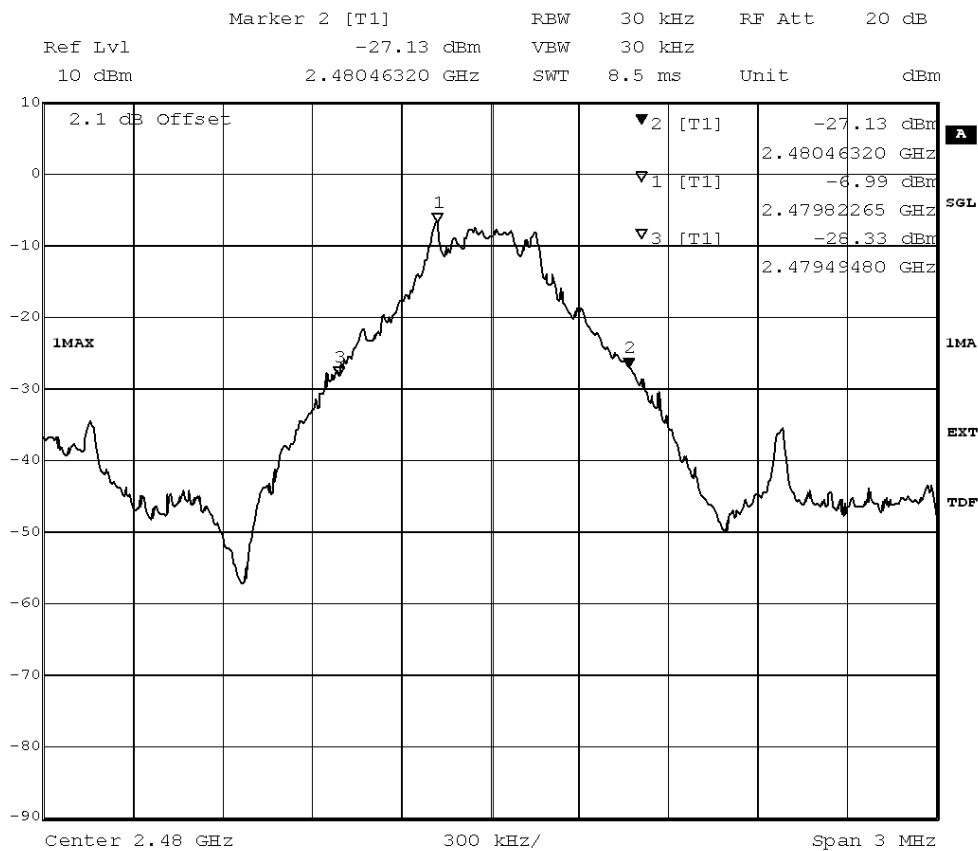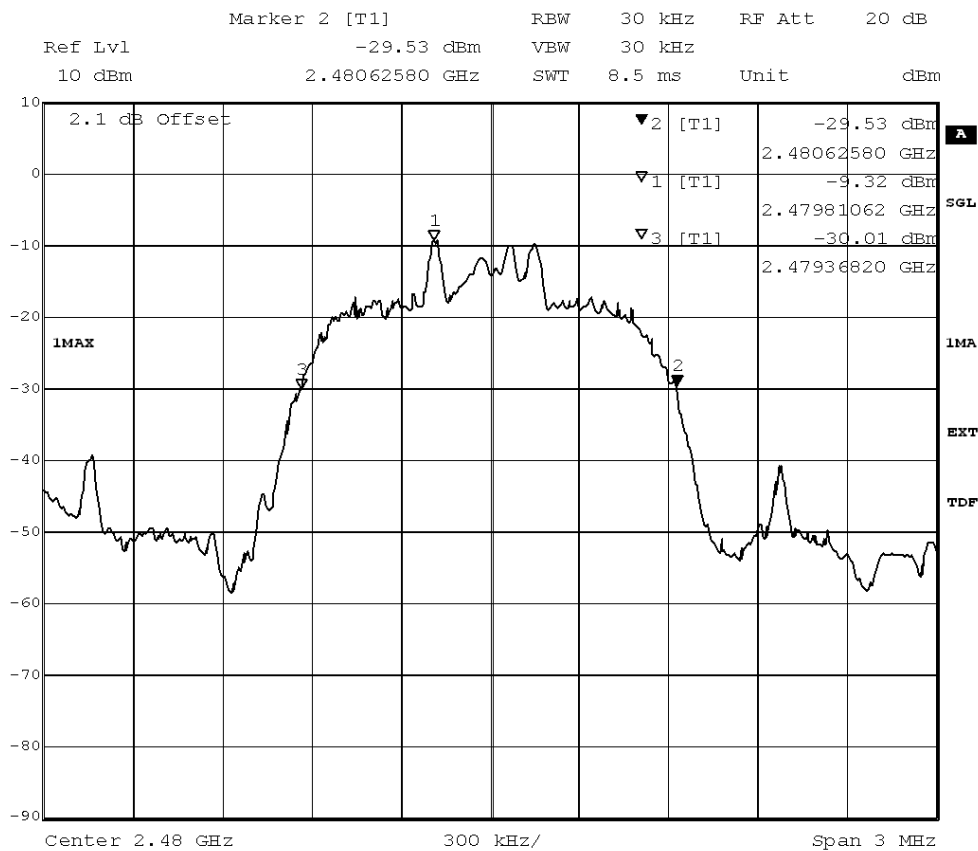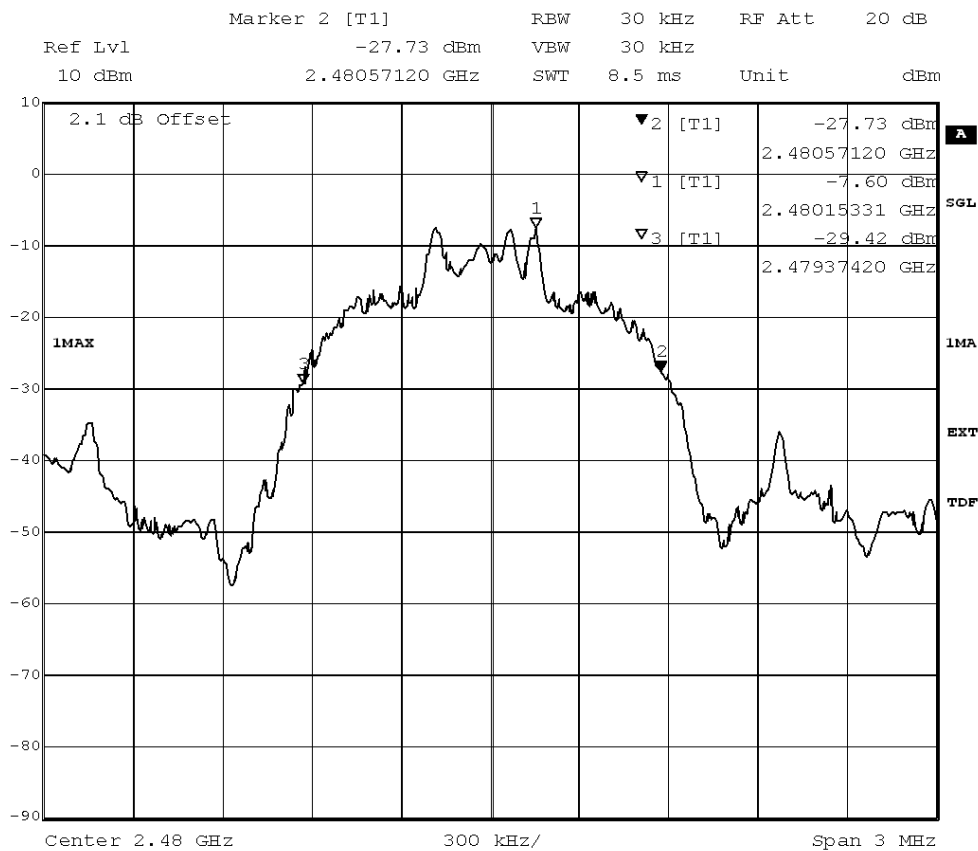
Date of Test: 2012/02/16 10:13

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-1.32	-2.34	-3.66

added by operator

	Marker 1 [T1]	RBW	3 MHz	RF Att	20 dB

```
              Marker 1 [T1]            RBW    3 MHz   RF Att    20 dB
    Ref Lvl                  -1.32 dBm  VBW    3 MHz
    10 dBm              2.40175351 GHz  SWT    5 ms    Unit       dBm
10
      2.1 dB Offset                                                    A
 0                            1
                             ▼                                         SGL
-10
-20
   1MAX                                                                1MA
-30
                                                                       EXT
-40
                                                                       TDF
-50
-60
-70
-80
-90
    Center 2.402 GHz           600 kHz/            Span 6 MHz
```

Title: Peak outputpower Power
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 10:01:35

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:41
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-3.73	-2.34	-6.07

added by operator

Marker 1 [T1]	RBW	3 MHz	RF Att 20 dB
Ref Lvl −3.73 dBm	VBW	3 MHz	
10 dBm 2.40171743 GHz	SWT	5 ms	Unit dBm

Title: Peak outputpower Power
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 12:25:50

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01
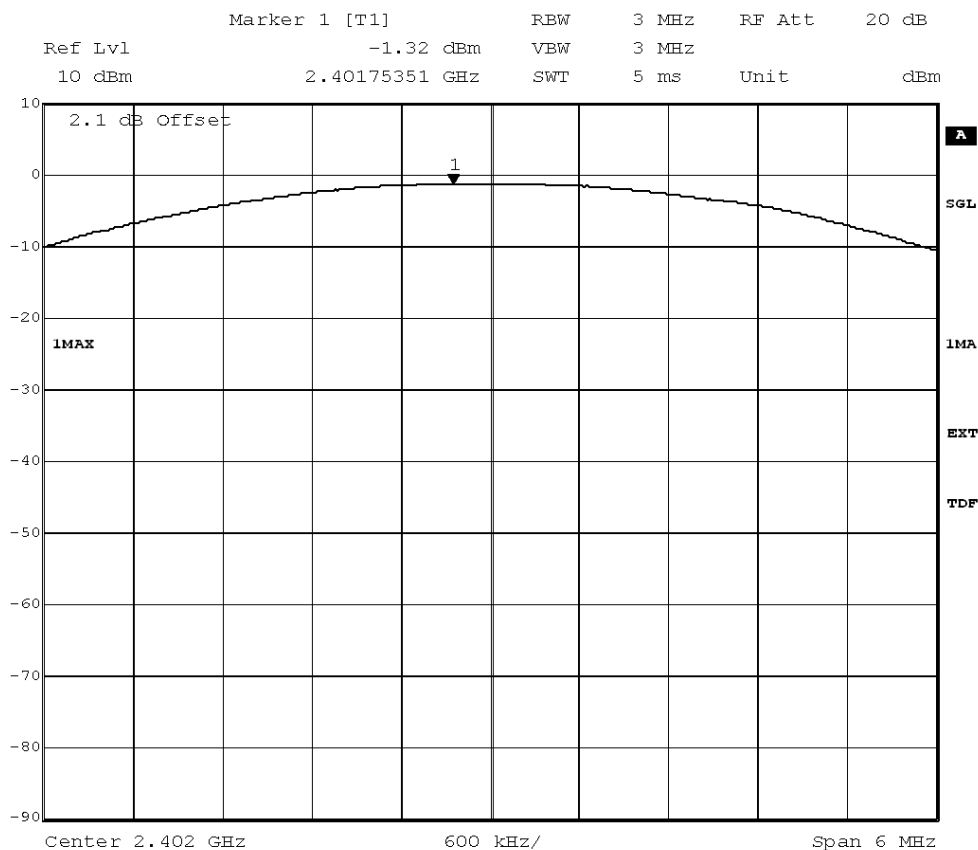
Date of Test: 2012/02/16 14:12
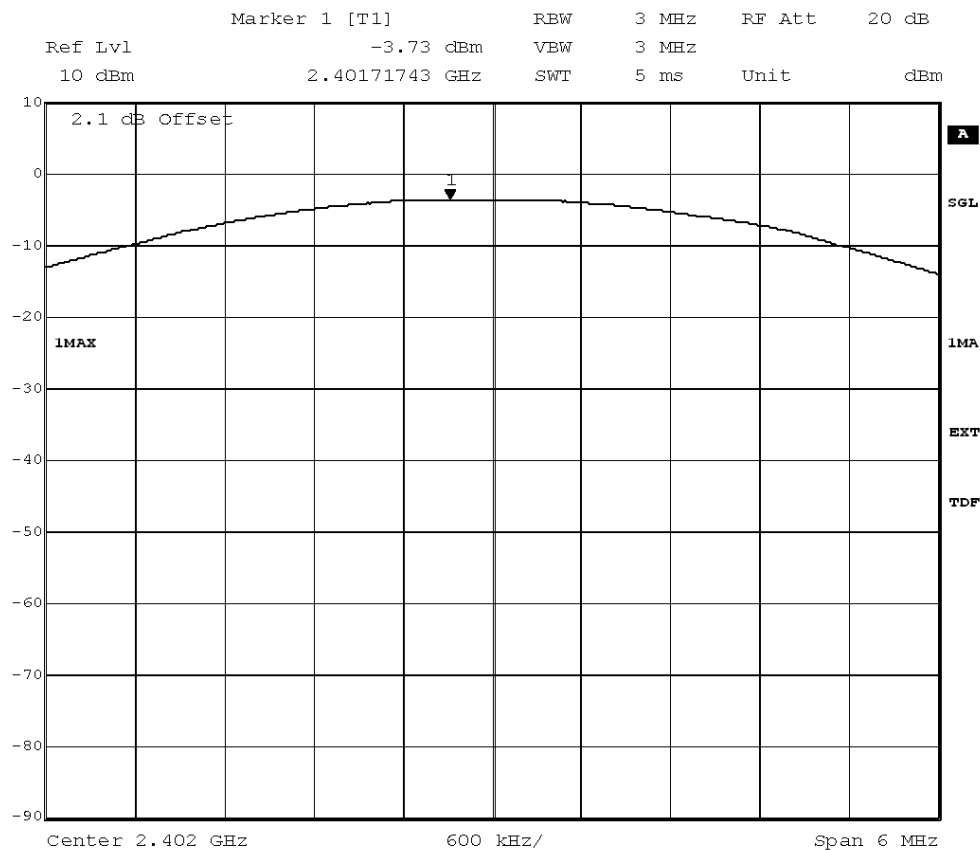
Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-3.39	-2.34	-5.73

added by operator

Marker 1 [T1]		RBW	3 MHz	RF Att	20 dB

Ref Lvl   -3.39 dBm   VBW   3 MHz

10 dBm   2.40195792 GHz   SWT   5 ms   Unit   dBm

2.1 dB Offset

A

SGL

1MAX

1MA

EXT

TDF

Center 2.402 GHz   600 kHz/   Span 6 MHz

Title: Peak outputpower Power
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 13:57:54

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 11:04
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-1.83	-2.34	-4.17

added by operator

	Marker 1 [T1]	RBW	3 MHz	RF Att 20 dB
Ref Lvl	−1.83 dBm	VBW	3 MHz	
10 dBm	2.44084970 GHz	SWT	5 ms	Unit dBm

```
 10
      2.1 dB Offset                                          A
  0                         1
                            ▽                               SGL
-10
-20
                                                           1MA
1MAX
-30
                                                           EXT
-40
                                                           TDF
-50
-60
-70
-80
-90
     Center 2.441 GHz            600 kHz/         Span 6 MHz
```

Title: Peak outputpower Power
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 10:51:31

