LTA
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SENA

Dates of Tests: Oct 25~Nov 02, 2010
Test Report S/N: LR500191011A
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. S7APARANISD1000U
IC 8154A-SD1000U
APPLICANT Sena Technologies, Inc.

Equipment Class	:	**Part 15 Spread Spectrum Transmitter (DSS)**
Manufacturing Description	:	**Bluetooth USB-Serial Adapter**
Manufacturer	:	**Sena Technologies, Inc.**
Model name	:	**Parani-SD1000U**
Test Device Serial No.:	:	**Identical prototype**
Rule Part(s)	:	**FCC Part 15.247 Subpart C; ANSI C-63.4-2003 RSS-210 and ISSUE No.: 7 Date: 2007**
Frequency Range	:	**2402 ~ 2480MHz**
RF power	:	**13.3 dBm - Conducted**
Data of issue	:	**November 2, 2010**

This test report is issued under the authority of:

Kyung-Taek LEE, Technical Manager

The test was supervised by:

Hyun-Chae You, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP®
NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.

Address : 243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822

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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2011-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Applicant & Manufacturer

Company name	:	Sena Technologies, Inc.
Address	:	210 Yangjae-dong Seocho-gu Seoul 137-130 Korea
Tel / Fax	:	+82-2-571-8283/ +82-2-573-7710

2-2 Equipment Under Test (EUT)

Trade name	:	Bluetooth USB-Serial Adapter
FCC ID	:	S7APARANISD1000U
Model name	:	Parani-SD1000U
Serial number	:	Identical prototype
Date of receipt	:	October 25, 2010
EUT condition	:	Pre-production, not damaged
Antenna type	:	Patch Antenna (M/N: HIF-2400) Max Gain 8.92 dBi Dipole Antenna (M/N: R-AN2400-1901RS) Max Gain 5.37 dBi Dipole Antenna (M/N: R-AN2400-5801RS) Max Gain 3.27 dBi Dipole Antenna (M/N: AN2400-3306RS) Max Gain 1.40 dBi
Frequency Range	:	2402 ~ 2480MHz
RF output power	:	Maximum 13.3 dBm
Number of channels	:	79
Channel spacing	:	1MHz
Channel Access Protocol	:	Frequency Hopping Spread Spectrum (FHSS)
Type of Modulation	:	Basic Mode(GFSK), EDR Mode(Pi/4 DQPSK, 8DPSK)
Power Source	:	DC 5.0V By PC USB

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2441	2480

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	PP37L	8V5RBN1	DELL
PRINTER	STYLUS C65	JF5Y020825	EPSON

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	Number of Hopping Frequencies	> 15 hops		C
15.247(a)	20 dB Bandwidth 99% Bandwidth	> 1.5 MHz		C
15.247	Dwell Time	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 250 mWatt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.249 / 15.209	Field Strength of Harmonics	< 54 dBuV (at 3m)	Radiated	C
15.109	Field Strength	-		C
15.207 /15.107	AC Conducted Emissions	EN 55022	Line Conducted	C
15.203	Antenna requirement	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003
RSS-210 and ISSUE No.: 7 Date: 2007

→ Antenna Requirement

The Sena Technologies, Inc. Parani-SD1000U unit complies with the requirement of §15.203.

The antenna connector is the reverse polarity SMA connector.

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation

Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 10 kHz (1% of the span or more) Sweep = auto

VBW = 10 kHz Detector function = peak

Trace = max hold

Measurement Data:

Test Results	
Carrier Frequency Separation (MHz)	**Result**
1.003	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of 20dB bandwidth of the hopping channel, whichever is greater.

Measurement Setup

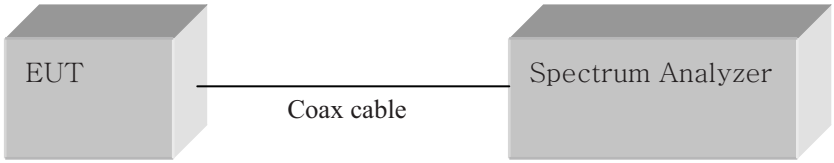
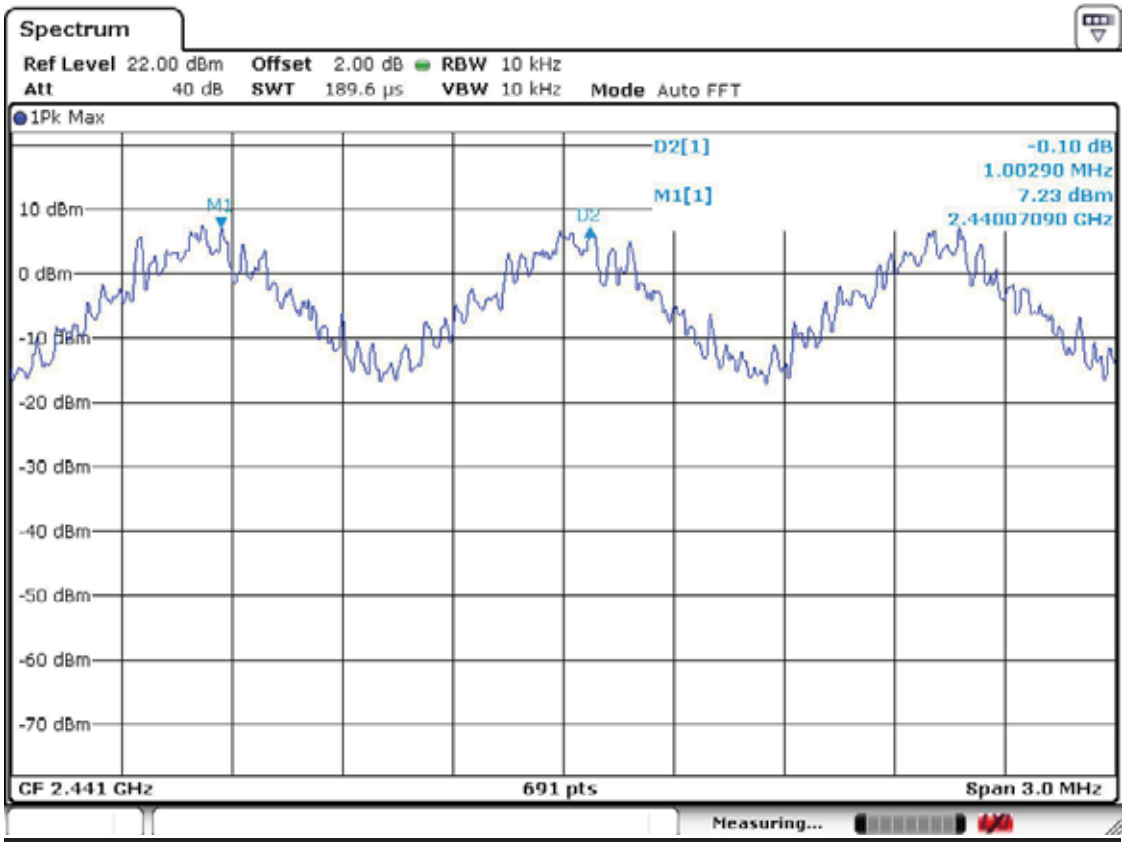


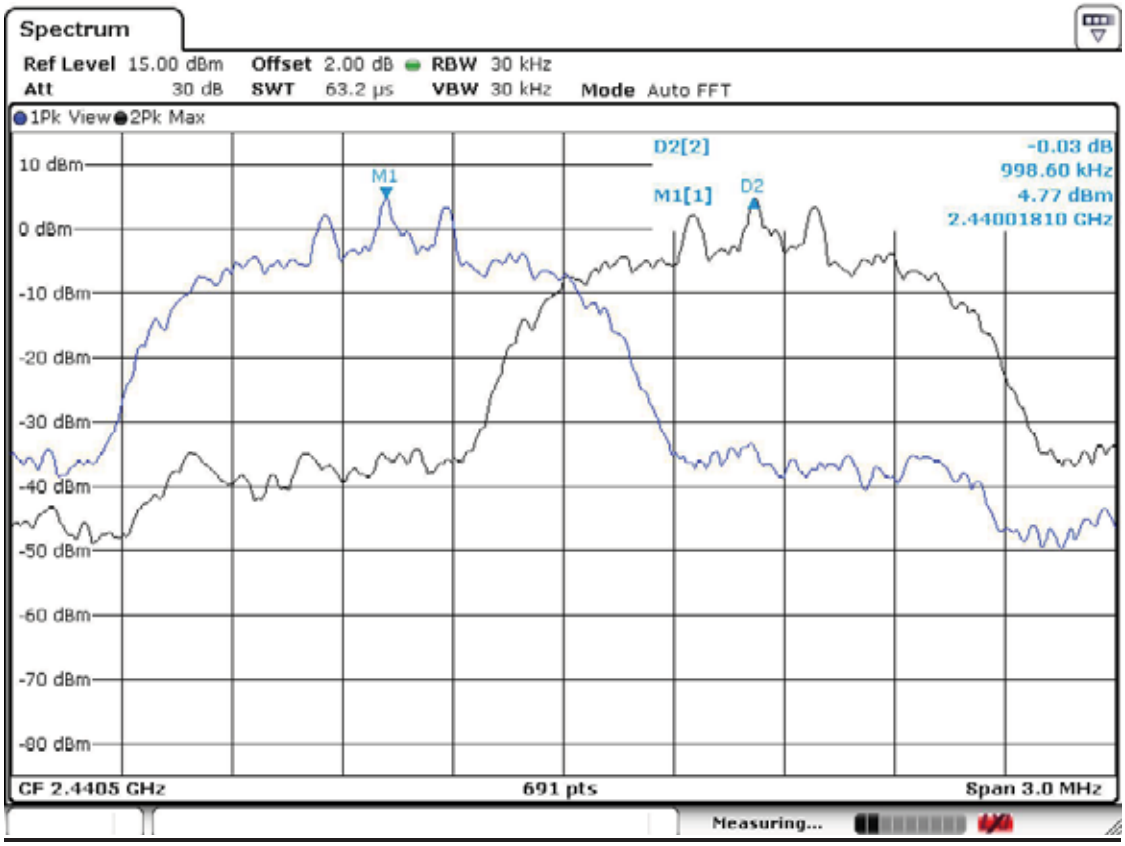
Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation

Basic Mode



EDR Mode



3.2.2 Number of Hopping Frequencies

Procedure:

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

To get higher resolution, four frequency ranges within the 2400 ~ 2483.5 MHz FH band were examined.

The spectrum analyzer is set to:

Frequency range 1: Start = 2400.0MHz, Stop = 2441.5 MHz

2: Start = 2441.5MHz, Stop = 2483.5 MHz

RBW = 100 kHz (1% of the span or more) Sweep = auto

VBW = 100 kHz (VBW ≥ RBW) Detector function = peak

Trace = max hold Span > 40MHz

Measurement Data: Complies

Total number of Hopping Channels	79

- See next pages for actual measured spectrum plots.

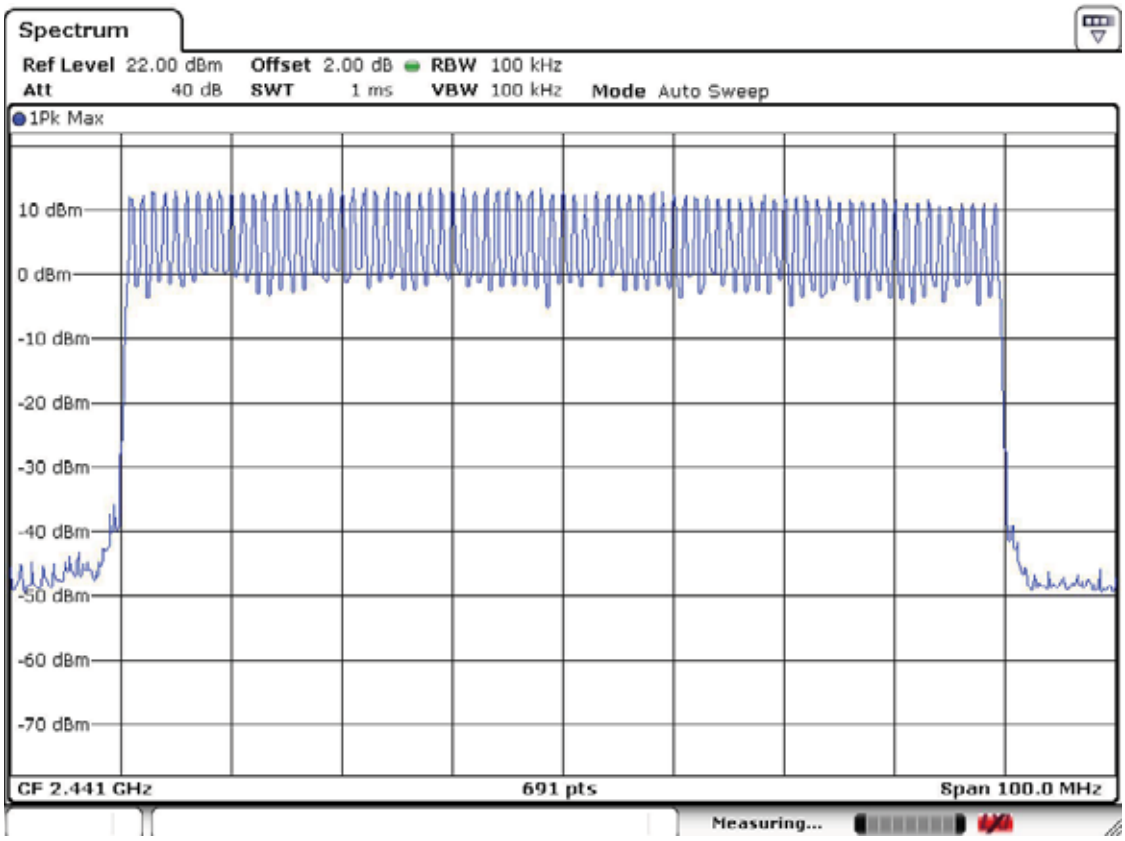
Minimum Standard:

At least 15 hopes

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Number of Hopping Frequencies



3.2.3 20 dB Bandwidth

Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 3 MHz (approximately 2 or 3 times of the 20 dB bandwidth)

RBW = 30 kHz

VBW = 30 kHz (VBW ≥ RBW)

Trace = max hold

Sweep = auto

Detector function = peak

dB/Div = 5dB

Measurement Data: Basic Mode

Frequency (MHz)	Channel No.	Test Results(MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	0.834	0.899
2441	39	0.890	0.894
2480	78	0.834	0.886

Measurement Data: EDR Mode

Frequency (MHz)	Channel No.	Test Results(MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	1.216	1.172
2441	39	1.216	1.172
2480	78	1.207	1.172

- See next pages for actual measured spectrum plots.

