

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E11DR-019

AGR No. : A119A-131R

Applicant : KACO new energy Inc.
Address : B-1701~1716, 2nd Woolim Lions Valley, 146-8, Sangdaewon-dong, Jungwon-gu,
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Manufacturer : KACO new energy Inc.
Address : 1st Floor, Dongbang Rental Bldg., 333-1 Sangdaewon1-dong, Jungwon-gu,
Seongnam-city, Gyeonggi-do, 462-807, Korea

Type of Equipment : Limited Single Modulator Transmitter (WLAN 802.11 b/g/n)
WLAN Module Inserting into PV Inverter

FCC ID. : A5T-HMI

Model Name : HMI

Serial number : N/A

Total page of Report : 110 pages (including this page)

Date of Incoming : October 04, 2011

Date of issue : December 09, 2011

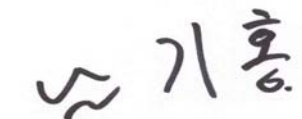
SUMMARY

The equipment complies with the regulation; **FCC Part 15 Subpart C Section 15.247.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E11DR-019	December 09, 2011	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

APPLICANT : KACO new energy Inc.
 ADDRESS : B-1701~1716, 2nd Woolim Lions Valley, 146-8, Sangdaewon-dong, Jungwon-gu,
 Seongnam-si, Gyeonggi-do, 462-807, Korea
 CONTACT PERSON : Mr. Yongmin, Lee / Researcher
 TELEPHONE NO : +82-70-8650-3494
 FCC ID : A5T-HMI
 MODEL NAME : HMI
 SERIAL NUMBER : -
 DATE : December 09, 2011

EQUIPMENT CLASS	<i>DTS – DIGITAL TRNSMISSION SYSTEM</i>
KIND OF EQUIPMENT	Limited Single Modular Transmitter with WLAN 802.11 b/g/n inserting into PV Inverter
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m open area test site

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.247 (i)	Radio Frequency Exposure Level	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit (See Note 1)
15.203	Antenna Requirement	Met requirement / PASS

Note 1: There are two type of products, PCB type(without LCD) and enclosure type(with LCD). But the used RF module is same, so test of radiated emissions were performed separately.

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2009 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

3. GENERAL INFORMATION

3.1 Product Description

The KACO new energy Inc., Model HMI (referred to as the EUT in this report) is a Limited Single Modular transmitter has function for 802.11 b/g/n shall be inserted into PV Inverter only manufactured by KACO new energy Inc. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Limited Single Modular Transmitter (WLAN 802.11b/g/n) Inserted into PV Inverter
TEMPERATURE RANGE	-30 °C ~ +80 °C
OPERATING FREQUENCY	2 412 MHz ~ 2 462 MHz
RF OUTPUT POWER	14.40 dBm(802.11b), 14.50 dBm(802.11g), 14.20 dBm(802.11n)
DATA TRANSFER RATE	802.11b : 11 Mbps, 802.11g : 54 Mbps , 802.11n : 65 Mbps
MODULATION TYPE	CCK, DQPSK, DBPSK(802.11b) OFDM/64-QAM, 16-QAM, QPSK, BPSK(802.11g/n)
ANTENNA	MFR.: WINiZEN, Model No.: W5E-WO-01
ANTENNA CONNECTOR TYPE	External Dipole Antenna
ANTENNA GAIN	5 ± 0.5 dBi
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ. >= 1 MHz)	12 MHz, 27 MHz, 25 MHz, 24.576 MHz and 48 MHz
NUMBER OF LAYER	8 Layers
EXRERNAL CONNECTOR	RS232, RS485, USB, SD Card and Antenna

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	KACO new energy	HMI REV 1.2	A5T-HMI

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
HMI	KACO new energy Inc.	A5T-HMI	Limited Single Modular Transmitter (EUT)	Inserted in PV Inverter
XP50U-H4	KACO new energy Inc.	N/A	PV Inverter	EUT
DRP-305DN	Digital Elec.	N/A	DC Power Supply	EUT

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting and receiving mode is programmed. For final testing, WLAN was set at Low Channel (2 412 MHz), Middle Channel (2 437 MHz), and High Channel (2 462 MHz) with 11 Mbps(802.11b), 54 Mbps(802.11g) and 65 Mbps(802.11n) data rates.

For radiated emission testing, the EUT was inserted into a PV inverter and transmitted maximum signal during the testing.