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result: Passed

Setup No.:   Z01
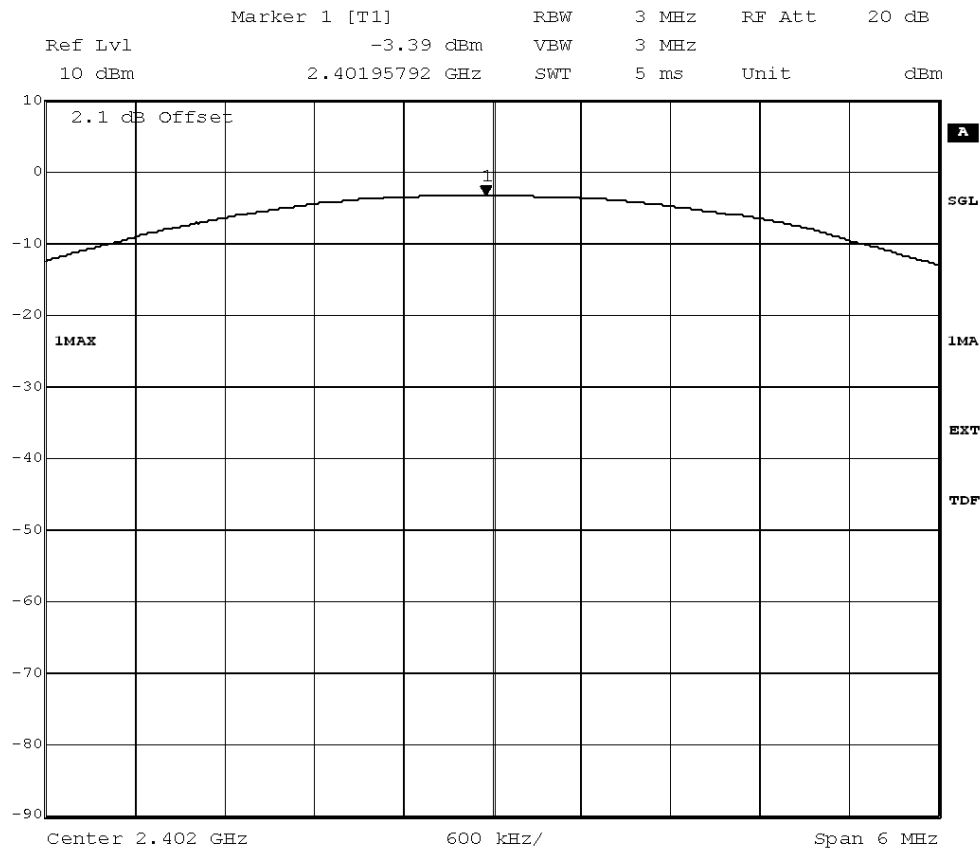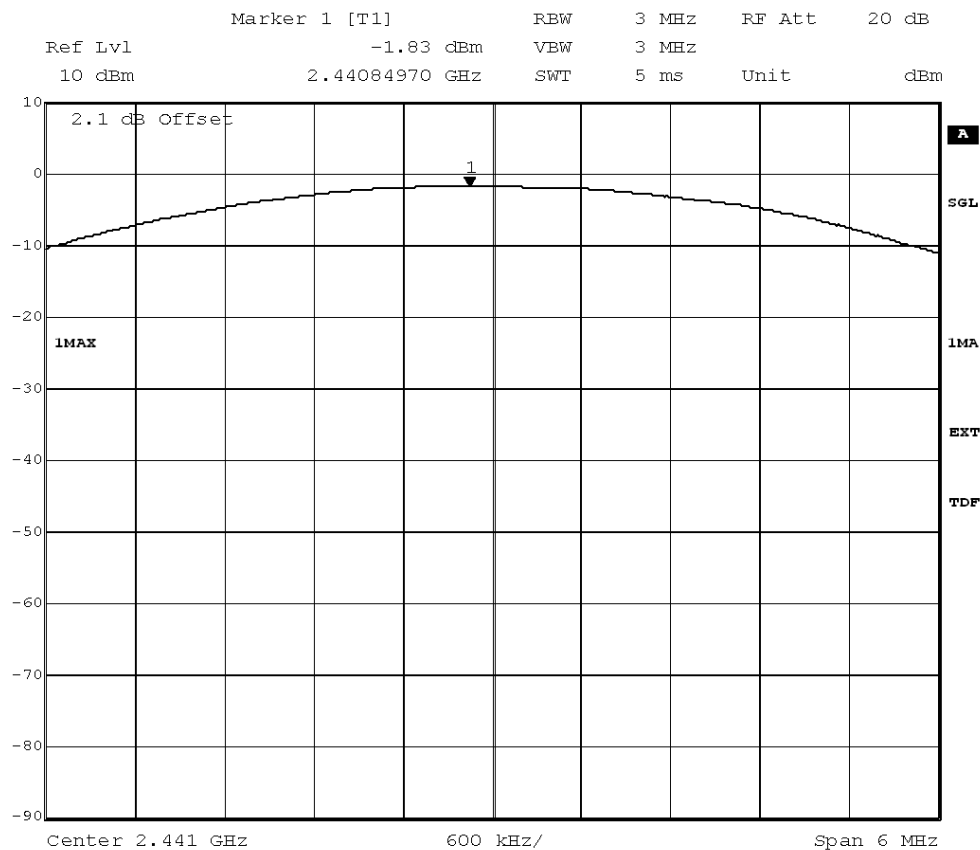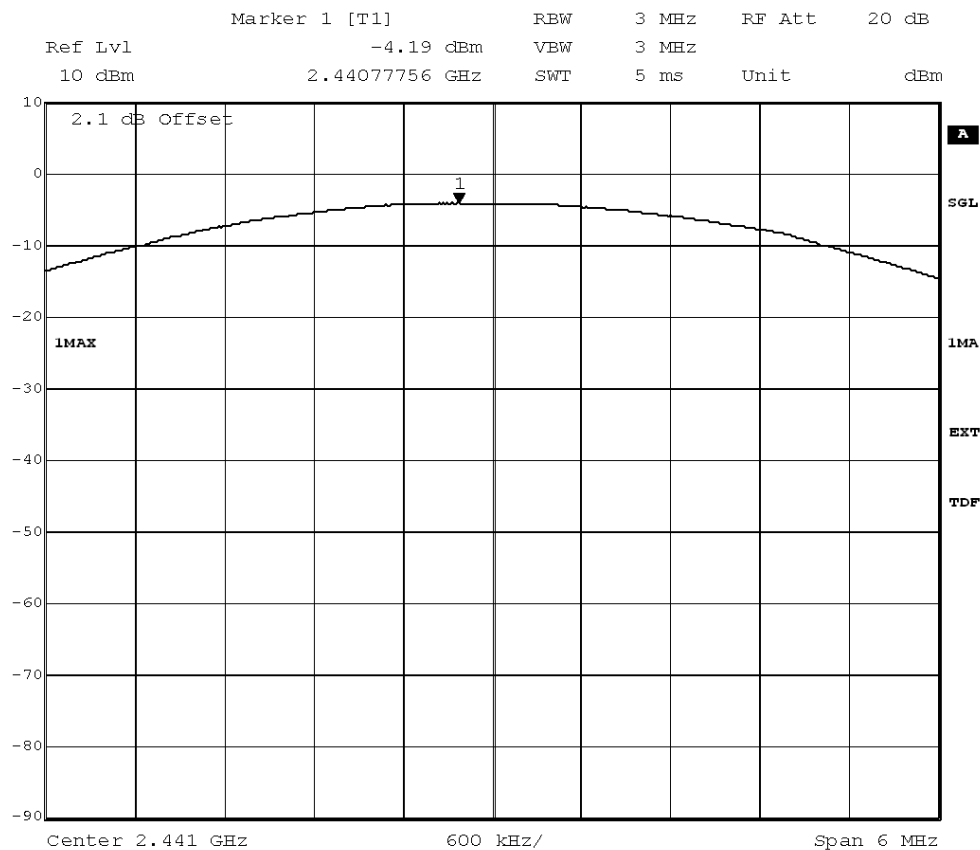
Date of Test: 2012/02/16 13:05

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-4.19	-2.34	-6.53

added by operator

	Marker 1 [T1]			RBW	3 MHz	RF Att	20 dB	
Ref Lvl			-4.19 dBm	VBW	3 MHz			
10 dBm		2.44077756 GHz		SWT	5 ms	Unit		dBm


```
10
      2.1 dB Offset                                          A

 0                              1
                                ▼                           SGL
-10

-20
    1MAX                                                    1MA
-30

-40                                                        EXT

-50                                                        TDF

-60

-70

-80

-90
    Center 2.441 GHz           600 kHz/           Span 6 MHz
```

Title: Peak outputpower Power
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 12:51:30

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

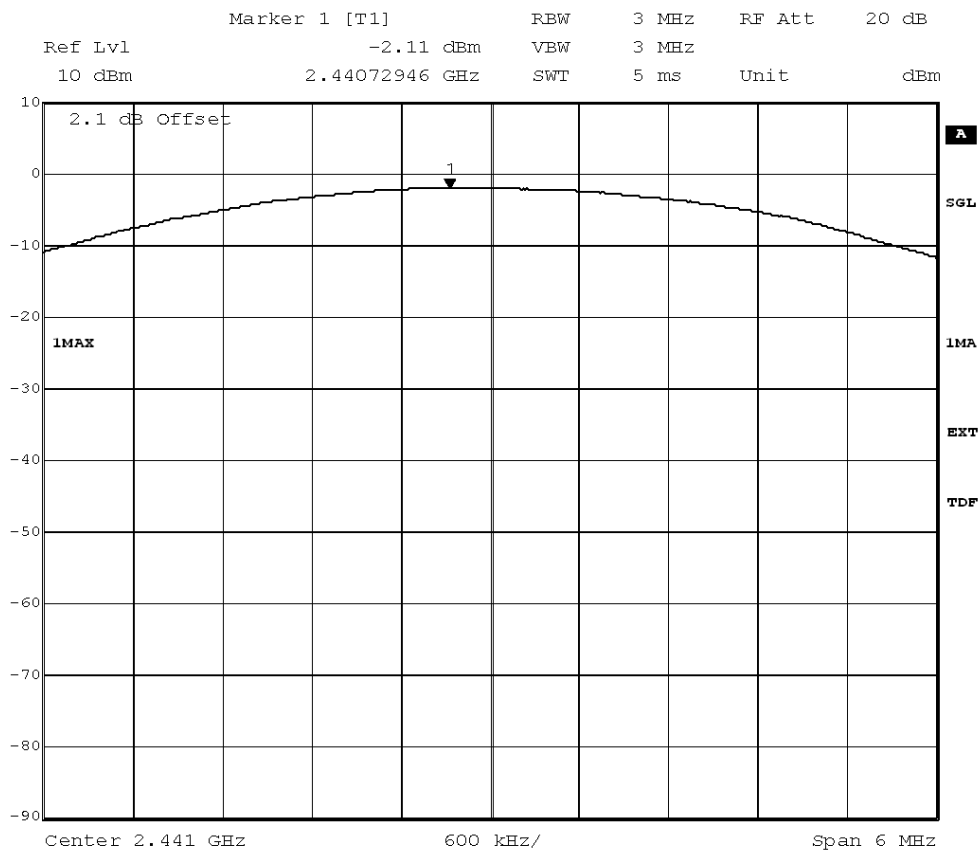|	
Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 14:55
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-2.11	-2.34	-4.45

added by operator


```
                    Marker 1 [T1]          RBW    3 MHz    RF Att    20 dB
        Ref Lvl                 -2.11 dBm   VBW    3 MHz
        10 dBm              2.44072946 GHz   SWT    5 ms     Unit        dBm
```

Title: Peak outputpower Power
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 14:42:40

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 11:52
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-5.18	-2.34	-7.52

added by operator

	Marker 1 [T1]		RBW	3 MHz	RF Att 20 dB
Ref Lvl		-5.18 dBm	VBW	3 MHz	
10 dBm		2.47980160 GHz	SWT	5 ms	Unit dBm

```
  10
      2.1 dB Offset                                                A
   0
                                1
                                ▼                               SGL
 -10
 -20
      1MAX                                                       1MA
 -30
                                                                 EXT
 -40
                                                                 TDF
 -50
 -60
 -70
 -80
 -90
      Center 2.48 GHz          600 kHz/              Span 6 MHz
```

Title: Peak outputpower Power
Comment A: CH T: 2480 MHz
Date: 16.FEB.2012 11:39:53

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.4; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:18
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-7.07	-2.34	-9.41

added by operator

```
            Marker 1 [T1]              RBW    3 MHz    RF Att    20 dB
  Ref Lvl                   -7.07 dBm  VBW    3 MHz
  10 dBm               2.47976553 GHz  SWT    5 ms     Unit         dBm
```



```
Title:      Peak outputpower Power
Comment A:  CH T: 2480 MHz
Date:       16.FEB.2012  12:04:08
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

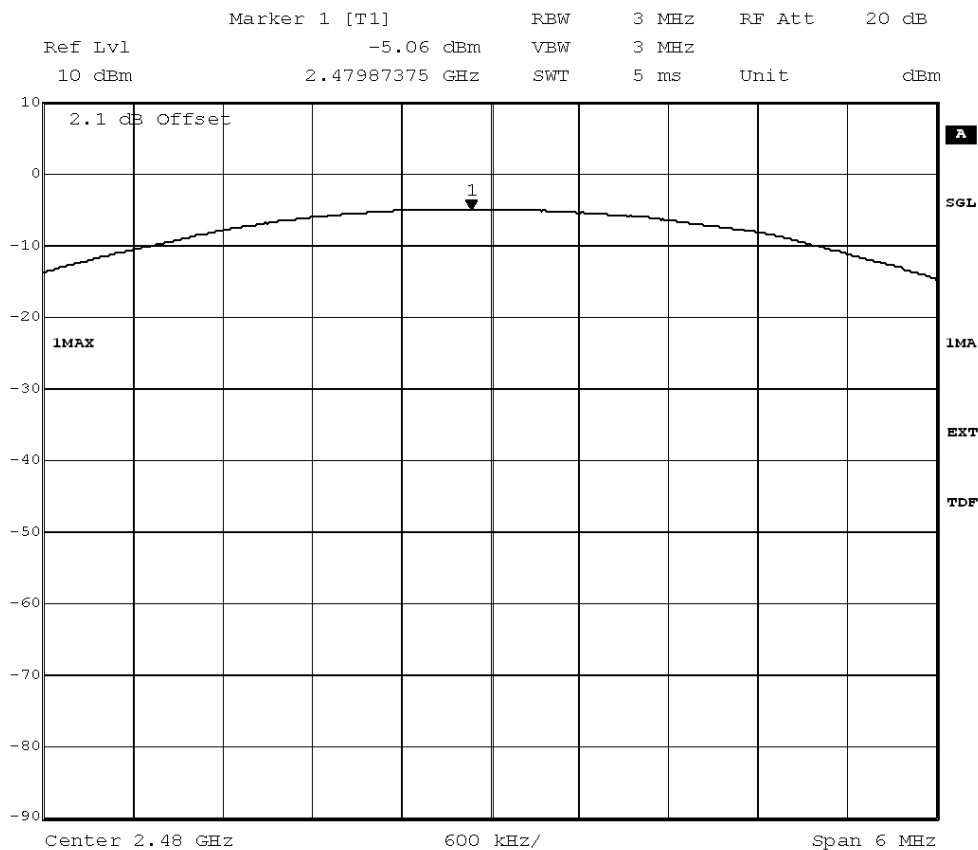**Test: 15c.4; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation**

Result: Passed

Setup No.:   Z01
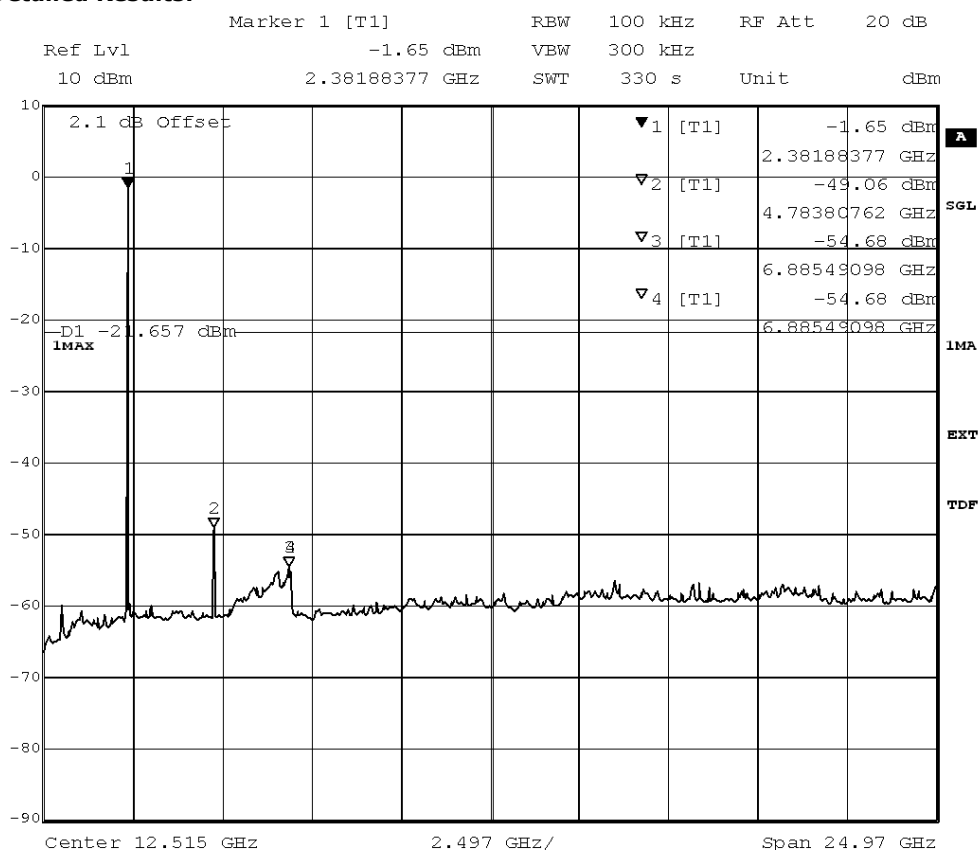
Date of Test: 2012/02/16 14:35

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

conducted peak output power value /dBm	Antenna gain	peak value EIRP /dBm
-5.06	-2.34	-7.40

added by operator