Minimum Standard:

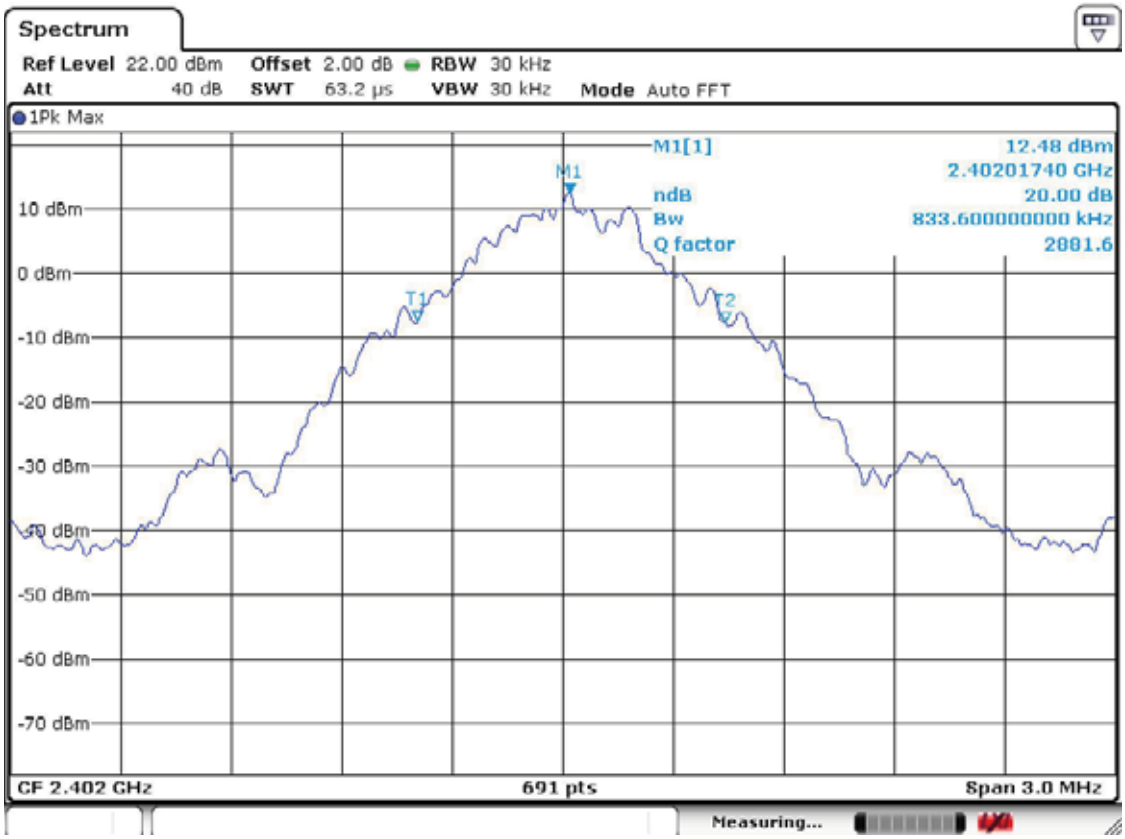
N/A

Measurement Setup

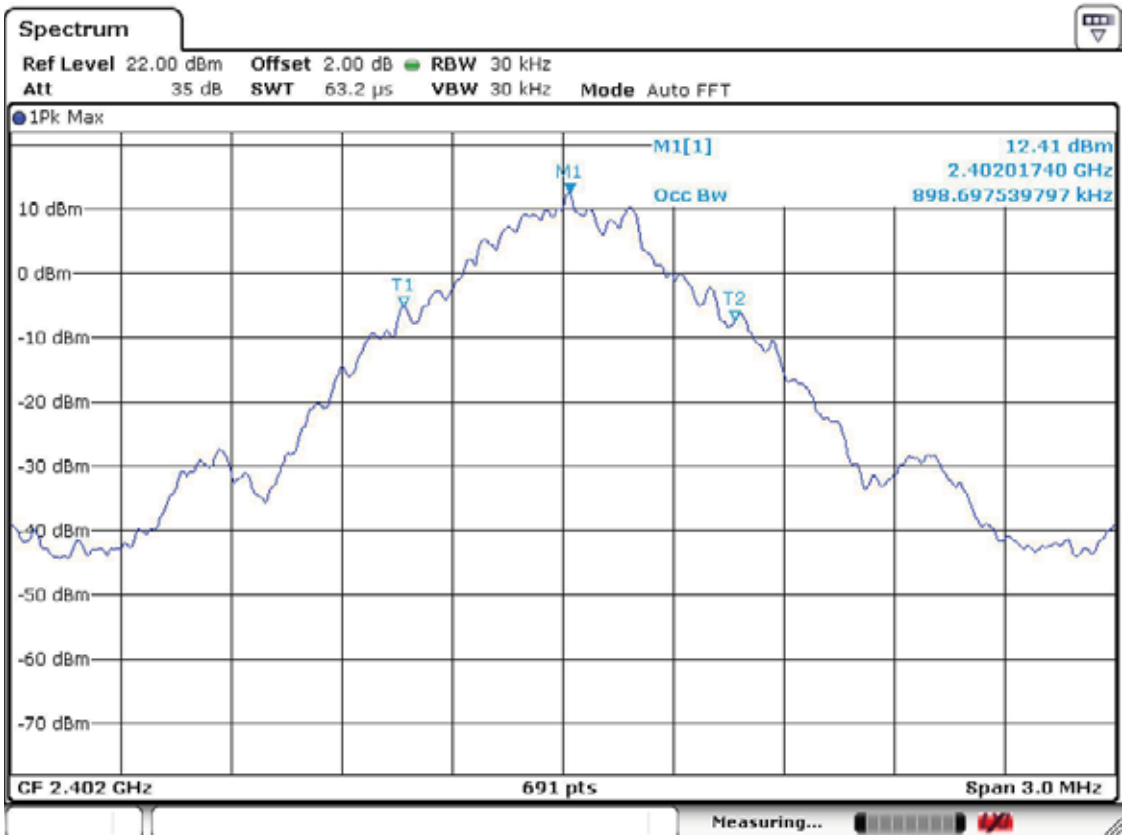
Same as the Chapter 3.2.1 (Figure 1)