5.4 Configuration of Test System

Line Conducted Test: The EUT was connected to DC power supply and power of DC power supply connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line conducted emission test was performed by using the procedure in ANSI C63.4: 2009 7.3.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 and 13.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The antenna of the EUT shall be molded with the antenna connector of the EUT at the manufacturer side, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Enclosure type(with LCD)	-
PCB type(without LCD)	X

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode		The Worse operating condition (Please check one only)
Enclosure type(with LCD)	802.11 b	X
	802.11 g	-
	802.11 n	-
PCB type(without LCD)	802.11 b	-
	802.11 g	-
	802.11 n	-

7. TEST DATA FOR 802.11b WLAN MODE

7.1 MINIMUM 6 dB BANDWIDTH

7.1.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

7.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



7.1.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

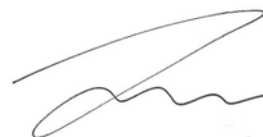
7.1.4 Test data

- Test Date : November 17, 2011

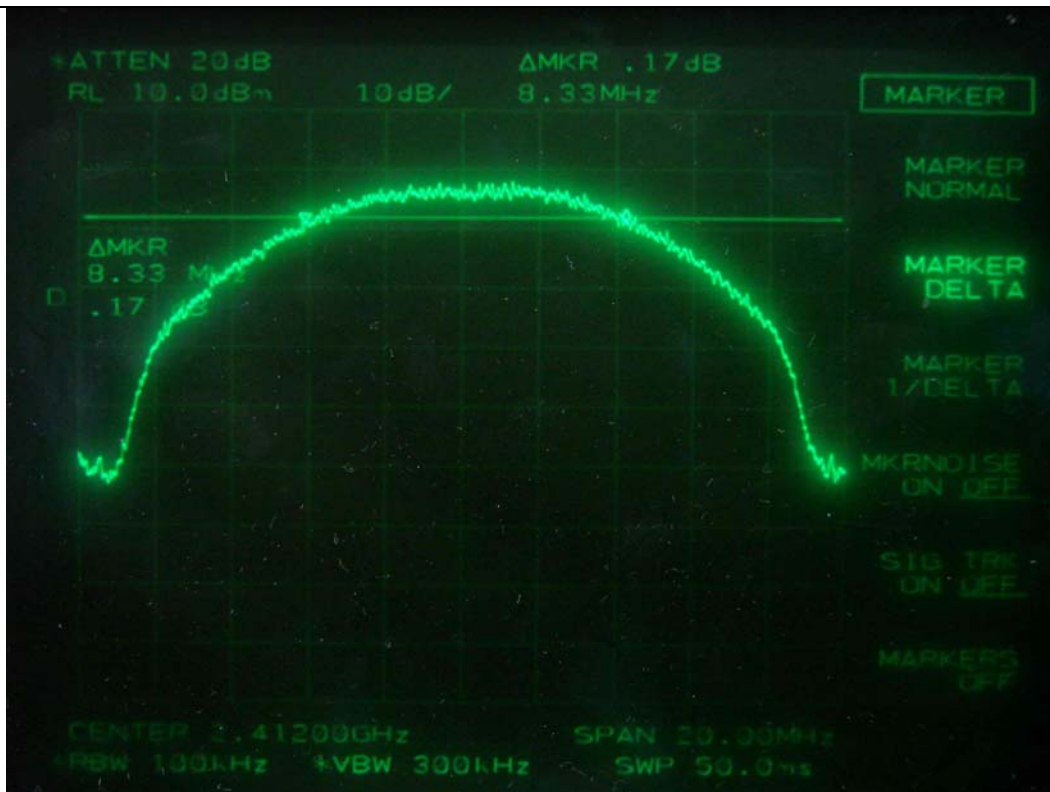
- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 412	8 330	500	-7 830
Middle	2 437	8 330	500	-7 830
High	2 462	8 330	500	-7 830

