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Tel: +82-31-323-6008   Fax: +82-31-323-6010
http://www.ltalab.com

Dates of Tests: Aug 25~Sep 01, 2009
Test Report S/N: LR500190909A
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

S7APARANIESD1XXV2

APPLICANT

Sena Technologies, Inc.

Equipment Class	:	**Part 15 Spread Spectrum Transmitter (DSS)**
Manufacturing Description	:	**Bluetooth Module**
Manufacturer	:	**Sena Technologies, Inc.**
Model name	:	**Parani-ESD1XXV2**
Variant Model name	:	**Parani-ESD110V2**
	:	**Parani-ESD100V2**
Test Device Serial No.:	:	**Identical prototype**
Rule Part(s)	:	**FCC Part 15.247 Subpart C; ANSI C-63.4-2003**
Frequency Range	:	**2402 ~ 2480MHz**
RF power	:	**Max 11.86dBm - Conducted**
Data of issue	:	**September 2, 2009**

This test report is issued under the authority of:

The test was supervised by:

Dong –Min   JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

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
Web site	:	http://www.ltalab.com
E-mail	:	chahn@ltalab.com
Telephone	:	+82-31-323-6008
Facsimile		+82-31-323-6010

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	2009-09-30	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	2010-05-03	IC filing

2. Information's about test item

2-1 Client & Manufacturer

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

2-2 Equipment Under Test (EUT)

Trade name	:	Bluetooth Module
FCC ID	:	S7APARANIESD1XXV2
Model name	:	Parani-ESD1XXV2
Variant Model name	:	Parani-ESD110V2
	:	Parani-ESD100V2
Serial number	:	Identical prototype
Date of receipt	:	August 24, 2009
EUT condition	:	Pre-production, not damaged
Antenna type	:	Dipole antenna (M/N: R-AN2400-1901RS) Max Gain 5.37 dBi
		Dipole antenna (M/N: R-AN2400-5801RS) Max Gain 3.17 dBi
		Helical antenna (M/N: AN2400-3306RS) Max Gain 1.40 dBi
		Chip antenna (M/N: SENA_009) Max Gain -0.1 dBi
Frequency Range	:	2402 ~ 2480MHz
RF output power	:	Max. 11.86dBm - Conducted
Number of channels	:	79
Duty cycle	:	81.62 %
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 3.3V

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2441	2480

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
DC Power Supply	E3615A	KR72705061	HP

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.

Note 1: Antenna Requirement

→ The Sena Technologies, Inc. Parani-ESD1XXV2 unit complies with the requirement of §15.203.

   The antenna connector is the reverse polarity SMA connector. And Chip antenna

Note 2: The sample was tested according to the following specification:
   FCC Parts 15.247; ANSI C-63.4-2003

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**
1.0014	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.
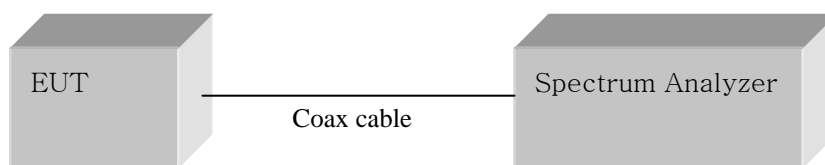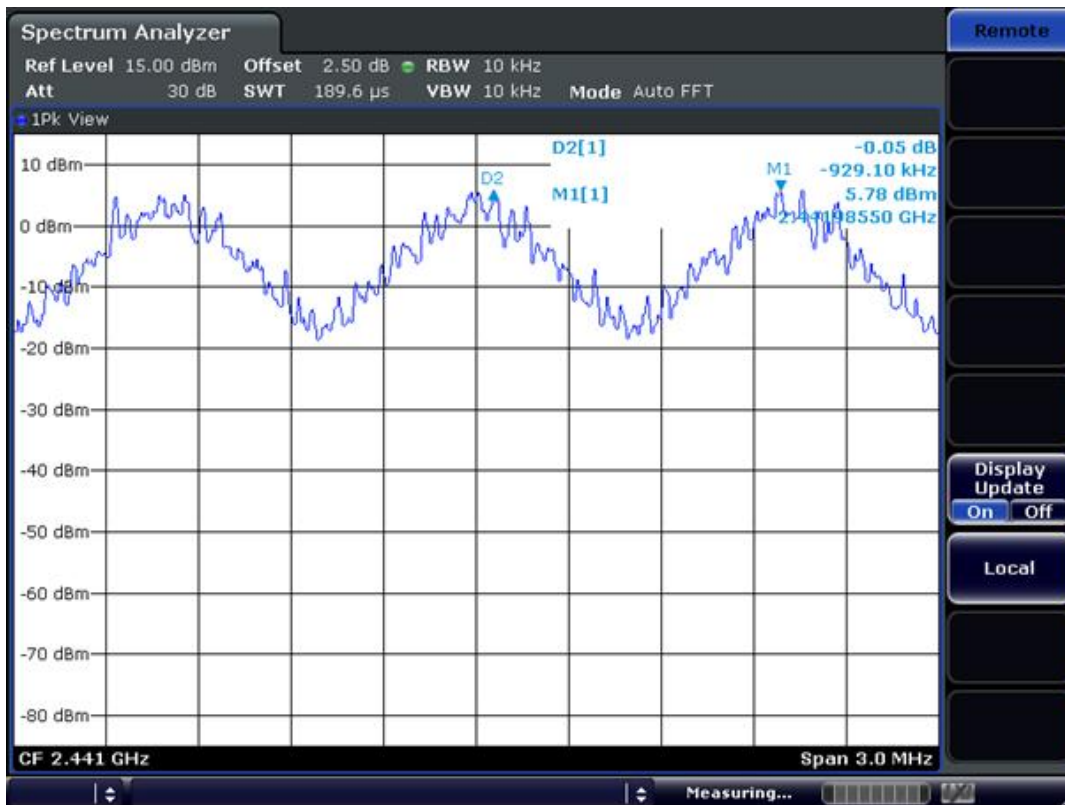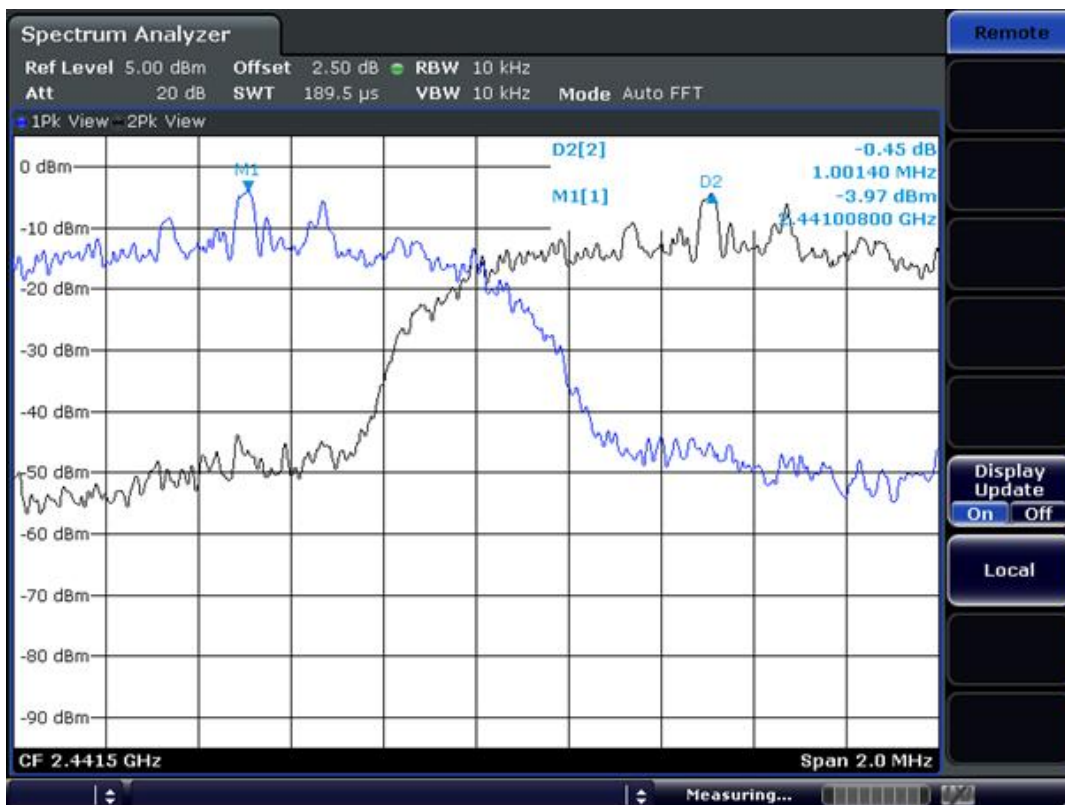
Measurement Setup

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 $\geq$ 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.
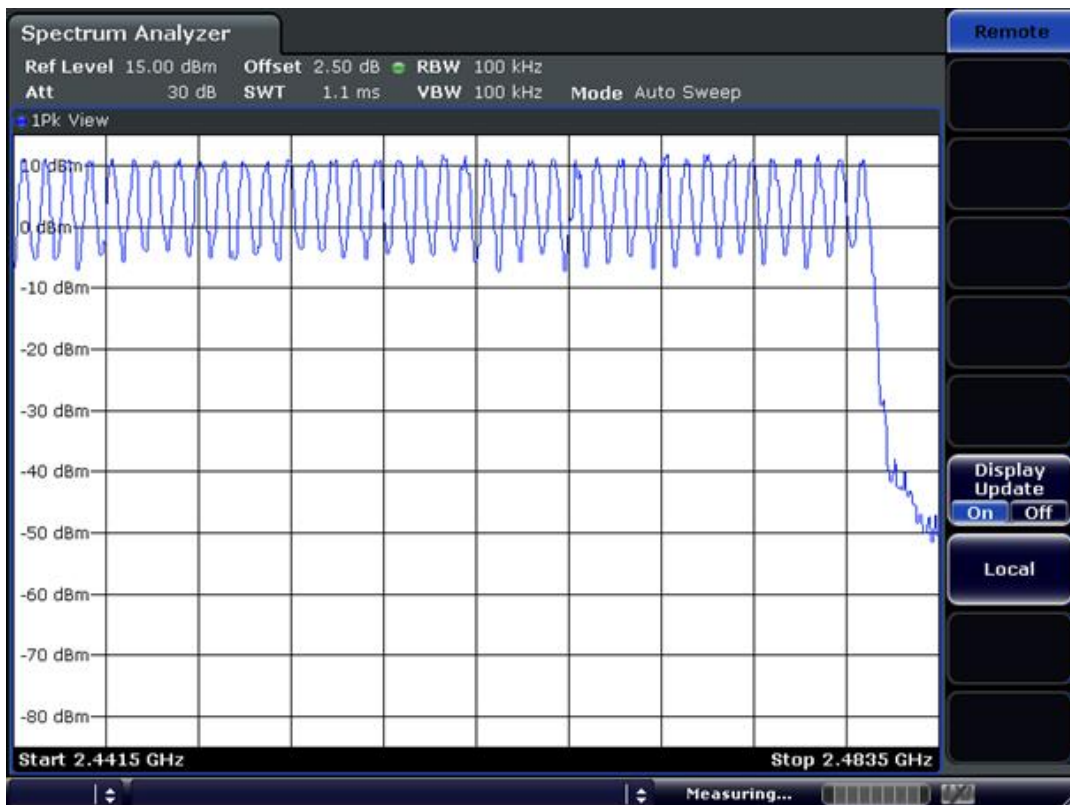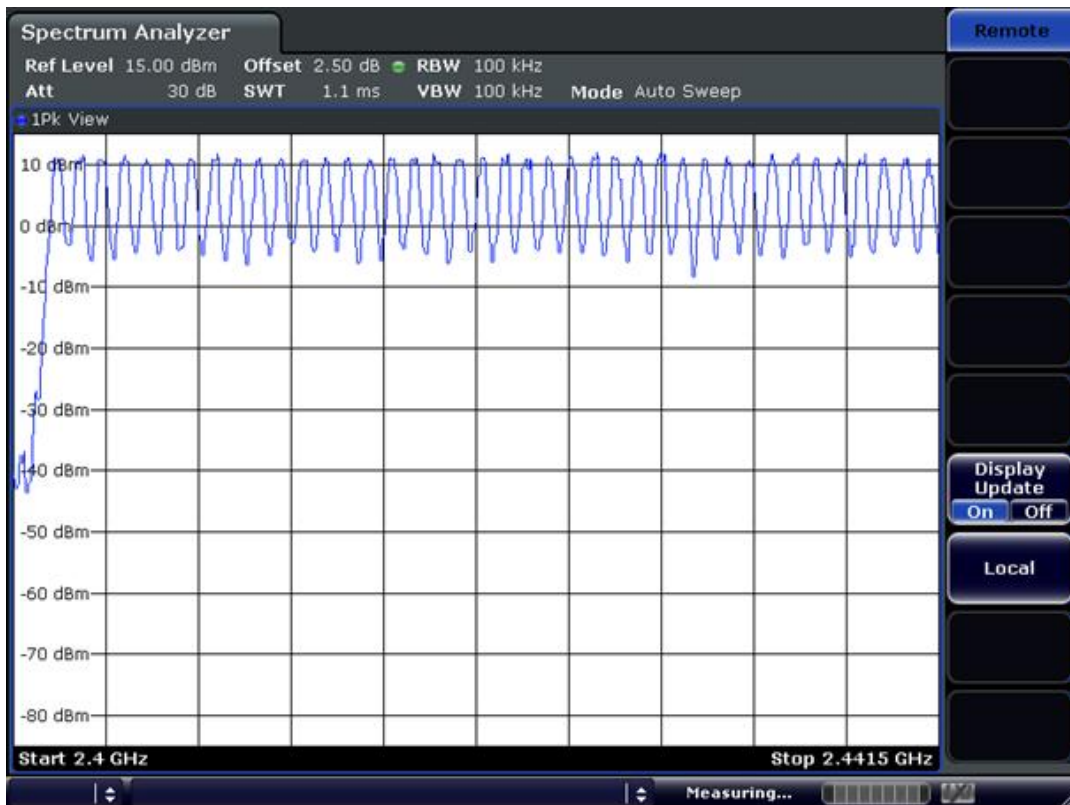
Minimum Standard:

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   Sweep = auto

VBW = 30 kHz (VBW $\geq$ RBW)   Detector function = peak

Trace = max hold

Measurement Data: Basic Mode

Frequency (MHz)	Channel No.	Test Results(MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	0.899	0.907
2441	39	0.881	0.894
2480	78	0.885	0.907

Measurement Data: EDR Mode

Frequency (MHz)	Channel No.	Test Results(MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	1.211	1.168
2441	39	1.211	1.168
2480	78	1.211	1.163

- 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

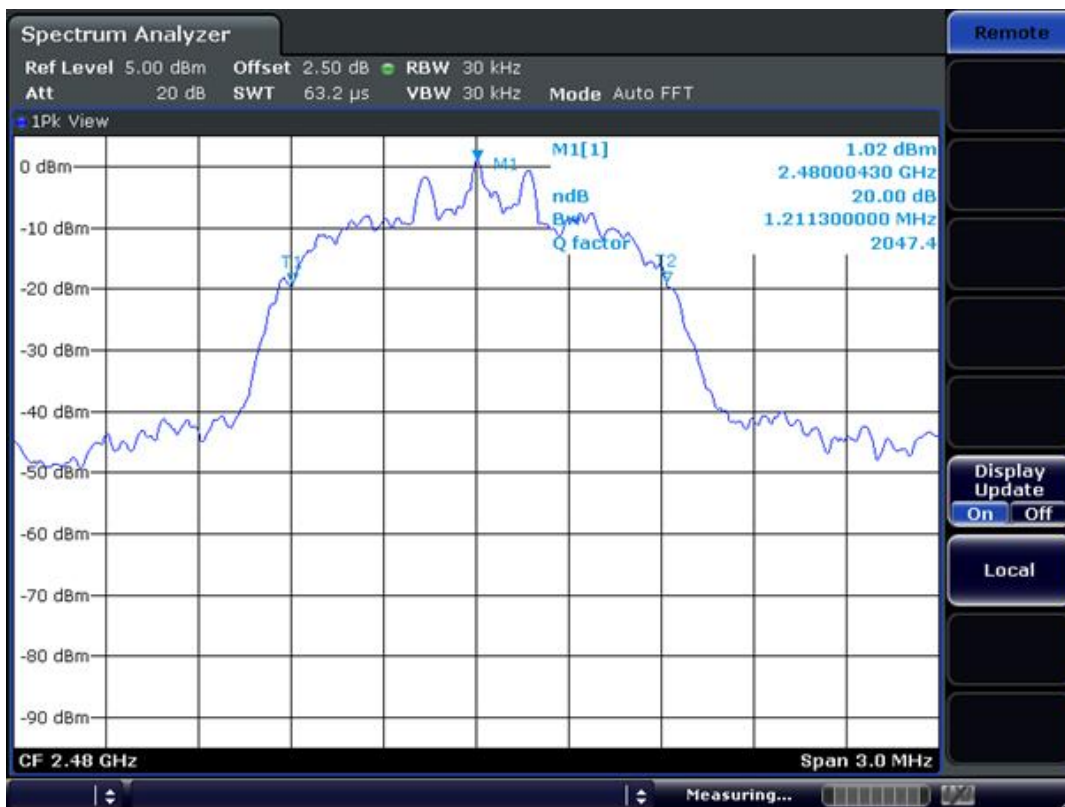## Channel 1 at EDR mode
20 dB Bandwidth

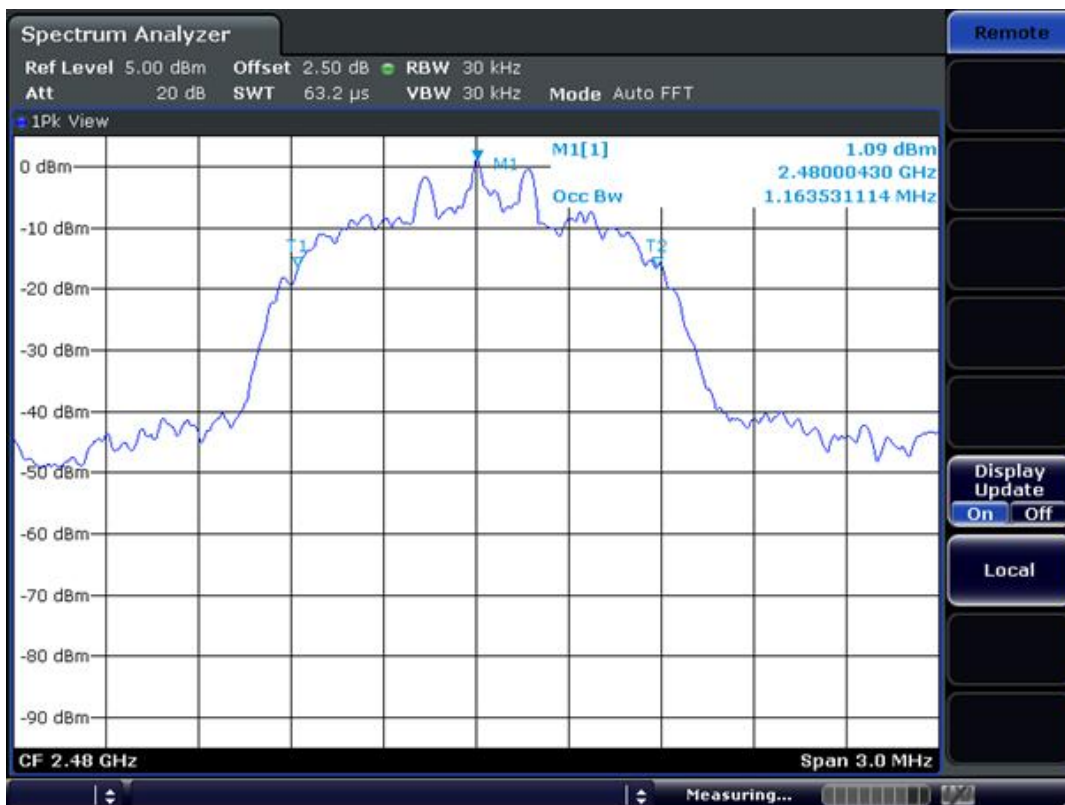### 99% Bandwidth