Channel 1 of basic mode

20 dB Bandwidth

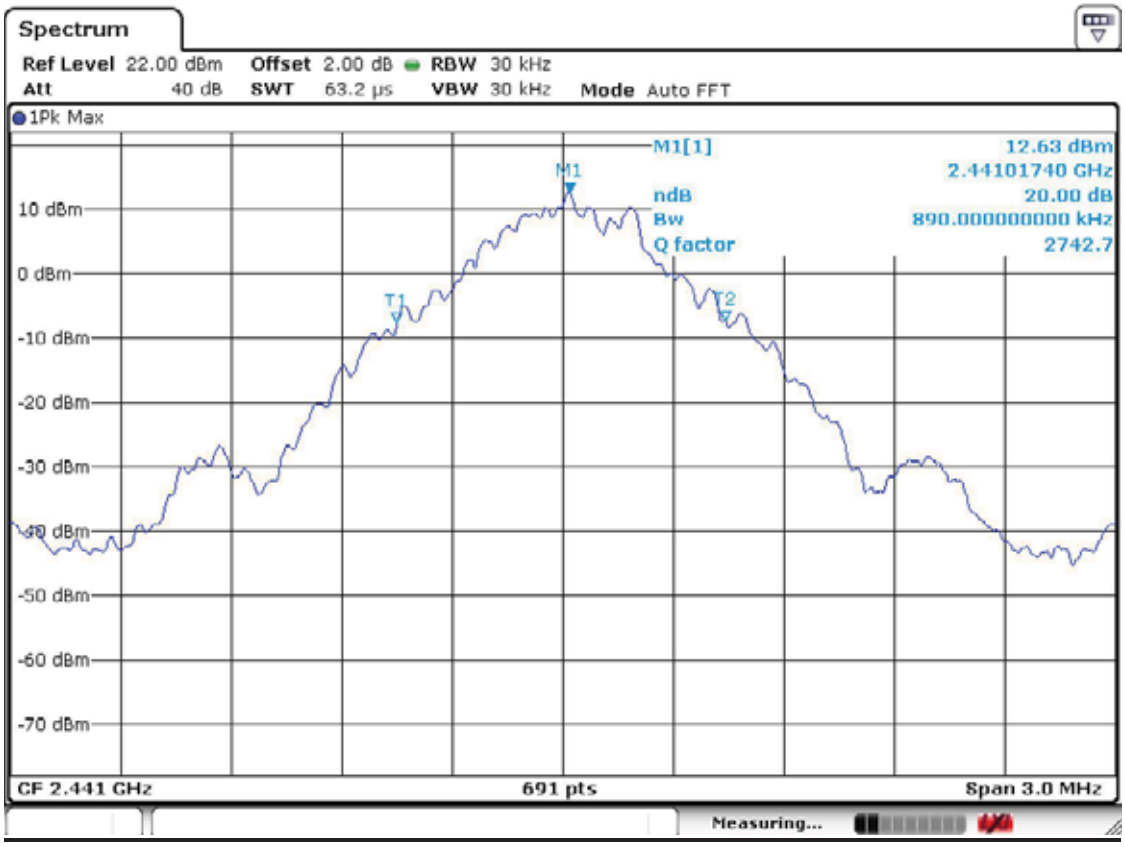


99% Bandwidth

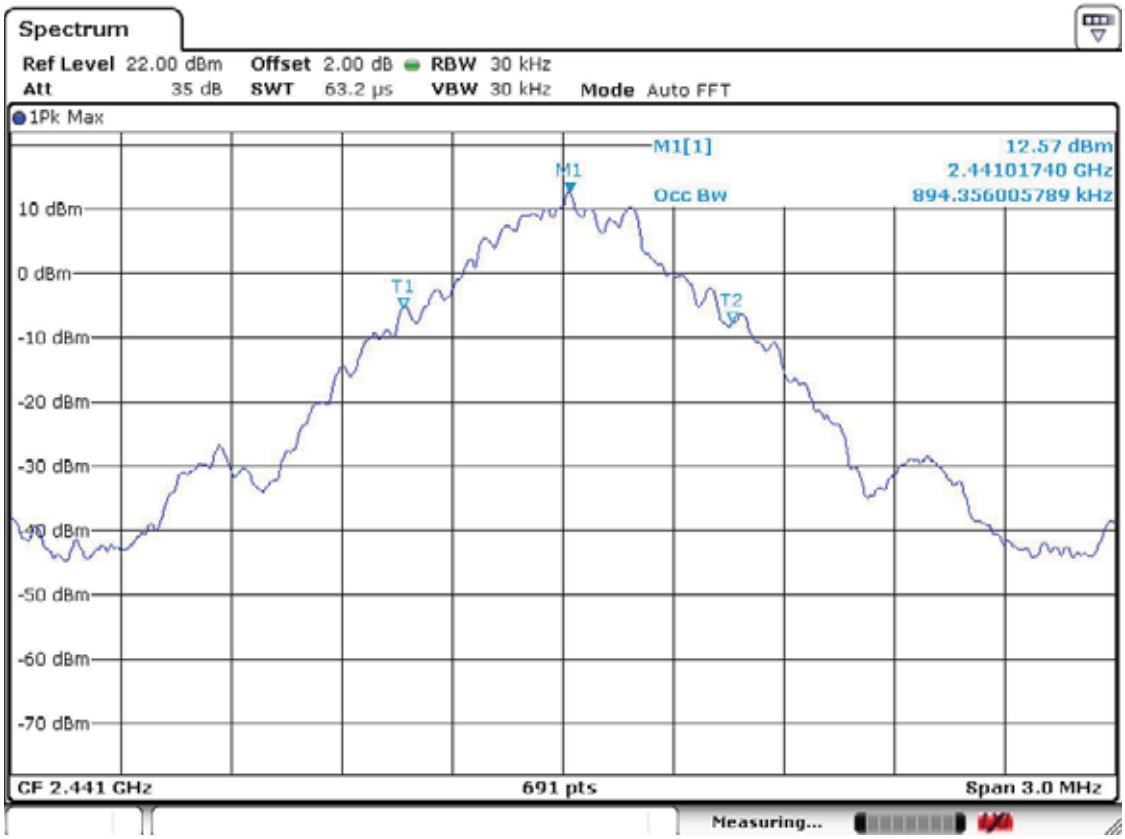


Channel 2 of basic mode

20 dB Bandwidth



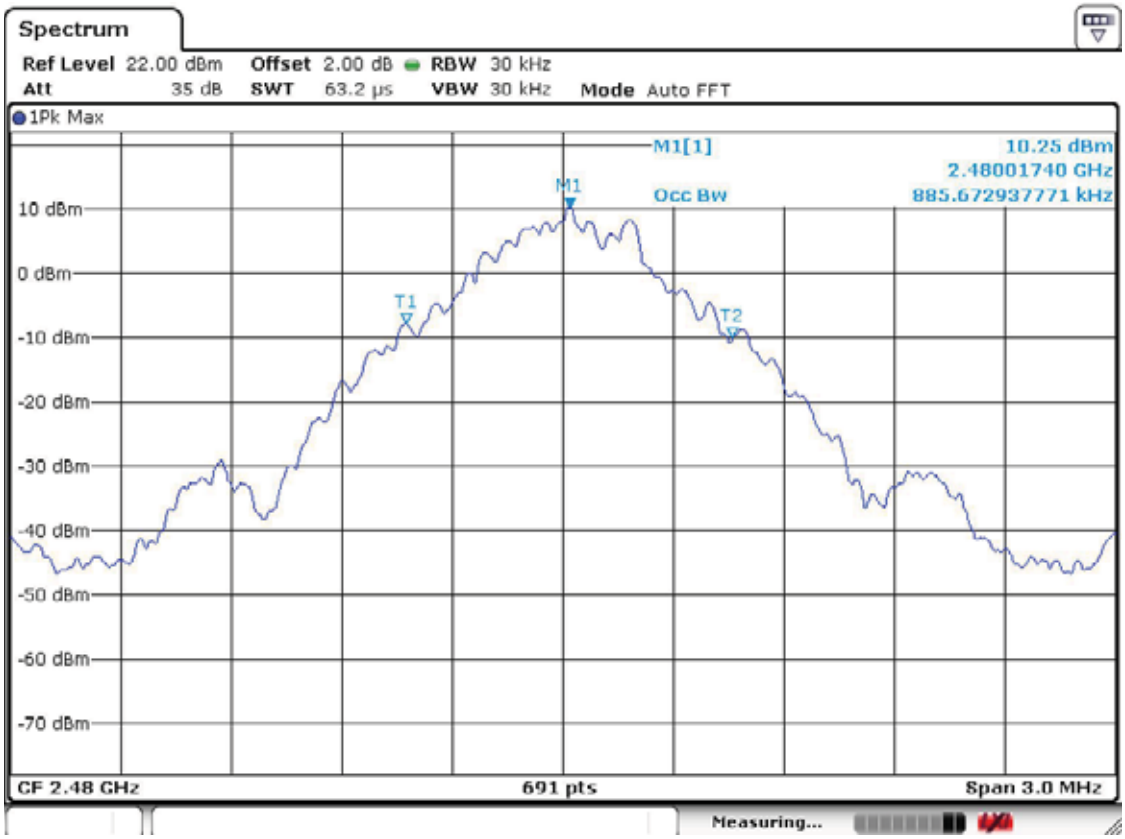
99% Bandwidth



Channel 3 of basic mode

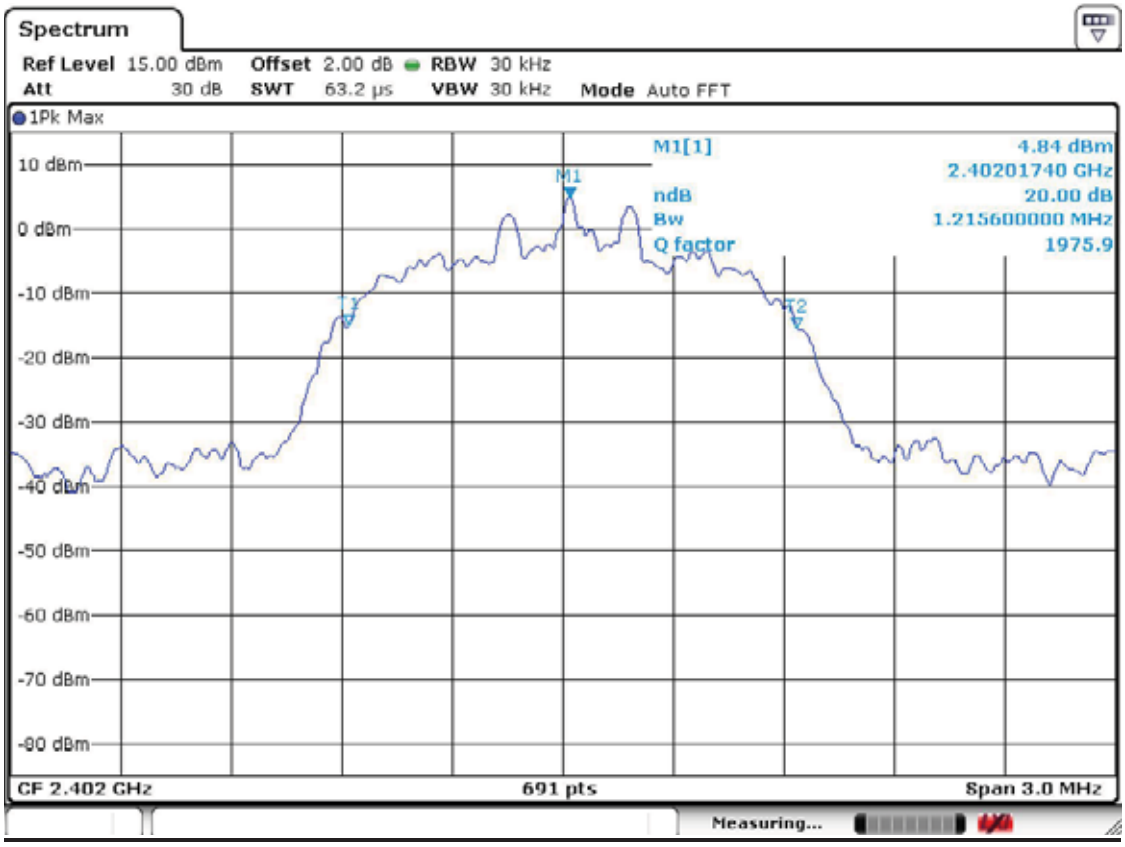
20 dB Bandwidth

99% Bandwidth

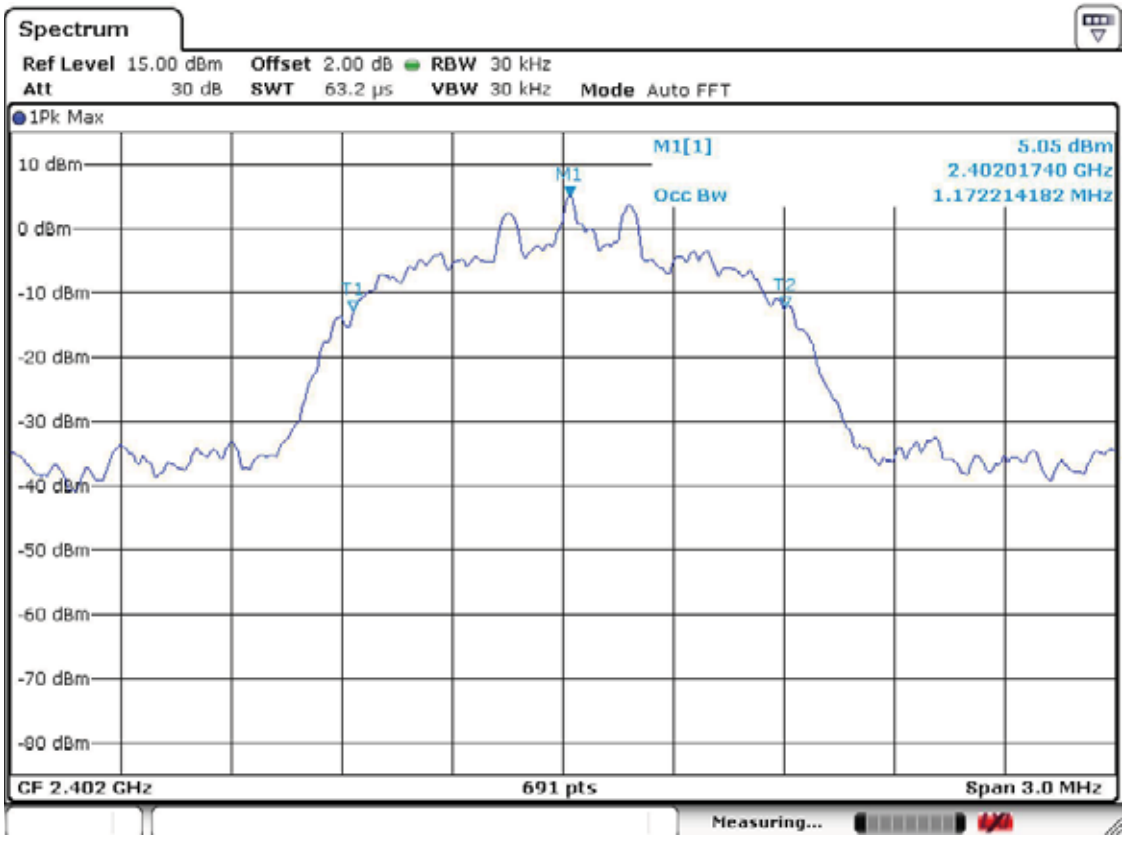


Channel 1 at EDR mode

20 dB Bandwidth

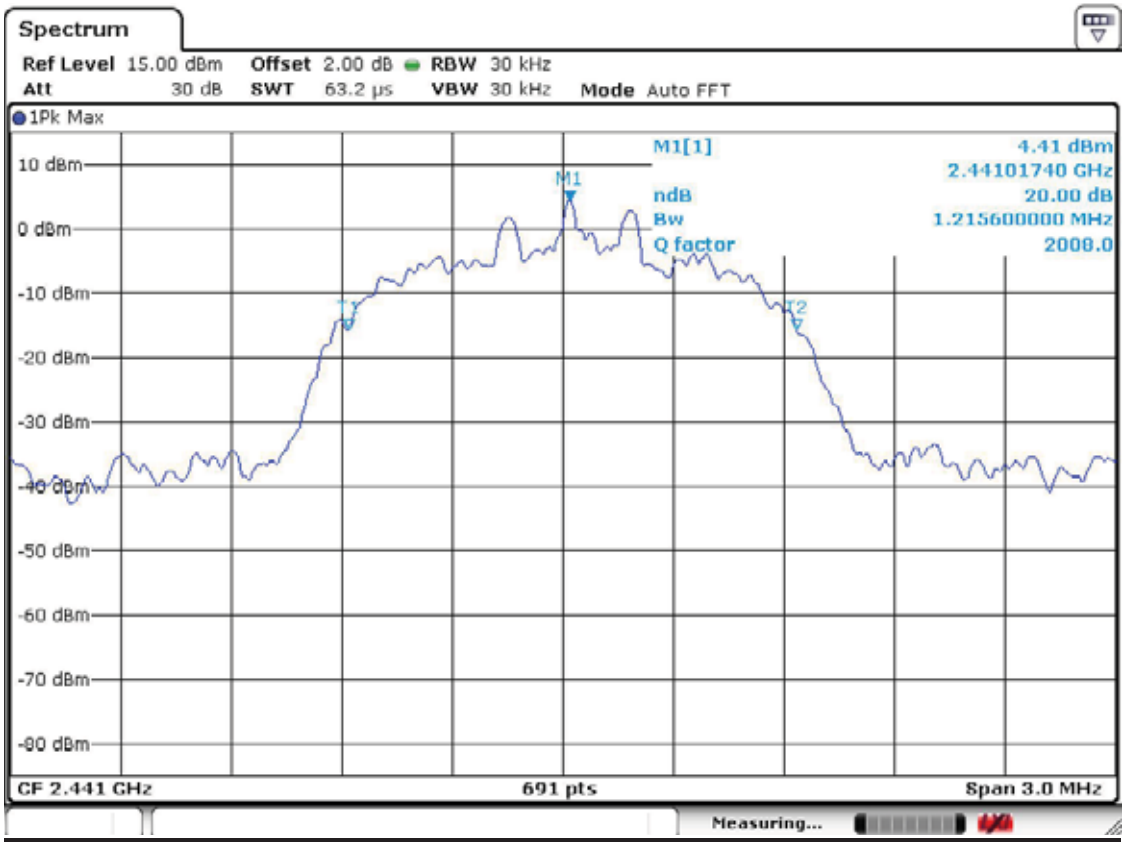


99% Bandwidth

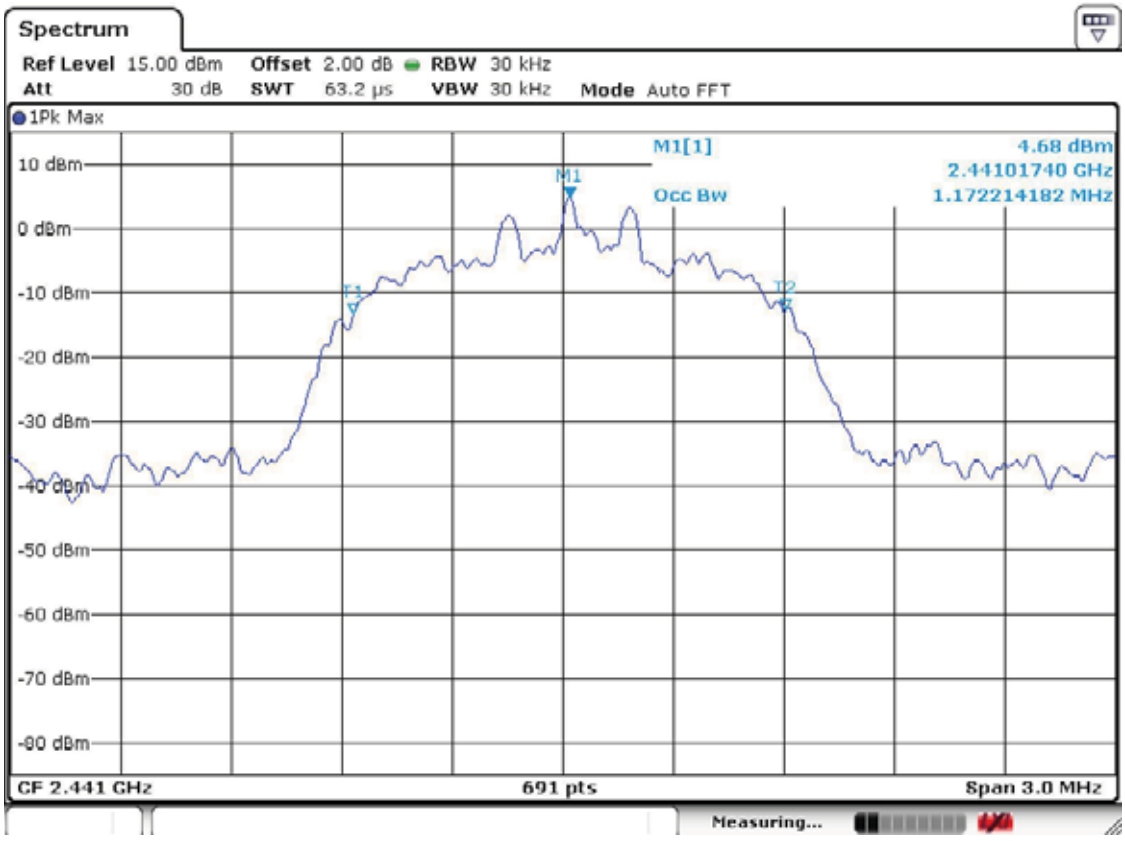


Channel 2 at EDR mode

20 dB Bandwidth

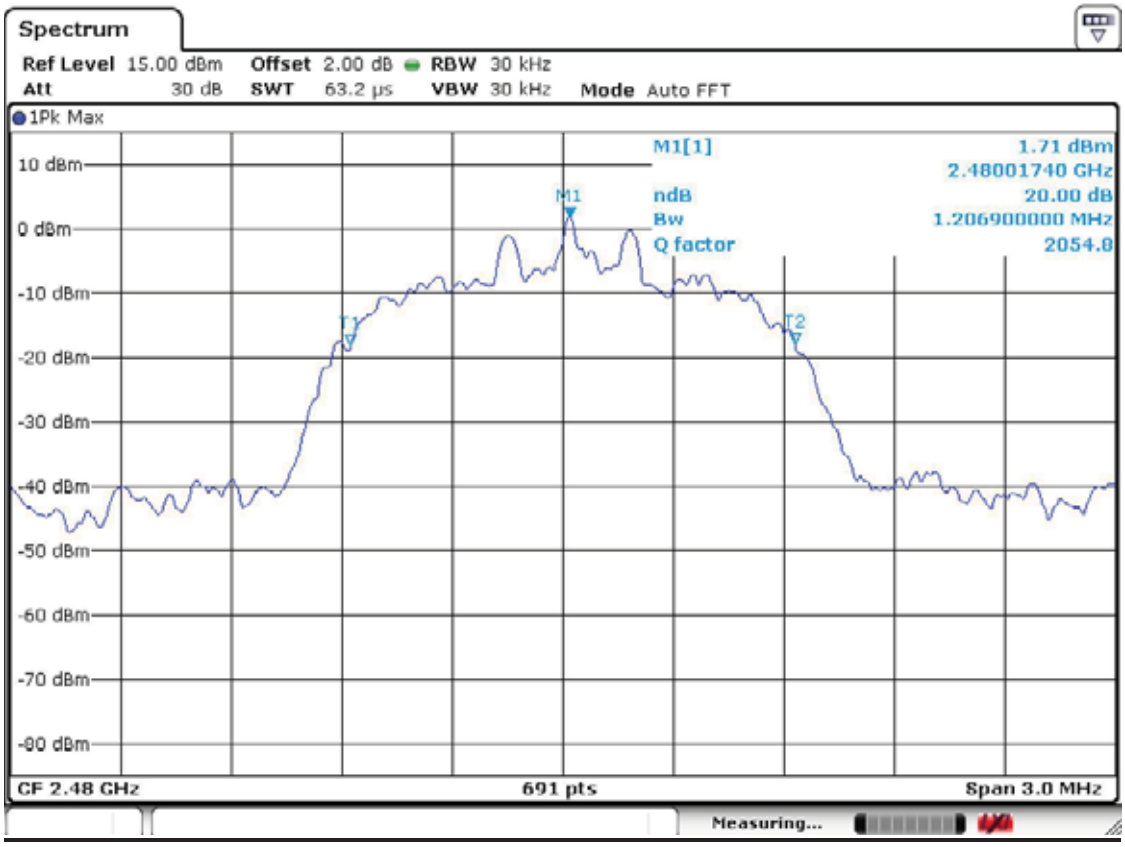


99% Bandwidth

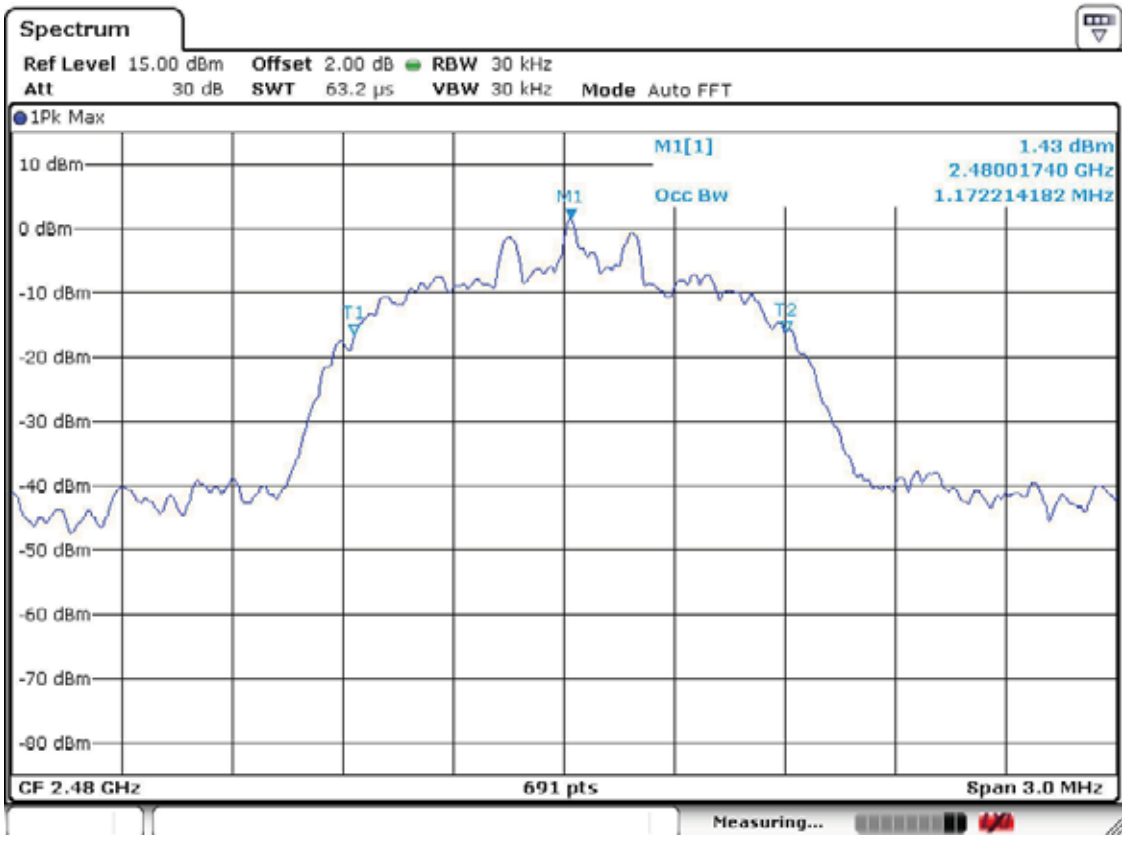


Channel 3 at EDR mode

20 dB Bandwidth



99% Bandwidth



3.2.4 Time of Occupancy (Dwell Time)

Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 2441 MHz — Span = zero

RBW = 1 MHz — VBW = 1 MHz (VBW ≥ RBW)