```
              Marker 1 [T1]            RBW    3 MHz    RF Att    20 dB
  Ref Lvl                  -5.06 dBm   VBW    3 MHz
   10 dBm            2.47987375 GHz    SWT    5 ms     Unit        dBm
```



```
Center 2.48 GHz              600 kHz/              Span 6 MHz
```

```
Title:      Peak outputpower Power
Comment A:  CH T: 2480 MHz
Date:       16.FEB.2012  14:22:46
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.4   15c.5 Spurious RF conducted emissions §15.247 (d)

Test: 15c.5; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 11:28
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:


```
                Marker 1 [T1]              RBW    100 kHz    RF Att    20 dB
    Ref Lvl                  -1.65 dBm     VBW    300 kHz
    10 dBm                2.38188377 GHz   SWT     330 s     Unit        dBm
```

Title: spurious emissions
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 11:16:27

added by operator

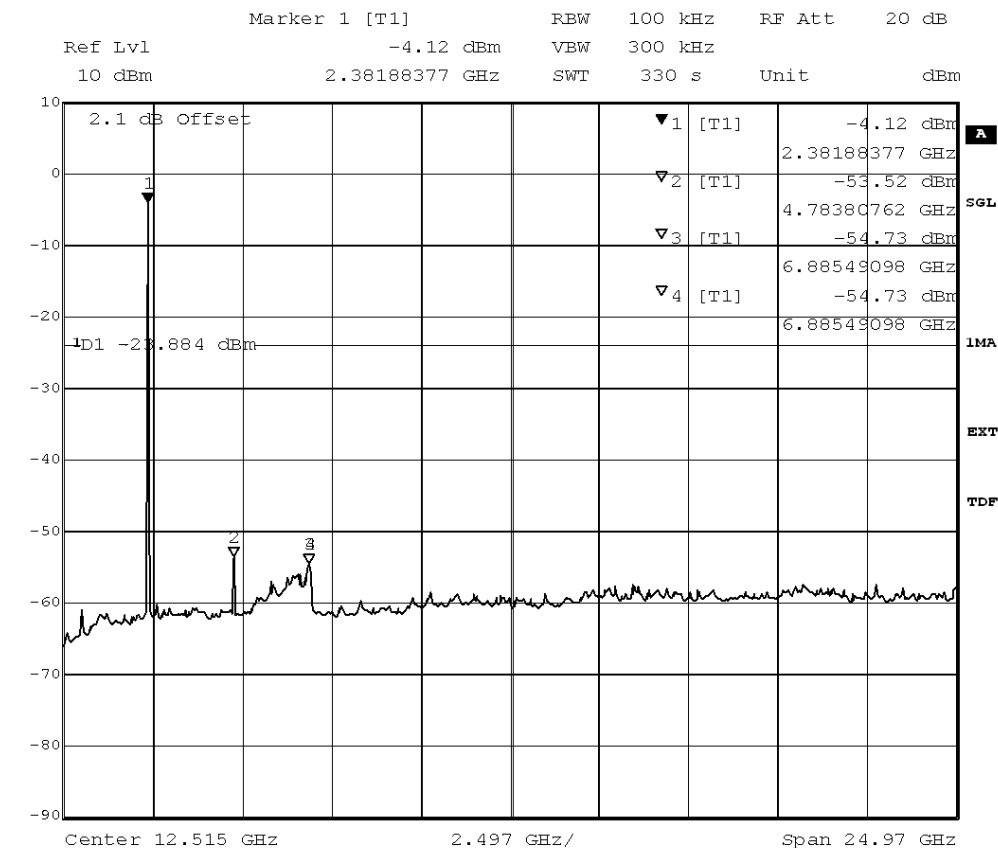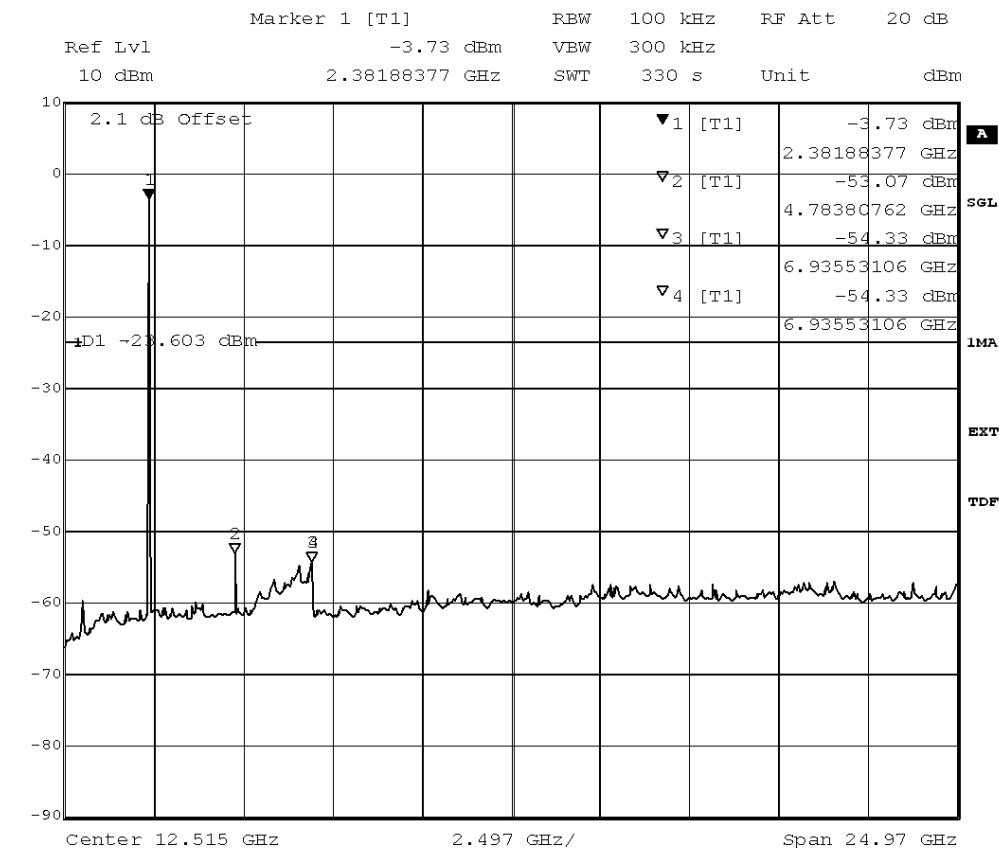**Test: 15c.5; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation**

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:42
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

```
               Marker 1 [T1]              RBW    100 kHz    RF Att    20 dB
    Ref Lvl                    -4.12 dBm   VBW    300 kHz
    10 dBm                2.38188377 GHz   SWT    330 s     Unit         dBm
```

2.1 dB Offset					▼1 [T1]		-4.12 dBm	A
						2.38188377 GHz	
					▽2 [T1]		-53.52 dBm	SGL
						4.78380762 GHz	
					▽3 [T1]		-54.73 dBm	
						6.88549098 GHz	
					▽4 [T1]		-54.73 dBm	
						6.88549098 GHz	1MA
D1 -23.884 dBm								

```
10 ┤  2.1 dB Offset                        ▼1 [T1]        -4.12 dBm   A
   │
 0 ┤    1                                  ▽2 [T1]       -53.52 dBm  SGL
   │
-10┤                                       ▽3 [T1]       -54.73 dBm
   │
   │                                       ▽4 [T1]       -54.73 dBm
-20┤                                                                 1MA
   │D1 -23.884 dBm
-30┤                                                                 EXT
   │
-40┤                                                                 TDF
   │
-50┤         2    3
   │         ▽    ▽
-60┤
   │
-70┤
   │
-80┤
   │
-90┴
   Center 12.515 GHz         2.497 GHz/            Span 24.97 GHz
```

```
Title:        spurious emissions
Comment A:  CH B: 2402 MHz
Date:       16.FEB.2012  12:22:05
```

added by operator

Test: 15c.5; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed
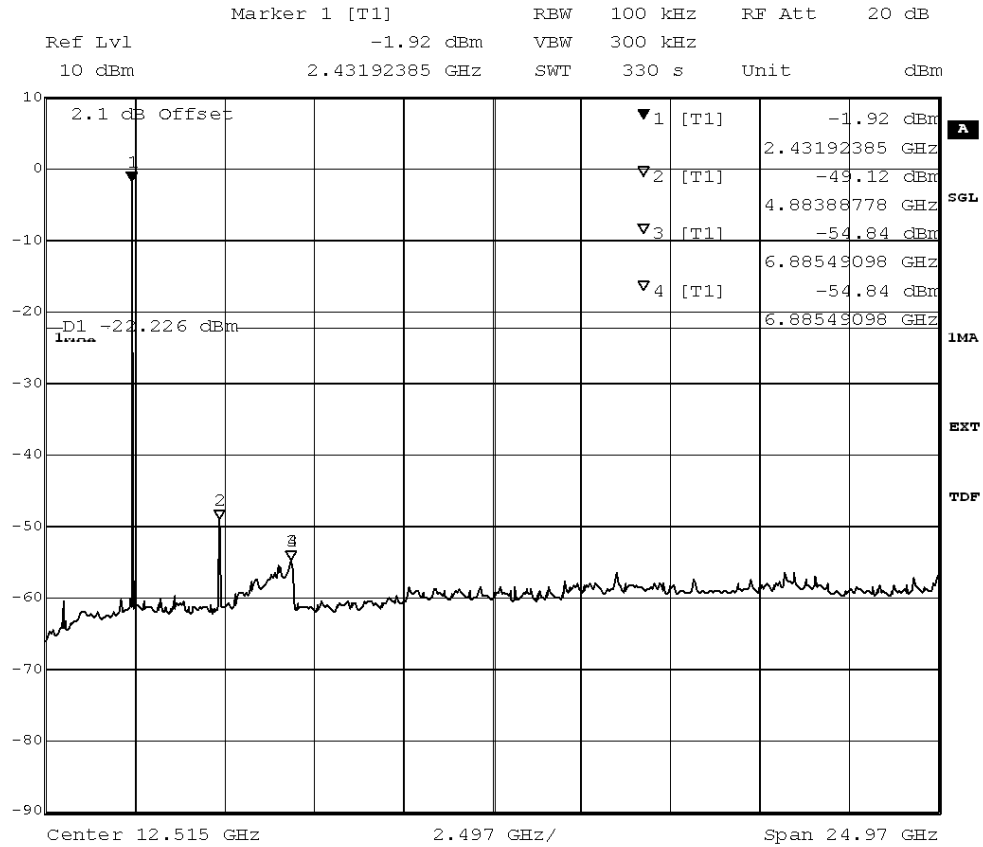
Setup No.:   Z01

Date of Test: 2012/02/16 14:13

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
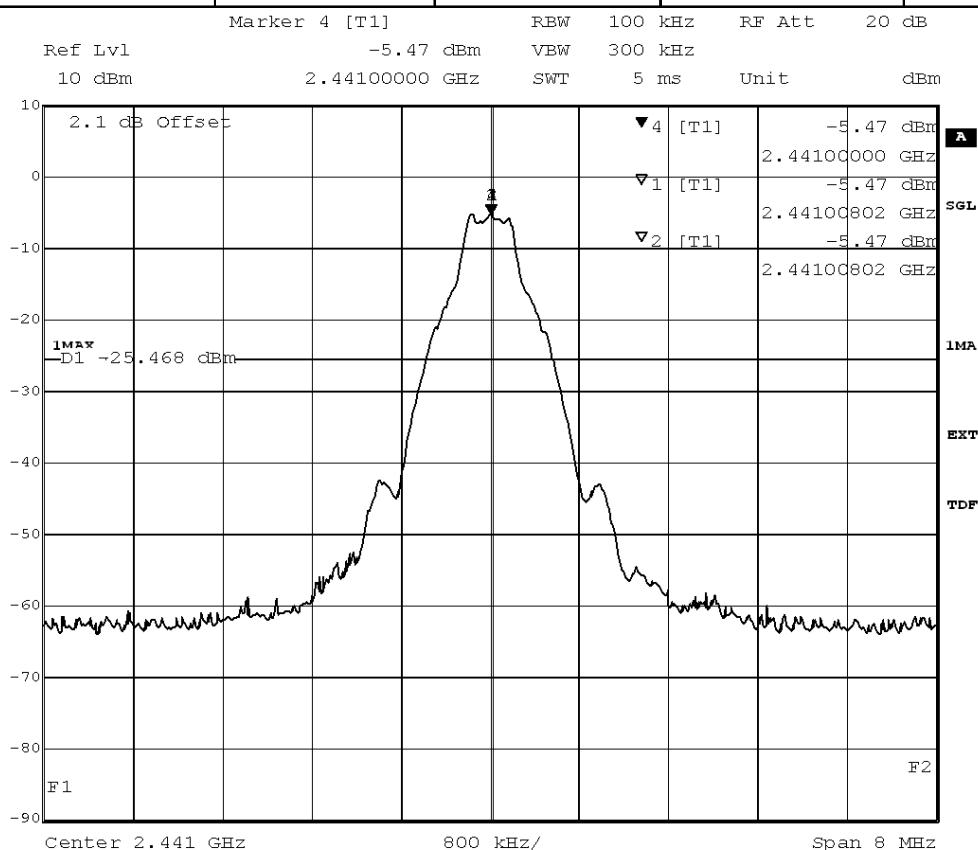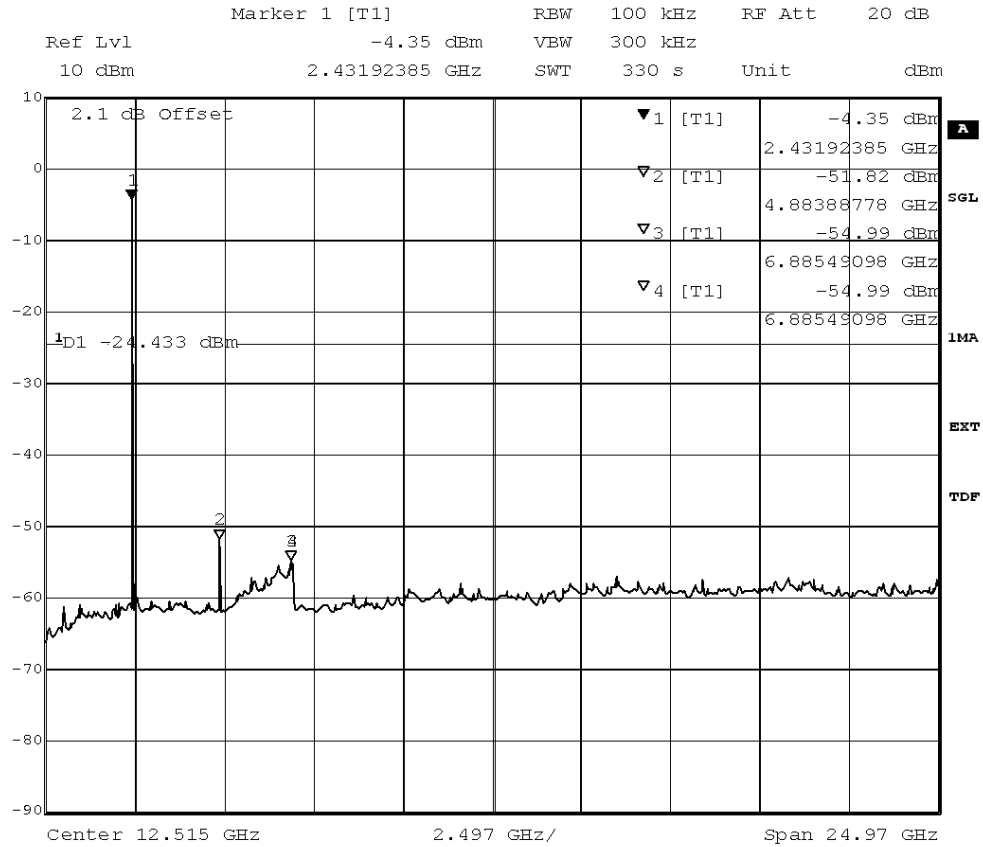
Test Specification: FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

```
           Marker 1 [T1]              RBW   100 kHz   RF Att    20 dB
    Ref Lvl                  -3.73 dBm   VBW   300 kHz
      10 dBm              2.38188377 GHz   SWT   330 s    Unit       dBm
```



```
Title:        spurious emissions
Comment A:  CH B: 2402 MHz
Date:        16.FEB.2012  13:54:02
```