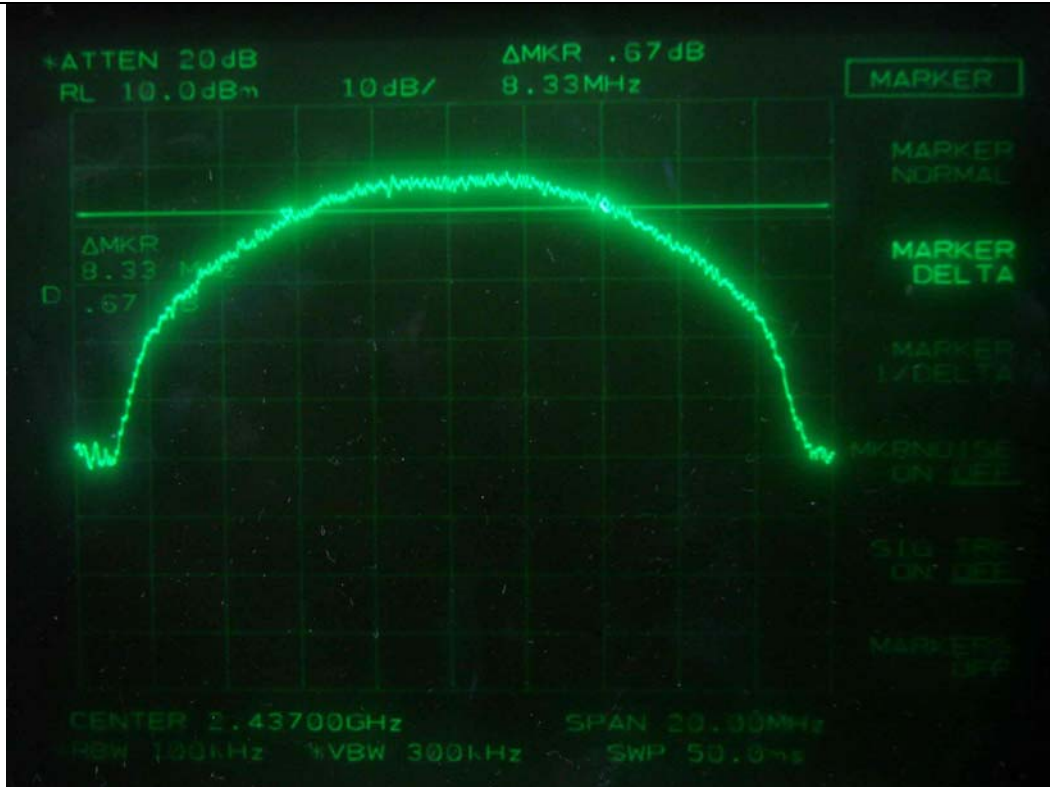
Remark: See next page for an overview sweep performed with peak detector.



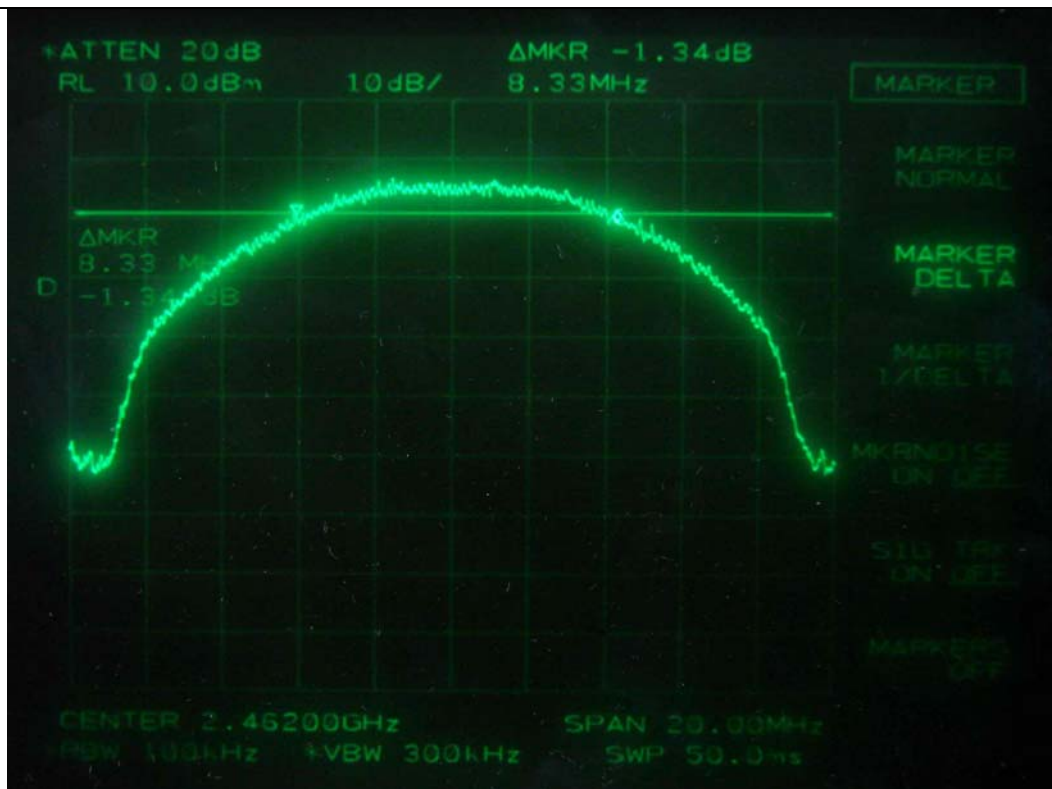
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