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 $\geq$ 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	0.516	163.05	400
DH3	15(Times / 3sec) *10.533 = 158.00	1.751	276.66	400
DH5	10(Times / 3sec) *10.533 = 105.33	3.033	319.47	400
EDR 3Mbps DH5	10(Times / 3sec) *10.533 = 105.33	3.059	322.20	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
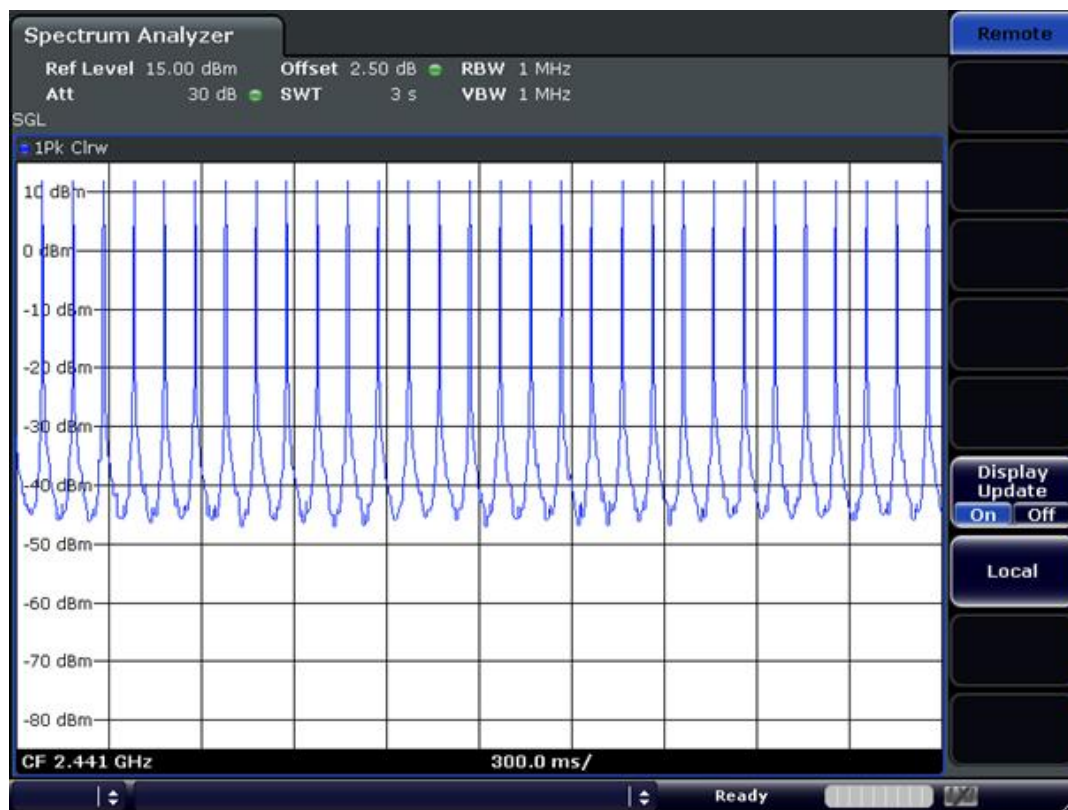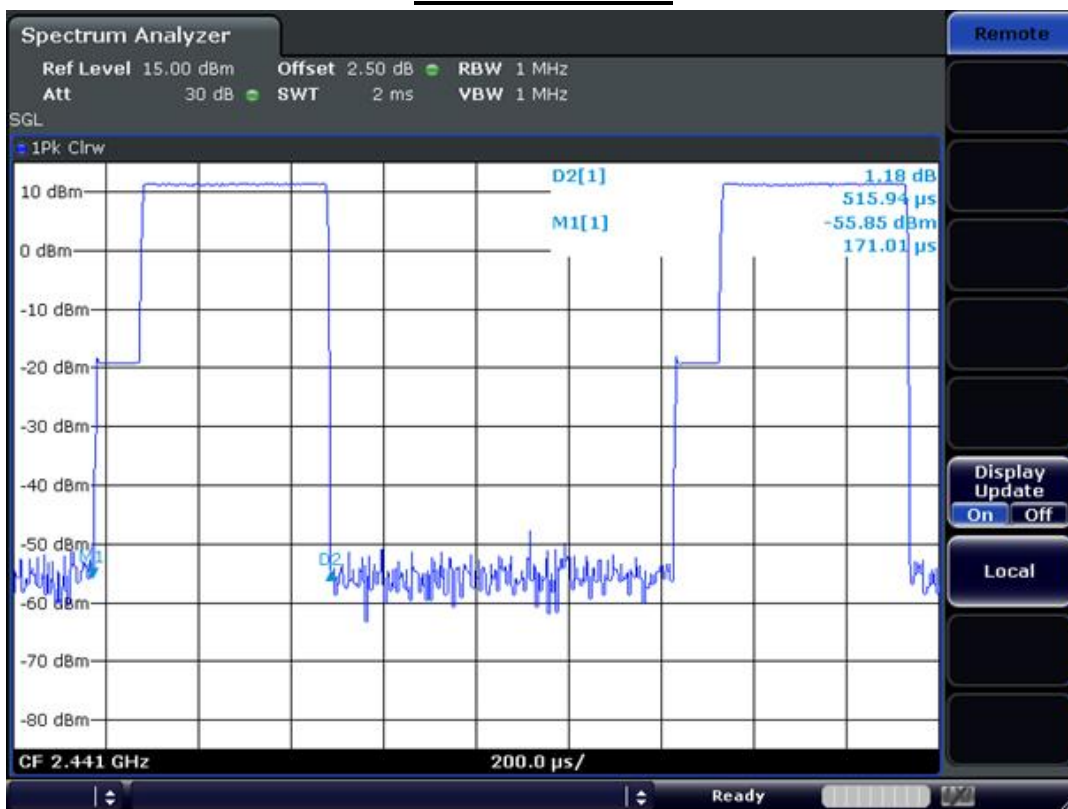
Minimum Standard:
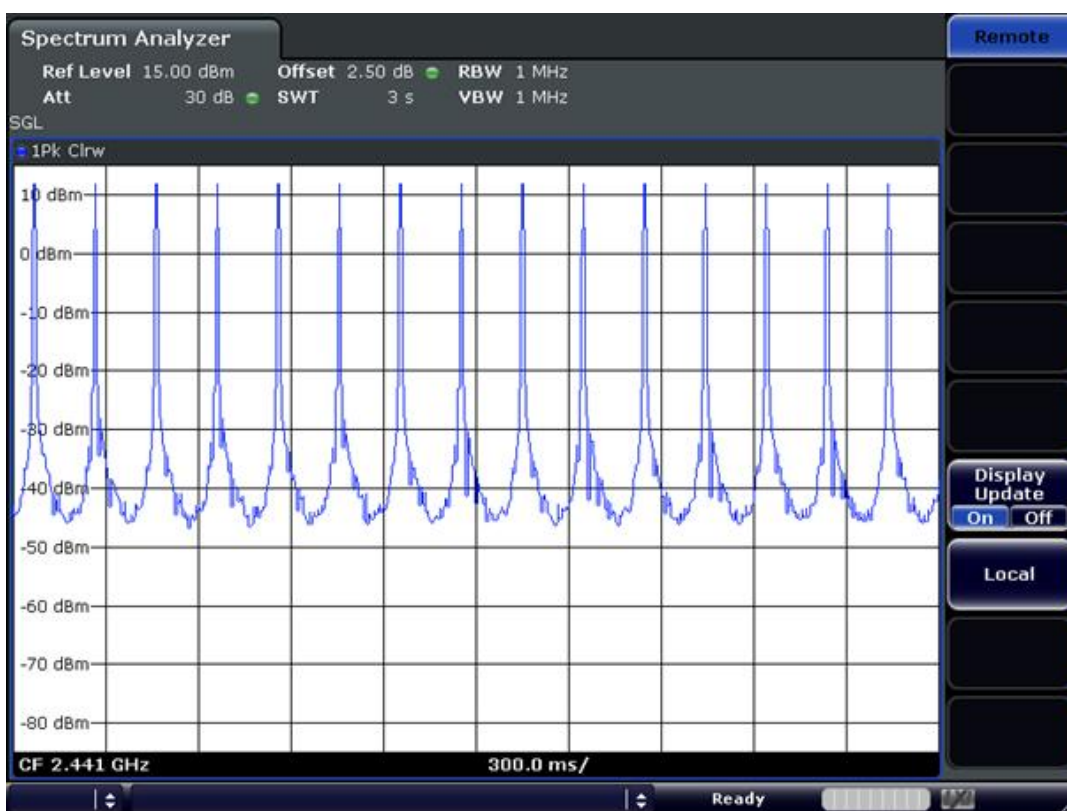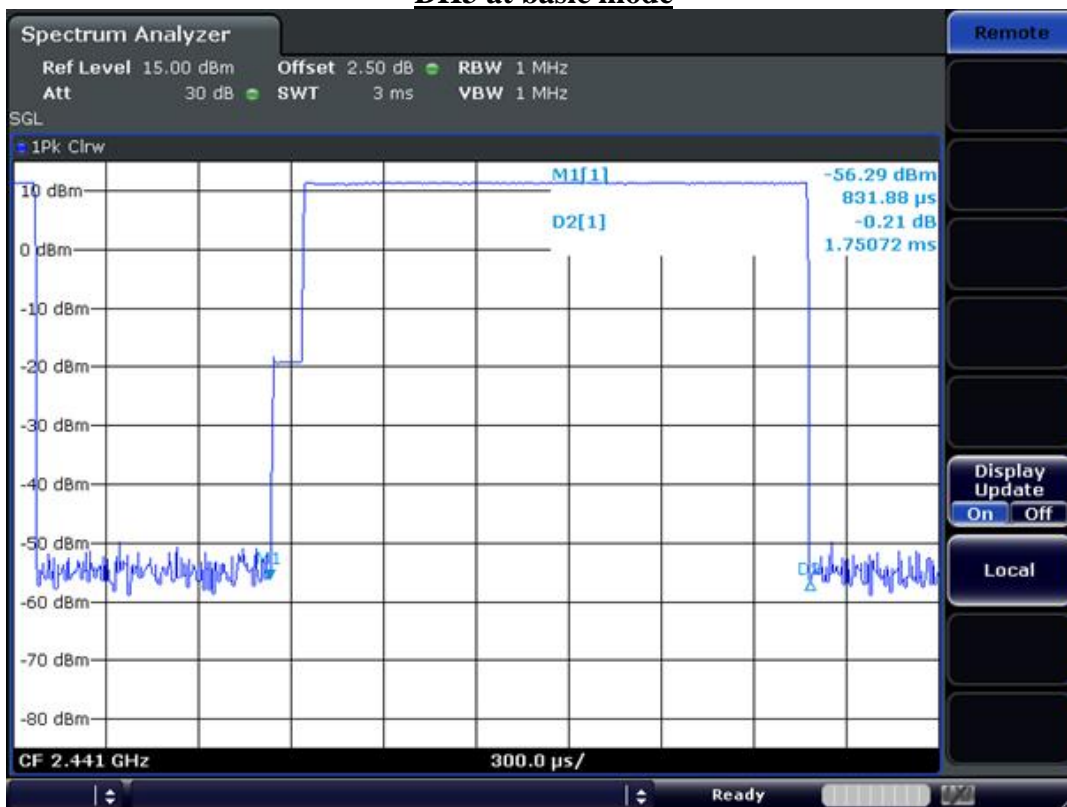
0.4 seconds within a 30 second period per any frequency

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)
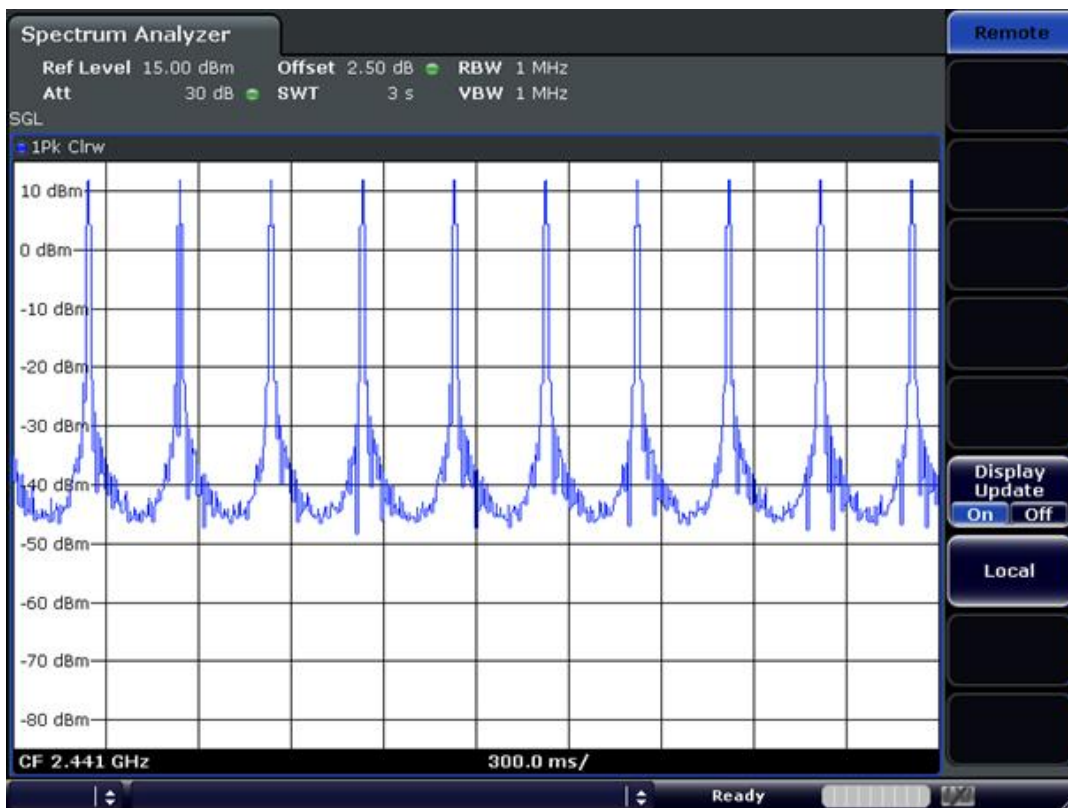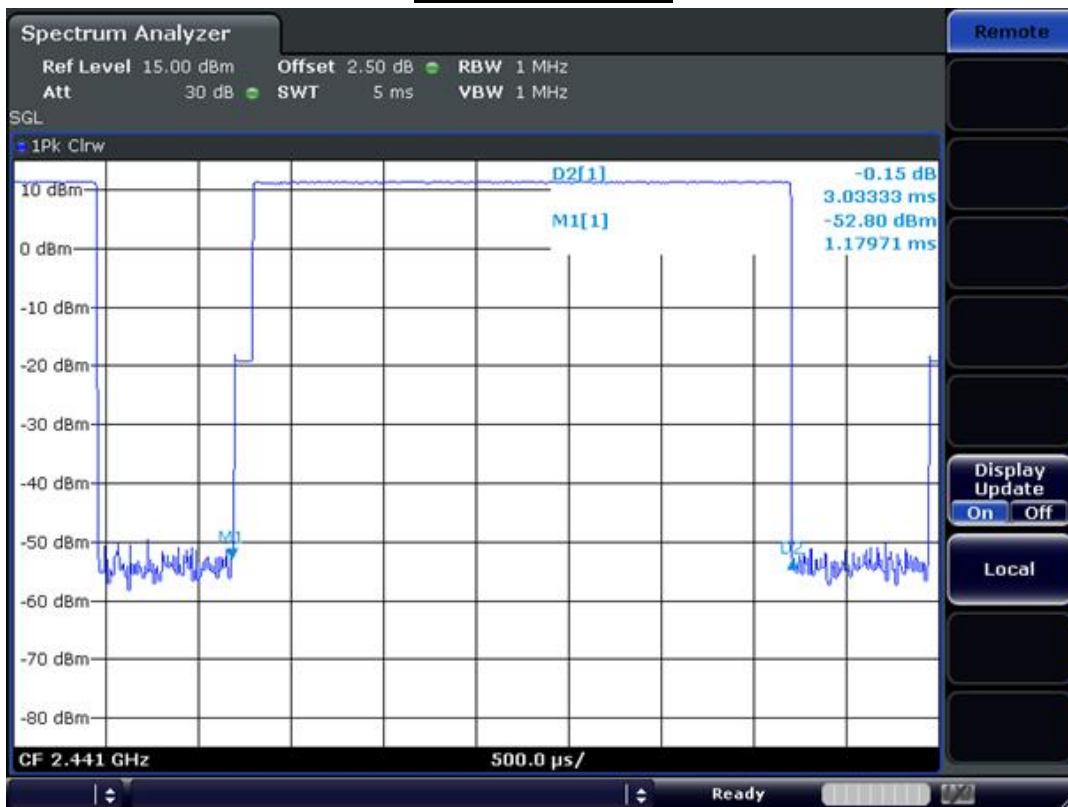
DH1 at basic mode