Trace = max hold — Detector function = peak

Measurement Data:

Mode	Number of transmission ina 31.6s (79Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
DH1	**30(Times / 3sec) *10.533 = 315.99**	**0.522**	**164.95**	**400**
DH3	**15(Times / 3sec) *10.533 = 158.00**	**1.752**	**276.82**	**400**
DH5	**10(Times / 3sec) *10.533 = 105.33**	**3.028**	**318.94**	**400**
EDR 3Mbps DH5	**10(Times / 3sec) *10.533 = 105.33**	**3.073**	**323.68**	**400**

- See next pages for actual measured spectrum plots.
- dwell time = {(number of hopping per second / number of slot) x duration time per channel} x 0.4 ms

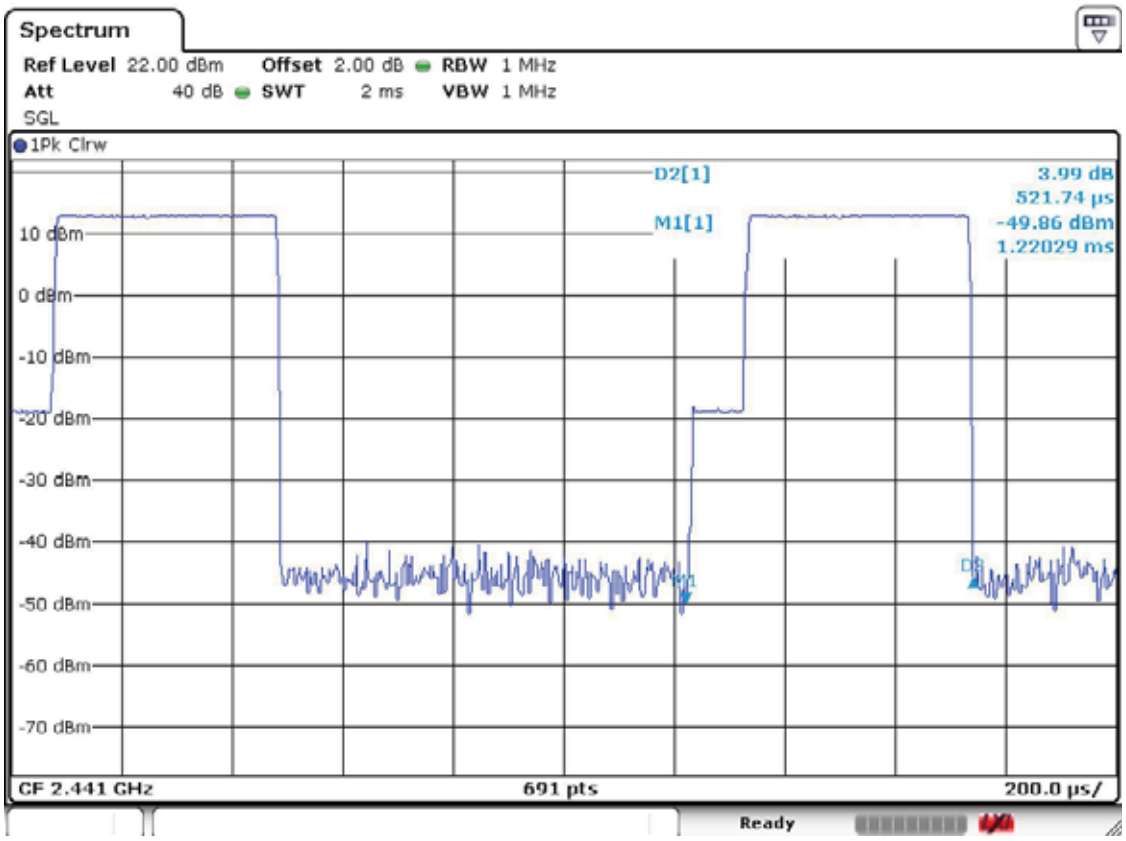
Minimum Standard:

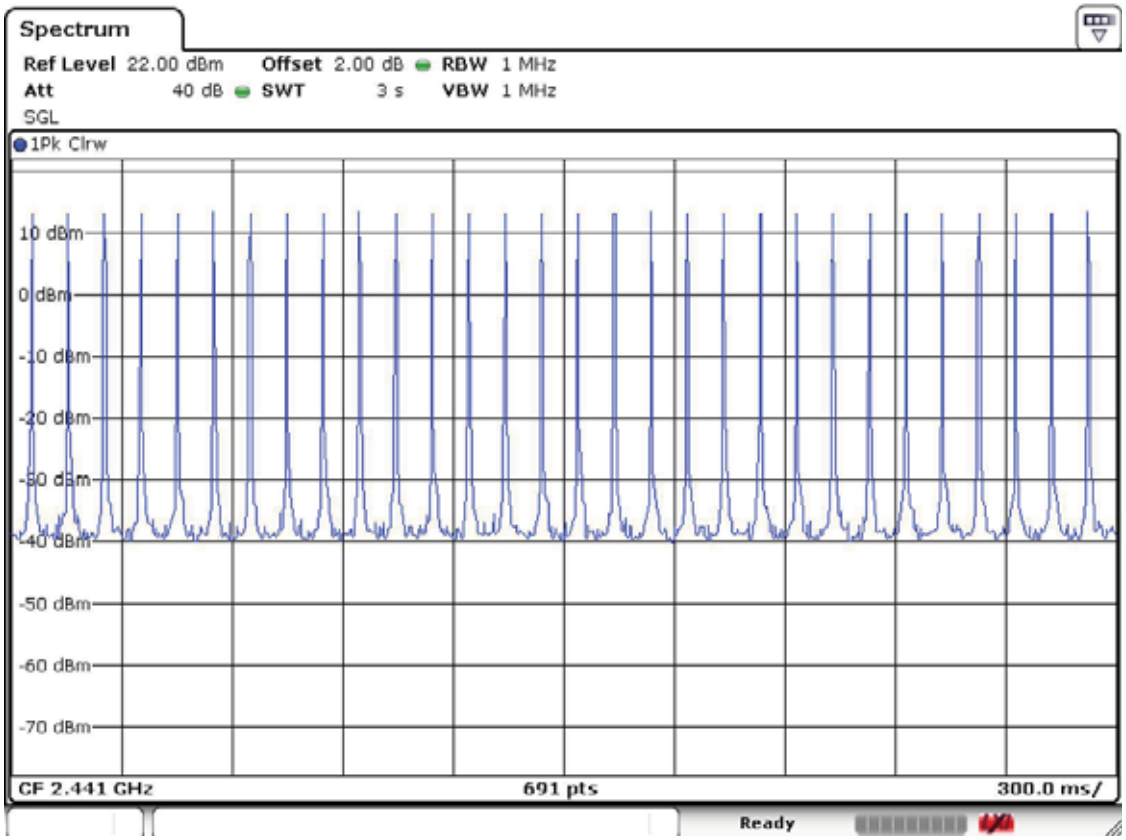
0.4 seconds within a 30 second period per any frequency

Measurement Setup

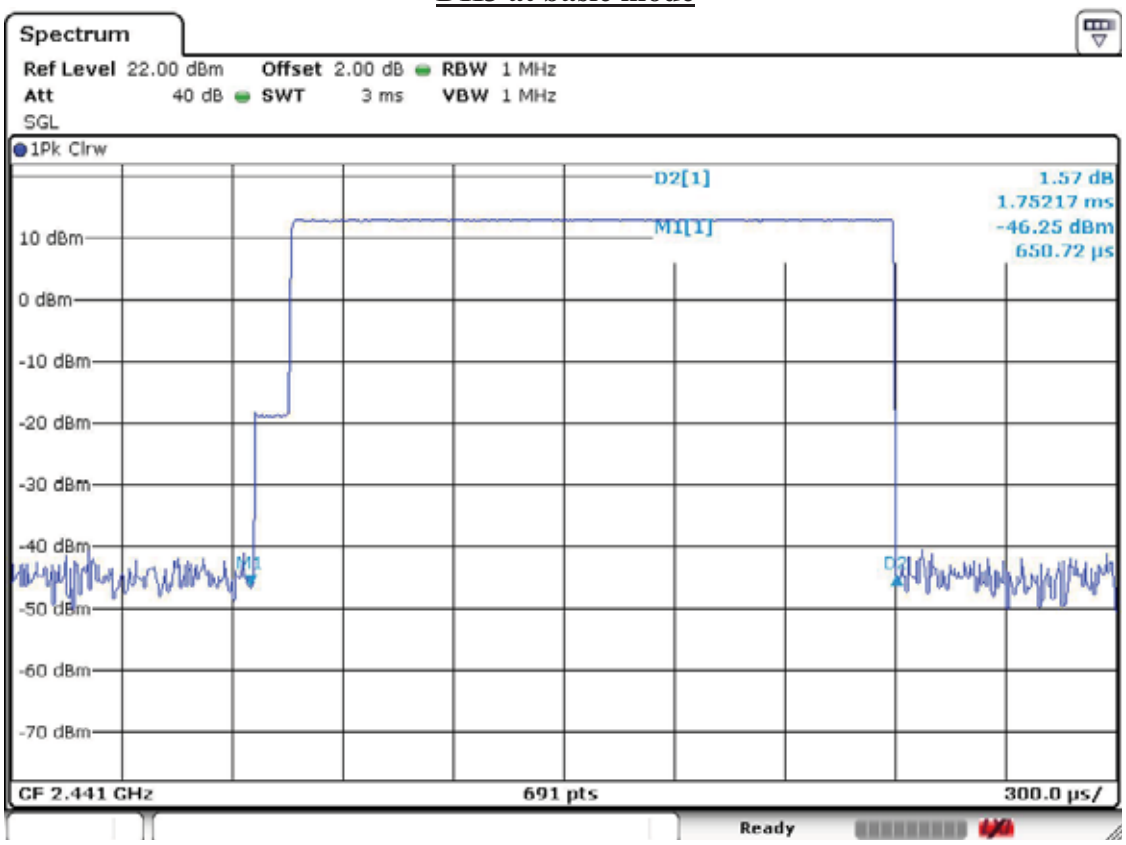
Same as the Chapter 3.2.1 (Figure 1)