added by operator

Test: 15c.5; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 11:08

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
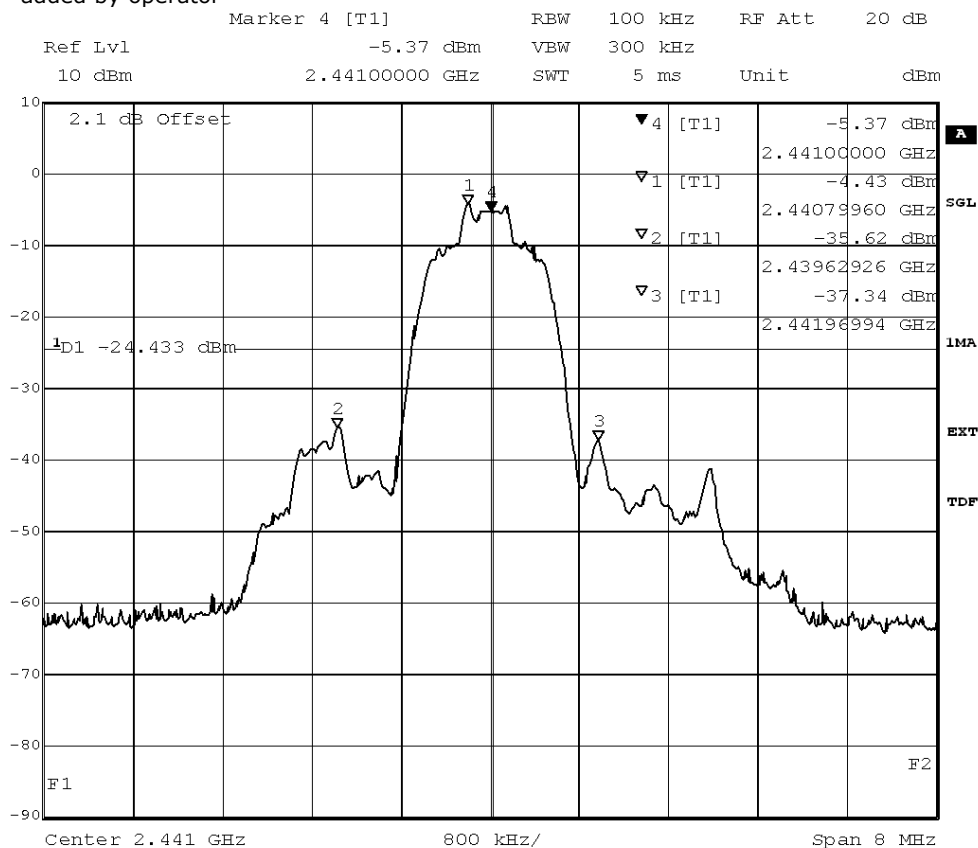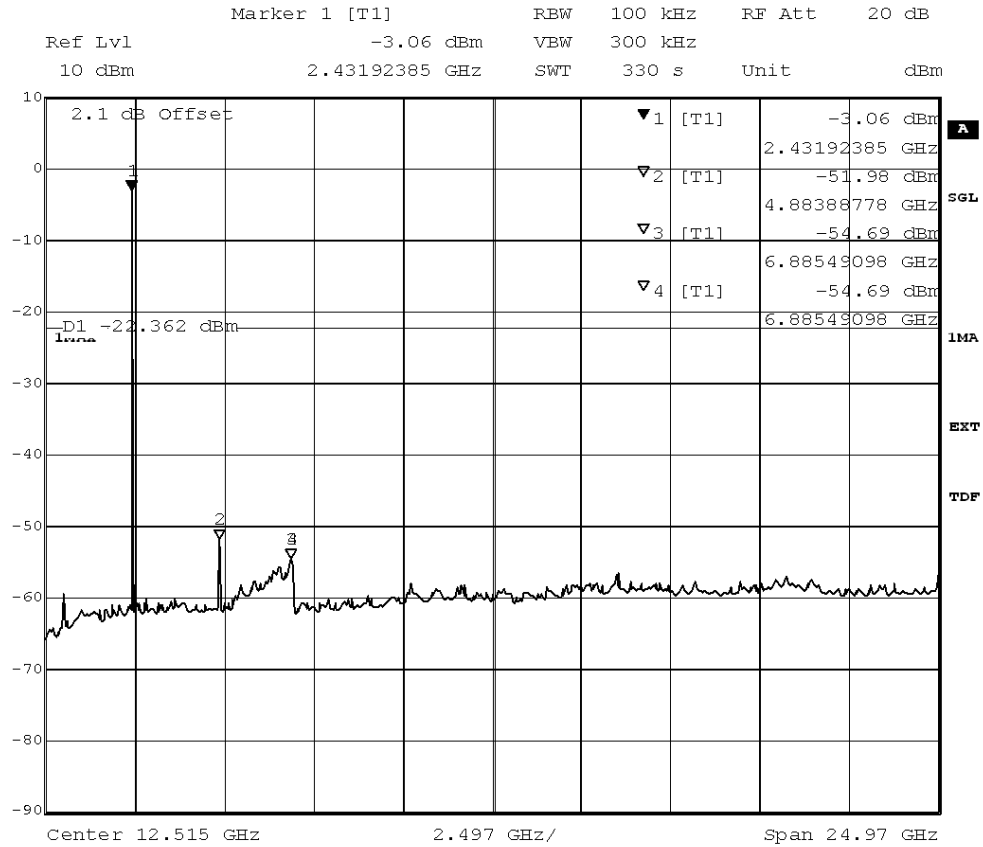
Test Specification: FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

```
                    Marker 1 [T1]              RBW    100 kHz    RF Att     20 dB
       Ref Lvl                    -1.92 dBm    VBW    300 kHz
       10 dBm                 2.43192385 GHz   SWT    330 s     Unit         dBm
```



```
Title:        spurious emissions
Comment A:    CH M: 2441 MHz
Date:         16.FEB.2012   10:50:59
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2441		-5.47		

```
                    Marker 4 [T1]              RBW    100 kHz   RF Att    20 dB
          Ref Lvl                -5.47 dBm     VBW    300 kHz
          10 dBm                2.44100000 GHz  SWT     5 ms    Unit           dBm

     10
         2.1 dB Offset                                 ▼4 [T1]         -5.47 dBm      A
                                                          2.44100000 GHz
      0                                                ▽1 [T1]         -5.47 dBm    SGL
                                                          2.44100802 GHz
    -10                                                ▽2 [T1]         -5.47 dBm
                                                          2.44100802 GHz
    -20
         1MAX                                                                       1MA
         -D1 -25.468 dBm
    -30
                                                                                    EXT
    -40
                                                                                    TDF
    -50

    -60

    -70

    -80                                                                        F2
         F1
    -90
         Center 2.441 GHz            800 kHz/              Span 8 MHz

          Title:        Band Edge Compliance
          Comment A:  CH M: 2441 MHz
          Date:       16.FEB.2012  11:00:50
```

Test: 15c.5; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 13:06

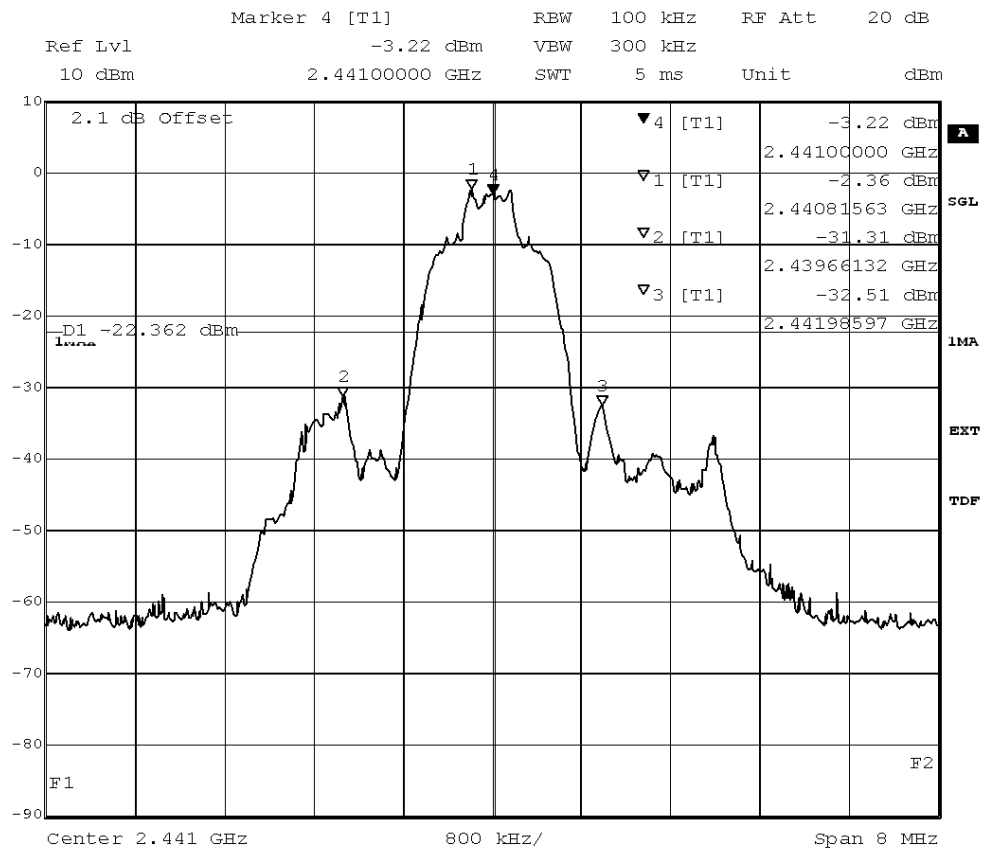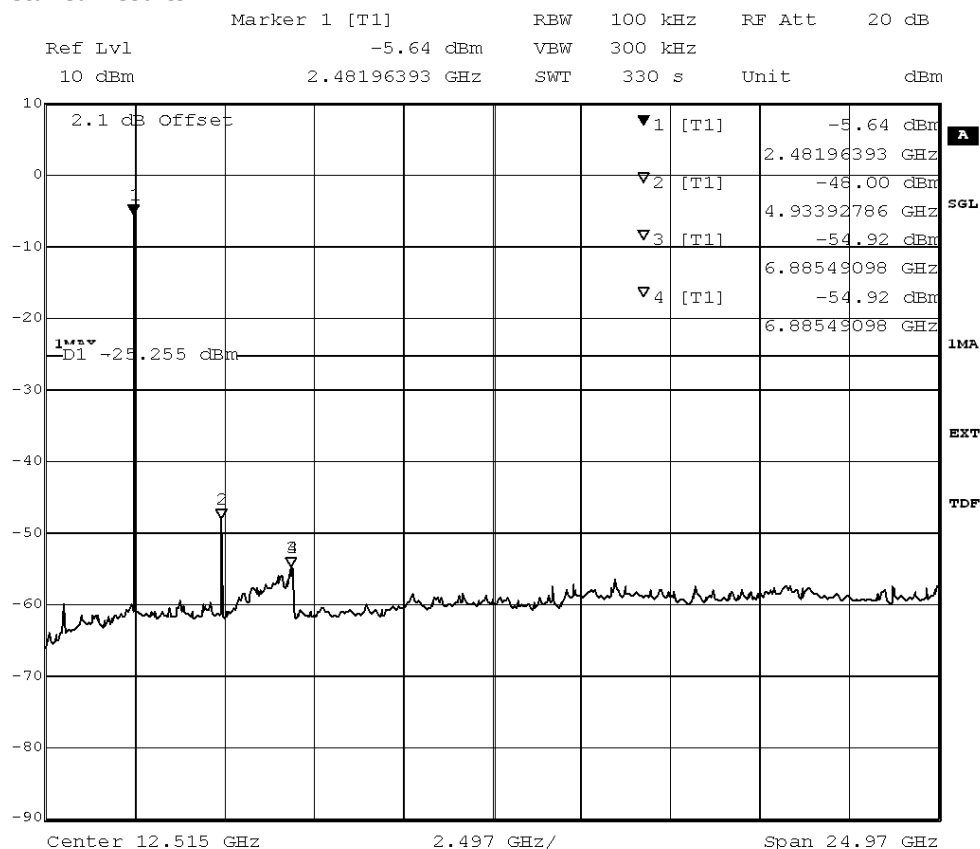*Body:*   FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
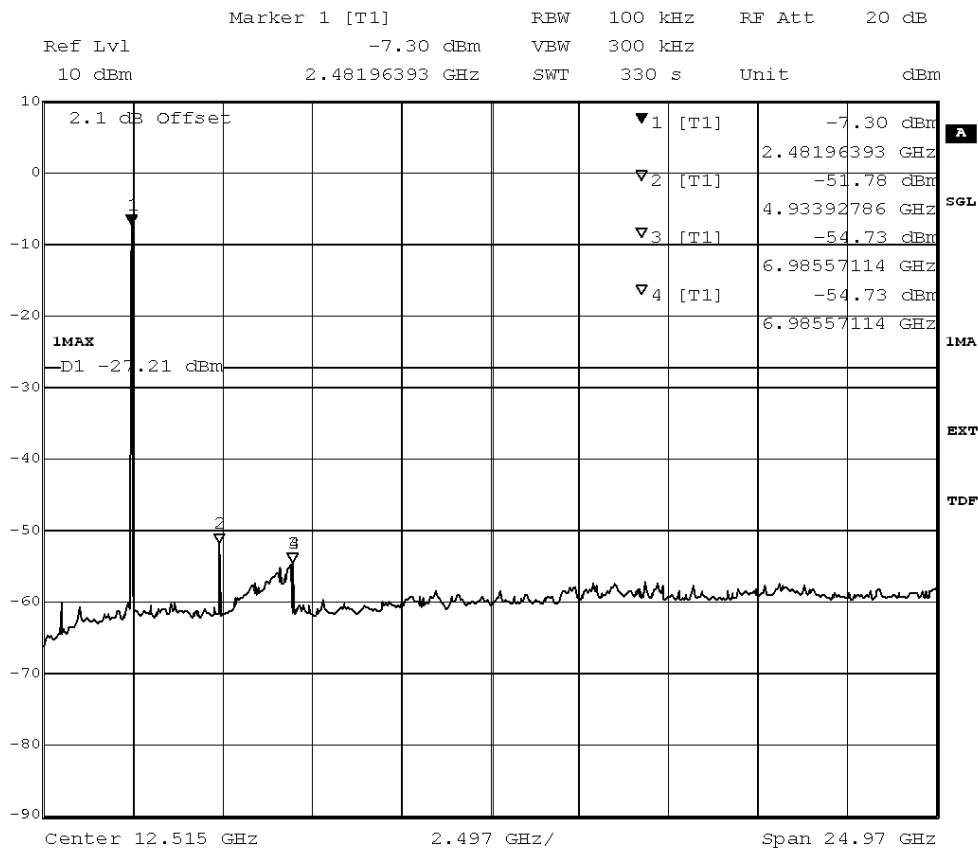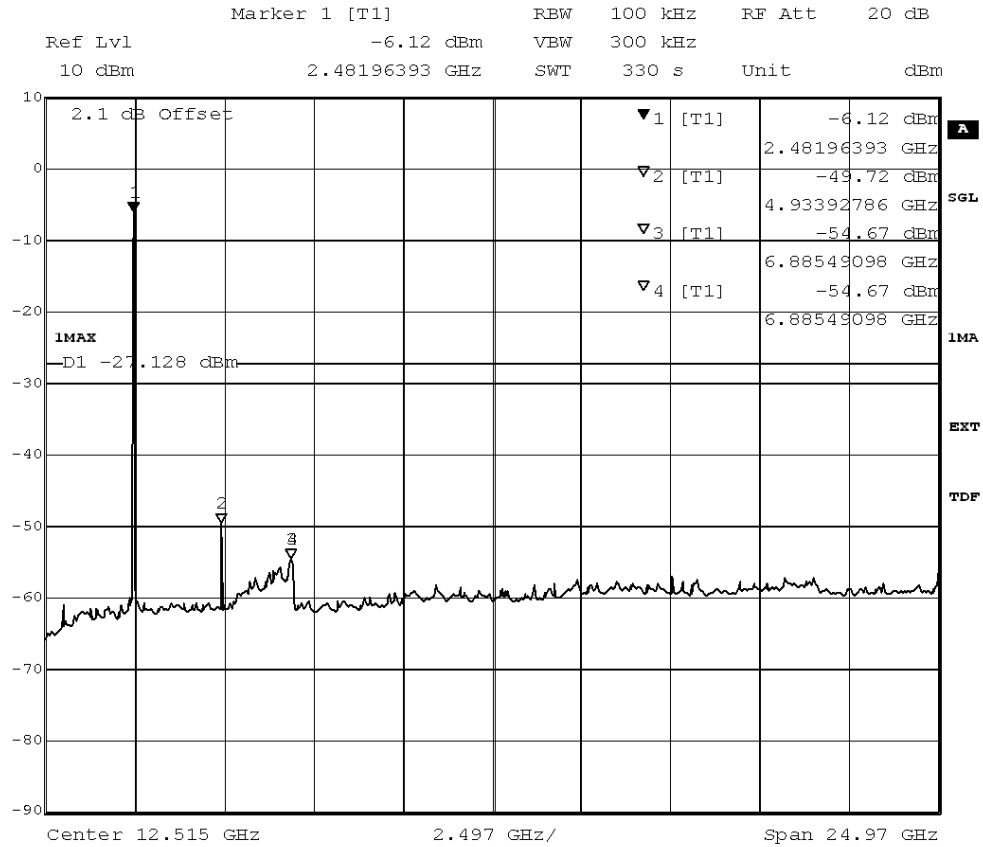
Test Specification: FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:


```
           Marker 1 [T1]              RBW   100 kHz    RF Att    20 dB
   Ref Lvl                   -4.35 dBm    VBW   300 kHz
    10 dBm              2.43192385 GHz    SWT    330 s     Unit          dBm
```

▼1 [T1]	-4.35 dBm	
	2.43192385 GHz	A
▽2 [T1]	-51.82 dBm	
	4.88388778 GHz	SGL
▽3 [T1]	-54.99 dBm	
	6.88549098 GHz	
▽4 [T1]	-54.99 dBm	1MA
	6.88549098 GHz	

2.1 dB Offset

D1 -24.433 dBm

Center 12.515 GHz   2.497 GHz/   Span 24.97 GHz

```
Title:       spurious emissions
Comment A:   CH M: 2441 MHz
Date:        16.FEB.2012  12:47:54
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2441		-4.43		

added by operator

```
                        Marker 4 [T1]          RBW    100 kHz   RF Att    20 dB
   Ref Lvl                      -5.37 dBm      VBW    300 kHz
   10 dBm                 2.44100000 GHz       SWT    5 ms     Unit        dBm
10
    2.1 dB Offset                          ▼4 [T1]          -5.37 dBm     A
                                                      2.44100000 GHz
 0                                 1  4    ▽1 [T1]          -4.43 dBm    SGL
                                  ▽ ▼                  2.44079960 GHz
-10                                        ▽2 [T1]         -35.62 dBm
                                                      2.43962926 GHz
                                           ▽3 [T1]         -37.34 dBm
-20                                                   2.44196994 GHz    1MA
  1D1 -24.433 dBm
-30
                             2                   3                       EXT
-40                         ▽                   ▽
                                                                        TDF
-50

-60

-70

-80                                                              F2
  F1
-90
   Center 2.441 GHz              800 kHz/              Span 8 MHz
```

Title: Band Edge Compliance
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 12:35:56
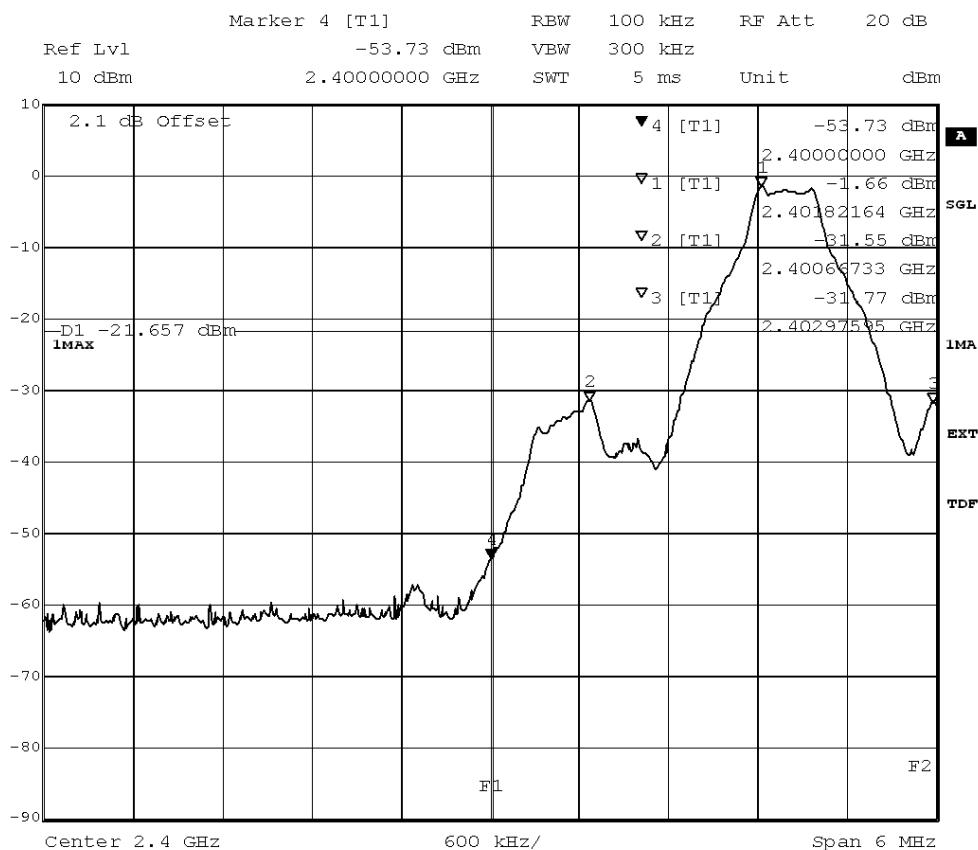
added by operator

Test: 15c.5; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01
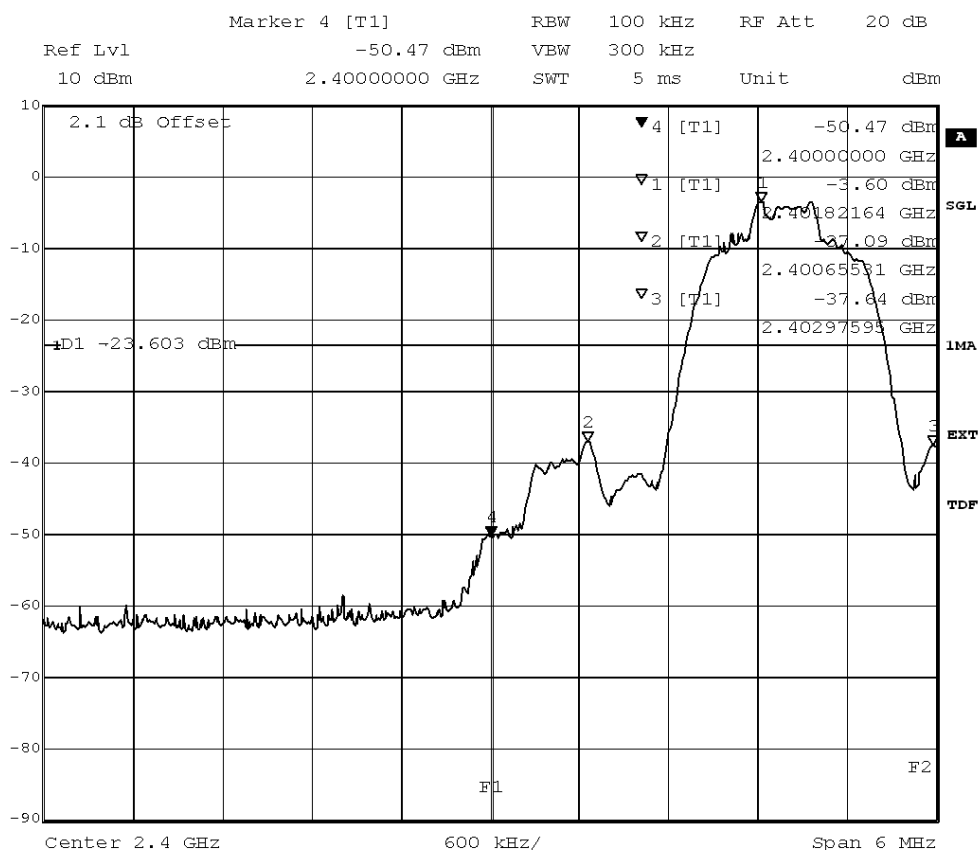
Date of Test: 2012/02/16 14:55

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:


```
                 Marker 1 [T1]              RBW    100 kHz    RF Att      20 dB
     Ref Lvl                    -3.06 dBm    VBW    300 kHz
     10 dBm              2.43192385 GHz      SWT    330 s      Unit          dBm
```

▼1 [T1]	-3.06 dBm	2.43192385 GHz
▽2 [T1]	-51.98 dBm	4.88388778 GHz
▽3 [T1]	-54.69 dBm	6.88549098 GHz
▽4 [T1]	-54.69 dBm	6.88549098 GHz

2.1 dB Offset

D1 -22.362 dBm

Center 12.515 GHz   2.497 GHz/   Span 24.97 GHz

```
Title:        spurious emissions
Comment A:  CH M: 2441 MHz
Date:        16.FEB.2012  14:38:59
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

```
              Marker 4 [T1]              RBW   100 kHz    RF Att      20 dB
          Ref Lvl                -3.22 dBm    VBW   300 kHz
          10 dBm              2.44100000 GHz   SWT     5 ms    Unit        dBm
```



```
 10
       2.1 dB Offset                          ▼4 [T1]          -3.22 dBm      A
                                                            2.44100000 GHz
  0                                           ▽1 [T1]          -2.36 dBm    SGL
                                                            2.44081563 GHz
 -10                                          ▽2 [T1]         -31.31 dBm
                                                            2.43966132 GHz
 -20                                          ▽3 [T1]         -32.51 dBm
     D1 -22.362 dBm                                          2.44198597 GHz  1MA
 -30
                                                                            EXT
 -40
                                                                            TDF
 -50

 -60

 -70

 -80                                                              F2
     F1
 -90
     Center 2.441 GHz              800 kHz/              Span 8 MHz
```

Title: Band Edge Compliance
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 14:26:59

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2441		-2.36		

added by operator

Test: 15c.5; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01
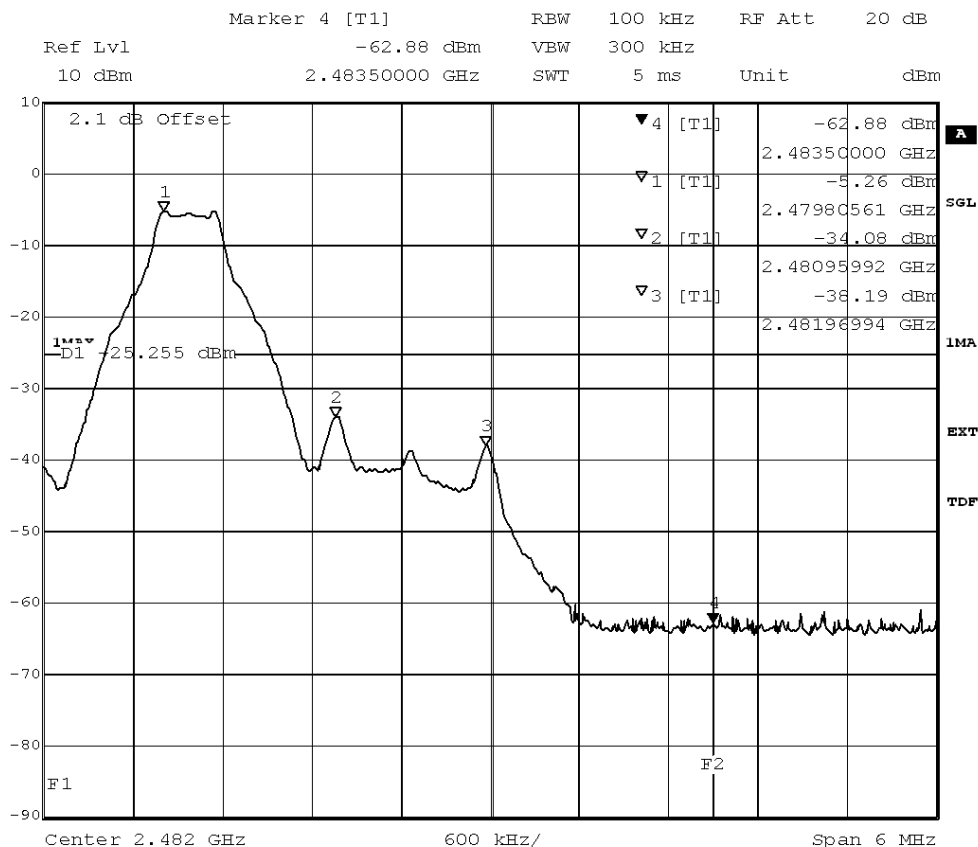
Date of Test: 2012/02/16 11:54

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:


```
                    Marker 1 [T1]          RBW   100 kHz    RF Att    20 dB
     Ref Lvl                  -5.64 dBm    VBW   300 kHz
      10 dBm           2.48196393 GHz      SWT   330 s     Unit        dBm
```

Title: spurious emissions
Comment A: CH T: 2480 MHz
Date: 16.FEB.2012 11:35:58

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.5; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result: Passed

Setup No.:   Z01
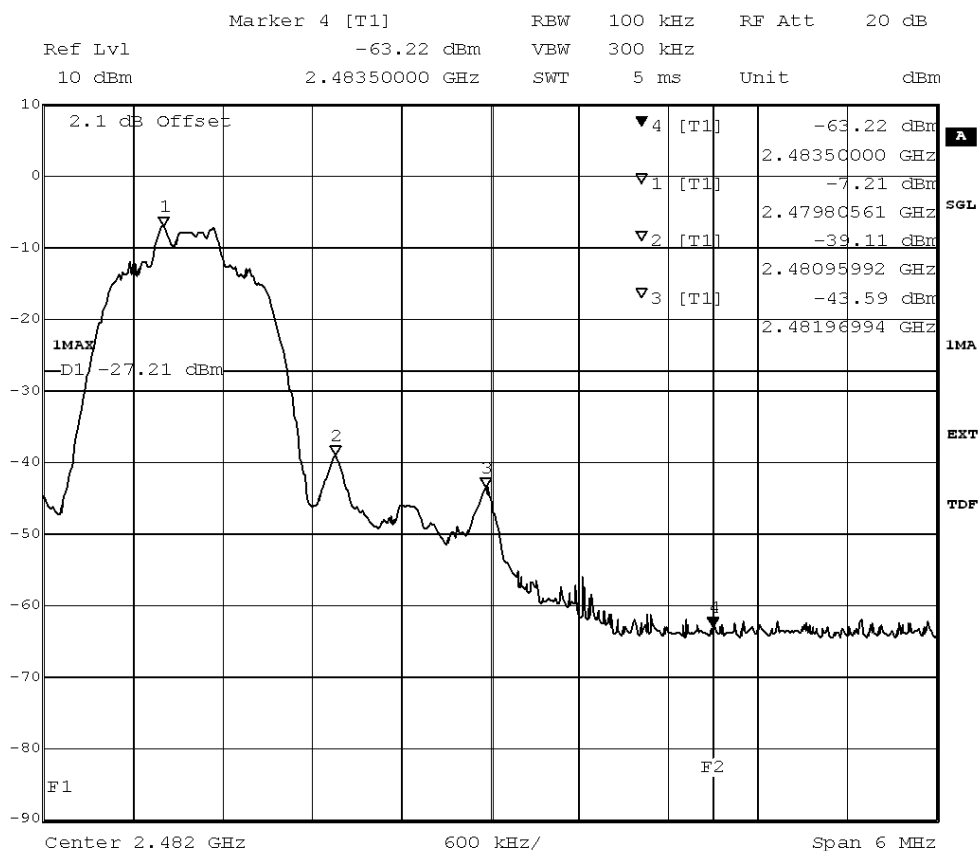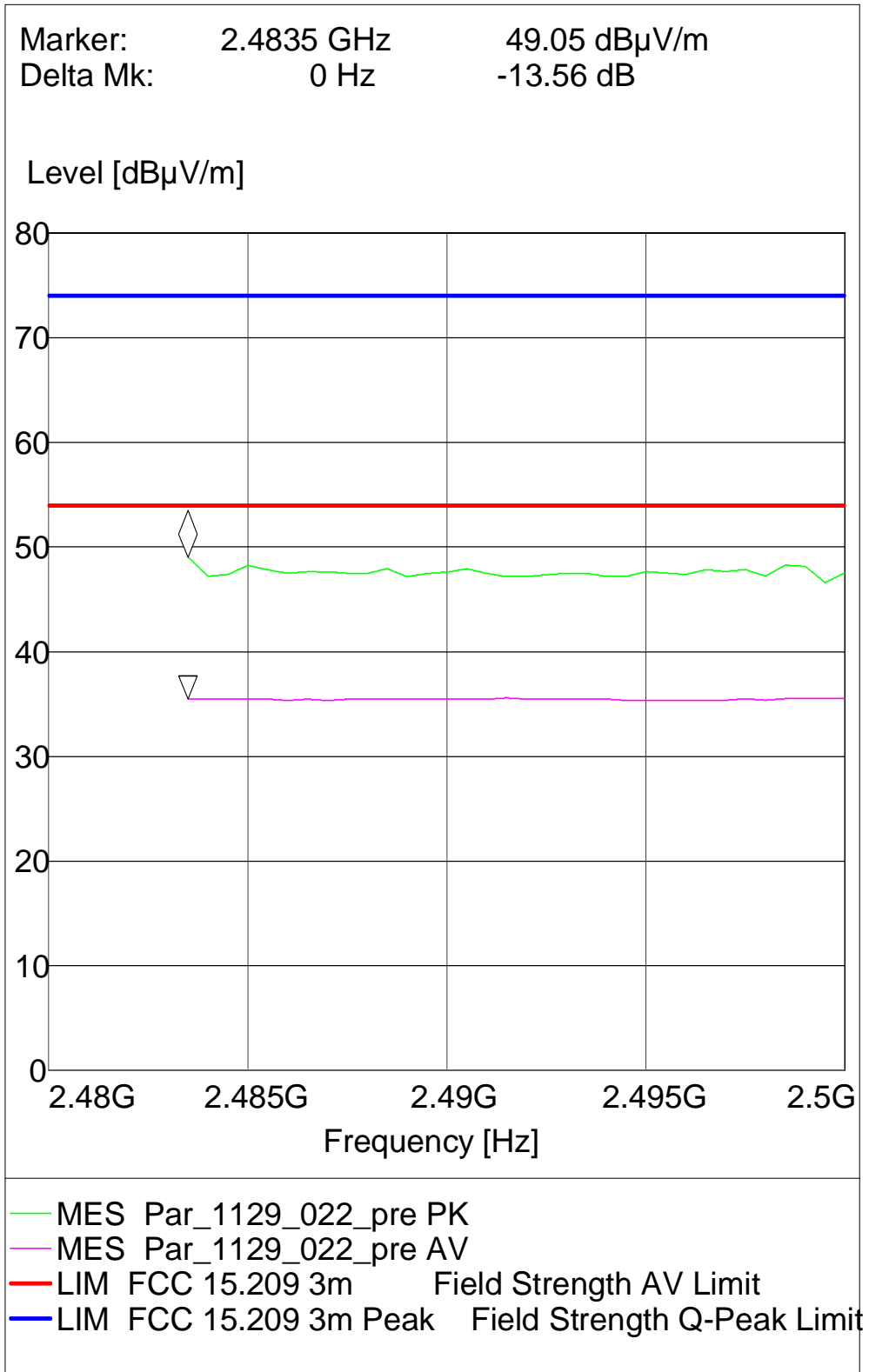
Date of Test: 2012/02/16 12:17

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