DH3 at basic mode

DH5 at basic mode

DH5 at EDR mode with 3Mbps
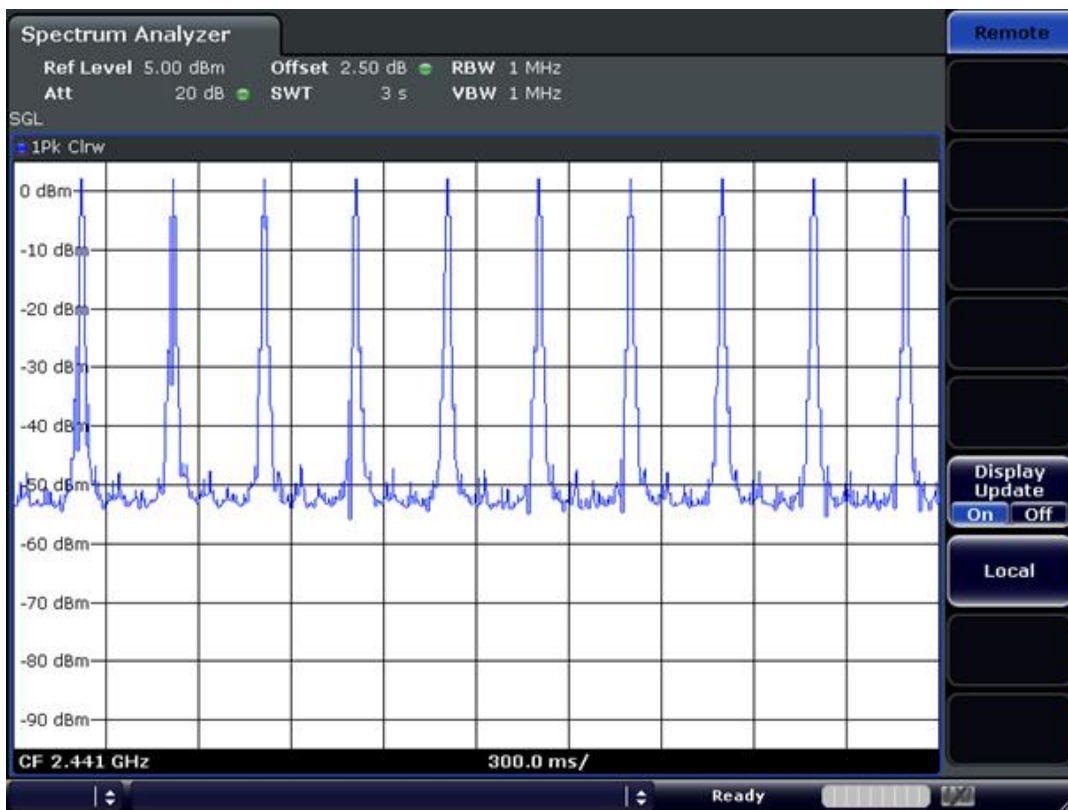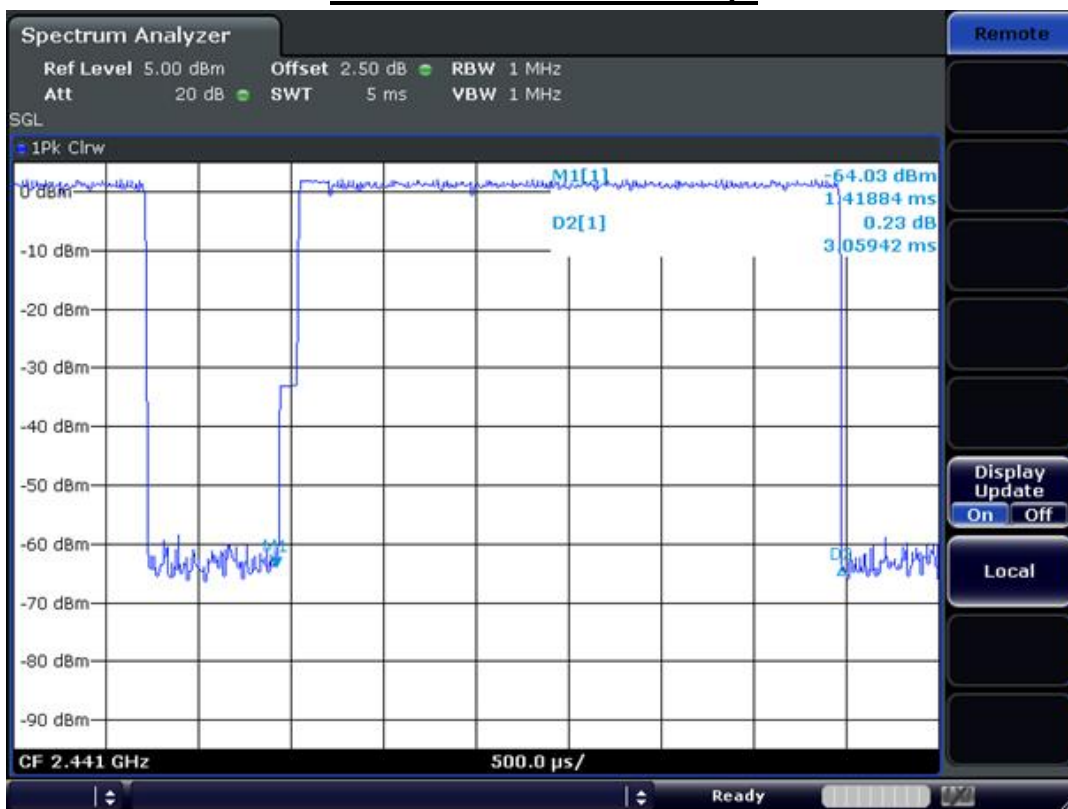
3.2.5 Transmitter Output Power

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 = 10 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 $\geq$ RBW)   Detector function = peak

Trace = max hold   Sweep = auto

Measurement Data: Basic Mode

Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2402	0	11.67	14.69	Complies
2441	39	11.86	15.35	Complies
2480	78	11.52	14.19	Complies