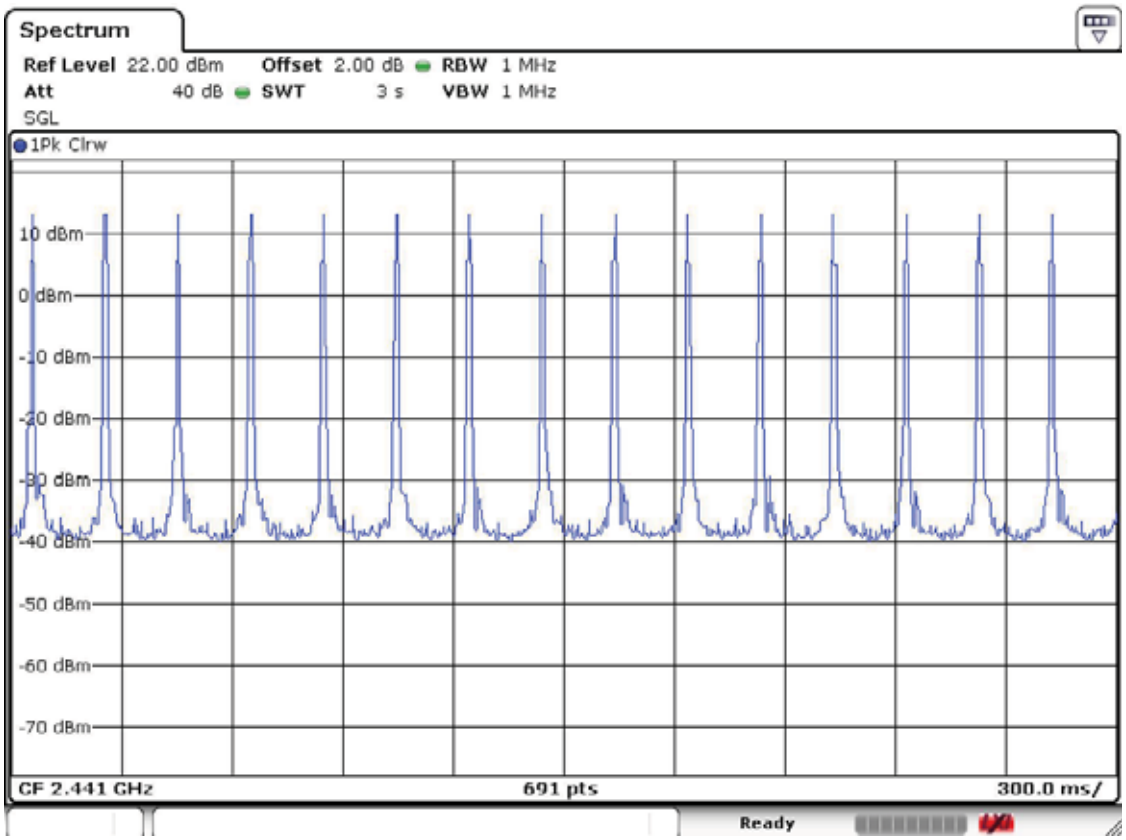
DH1 at basic mode



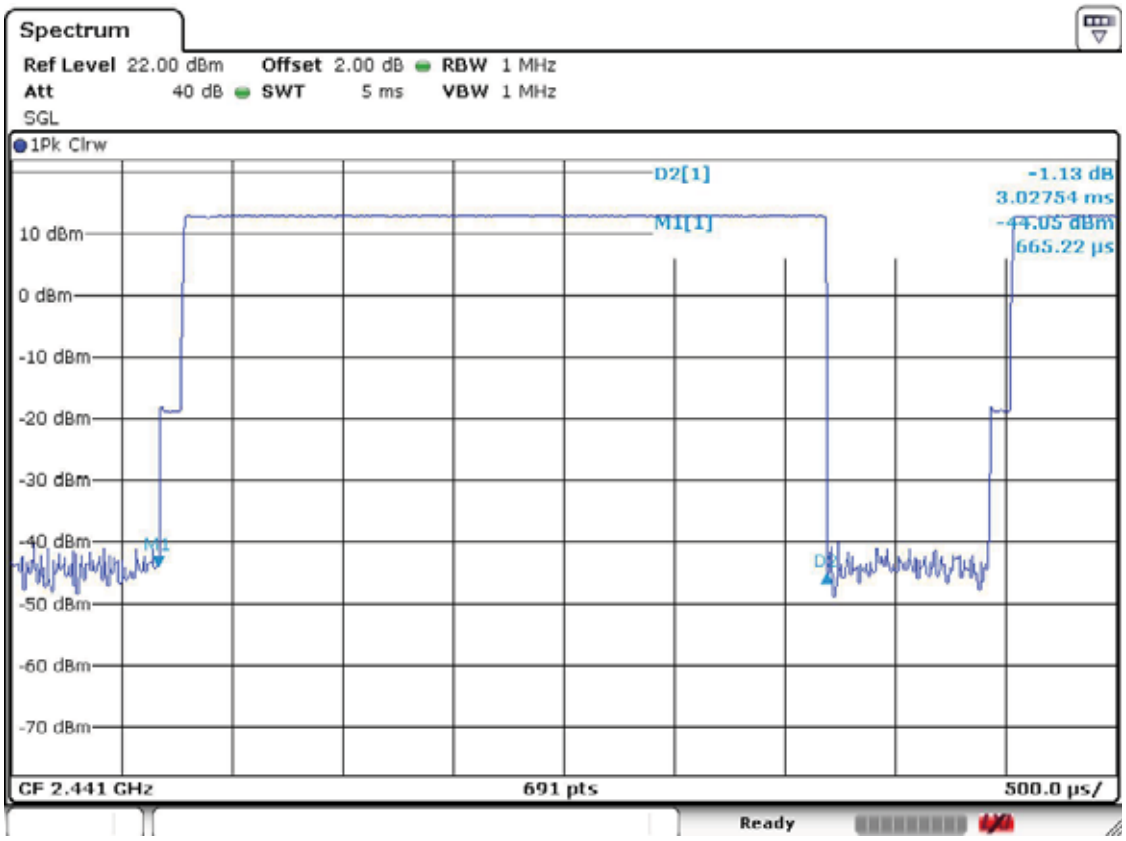


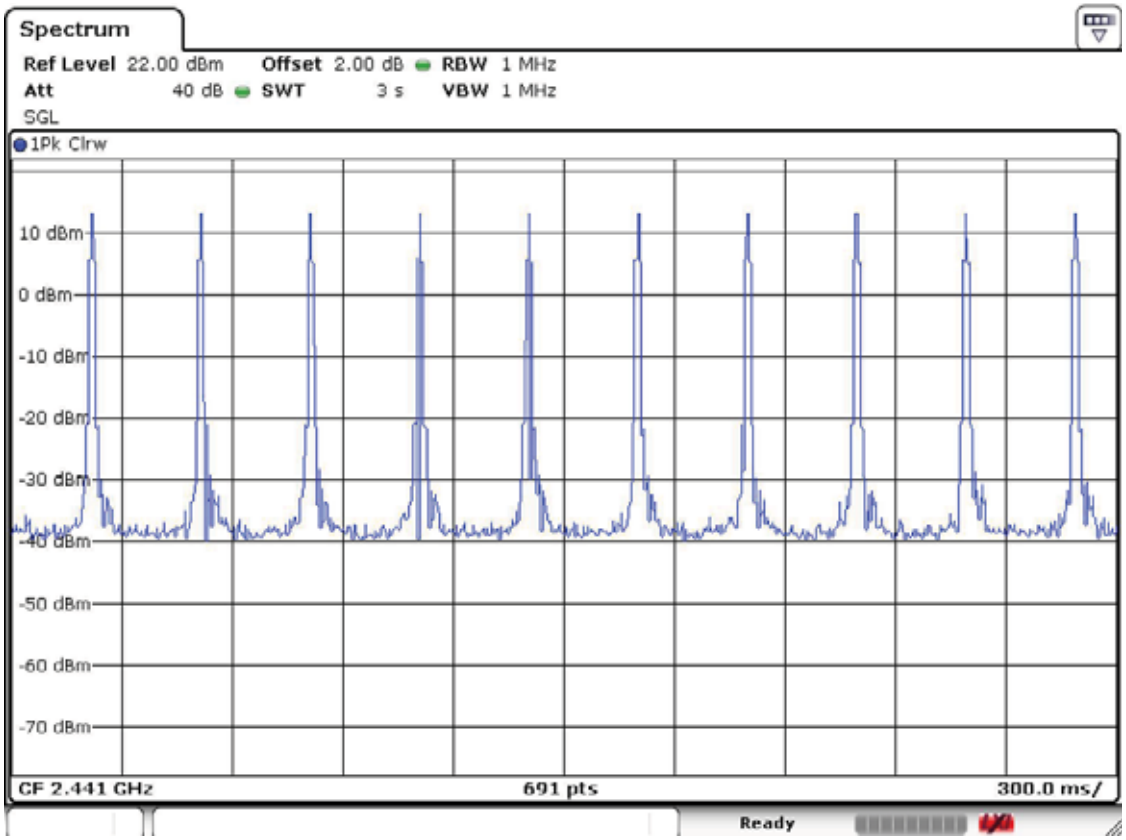
DH3 at basic mode



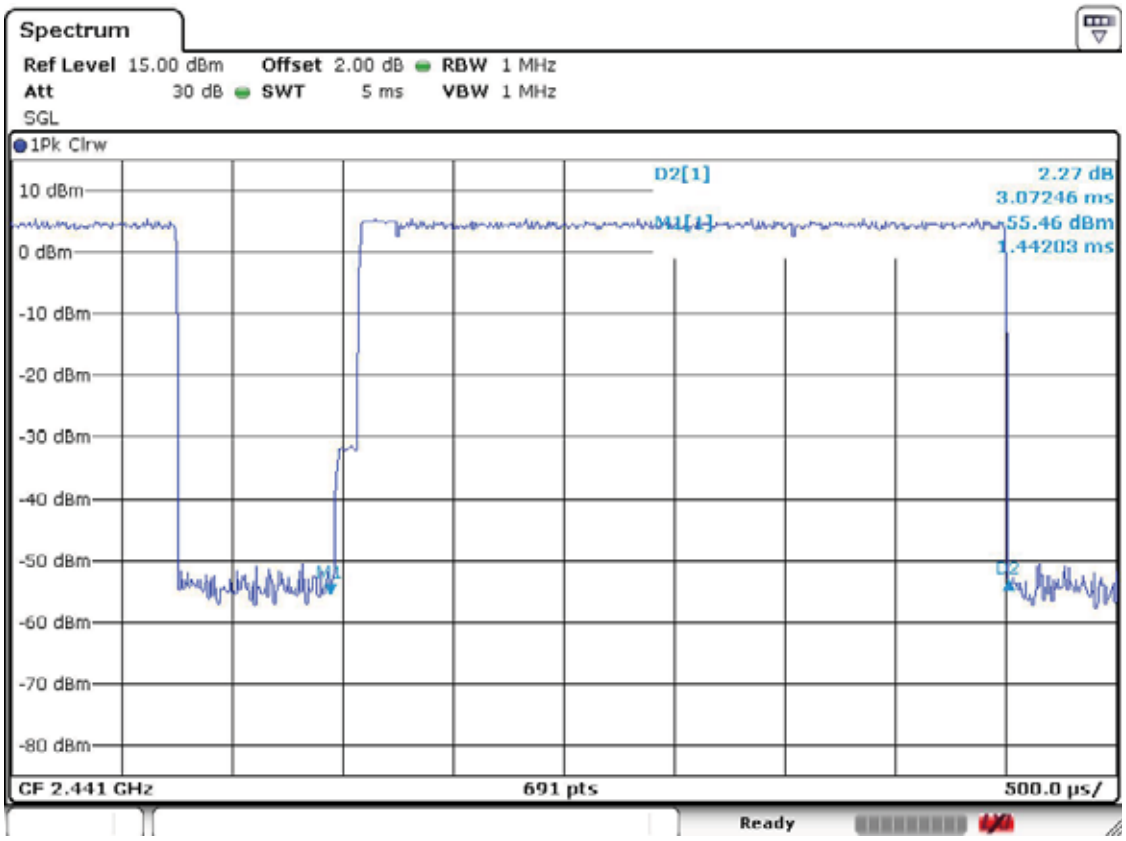


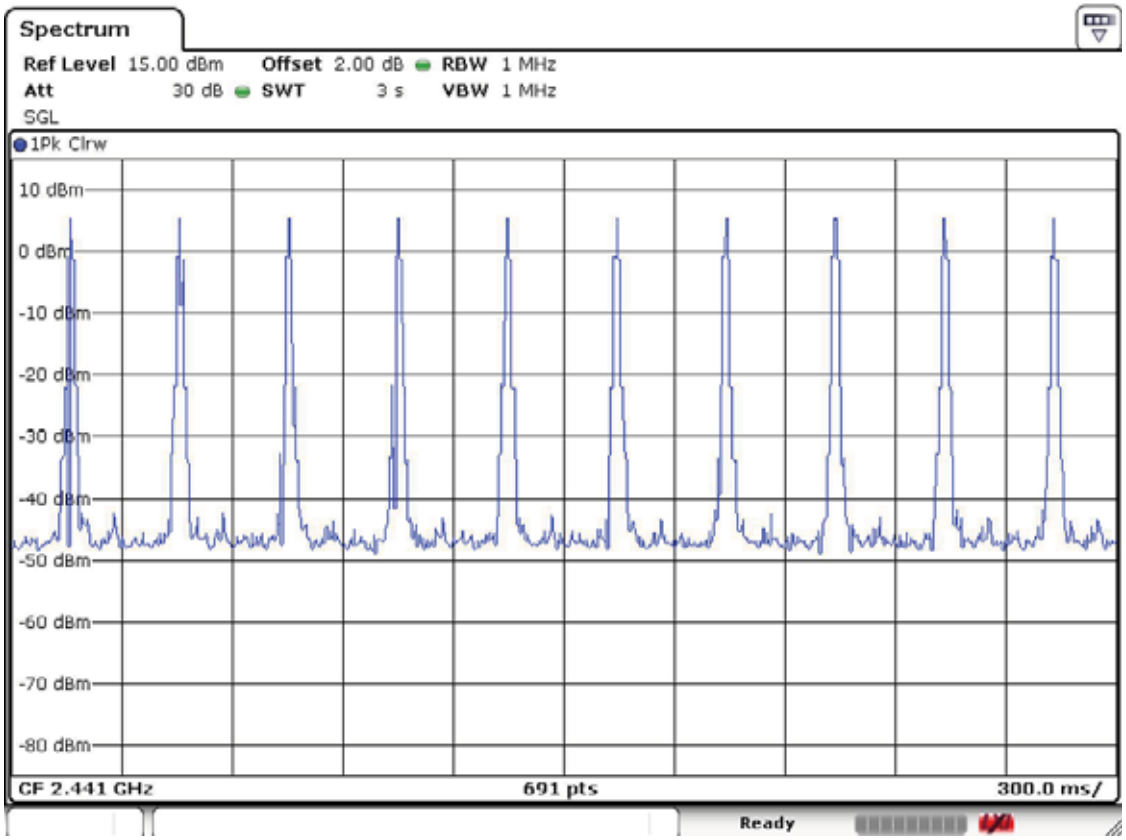
DH5 at basic mode





DH5 at EDR mode with 3Mbps





3.2.5 Transmitter Output Power

Procedure:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 20 MHz (approximately 5 times of the 20 dB bandwidth)

RBW = 3 MHz (greater than the 20dB bandwidth of the emission being measured)

VBW = 3 MHz (VBW ≥ RBW) Detector function = peak

Trace = max hold Sweep = auto

Measurement Data: Basic Mode

Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2402	0	**13.14**	**20.61**	Complies
2441	39	**13.30**	**21.38**	Complies
2480	78	**11.31**	**13.52**	Complies

Measurement Data: EDR Mode

Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2402	0	**6.08**	**4.06**	Complies
2441	39	**5.70**	**3.72**	Complies
2480	78	**2.65**	**1.84**	Complies

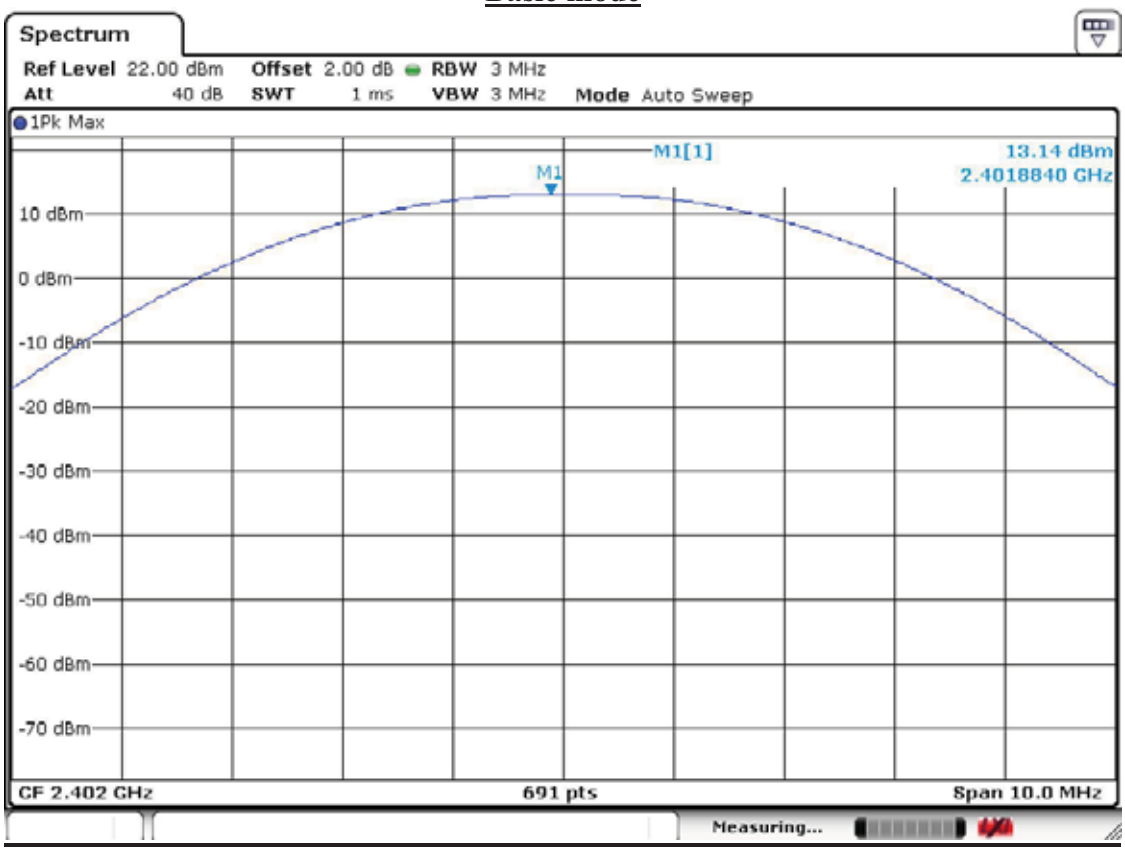
- See next pages for actual measured spectrum plots.