```
              Marker 1 [T1]             RBW   100 kHz   RF Att    20 dB
    Ref Lvl                  -7.30 dBm   VBW   300 kHz
    10 dBm               2.48196393 GHz  SWT    330 s    Unit          dBm
  10
       2.1 dB Offset                             ▼1 [T1]        -7.30 dBm    A
                                                            2.48196393 GHz
   0                                              ▽2 [T1]       -51.78 dBm   SGL
                                                            4.93392786 GHz
                                                 ▽3 [T1]       -54.73 dBm
  -10                                                       6.98557114 GHz
                                                 ▽4 [T1]       -54.73 dBm
  -20                                                       6.98557114 GHz
     1MAX                                                                    1MA
     D1 -27.21 dBm
  -30                                                                        EXT
  -40
                                                                            TDF
  -50
  -60
  -70
  -80
  -90
       Center 12.515 GHz            2.497 GHz/            Span 24.97 GHz

    Title:        spurious emissions
    Comment A:  CH T: 2480 MHz
    Date:       16.FEB.2012  12:00:28
```

added by operator

Test: 15c.5; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01
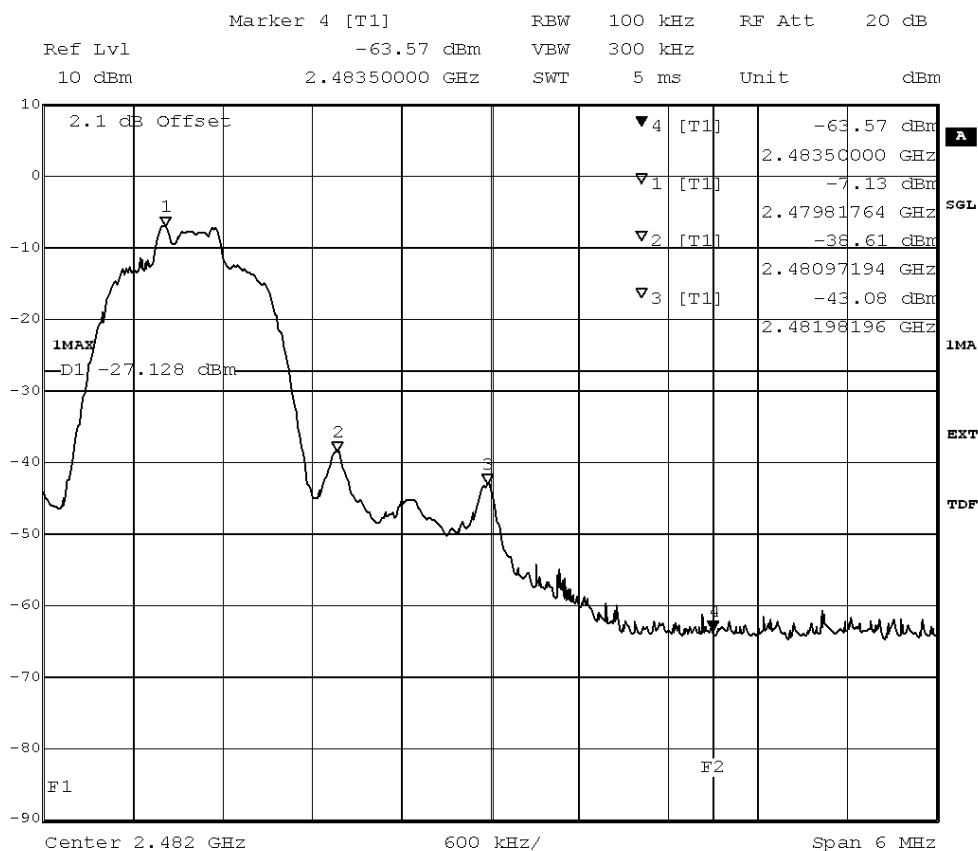
Date of Test: 2012/02/16 14:35

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

	Marker 1 [T1]		RBW	100 kHz	RF Att	20 dB
Ref Lvl		-6.12 dBm	VBW	300 kHz		
10 dBm		2.48196393 GHz	SWT	330 s	Unit	dBm

```
 10
        2.1 dB Offset                        ▼1 [T1]        -6.12 dBm    A
                                                       2.48196393 GHz
  0                                           ▽2 [T1]       -49.72 dBm   SGL
                                                       4.93392786 GHz
 -10                                          ▽3 [T1]       -54.67 dBm
                                                       6.88549098 GHz
 -20                                          ▽4 [T1]       -54.67 dBm
     1MAX                                              6.88549098 GHz   1MA
     D1 -27.128 dBm
 -30
                                                                        EXT
 -40
                                                                        TDF
 -50
 -60
 -70
 -80
 -90
     Center 12.515 GHz        2.497 GHz/           Span 24.97 GHz
```

Title: spurious emissions
Comment A: CH T: 2480 MHz
Date: 16.FEB.2012   14:19:00

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.5 15c.6 Band edge compliance §15.247 (d)

Test: 15c.6; Frequency = 2402, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = conducted
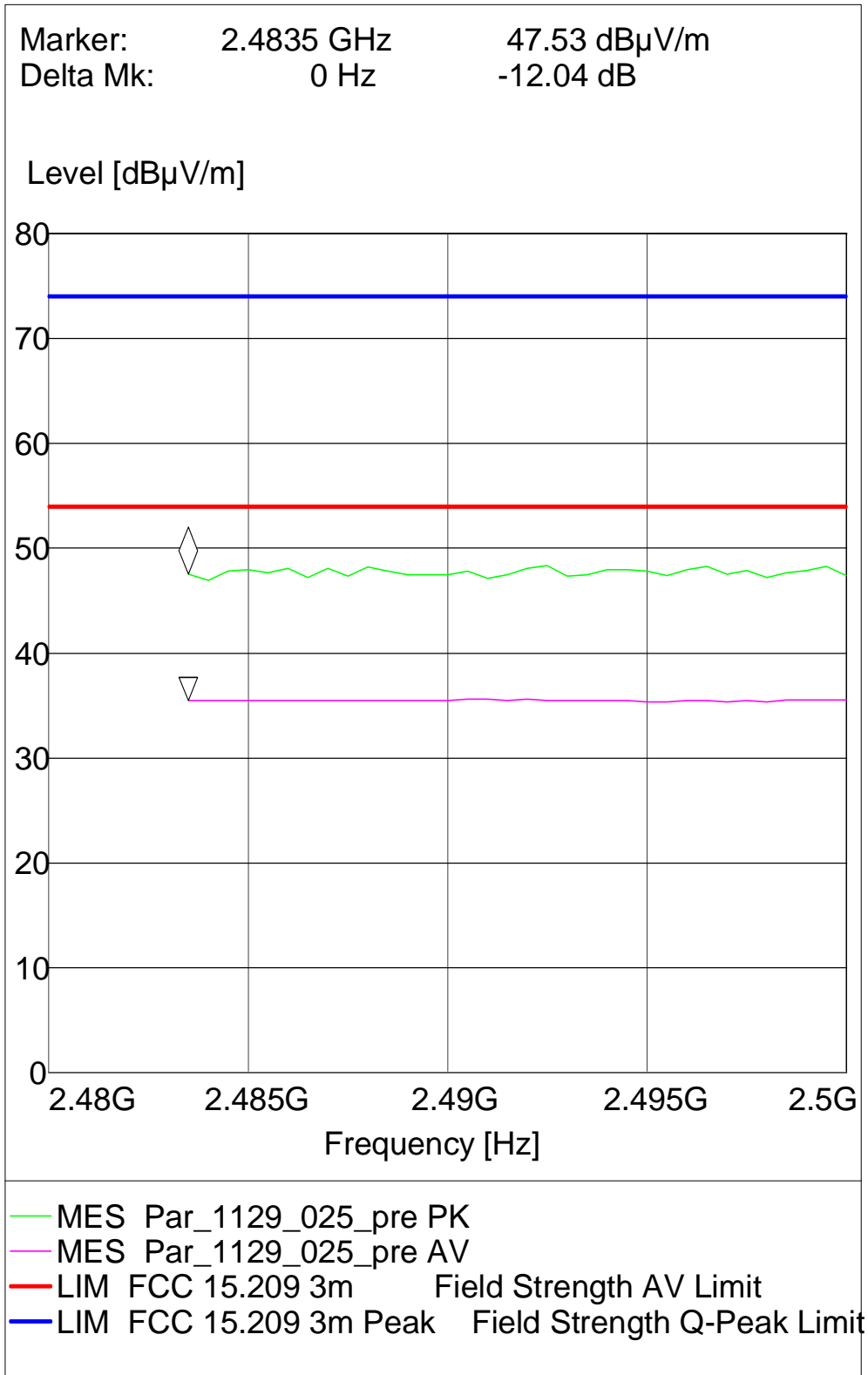
Result: Passed

Setup No.: Z01

Date of Test: 2012/02/16 11:29

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2400	-53.73	-1.66	-21.66	32.07

added by operator


```
                        Marker 4 [T1]            RBW   100 kHz   RF Att    20 dB
         Ref Lvl                  -53.73 dBm     VBW   300 kHz
          10 dBm               2.40000000 GHz    SWT    5 ms     Unit       dBm
```

Title: Band Edge Compliance
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 11:04:30

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.6; Frequency = 2402, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = conducted

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 12:43
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2400	-51.52	-3.88	-23.88	27.64

added by operator


```
                    Marker 4 [T1]          RBW   100 kHz    RF Att    20 dB
     Ref Lvl                   -51.52 dBm   VBW   300 kHz
      10 dBm                2.40000000 GHz   SWT    5 ms     Unit        dBm
```

Title: Band Edge Compliance
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 12:10:08

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

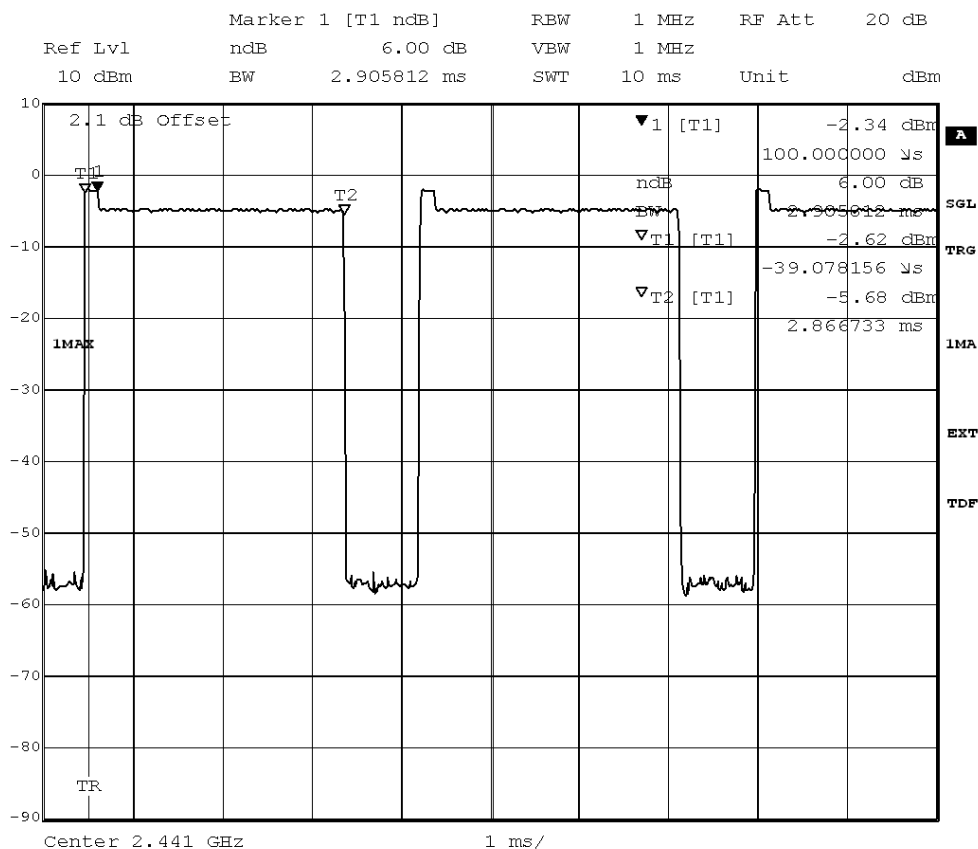**Test: 15c.6; Frequency = 2402, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = conducted**

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 14:14

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2400	-50.47	-3.60	-23.60	26.87

added by operator

Title: Band Edge Compliance
Comment A: CH B: 2402 MHz
Date: 16.FEB.2012 13:42:04

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = conducted

Result: Passed

Setup No.:   Z01

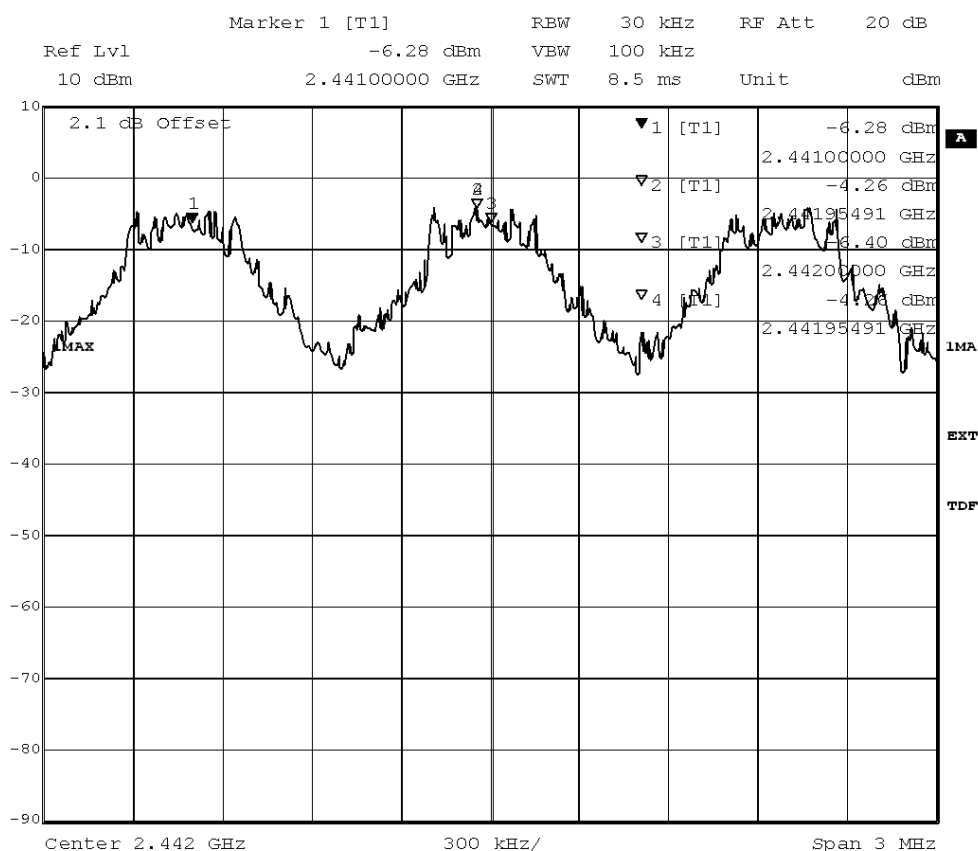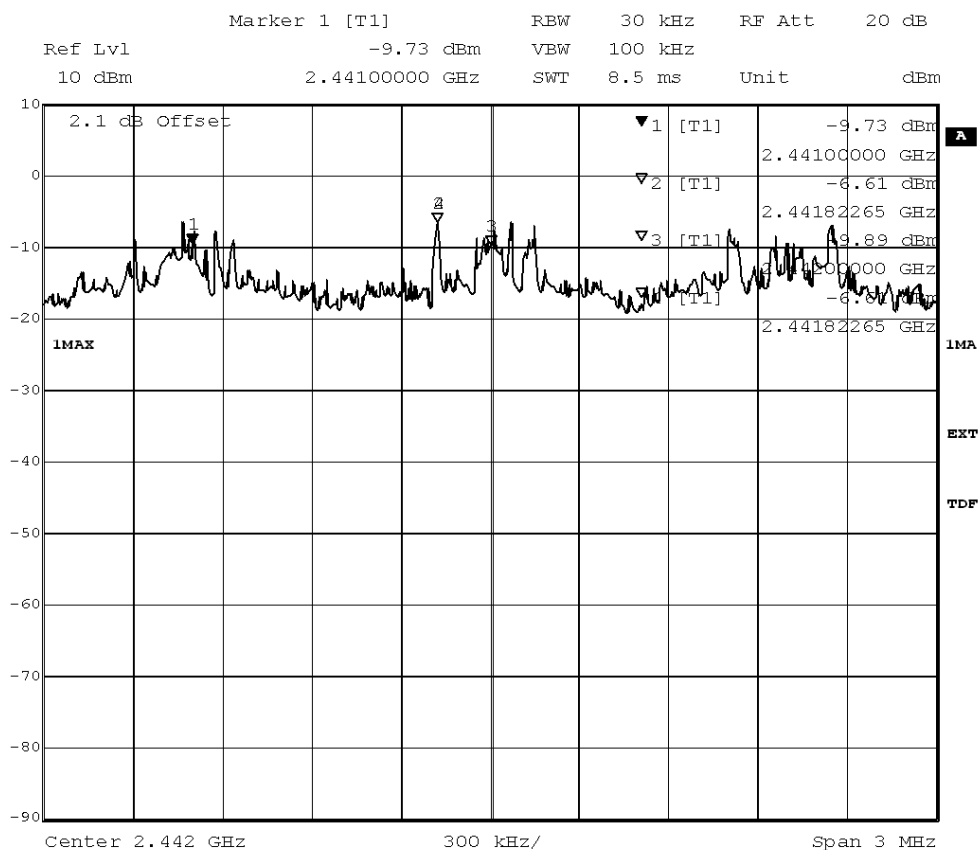Date of Test: 2012/02/16 11:54

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2484	-62.88	-5.26	-25.26	37.62

added by operator