Measurement Data: EDR Mode

Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2402	0	2.70	1.86	Complies
2441	39	2.58	1.81	Complies
2480	78	2.25	1.86	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
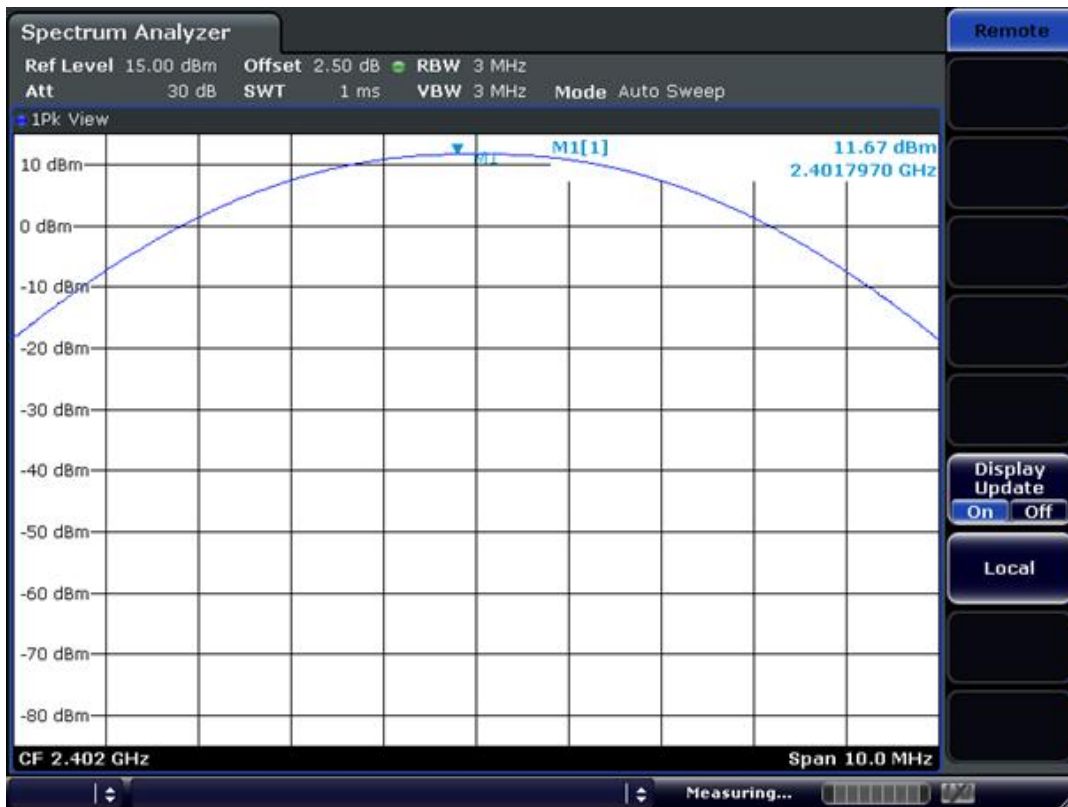
EDR mode
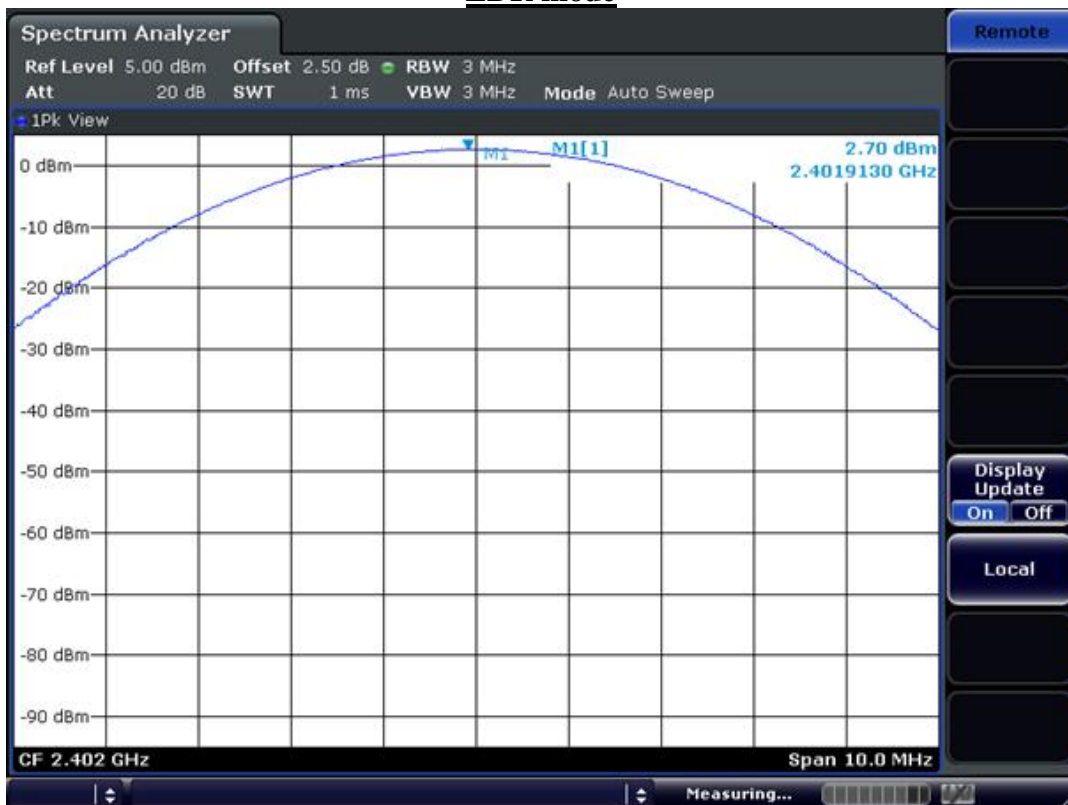
Channel 2
Basic mode
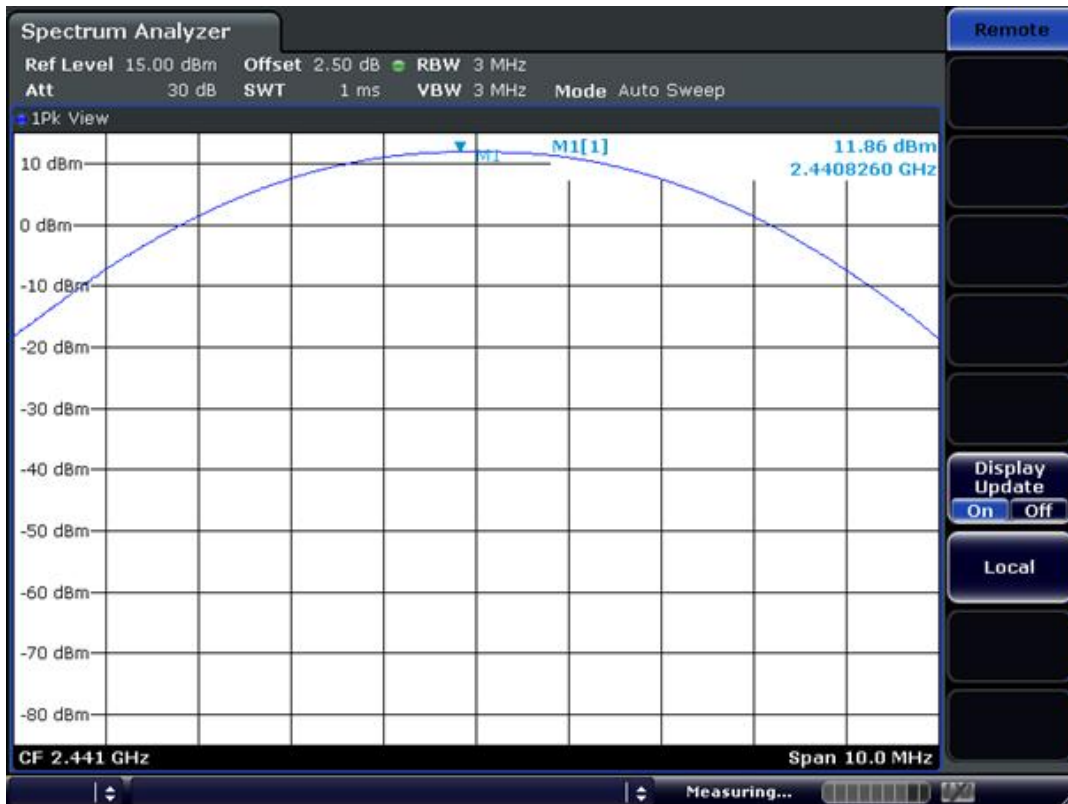
EDR mode
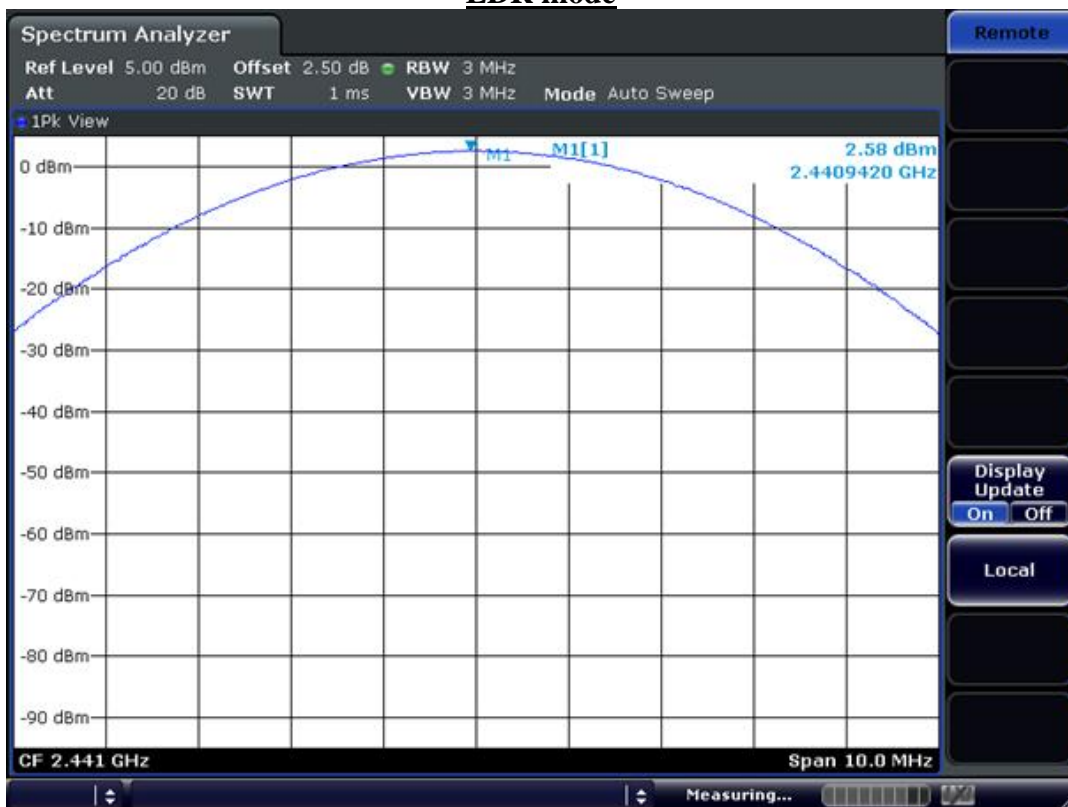
Channel 3
Basic mode
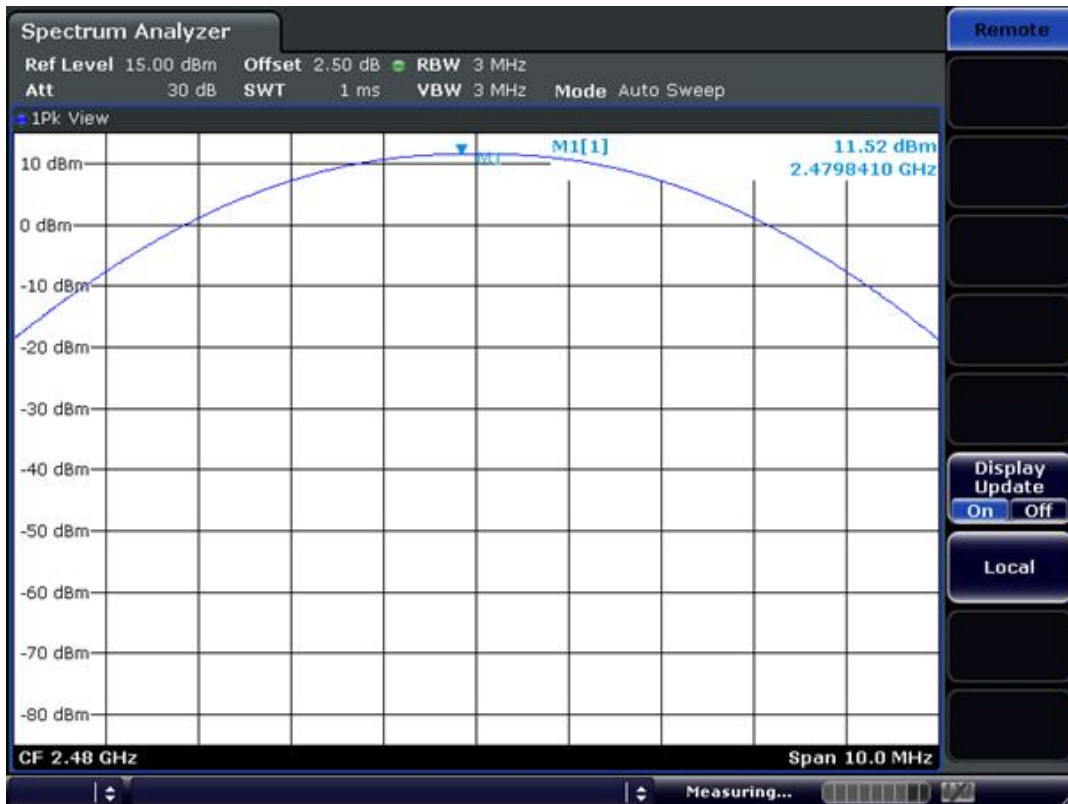
EDR mode
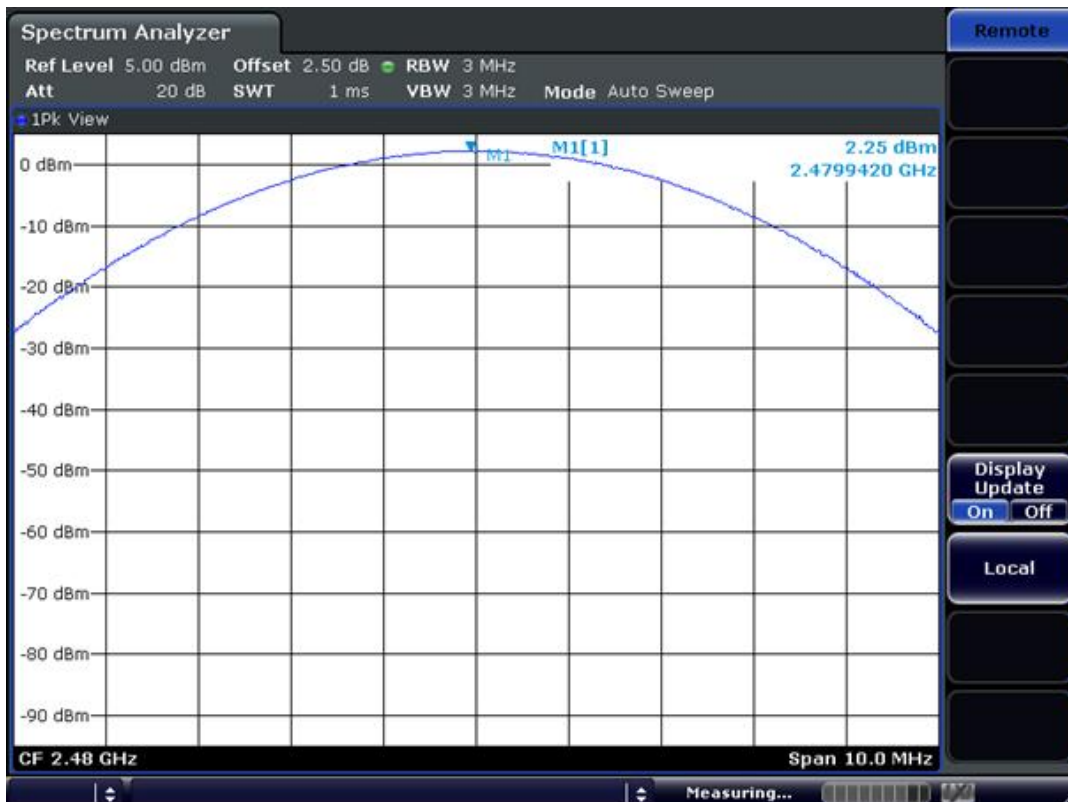
3.2.6 Band Edge