Minimum Standard:	< 250 mW

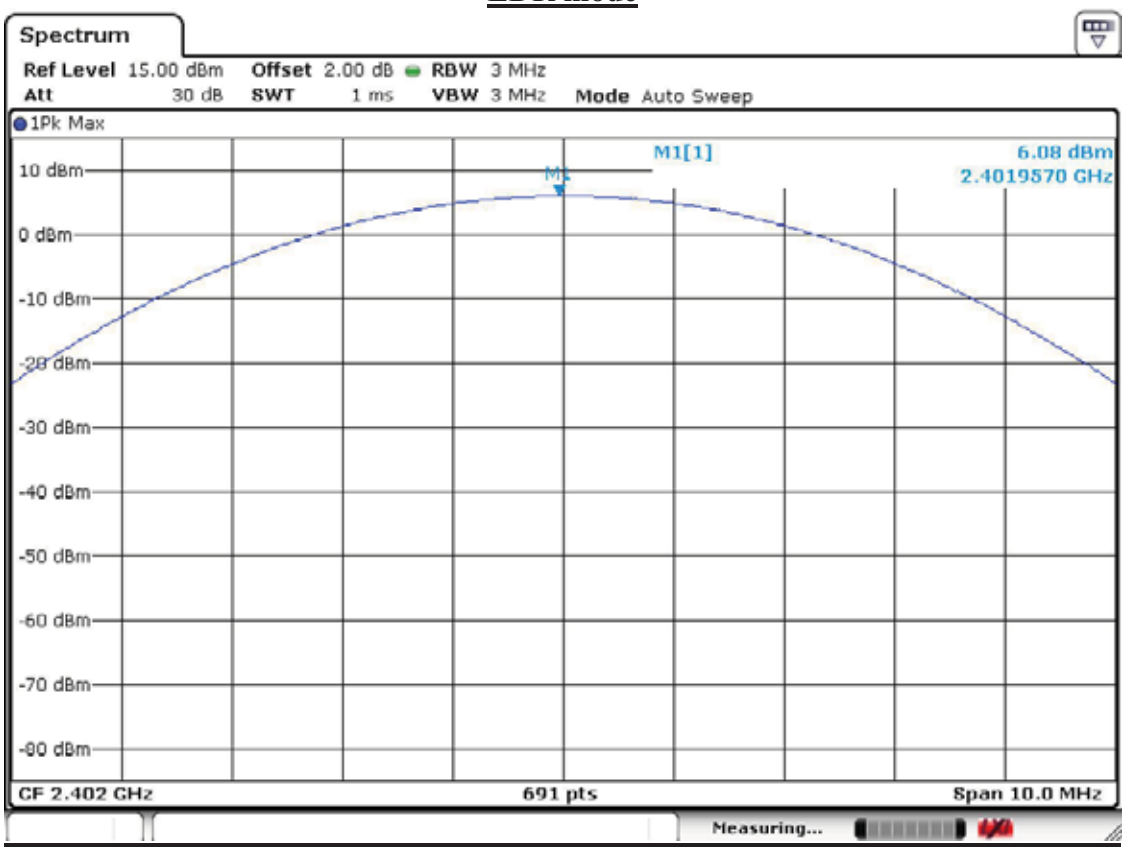
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

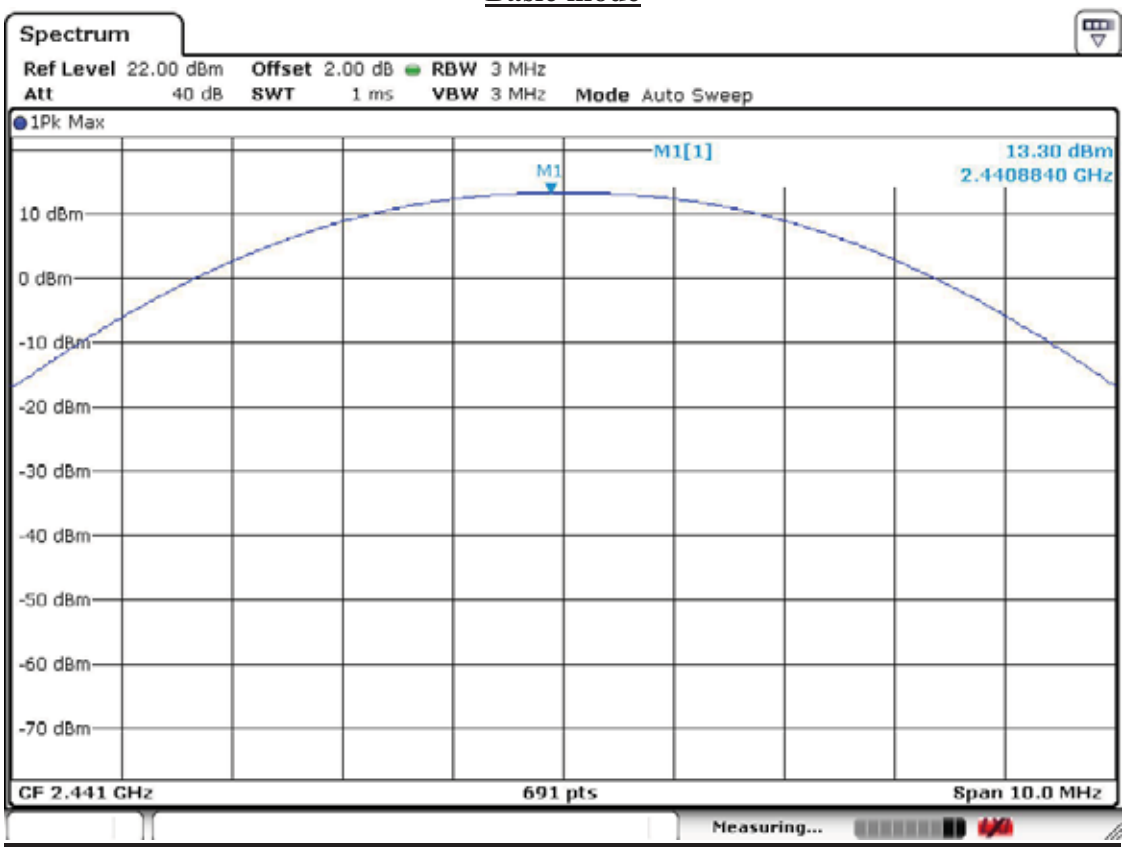
Channel 1
Basic mode



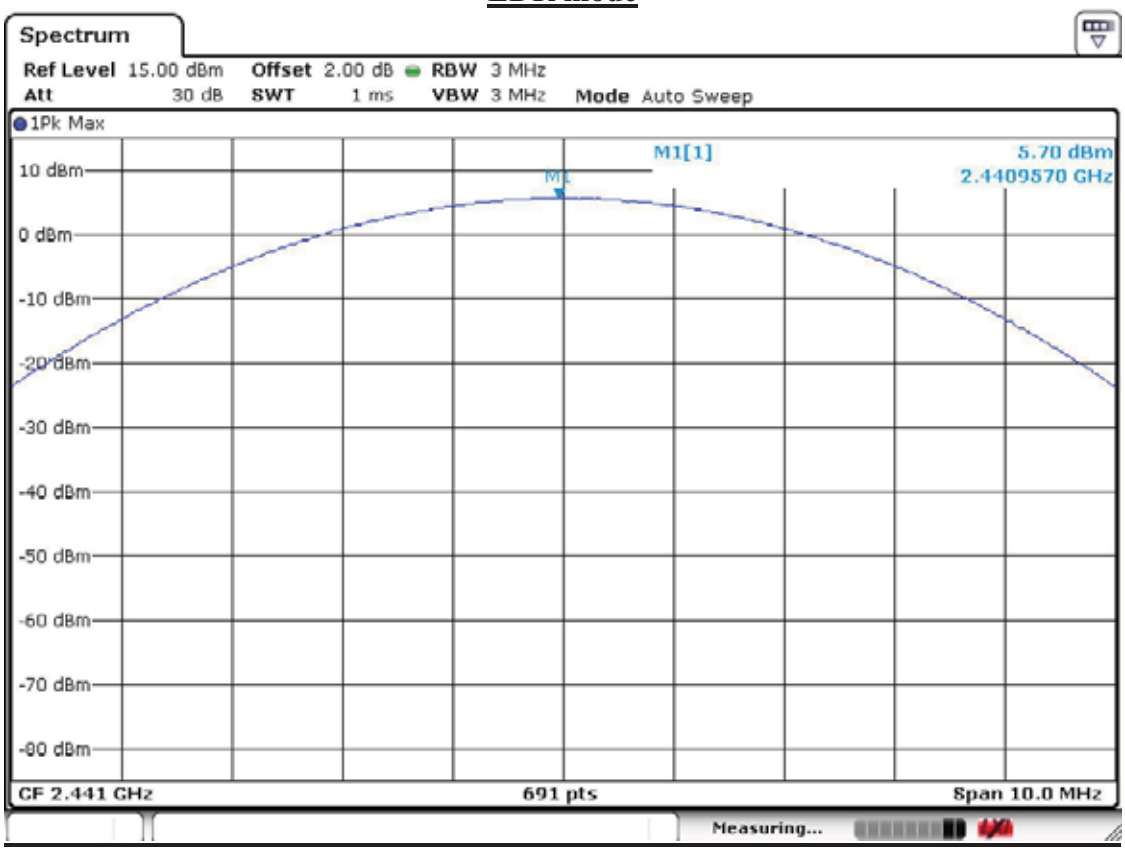
EDR mode



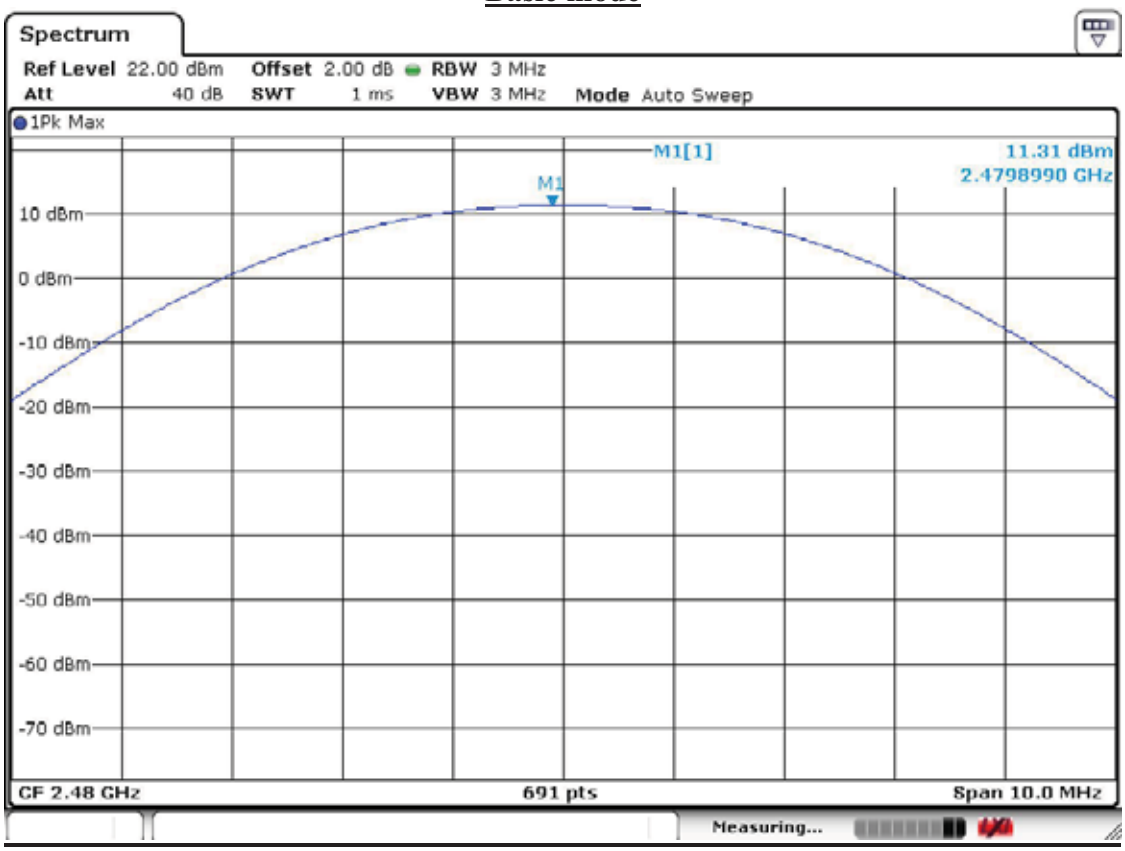
Channel 2
Basic mode



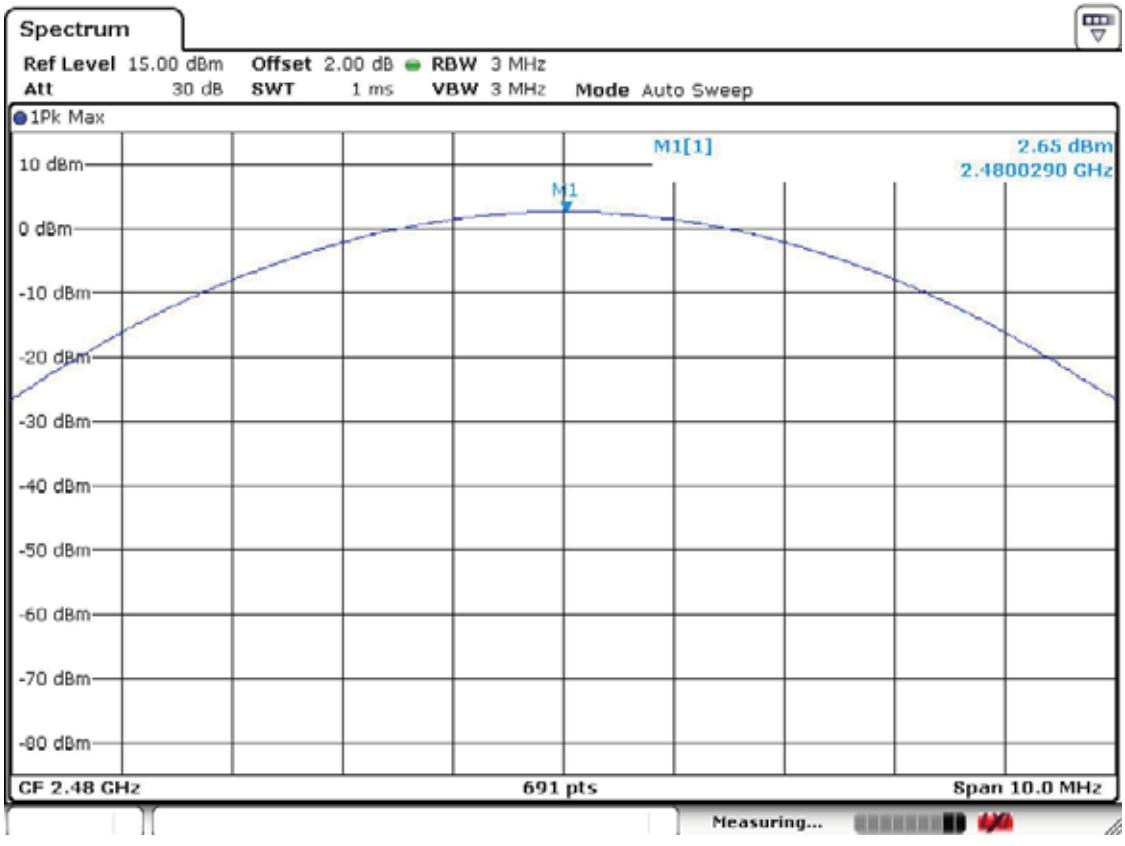
EDR mode



Channel 3
Basic mode



EDR mode



3.2.6 Band Edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz	VBW = 100 kHz
Span = 10 MHz	Detector function = peak
Trace = max hold	Sweep = auto