```
              Marker 4 [T1]              RBW   100 kHz    RF Att    20 dB
    Ref Lvl                 -62.88 dBm   VBW   300 kHz
    10 dBm              2.48350000 GHz   SWT    5 ms     Unit       dBm
```

```
Title:       Band Edge Compliance
Comment A:  CH T: 2480 MHz
Date:       16.FEB.2012  11:24:02
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 1 Mbps with GFSK modulation, Method = radiated

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/01 9:13
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

Marker:	2.4835 GHz	47.53 dBµV/m
Delta Mk:	0 Hz	-12.04 dB

Level [dBµV/m]

Frequency [Hz]

—— MES Par_1129_019_pre PK
—— MES Par_1129_019_pre AV
—— LIM FCC 15.209 3m   Field Strength AV Limit
—— LIM FCC 15.209 3m Peak   Field Strength Q-Peak Limit

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

TX on	Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
2480 MHz	Ver + Hor	74	54	2483.5	47.53	35.49	26.47	18.51	Passed

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = conducted

Result: Passed

Setup No.:   Z01

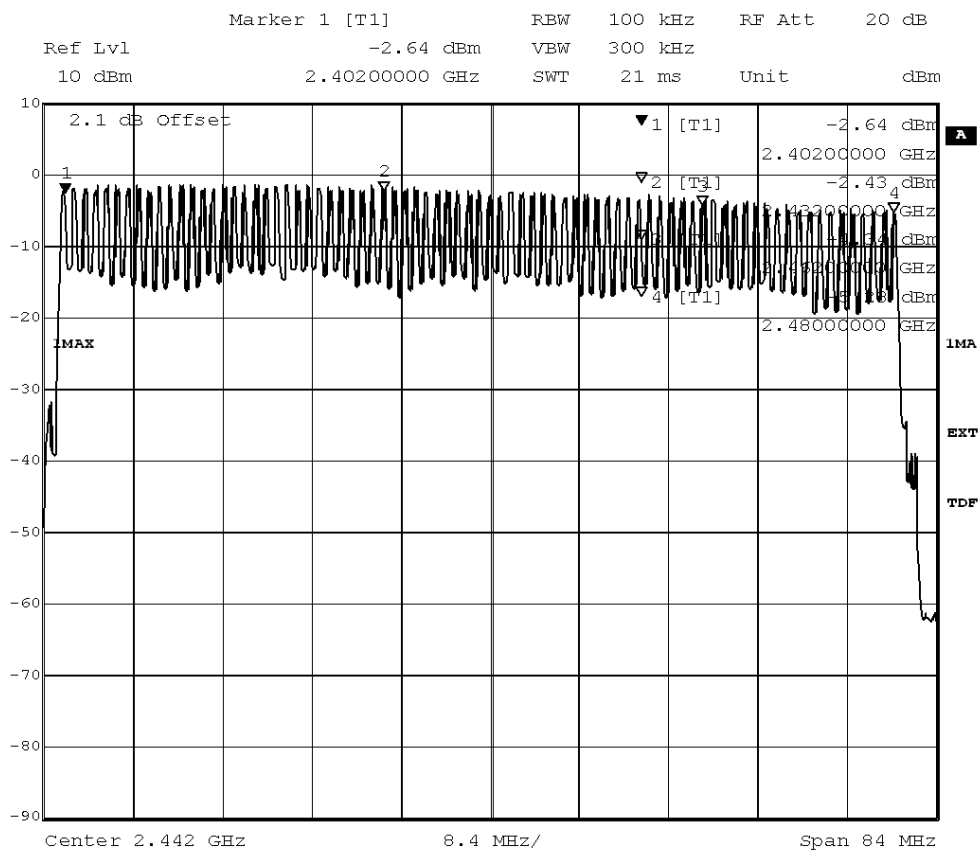*Date of Test:*   2012/02/16 12:18

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2484	-63.22	-7.21	-27.21	36.01

added by operator

Title: Band Edge Compliance
Comment A: CH T: 2480 MHz
Date: 16.FEB.2012 11:48:31

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation, Method = radiated

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/01 9:14
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

Marker:	2.4835 GHz	49.05 dBµV/m
Delta Mk:	0 Hz	-13.56 dB

Level [dBµV/m]

Frequency [Hz]

—— MES Par_1129_022_pre PK
—— MES Par_1129_022_pre AV
—— LIM FCC 15.209 3m   Field Strength AV Limit
—— LIM FCC 15.209 3m Peak   Field Strength Q-Peak Limit

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

TX on	Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
2480 MHz	Ver + Hor	74	54	2483.5	49.05	35.49	24.95	18.51	Passed

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = conducted

Result: Passed

Setup No.: Z01

Date of Test: 2012/02/16 14:36

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Margin to limit dB
2484	-63.57	-7.13	-27.13	36.44

added by operator

Title: Band Edge Compliance
Comment A: CH T: 2480 MHz
Date: 16.FEB.2012 14:07:02

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.6; Frequency = 2480, Mode = BT transmit using 3 Mbps with 8DPSK modulation, Method = radiated

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/01 9:15
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Detailed Results:

Marker:	2.4835 GHz	47.53 dBµV/m
Delta Mk:	0 Hz	-12.04 dB

Level [dBµV/m]

Frequency [Hz]

—— MES Par_1129_025_pre PK
—— MES Par_1129_025_pre AV
—— LIM FCC 15.209 3m   Field Strength AV Limit
—— LIM FCC 15.209 3m Peak   Field Strength Q-Peak Limit

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

TX on	Ant. Polar.	Limit PK [dBµV]	Limit AV [dBµV]	Frequency [MHz]	Corrected value PK [dBµV]	Corrected value AV [dBµV]	Margin PK [dB]	Margin AV [dB]	Result
2480 MHz	Ver + Hor	74	54	2483.5	47.53	35.49	26.47	18.51	Passed

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.6   15c.7 Dwell time §15.247 (a) (1) (iii)

Test: 15c.7; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 10:19

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Packet type	Time slot length	Dwell time	Dwell time ms
DH5	2.93	time slot length * 1600/5 /79 * 31.6	374.51

added by operator

Title: Dwell time
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 10:07:32

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.7; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 13:10
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Packet type	Time slot length	Dwell time	Dwell time ms
DH5	2.91	time slot length * 1600/5 /79 * 31.6	371.94

added by operator

Title: Dwell time
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 12:59:19

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.7; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 14:57

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Packet type	Time slot length	Dwell time	Dwell time ms
DH5	2.91	time slot length * 1600/5 /79 * 31.6	371.94

added by operator


```
              Marker 1 [T1 ndB]        RBW    1 MHz    RF Att    20 dB
    Ref Lvl           ndB      6.00 dB  VBW    1 MHz
    10 dBm            BW   2.905812 ms  SWT   10 ms     Unit         dBm
```

Title: Dwell time
Comment A: CH M: 2441 MHz
Date: 16.FEB.2012 14:46:32

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.7 15c.8 Channel separation §15.247 (a) (1)

Test: 15c.8; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 10:29

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Channel separation / MHz
1.000

```
          Marker 1 [T1]            RBW   30 kHz    RF Att    20 dB
   Ref Lvl              -6.28 dBm   VBW  100 kHz
    10 dBm          2.44100000 GHz  SWT  8.5 ms    Unit      dBm
```



```
Center 2.442 GHz              300 kHz/              Span 3 MHz
```

```
Title:     Channel separation
Comment A:  CH H: Hopping
Date:      16.FEB.2012  10:15:16
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.8; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 13:31
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Channel separation / MHz
1.000

Title: Channel separation
Comment A: CH H: Hopping
Date: 16.FEB.2012 13:09:48

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.8; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result: Passed

Setup No.:   Z01

Date of Test: 2012/02/16 13:49

Body: FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES

Test Specification: FCC part 2 and 15

Detailed Results:

Channel separation / MHz
1.000

```
          Marker 1 [T1]              RBW    30 kHz    RF Att    20 dB
    Ref Lvl                 -7.85 dBm    VBW   100 kHz
    10 dBm              2.44100000 GHz    SWT   8.5 ms    Unit          dBm
```