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.
- The used antenna is "R-AN2400-1901RS" and it gave the worse case emissions.

Minimum Standard:	> 20 dBc

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Band – edge of Basic Mode
Lower edge
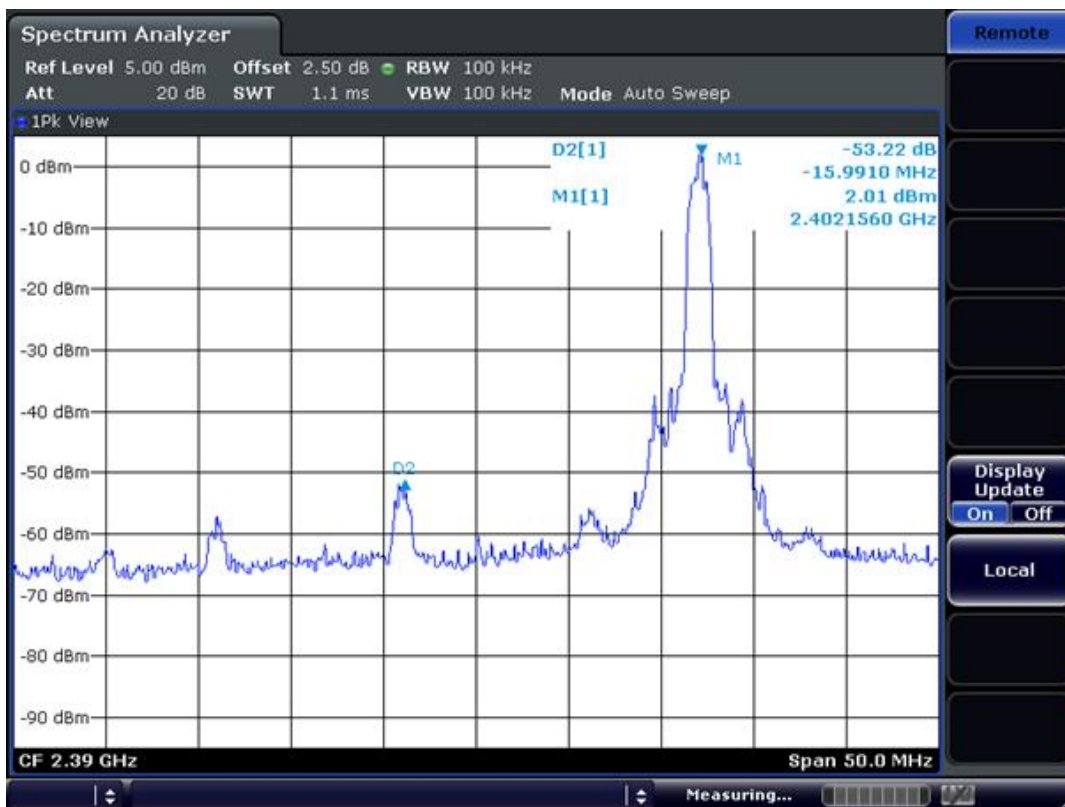
Upper edge

Band-edges in the restricted band 2483.5 ~ 2500 MHz measurement
- Document DA 00-705 Marker Delta Method

Frequency (MHz)	Detect mode	Pol.	Reading (dBuV/m)	T.F (dB)	Step 1 Data	delta	Step 3 Data	Limit
2483.5	PK	H	108.34	1.1	109.44	54.27	55.17	74
	AV	H	98.56	1.1	99.66	54.27	45.39	54

Note) Step 1 = Reading + T.F

(T.F = Ant.F + Cable loss – PreAmp Gain)

Step 3 = Step 1 – Delta Value

Unwanted Emission – Low channel
Frequency Range = 30 MHz ~ 26.5 GHz
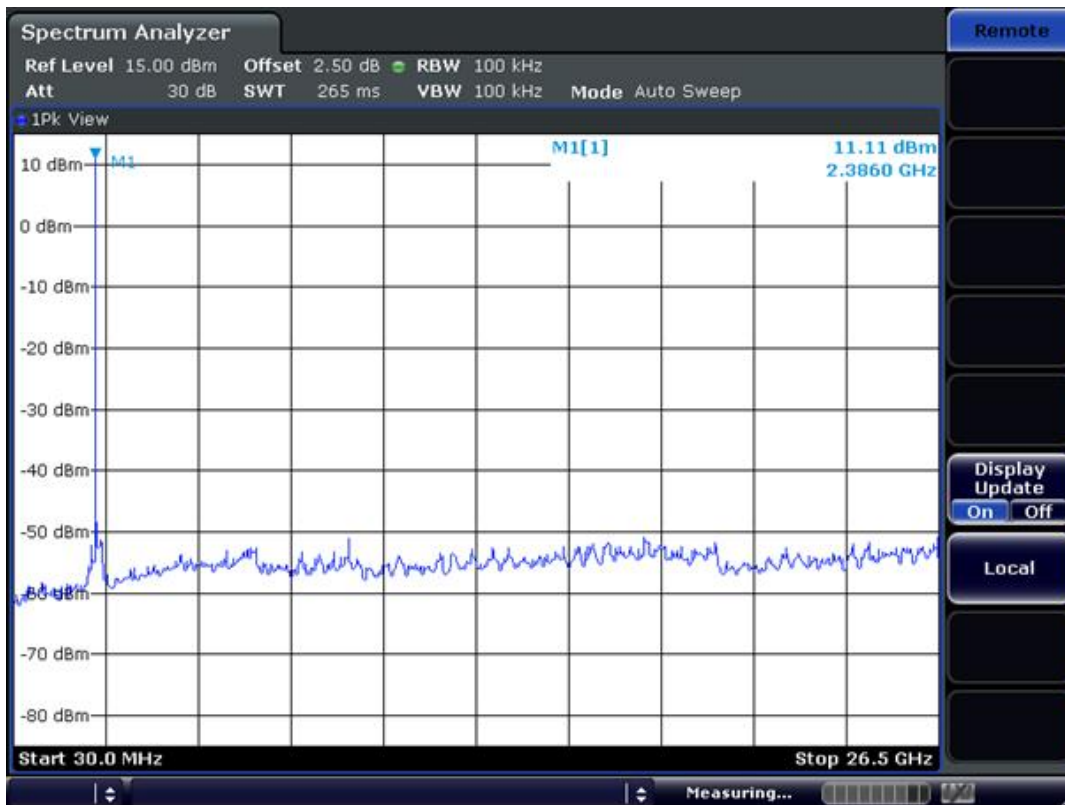
Unwanted Emission – Middle channel
Frequency Range = 30 MHz ~ 26.5 GHz
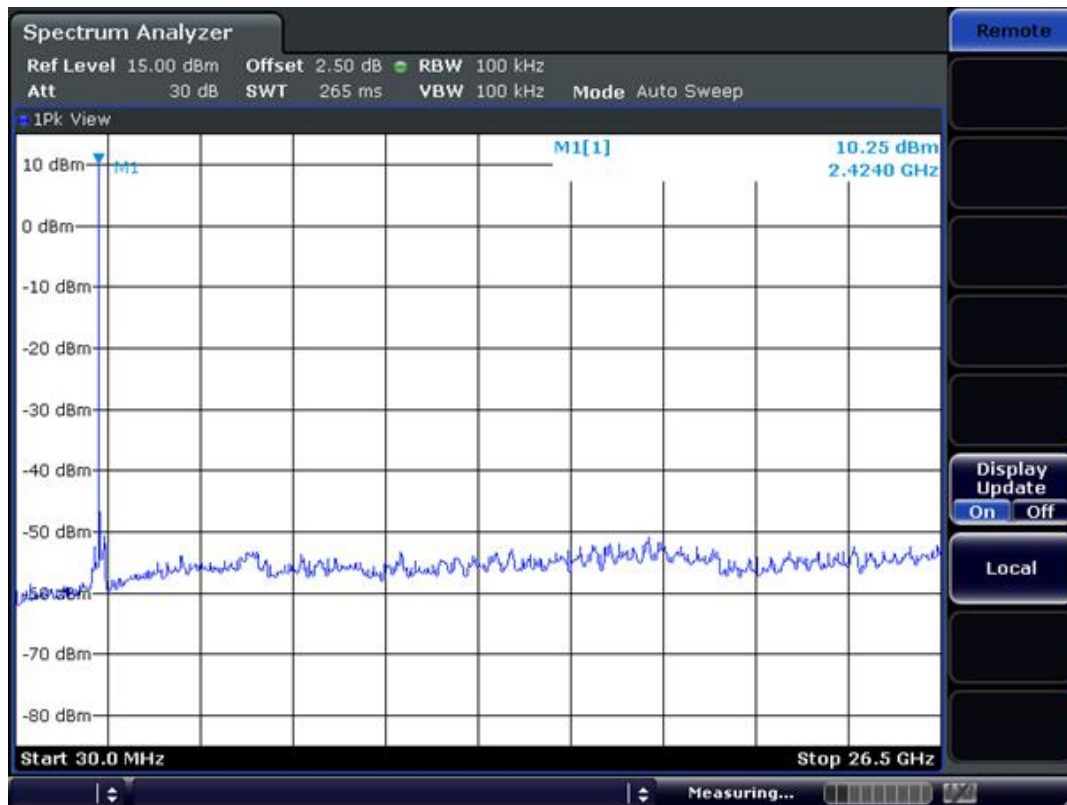
Unwanted Emission – High channel
Frequency Range = 30 MHz ~ 26.5 GHz
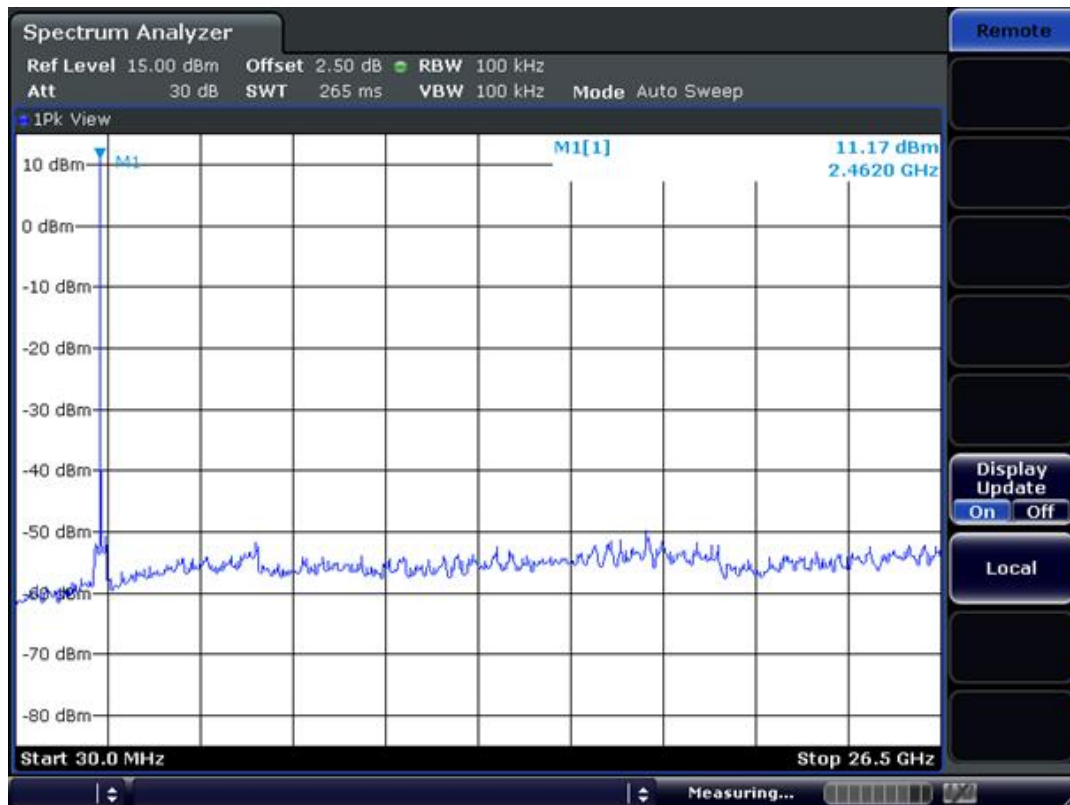
3.2.7 Field Strength of Harmonics