Measurement Data: Complies

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

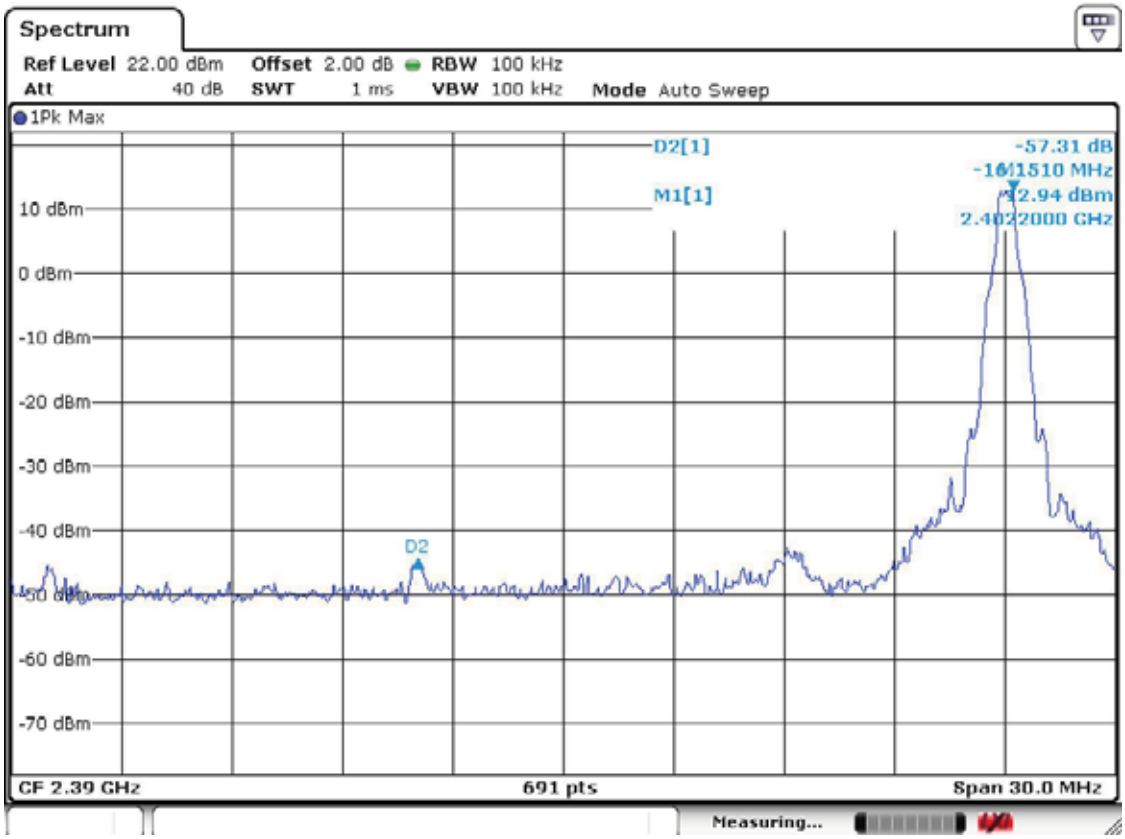
Minimum Standard:	> 20 dBc

Measurement Setup

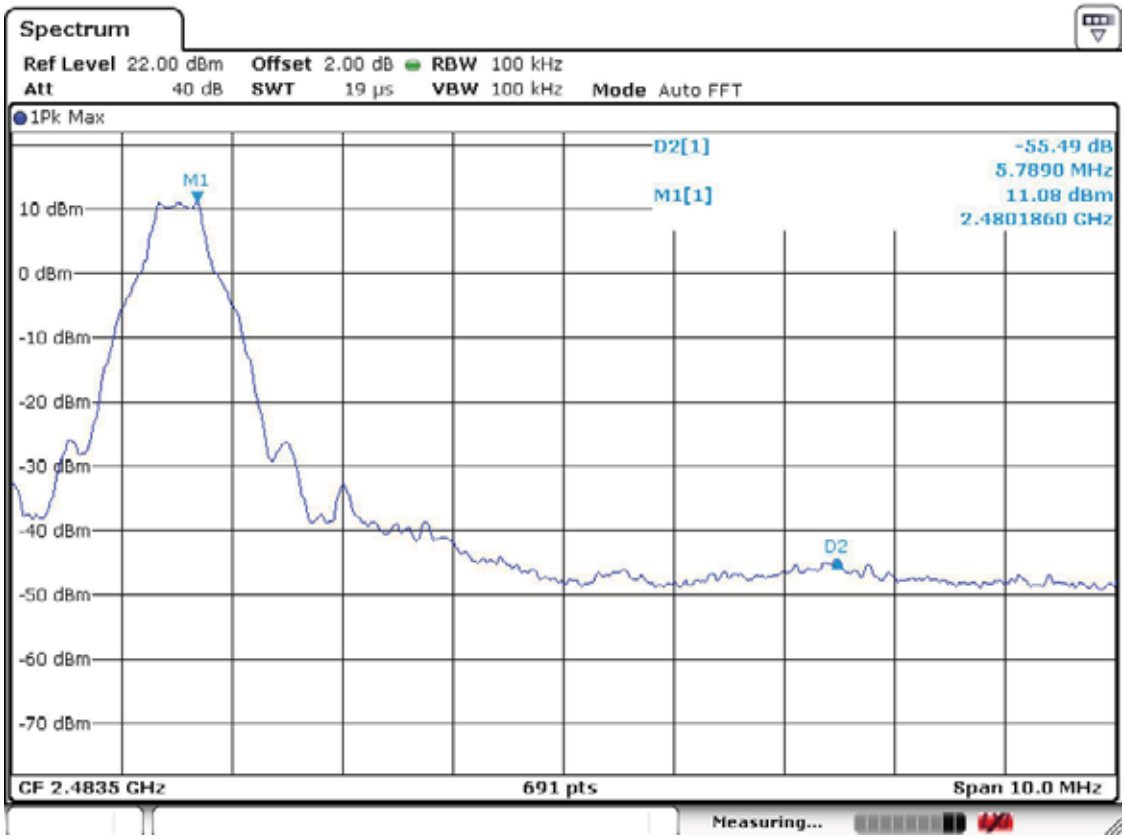
Same as the Chapter 3.2.1 (Figure 1)

Band – edge

Lower edge



Upper edge



Measurement Data (ANT M/N : HIF-2400)

Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp. Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2390	49.8	61.2	H	26.0	36.0	8.2	54.0	74.0	48.0	59.4	6.0	14.6

Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp. Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2483.5	47.5	60.3	H	26.0	36.0	8.2	54.0	74.0	45.7	58.5	8.3	15.5

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented.

Measurement Data (ANT M/N : R-AN2400-1901RS)

Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp. Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2390	46.7	58.2	H	26.0	36.0	8.2	54.0	74.0	44.9	56.4	9.1	17.6

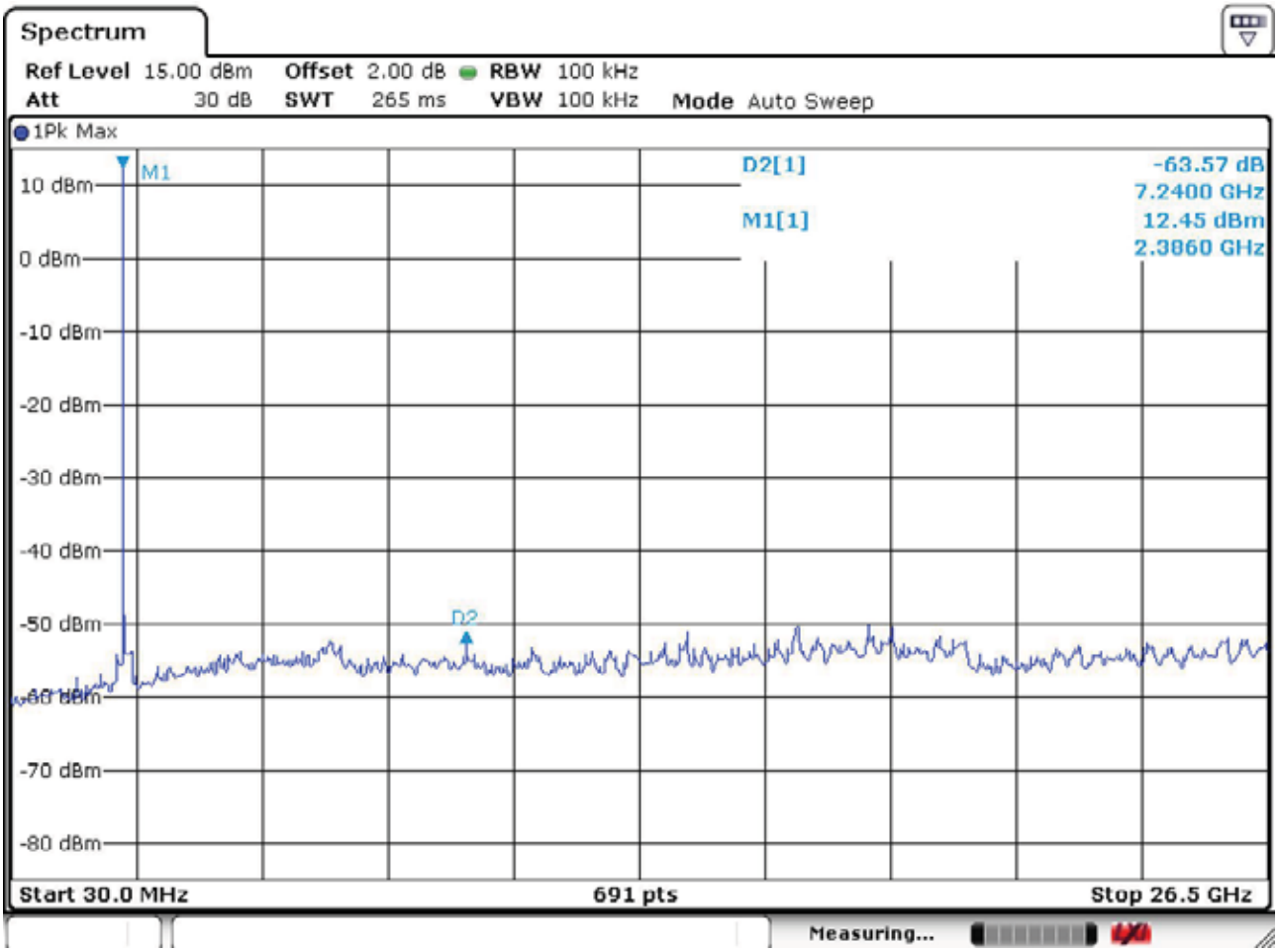
Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp. Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2483.5	44.8	56.5	H	26.0	36.0	8.2	54.0	74.0	43.0	54.7	11.0	19.3

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented.

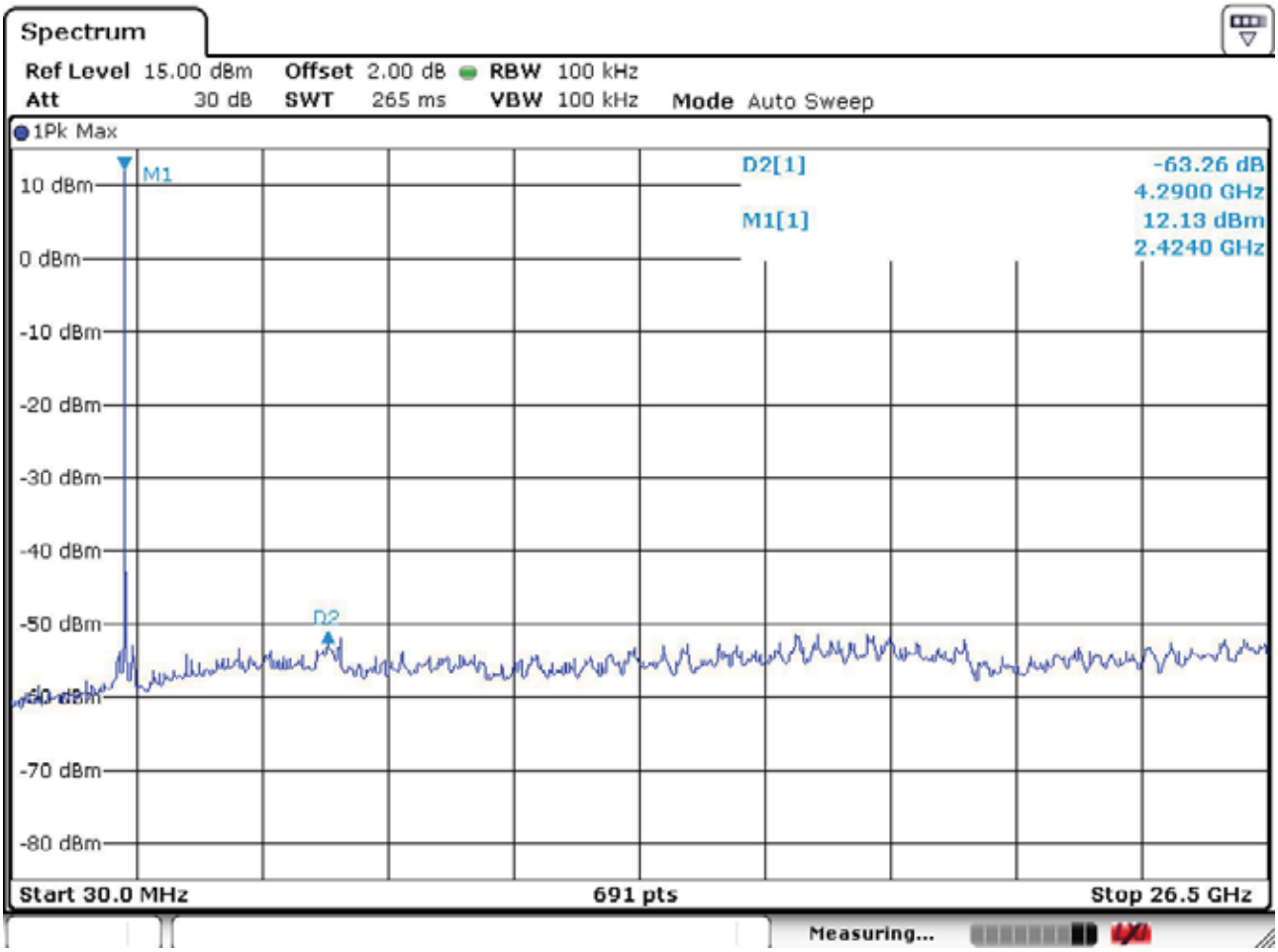
Unwanted Emission – Low channel

Frequency Range = 30 MHz ~ 26.5 GHz



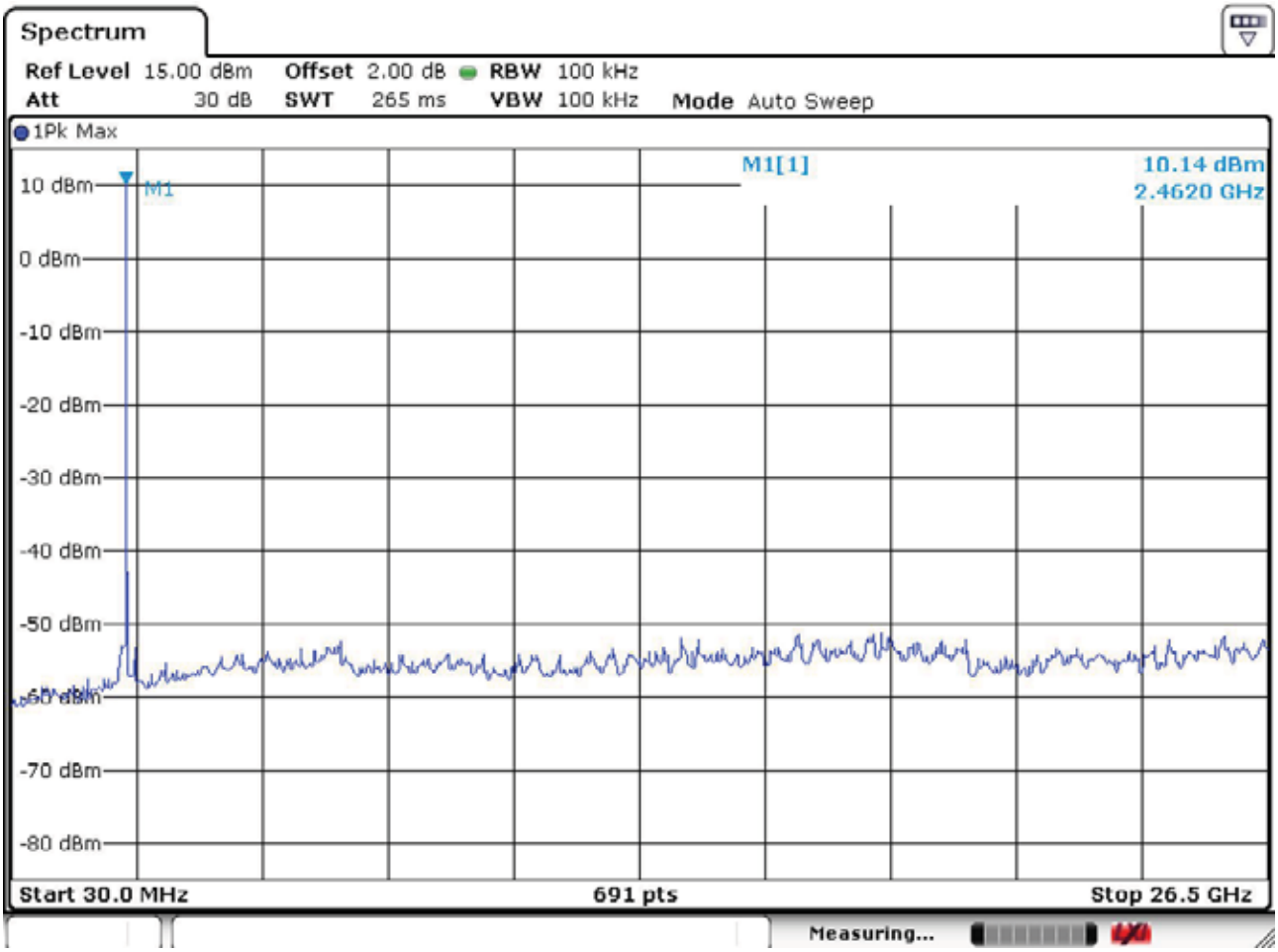
Unwanted Emission – Middle channel

Frequency Range = 30 MHz ~ 26.5 GHz



Unwanted Emission – High channel

Frequency Range = 30 MHz ~ 26.5 GHz



3.2.7 Field Strength of Harmonics

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz) Peak:VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th harmonic) Average:VBW=10Hz

Span = 100 MHz Detector function = Peak and Average

Trace = max hold Sweep = auto

Measurement Data: Complies

- Refer to the next page.
- No other emissions were detected at a level greater than 10dB below limit.
- The three antennas were used with this EUT during the Testing.
- The used antenna is “R-AN2400-1901RS”/ “HIF-2400” and it gave the worse case emissions.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data (ANT M/N : HIF-2400)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4804.00	53.4	62.8	H	31.4	34.6	8.7	-30.25	54.0	74.0	28.6	38.0	25.4	36.0
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4882.0	53.8	62.6	H	31.4	34.6	8.7	-30.25	54.0	74.0	29.0	37.8	25.0	36.2
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4960.0	55.6	64.5	H	31.4	34.6	8.7	-30.25	54.0	74.0	30.8	39.7	23.2	34.3

NOTE.