```
  Center 2.442 GHz              300 kHz/              Span 3 MHz
```

```
Title:      Channel separation
Comment A:  CH H: Hopping
Date:       16.FEB.2012  13:32:08
```

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

3.6.8   15c.9 Number of hopping frequencies §15.247 (a) (1) (iii)

Test: 15c.9; Frequency = 2441, Mode = BT transmit using 1 Mbps with GFSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 10:30
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Number of Hopping Frequencies
79

Title: Number of hopping frequencies
Comment A: CH H: Hopping
Date: 16.FEB.2012 10:18:35

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.9; Frequency = 2441, Mode = BT transmit using 2 Mbps with PI/4 DQPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 13:33
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Number of Hopping Frequencies
79

Title: Number of hopping frequencies
Comment A: CH H: Hopping
Date: 16.FEB.2012 13:18:43

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test: 15c.9; Frequency = 2441, Mode = BT transmit using 3 Mbps with 8DPSK modulation

Result:	Passed
Setup No.:	Z01
Date of Test:	2012/02/16 13:50
Body:	FCC47CFRChIPART15c247RADIO FREQUENCY DEVICES
Test Specification:	FCC part 2 and 15

Detailed Results:

Number of Hopping Frequencies
79

	Marker 1 [T1]	RBW 100 kHz	RF Att 20 dB
Ref Lvl	−2.89 dBm	VBW 300 kHz	
10 dBm	2.40200000 GHz	SWT 21 ms	Unit dBm

2.1 dB Offset

▼1 [T1] −2.89 dBm 2.40200000 GHz

▽2 [T1] −3.44 dBm 2.43200000 GHz

4 dBm GHz

▽4 [T1] −6.81 dBm 2.48000000 GHz

A

1MAX

1MA

EXT

TDF

Center 2.442 GHz   8.4 MHz/   Span 84 MHz

Title: Number of hopping frequencies
Comment A: CH H: Hopping
Date: 16.FEB.2012 13:37:34

added by operator

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

4　Test Equipment Details

4.1　List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

Test Equipment Anechoic Chamber

Lab ID:	**Lab 1**
Manufacturer:	Frankonia
Description:	Anechoic Chamber for radiated testing
Type:	10.58x6.38x6.00 m³

Single Devices for Anechoic Chamber

Single Device Name	Type	Serial Number	Manufacturer	
Air compressor	none	-	Atlas Copco	
Anechoic Chamber	10.58 x 6.38 x 6.00 m³	none	Frankonia	
	Calibration Details		*Last Execution*	*Next Exec.*
	FCC listing 96716 3m Part15/18		2011/01/11	2014/01/10
	IC listing 3699A-1 3m		2011/02/07	2014/02/06
Controller Maturo	MCU	961208	Maturo GmbH	
EMC camera	CE-CAM/1	-	CE-SYS	
EMC camera Nr.2	CCD-400E	0005033	Mitsubishi	
Filter ISDN	B84312-C110-E1		Siemens&Matsushita	
Filter Universal 1A	BB4312-C30-H3	-	Siemens&Matsushita	

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID:	**Lab 1**
Description:	Equipment for emission measurements
Serial Number:	see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer	
Antenna mast	AS 620 P	620/37	HD GmbH	
Biconical dipole	VUBA 9117	9117-108	Schwarzbeck	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2008/10/27	2013/10/26
	Standard Calibration		2012/01/18	2015/01/17
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq	
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq	
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq	
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2+W38.01-2	Kabel Kusch	
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02-2+W38.02-2	Rosenberger Micro-Coax	
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	Type	Serial Number	Manufacturer	
	Standard Calibration		2009/04/16	2012/04/15
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2009/04/28	2012/04/27
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic	
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic	
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic	
High Pass Filter	WHKX 7.0/18G-8SS	09	Wainwright	
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2009/05/27	2012/05/26
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/10/27	2014/10/26
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH	
Pyramidal Horn Antenna 40 GHz	3160-10	00086675	EMCO Elektronik GmbH	
Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	TD1.5-10kg/024/3790709	Maturo GmbH	

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test Equipment Auxiliary Test Equipment

Lab ID:	**Lab 1**
Manufacturer:	see single devices
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

Single Device Name	Type	Serial Number	Manufacturer
Broadband Power Divider N (Aux)	1506A / 93459	LM390	Weinschel Associates
Broadband Power Divider SMA	WA1515	A855	Weinschel Associates
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	Fluke Europe B.V.

	Calibration Details		*Last Execution Next Exec.*
	Customized calibration		2011/10/19 2013/10/18

Single Device Name	Type	Serial Number	Manufacturer
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	Pontis
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	Pontis
Isolating Transformer	LTS 604	1888	Thalheimer Transformatorenwerke GmbH
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright
Vector Signal Generator	SMIQ 03B	832492/061	Rohde & Schwarz GmbH & Co.KG

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test Equipment Digital Signalling Devices

Lab ID: **Lab 1**
Description: Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

Single Device Name	Type	Serial Number	Manufacturer
Bluetooth Signalling Unit CBT	CBT	100589	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution Next Exec.*
	Standard calibration		2011/11/24 2014/11/23
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution Next Exec.*
	Standard calibration		2011/05/26 2013/05/25
	HW/SW Status		*Date of Start Date of End*
	Hardware: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04 Software: K21 4v21, K22 4v21, K23 4v21, K24 4v21, K42 4v21, K43 4v21, K53 4v21, K56 4v22, K57 4v22, K58 4v22, K59 4v22, K61 4v22, K62 4v22, K63 4v22, K64 4v22, K65 4v22, K66 4v22, K67 4v22, K68 4v22, K69 4v22 Firmware: µP1 8v50 02.05.06 ---		2007/07/16
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution Next Exec.*
	Standard calibration		2011/12/07 2014/12/06
	HW/SW Status		*Date of Start Date of End*
	HW options: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02 SW options: K21 4v11, K22 4v11, K23 4v11, K24 4v11, K27 4v10, K28 4v10, K42 4v11, K43 4v11, K53 4v10, K65 4v10, K66 4v10, K68 4v10, Firmware: µP1 8v40 01.12.05 ---		2007/01/02
	SW: K62, K69		2008/11/03

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test Equipment Emission measurement devices

Lab ID: **Lab 1**
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Emission measurement devices

Single Device Name	Type	Serial Number	Manufacturer
Personal Computer	Dell	30304832059	Dell
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution Next Exec.*
	standard calibration		2011/05/12 2014/05/11
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG
	Calibration Details		*Last Execution Next Exec.*
	Standard Calibration		2011/12/05 2013/12/04
	HW/SW Status		*Date of Start Date of End*
	Firmware-Update 4.34.4 from 3.45 during calibration		2009/12/03

Test Equipment Multimeter 12

Lab ID: **Lab 2**
Description: Ex-Tech 520
Serial Number: 05157876

Single Devices for Multimeter 12

Single Device Name	Type	Serial Number	Manufacturer
Digital Multimeter 12 (Multimeter)	EX520	05157876	Extech Instruments Corp.
	Calibration Details		*Last Execution Next Exec.*
	Customized calibration		2011/10/18 2013/10/17

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test Equipment Regulatory Bluetooth RF Test Solution

Lab ID: **Lab 2**
Description: Regulatory Bluetooth RF Tests
Type: Bluetooth RF
Serial Number: 001

Single Devices for Regulatory Bluetooth RF Test Solution

Single Device Name	Type	Serial Number	Manufacturer	
ADU 200 Relay Box 7	Relay Box	A04380	Ontrak Control Systems Inc.	
Bluetooth Signalling Unit CBT	CBT	100302	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2011/08/17	2012/08/16
Power Meter NRVD	NRVD	832025/059		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2011/06/14	2012/06/13
Power Sensor NRV Z1 A	PROBE	832279/013		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2011/06/14	2012/06/13
Power Supply	NGSM 32/10	2725		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2011/06/15	2013/06/14
Rubidium Frequency Normal MFS	Datum MFS	002	Datum GmbH	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2011/08/17	2012/08/16
Signal Analyser FSIQ26	1119.6001.26	832695/007	Rohde & Schwarz GmbH & Co.KG	
Vector Signal Generator SMIQ03B	SMIQ03B	832870/017		
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2010/06/23	2013/06/20

Test Equipment Shielded Room 07

Lab ID: **Lab 2**
Description: Shielded Room 4m x 6m

Test Equipment T/H Logger 04

Lab ID: **Lab 2**
Description: Lufft Opus10
Serial Number: 7481

Single Devices for T/H Logger 04

Single Device Name	Type	Serial Number	Manufacturer
ThermoHygro Datalogger 04 (Environ)	Opus10 THI (8152.00)	7481	Lufft Mess- und Regeltechnik GmbH

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Test Equipment Temperature Chamber 01

Lab ID:	**Lab 2**
Manufacturer:	see single devices
Description:	Temperature Chamber KWP 120/70
Type:	Weiss
Serial Number:	see single devices

Single Devices for Temperature Chamber 01

Single Device Name	Type	Serial Number	Manufacturer
Temperature Chamber Weiss 01	KWP 120/70	59226012190010	Weiss Umwelttechnik GmbH

Calibration Details		Last Execution	Next Exec.
Specific calibration		2010/03/16	2012/03/15

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

5   Annex

5.1   Additional Information for Report

Setup Drawings

Remark: Depending on the frequency range suitable
antenna types, attenuators or preamplifiers are used.

Drawing 1:   Setup in the Anechoic chamber:
Measurements below 1 GHz: Semi-anechoic, conducting ground plane.
Measurements above 1 GHz: Fully-anechoic, absorbers on all surfaces

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

Summary of Test Results

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The EUT complied with all performed tests as listed in the summary section of this report.

_____

Technical Report Summary

_____

_____

Type of Authorization :

Certification for an Intentional Radiator (Frequency Hopping Spread Spectrum).

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 and 15. The following subparts are applicable to the results in this test report

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 15, Subpart C – Intentional Radiators

§ 15.201   Equipment authorization requirement

§ 15.207   Conducted limits

§ 15.209   Radiated emission limits; general requirements

§ 15.247   Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

additional documents

The tests were selected and performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000. Instead of applying ANSI C63.4-1992 which is referenced in the FCC Public Note, the newer ANSI C63.4-2009 is applied.

Description of Methods of Measurements

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Conducted emissions (AC power line)

_____

Standard   FCC Part 15, Subpart C

The test was performed according to: ANSI C 63.4,

Test Description

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

The test set-up was made in accordance to the general provisions of ANSI C 63.4.
The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from 50µH || 50 Ohm Line Impedance Stabilization Network (LISN). The LISN's unused connections were terminated with 50 Ohm loads. The measurement procedure consists of two steps. It is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan
Intention of this step is, to determine the conducted EMI-profile of the EUT.
EMI receiver settings:
- Detector: Peak - Maxhold
- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 5 kHz
- IF–Bandwidth: 9 kHz
- Measuring time / Frequency step: 20 ms
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2: Final measurement
Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.
EMI receiver settings:
- Detector: Quasi-Peak
- IF - Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:
1) Neutral lead - reference ground (PE grounded)
2) Phase lead - reference ground (PE grounded)
3) Neutral lead - reference ground (PE floating)
4) Phase lead - reference ground (PE floating)

The highest value is reported.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.207

Frequency Range (MHz)	QP Limit (dBµV)	AV Limit (dBµV)
0.15 – 0.5	66 to 56	56 to 46
0.5 – 5	56	46
5 – 30	60	50

Used conversion factor: Limit (dBµV) = 20 log (Limit (µV)/1µV).

_____

Occupied bandwidth
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was setup to perform the occupied bandwidth measurements.
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.
The results recorded were measured with the modulation which produces the worst-case (widest) occupied bandwidth. The resolution bandwidth for measuring the reference level and the occupied bandwidth was 30 kHz.

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

The EUT was connected to the spectrum analyzer via a short coax cable.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (1)
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 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly 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.

Implication by the test laboratory:
Since the Bluetooth technology defines a fixed channel separation of 1 MHz this design parameter defines the maximum allowed occupied bandwidth depending on the EUT's output power:
1.   Under the provision that the system operates with an output power not greater than 125 mW (21.0 dBm) : Implicit Limit: Max. 20 dB BW = 1.0 MHz / 2/3 = 1.5 MHz
2.   If the system output power exceeds 125 mW (21.0 dBm): Implicit Limit: Max. 20 dB BW = 1.0 MHz

Used conversion factor: Output power (dBm) = 10 log (Output power (W) / 1mW)

The measured output power of the system is below 125 mW (21.0 dBm). For the results, please refer to the related chapter of this report. Therefore the limit is determined as 1.5 MHz.

_____

Peak power output
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was set up to perform the output power measurements. The resolution bandwidth for measuring the output power was set to 3 MHz. The reference level of the spectrum analyzer was set higher than the output power of the EUT. The EUT was connected to the spectrum analyzer via a short coax cable with a known loss.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (b) (1)
(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW)
==> Maximum Output Power: 30 dBm

_____

Spurious RF conducted emissions
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was set up to perform the spurious emissions measurements.
The EUT was connected to spectrum analyzer via a short coax cable with a known loss.
Analyzer settings:

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

- Detector: Peak-Maxhold
- Frequency range: 30 – 25000 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Sweep Time: 330 s

The reference value for the measurement of the spurious RF conducted emissions is determined during the test "band edge compliance" (cf. chapter 3.6). This value is used to calculate the 20 dBc limit.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (c)
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

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Spurious radiated emissions

_____

Standard   FCC Part 15, Subpart C

The test was performed according to: ANSI C 63.4,

Test Description

The test set-up was made in accordance to the general provisions of ANSI C63.4–2009.
The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.
The test was performed at the distance of 3 m between the EUT and the receiving antenna. The measurement procedure is implemented into the EMI test software ES-K1 from R&S. The radiated emissions measurements were made in a typical installation configuration. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is performed at 2 axes. A pre-check is also performed while the EUT is powered from both AC and DC (battery) power in order to find the worst-case operating condition.

1. Measurement up to 30 MHz
The test set-up was made in accordance to the general provisions of ANSI C63.4.
The Equipment Under Test (EUT) was set up on a non-conductive table in the anechoic chamber.
The radiated emissions measurements were made in a typical installation configuration.
The measurement procedure is implemented into the EMI test software ES-K1 from R&S.
The Loop antenna HFH2-Z2 is used.
Step 1: pre-measurement
- Anechoic chamber
- Antenna distance: 10 m
- Detector: Peak-Maxhold
- Frequency range: 0.009 – 0.15 and 0.15 – 30 MHz
- Frequency steps: 0.1 kHz and 5 kHz
- IF–Bandwidth: 0.2 kHz and 10 kHz
- Measuring time / Frequency step: 100 ms
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.
Step 2: final measurement
For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.
- Open area test side
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 – 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF–Bandwidth: 200 Hz – 10 kHz
- Measuring time / Frequency step: 100 ms
2. Measurement above 30 MHz and up to 1 GHz
Step 1: Preliminary scan
Preliminary test to identify the highest amplitudes relative to the limit.
Settings for step 1:
- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

- Frequency steps: 60 kHz
- IF–Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs (BT Timing 1.25 ms)
- Turntable angle range: −180 to +180°
- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.
Step 2: second measurement
For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.
- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: −180 to +180°
- Turntable step size: 45°
- Height variation range: 1 – 4 m
- Height variation step size: 0.5 m
- Polarisation: horizontal + vertical
After this step the EMI test system has determined the following values for
each frequency (of step 1):
- Frequency
- Azimuth value (of turntable)
- Antenna height
The last two values have now the following accuracy:
- Azimuth value (of turntable): 45°
- Antenna height: 0.5 m
Step 3: final measurement
In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.
For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will be slowly varied by +/−22.5° around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by +/−25 cm around the antenna height determined. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.
- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: −22.5° to +22.5° around the determined value
- Height variation range: −0.25 m to +0.25 m around the determined value
Step 4: final measurement with QP detector
With the settings determined in step 3, the final measurement will be performed:
EMI receiver settings for step 4:
- Detector: Quasi-Peak (< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

3. Measurement above 1 GHz
The following modifications apply to the measurement procedure for the frequency range above 1 GHz:
The measurement distance was reduced to 1 m. The results were extrapolated by the extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements, inverse linear-distance squared for the power reference level measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 GHz) and a horn antenna (18–25 GHz) are used, the steps 2–4 are omitted. Step 1 was performed with one height of the receiving antenna only.
EMI receiver settings:
- Detector: Peak, Average
- IF Bandwidth = 1 MHz

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

Reference: MDE_PARRO_1129_FCCb

acc. Title 47 CFR chapter I part 15 subpart C

For the enhanced data rate packets the test is performed as worst-case-check in order to verify that emissions have a comparable level as found at basic data rate. Typically, the measurement for these packets is performed in the frequency range 1 to 8 GHz but it depends on the emissions found during the test for the basic data rate. Please refer to the results for the used frequency range.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (d)
... In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit(dBµV/m @10m)
0.009 – 0.49	2400/F(kHz)	300	Limit (dBµV/m)+30dB
0.49 – 1.705	24000/F(kHz)	30	Limit (dBµV/m)+10dB
1.705 - 30	30	30	Limit (dBµV/m)+10dB

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit (dBµV/m)
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
above 960	500	3	54.0

§15.35(b)
..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

_____

Band edge compliance
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: ANSI C 63.4, FCC §15.31

Test Description

The procedure to show compliance with the band edge requirement is divided into two measurements: 1. Show compliance of the lower band edge by a conducted measurement and 2. show compliance of the higher band edge by a radiated and conducted measurement.

For the first measurement the EUT is set to transmit on the lowest channel (2402 MHz). The lower band edge is 2400 MHz.
Analyzer settings:
- Detector: Peak
- RBW= 100 kHz
- VBW= 300 kHz

For the second measurement the EUT is set to transmit on the highest channel (2480 MHz). The higher band edge is 2483.5 MHz.
Analyzer settings for conducted measurement:
- Detector: Peak
- RBW= 100 kHz
- VBW= 300 kHz
EMI receiver settings:
- Detector: Peak, Average
- IF Bandwidth = 1 MHz

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Test Requirements / Limits

FCC Part 15.247 (d)
"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 power limits.
...
Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c))."

For the measurement of the lower band edge the RF power at the band edge 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..."

For the measurement of the higher band edge the limit is "specified in Section 15.209(a)".

_____

Dwell time
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was set up to perform the dwell time measurements. The EUT was connected to the spectrum analyzer via a short coax cable. The dwell time is calculated by:

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

with:
- hop rate = 1600 * 1/s for DH1 packets   = 1600 s-1
- hop rate = 1600/3 * 1/s for DH3 packets   = 533.33 s-1
- hop rate = 1600/5 * 1/s for DH5 packets   = 320 s-1
- number of hopping channels = 79
- 31.6 s = 0.4 seconds multiplied by the number of hopping channels = 0.4 s * 79

The highest value of the dwell time is reported.

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (1) (iii)

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. Since the Bluetooth technology uses 79 channels this period is calculated to be 31.6 seconds.

_____

Channel separation
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was set up to perform the channel separation measurements. The channel separation is independent from the modulation pattern.
The EUT was connected to spectrum analyzer via a short coax cable.
Analyzer settings:
- Detector: Peak-Maxhold

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- Span: 3 MHz
- Centre Frequency: a mid frequency of the 2.4 GHz ISM band
- Resolution Bandwidth (RBW): 30 kHz
- Video Bandwidth (VBW): 100 kHz
- Sweep Time: Coupled

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (1)
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 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly 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.

_____

Number of hopping frequencies
_____

Standard   FCC Part 15, Subpart C

The test was performed according to: FCC §15.31

Test Description

The Equipment Under Test (EUT) was set up to perform the number of hopping frequencies measurement.
The number of hopping frequencies is independent from the modulation pattern.
The EUT was connected to spectrum analyzer via a short coax cable.
Analyzer settings:
- Detector: Peak-Maxhold
- Centre frequency: 2442 MHz
- Frequency span: 84 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Sweep Time: Coupled

Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (iii)
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

****
FCC and IC Correlation of measurement requirements
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The following tables show the correlation of measurement requirements for Bluetooth equipment and Digital Apparatus from FCC and IC standards.

Bluetooth® equipment:

Measurement	FCC reference	IC reference
Conducted emissions on AC mains	§ 15.207	RSS-Gen: 7.2.4
Occupied bandwidth	§ 15.247 (a) (1)	RSS-210: A8.1
Peak power output	§ 15.247 (b) (1)	RSS-210: A8.4
Spurious RF conducted emissions	§ 15.247 (d)	RSS-Gen: 6;RSS-210: A8.5
Spurious radiated emissions	§ 15.247 (d)	RSS-Gen: 6;RSS-210: A8.5
Band edge compliance	§ 15.247 (d)	RSS-210: A8.5
Dwell time	§ 15.247 (a) (1) (iii)	RSS-210: A8.1
Channel separation	§ 15.247 (a) (1)	RSS-210: A8.1
No. of hopping frequencies	§ 15.247 (a) (1) (iii)	RSS-210: A8.1

Reference: MDE_PARRO_1129_FCCb

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Antenna requirement   § 15.203 / 15.204   RSS-Gen: 7.1.2

Digital Apparatus:

Measurement	FCC reference	IC reference
Conducted Emissions(AC Power Line)	§15.107	ICES-003
Spurious Radiated Emissions	§15.109	ICES-003

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