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 $\geq$ 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"/ "SENA_009"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:

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Antenna	Amp.Gain	Cable			
			No other emissions were detected at a level greater than 20dB below limit					

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Antenna	Amp.Gain	Cable			
			No other emissions were detected at a level greater than 20dB below limit					

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Antenna	Amp.Gain	Cable			
			No other emissions were detected at a level greater than 20dB below limit					

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

Radiated Emissions(R-AN2400-1901RS)- BT

LTA
Laboratory for Test & Approval Co.,Ltd.

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Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: parani-ESD110V2   TEST MODE: BT mode
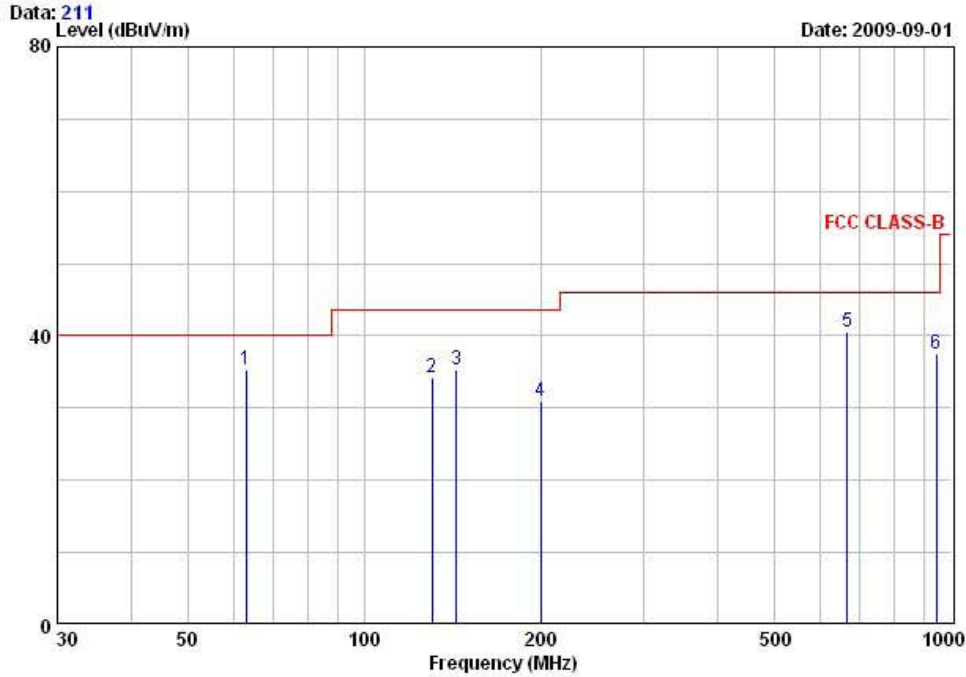
Temp Humi : 26 / 36   Tested by: KIM.K.I
--------------------------------   ----------------

Data: 211

Date: 2009-09-01

	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	62.98	50.20	-14.86	35.34	40.00	4.66	100	68	VERTICAL
2	130.54	47.20	-13.06	34.14	43.50	9.36	100	45	VERTICAL
3	143.79	47.20	-11.98	35.22	43.50	8.28	126	31	HORIZONTAL
4	200.28	43.50	-12.50	31.00	43.50	12.50	215	58	HORIZONTAL
5	665.29	42.30	-1.68	40.62	46.00	5.38	186	25	HORIZONTAL
6	945.20	35.30	2.28	37.58	46.00	8.42	100	189	VERTICAL

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

- 1 -

Radiated Emissions(SENA_009)- BT

LTA
Laboratory for Test & Approval Co.,Ltd.

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Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: parani-ESD100V2   TEST MODE: BT mode

Temp Humi : 26 / 36   Tested by: KIM.K.I
-------------------------------   ----------------

Data: 208

	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	30.42	48.00	-15.70	32.30	40.00	7.70	215	321	VERTICAL
2	130.09	47.30	-13.11	34.19	43.50	9.31	100	53	VERTICAL
3	143.65	47.10	-12.05	35.05	43.50	8.45	205	215	HORIZONTAL
4	200.69	43.70	-12.38	31.32	43.50	12.18	165	32	HORIZONTAL
5	665.98	42.30	-2.04	40.26	46.00	5.74	215	251	HORIZONTAL
6	970.61	37.30	3.16	40.46	54.00	13.54	175	25	HORIZONTAL

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

- 1 -

3.2.8 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	Conducted Limit (dBuV)	
(MHz)	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(R-AN2400-1901RS) – BT– Line