- No other emissions were detected at a level greater than 20dB below limit.
- Sample Calculation.

  Margin = Limit –Result / Result = Reading +C.F +DF / C.F=AF+CL-AG

  Where, C.F = Correction Facor, AF=Antenna, CL=Cable, AG=Amp.Gain

  D.C.F (Duty Cycle Correction Factor) = 20log(The worst Case DWELL Time/100ms)

  = 20log(3.073ms/100ms) = -30.25

Measurement Data (ANT M/N : R-AN2400-1901RS)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4804.00	44.9	53.8	H	31.4	34.6	8.7	-30.25	54.0	74.0	20.1	29.0	33.9	45.0
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4882.0	46.5	56	H	31.4	34.6	8.7	-30.25	54.0	74.0	21.7	31.2	32.3	42.8
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor			D.C.F	Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
				Antenna	Amp.Gain	Cable							
4960.0	48.6	58.5	H	31.4	34.6	8.7	-30.25	54.0	74.0	23.8	33.7	30.2	40.3

NOTE.

- No other emissions were detected at a level greater than 20dB below limit.
- Sample Calculation.

  Margin = Limit –Result / Result = Reading +C.F +DF / C.F=AF+CL-AG

  Where, C.F = Correction Facor, AF=Antenna, CL=Cable, AG=Amp.Gain

  D.C.F (Duty Cycle Correction Factor) = 20log(The worst Case DWELL Time/100ms)

  = 20log(3.065ms/100ms) = -30.27

BT mode

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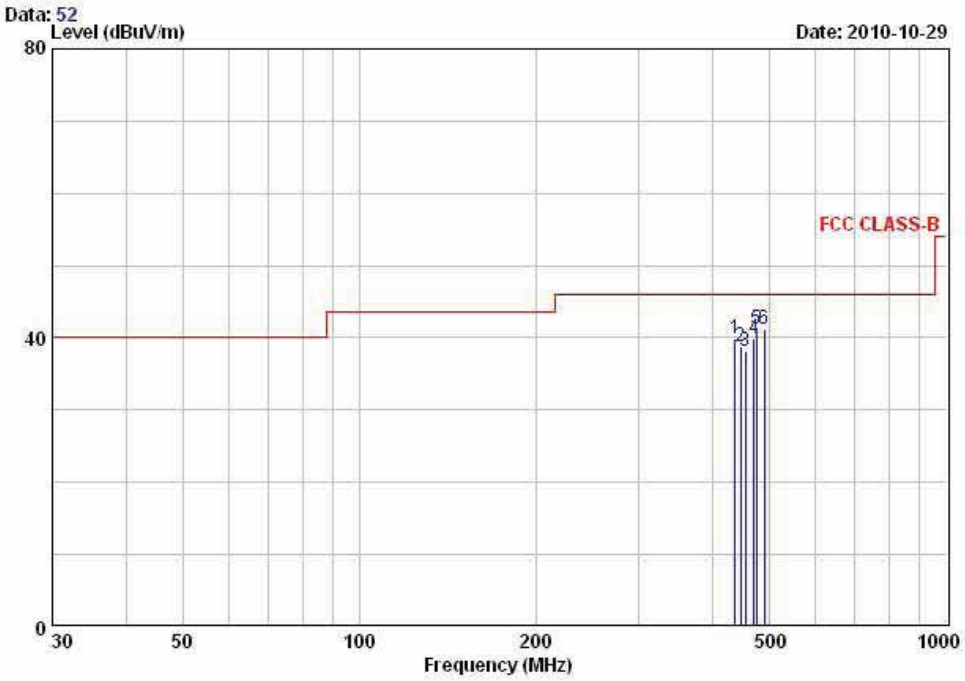
Fax:+82-31-3236010

EUT/Model No.: Parani-SD1000U TEST MODE: Bluetooth mode

Temp Humi : 12 / 37 Tested by: PARK.H.W



	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	437.03	46.00	-6.15	39.85	46.00	6.15	100	325	HORIZONTAL
2	446.33	44.90	-6.02	38.88	46.00	7.12	100	257	HORIZONTAL
3	455.63	44.00	-5.88	38.12	46.00	7.88	103	252	HORIZONTAL
4	470.37	45.60	-5.68	39.92	46.00	6.08	101	164	HORIZONTAL
5	475.96	46.70	-5.60	41.10	46.00	4.90	105	147	HORIZONTAL
6	490.75	46.60	-5.40	41.20	46.00	4.80	100	79	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.8 Field Strength of Harmonics -Receiver

Definition:

The field strength of emissions from intentional radiators was measured.

Test method	:	FCC Part 15.209
Frequency Range	:	30 MHz ~ 10th harmonic.
Bandwidth	:	120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	:	3 meters
Test mode	:	Rx mode
Result	:	**Complies**

Measurement Data:

- No other emissions were detected at a level greater than 20dB below limit.
- Refer to the next page.
- The used antenna is “R-AN2400-1901RS”/ “HIF-2400” and it gave the worse case emissions.

Field Strength Limit

Part 15.209 LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100**
88 ~ 216	150**
216 ~ 960	200**
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data (ANT M/N : HIF-2400)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp.Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2404.00	34.1	36.2	H	26.0	36.0	8.2	54.0	74.0	32.3	34.4	21.7	39.6
Frequency [MHz]	**Reading [dBuV/m] AV / Peak**		**Pol.**	**Correction Factor Antenna**	**Amp.Gain**	**Cable**	**Limits [dBuV/m] AV / Peak**		**Result [dBuV/m] AV / Peak**		**Margin [dB] AV / Peak**	
2443.0	33.9	35.8	H	26.0	36.0	8.2	54.0	74.0	32.1	34.0	21.9	40.0
Frequency [MHz]	**Reading [dBuV/m] AV / Peak**		**Pol.**	**Correction Factor Antenna**	**Amp.Gain**	**Cable**	**Limits [dBuV/m] AV / Peak**		**Result [dBuV/m] AV / Peak**		**Margin [dB] AV / Peak**	
2482.0	34.5	36.8	H	26.0	36.0	8.2	54.0	74.0	32.7	35.0	21.3	39.0

No other emissions were detected at a level greater than 20dB below limit.

Measurement Data (ANT M/N : R-AN2400-1901RS)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp.Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2404.00	30.4	32.6	H	26.0	36.0	8.2	54.0	74.0	28.6	30.8	25.4	43.2
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp.Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2443.0	31.2	33.5	H	26.0	36.0	8.2	54.0	74.0	29.4	31.7	24.6	42.3
Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Amp.Gain	Cable	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2482.0	30.1	34.5	H	26.0	36.0	8.2	54.0	74.0	28.3	32.7	25.7	41.3

No other emissions were detected at a level greater than 20dB below limit.

3.2.9 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.
- The used antenna is "R-AN2400-1901RS" and it gave the worse case emissions.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Conducted Emissions at BT mode – Line

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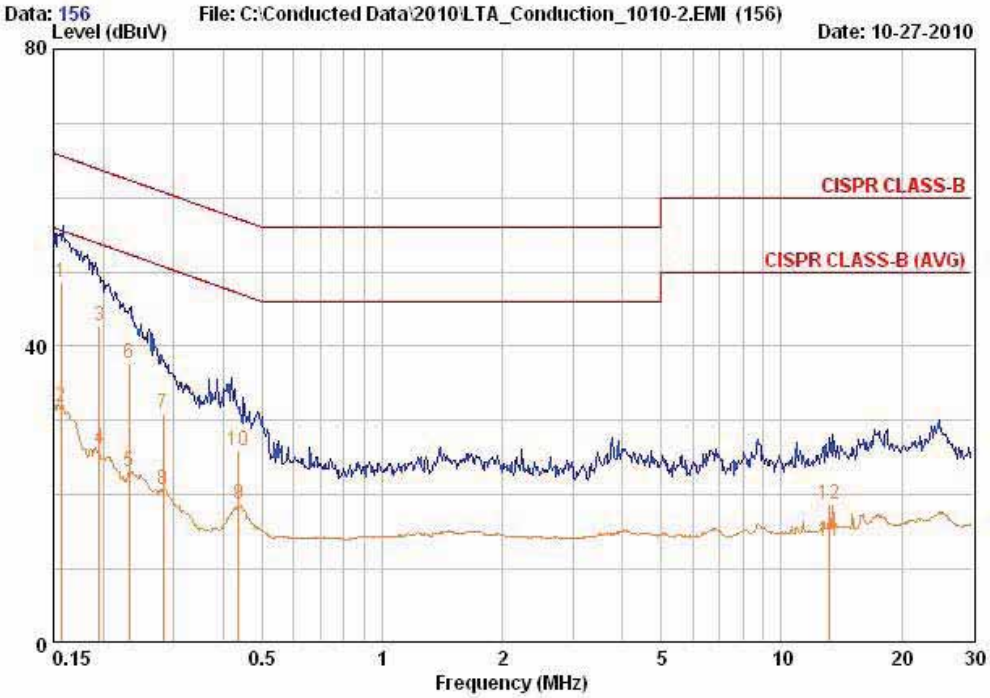
Fax:+82-31-3236010

EUT / Model No.	: Parani-SD1000U	Phase	: LINE
Test Mode	: Bluetooth mode	Test Power	: 120 / 60
Temp./Humi.	: 21 / 43	Test Engineer	: PARK.H.W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.157	38.85	22.15	9.65	48.50	31.80	65.62	55.62	17.12	23.82
0.195	33.16	16.46	9.65	42.81	26.11	63.82	53.82	21.01	27.71
0.232	28.05	13.35	9.66	37.71	23.01	62.38	52.38	24.67	29.37
0.282	21.36	11.06	9.65	31.01	20.71	60.76	50.76	29.75	30.05
0.436	16.35	9.05	9.67	26.02	18.72	57.14	47.14	31.12	28.42
13.200	8.40	3.40	10.32	18.72	13.72	60.00	50.00	41.28	36.28

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions at BT mode – Neutral

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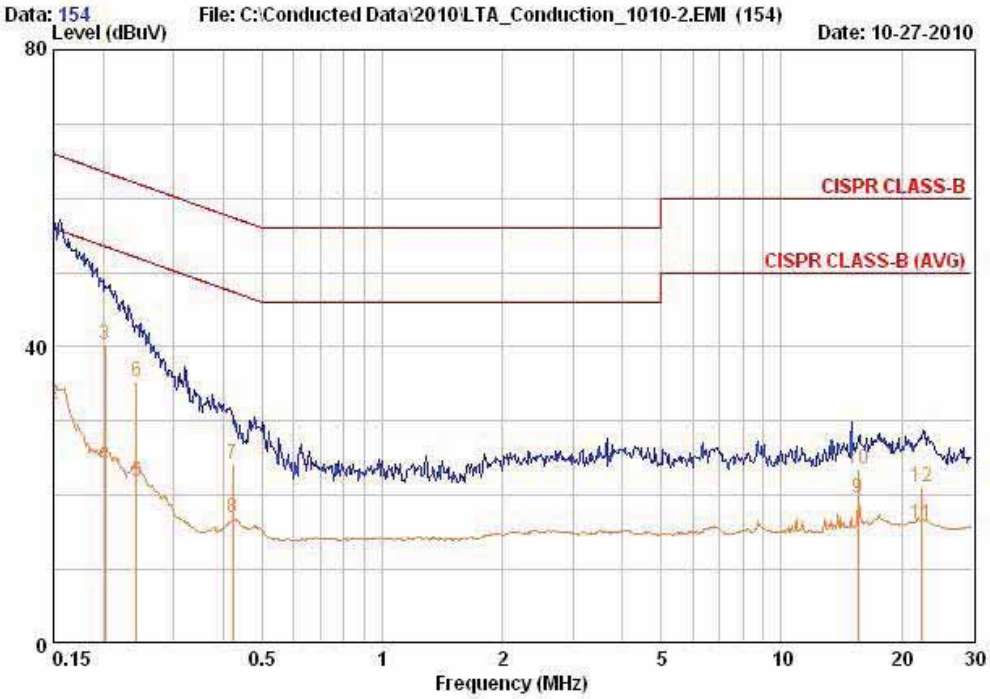
EUT / Model No.	: Parani-SD1000U	Phase	: NEUTRAL
Test Mode	: Bluetooth mode	Test Power	: 120 / 60
Temp./Humi.	: 21 / 43	Test Engineer	: PARK.H.W



Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.150	38.25	22.65	9.66	47.91	32.31	66.00	56.00	18.09	23.69
0.202	30.56	14.36	9.66	40.22	24.02	63.53	53.53	23.31	29.51
0.242	25.75	12.05	9.66	35.41	21.71	62.03	52.03	26.62	30.32
0.423	14.45	7.25	9.66	24.11	16.91	57.39	47.39	33.28	30.48
15.550	13.11	9.11	10.43	23.54	19.54	60.00	50.00	36.46	30.46
22.416	10.45	5.45	10.65	21.10	16.10	60.00	50.00	38.90	33.90

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	8563E	3425A02505	HP	Mar-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-11
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-11
7	Attenuator (10dB)	8491A	63196	HP	Oct-11
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-11
9	EMI Test Receiver	ESVD	843748/001	R&S	Mar-11
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-11
13	RF Amplifier	8449B	3008A02126	HP	Mar-11
14	Test Receiver	ESHS10	828404/009	R&S	Mar-11
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-10
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-10
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-10
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-10
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-11
28	DC Power Supply	6622A	3448A03079	HP	Oct-11
29	Frequency Counter	5342A	2826A12411	HP	Mar-11
30	Power Meter	EPM-441A	GB32481702	HP	Mar-11
31	Power Sensor	8481A	2702A64048	HP	Mar-11
32	Audio Analyzer	8903B	3729A18901	HP	Oct-11
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-11
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-11
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Mar-11
37	LISN	ENV216	100408	R&S	Oct-11