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```
EUT / Model No. : parani-ESD110V2        Phase        : LINE
                 ---------------------                -------------------------
Test Mode        : BT mode                Test Power   : 120 / 60
                 ---------------------                -------------------------
Temp./Humi.      : 25 / 55                Test Engineer : KIM.K.I
                 ---------------------                -------------------------
```
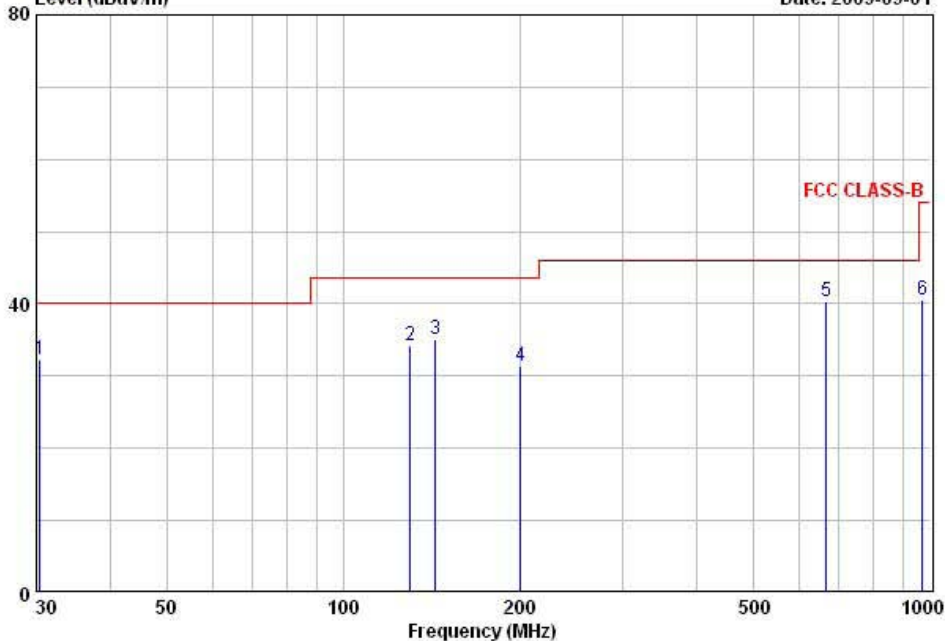
Data: 168   File: D:\Conducted Data\2009\LTA_Conduction_0908_2.EMI (192)   Date: 2009-08-31
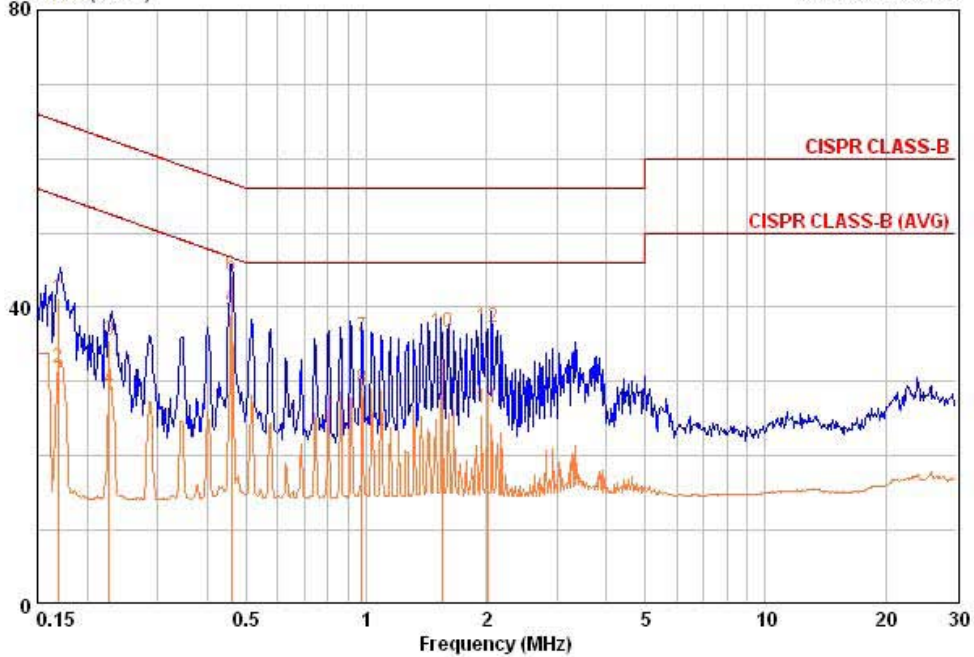
Freq	RD QP	RD AV	C.F	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.169	31.49	22.09	9.65	41.15	31.75	65.01	55.01	23.86	23.26
0.227	25.98	19.38	9.65	35.63	29.03	62.56	52.56	26.93	23.53
0.459	34.65	29.85	9.66	44.31	39.51	56.71	46.71	12.40	7.20
0.973	26.25	19.25	9.79	36.04	29.04	56.00	46.00	19.96	16.96
1.550	26.75	19.25	9.84	36.59	29.09	56.00	46.00	19.41	16.91
2.007	27.45	16.65	9.81	37.26	26.46	56.00	46.00	18.74	19.54

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

- 1 -

AC Conducted Emissions(R-AN2400-1901RS) – BT – Neutral

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Laboratory for Test & Approval Co.,Ltd.

EUT / Model No. : parani-ESD110V2   Phase   : NEUTRAL

Test Mode   : BT mode   Test Power   : 120 / 60

Temp./Humi.   : 25 / 55   Test Engineer : KIM.K.I

Data: 170   File: D:\Conducted Data\2009\LTA_Conduction_0908_2.EMI (192)   Date: 2009-08-31
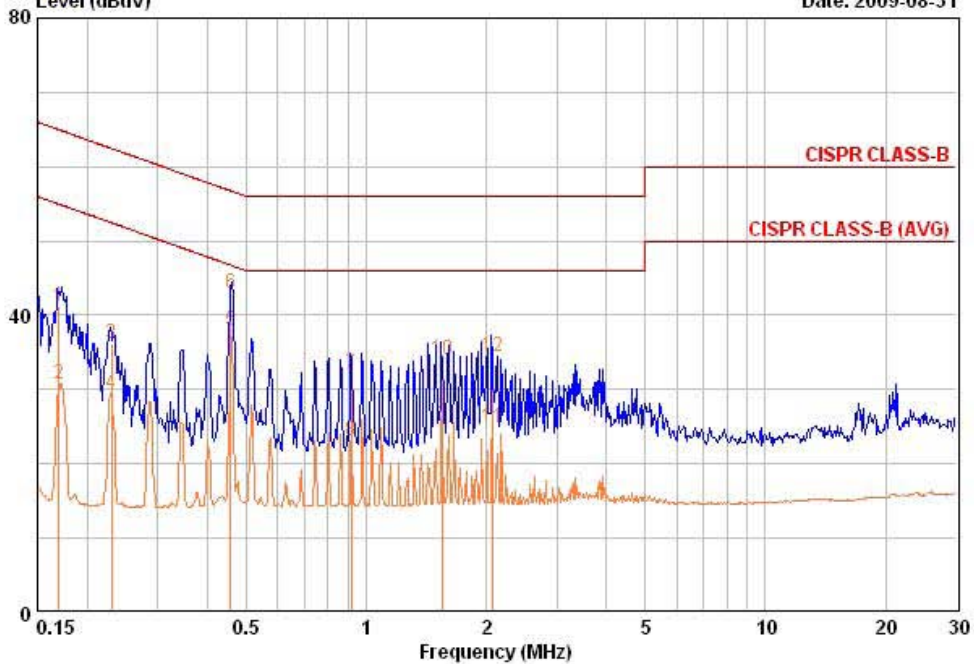
Freq MHz	RD QP dBuV	RD AV dBuV	C.F dB	Result QP dBuV	Result AV dBuV	Limit QP dBuV	Limit AV dBuV	Margin QP dB	Margin AV dB
0.170	31.39	20.99	9.72	41.11	30.71	64.96	54.96	23.85	24.25
0.230	26.48	19.78	9.67	36.15	29.45	62.45	52.45	26.30	23.00
0.458	33.15	28.15	9.69	42.84	37.84	56.73	46.73	13.89	8.89
0.915	22.15	13.25	9.81	31.95	23.05	56.00	46.00	24.05	22.95
1.548	24.25	16.25	9.84	34.09	26.09	56.00	46.00	21.91	19.91
2.064	24.65	15.05	9.79	34.44	24.84	56.00	46.00	21.56	21.16

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

- 1 -

AC Conducted Emissions(SENA_009) – BT– Line

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EUT / Model No. : parani-ESD100V2	Phase	: LINE
Test Mode	: BT mode	Test Power	: 120 / 60
Temp./Humi.	: 24 / 53	Test Engineer	: B.S.KIM

Data: 184   File: D:\Conducted Data\2009\LTA_Conduction_0908_2.EMI (192)   Date: 2009-08-31

CISPR CLASS-B
CISPR CLASS-B (AVG)

| 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
0.169	31.39	20.89	9.65	41.05	30.55	65.01	55.01	23.96	24.46
0.227	25.88	18.48	9.65	35.53	28.13	62.56	52.56	27.03	24.43
0.461	33.15	26.35	9.66	42.81	36.01	56.67	46.67	13.86	10.66
0.514	27.45	19.85	9.71	37.16	29.56	56.00	46.00	18.84	16.44
0.973	24.85	16.45	9.79	34.64	26.24	56.00	46.00	21.36	19.76
2.063	25.35	14.15	9.81	35.17	23.97	56.00	46.00	20.83	22.03

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

- 1 -

AC Conducted Emissions(SENA_009) – BT – Neutral

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```
EUT / Model No. : parani-ESD100V2          Phase        : NEUTRAL
                  ---------------------------            -------------------------
Test Mode       : BT mode                   Test Power   : 120 / 60
                  ---------------------------            -------------------------
Temp./Humi.     : 24 / 53                   Test Engineer : B.S.KIM
                  ---------------------------            -------------------------
```

Data: 186   File: D:\Conducted Data\2009\LTA_Conduction_0908_2.EMI (192)   Date: 2009-08-31


```
    Freq      RD       RD     C.F    Result   Result  Limit   Limit   Margin  Margin
              QP       AV             QP       AV      QP      AV      QP      AV
    MHz      dBuV     dBuV    dB     dBuV     dBuV    dBuV    dBuV    dB      dB
  -------  -------  -------  ------ -------- ------- ------- ------- ------- -------
   0.171   31.49    19.39    9.72   41.21    29.11   64.91   54.91   23.70   25.80
   0.226   25.08    16.68    9.66   34.75    26.35   62.60   52.60   27.85   26.25
   0.456   31.65    25.35    9.69   41.34    35.04   56.77   46.77   15.42   11.72
   0.518   26.45    19.65    9.70   36.15    29.35   56.00   46.00   19.85   16.65
   0.572   21.34    14.64    9.75   31.09    24.39   56.00   46.00   24.91   21.61
   2.063   23.25    14.15    9.79   33.04    23.94   56.00   46.00   22.96   22.06
```

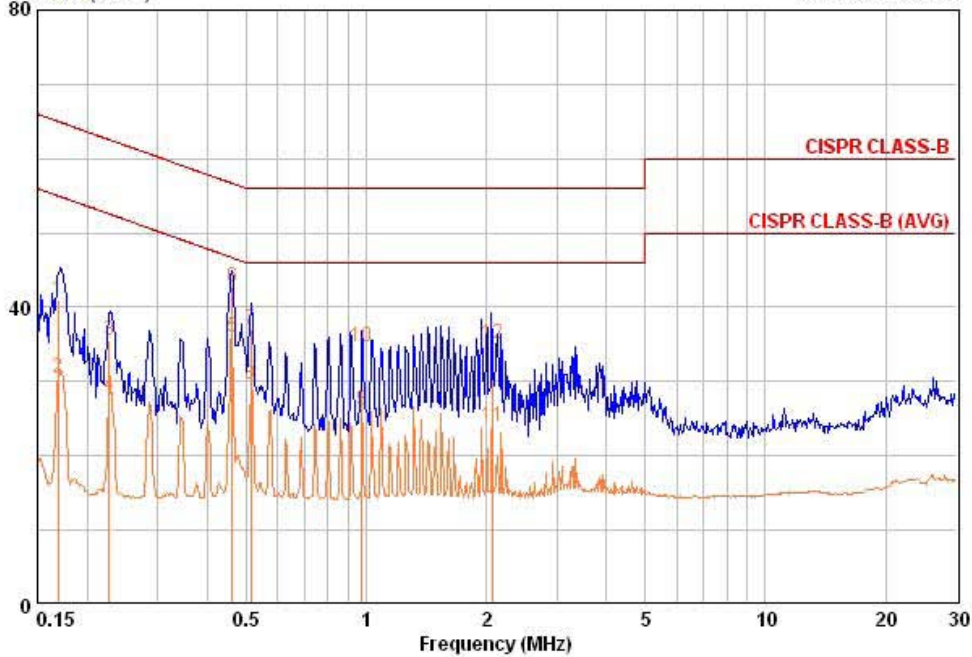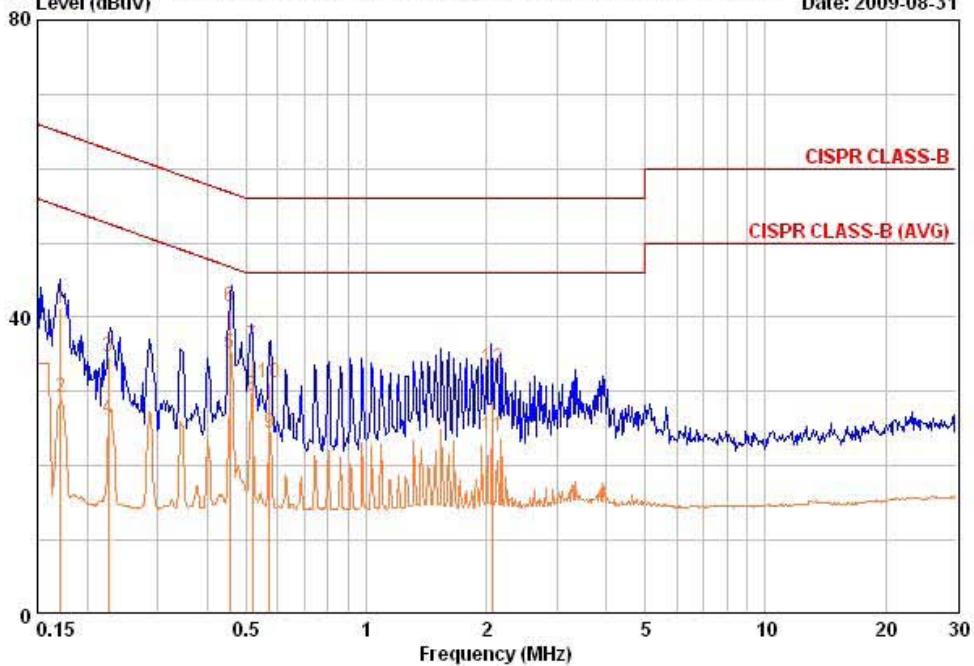Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

- 1 -

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-10
2	Spectrum Analyzer	8563E	3425A02505	HP	Apr-10
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-09
4	Signal Generator	8648C	3623A02597	HP	Apr-10
5	Signal Generator	83711B	US34490456	HP	Apr-10
6	Attenuator (3dB)	8491A	37822	HP	Oct-09
7	Attenuator (10dB)	8491A	63196	HP	Oct-09
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-09
9	EMI Test Receiver	ESVD	843748/001	R&S	Apr-10
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-10
13	RF Amplifier	8449B	3008A02126	HP	Apr-10
14	Test Receiver	ESHS10	828404/009	R&S	Apr-10
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-09
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-09
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-09
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-09
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Apr-10
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-09
28	DC Power Supply	6622A	3448A03079	HP	Oct-09
29	Frequency Counter	5342A	2826A12411	HP	Apr-10
30	Power Meter	EPM-441A	GB32481702	HP	Apr-10
31	Power Sensor	8481A	2702A64048	HP	Apr-10
32	Audio Analyzer	8903B	3729A18901	HP	Oct-09
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-09
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-09
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Apr-10
37	LISN	ENV216	100408	R&S	Oct-09