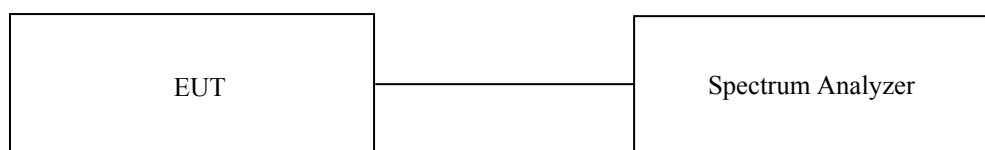
7.2 MAXIMUM PEAK OUTPUT POWER

7.2.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

7.2.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



7.2.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

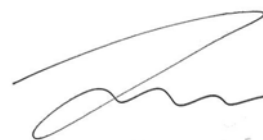
7.2.4 Test data

- Test Date : November 17, 2011

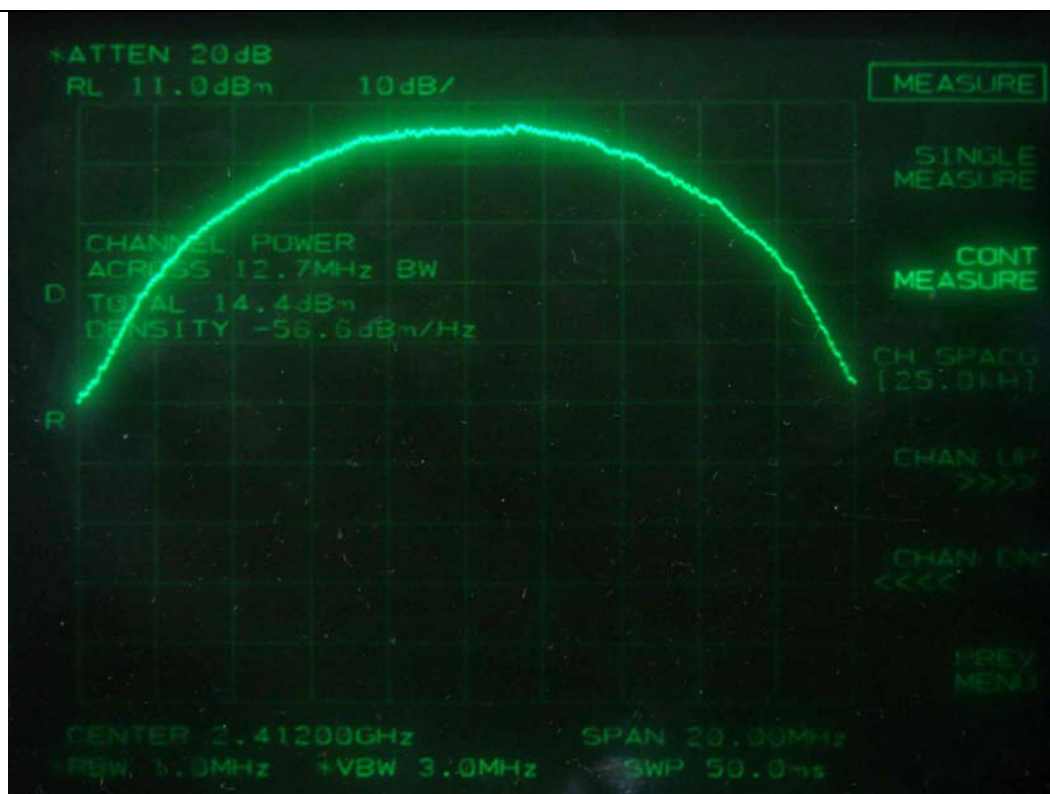
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99 % Occupied Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	12.70	14.40	30.00	-15.60
Middle	2 437	12.73	14.00	30.00	-16.00
High	2 462	12.73	13.20	30.00	-16.80

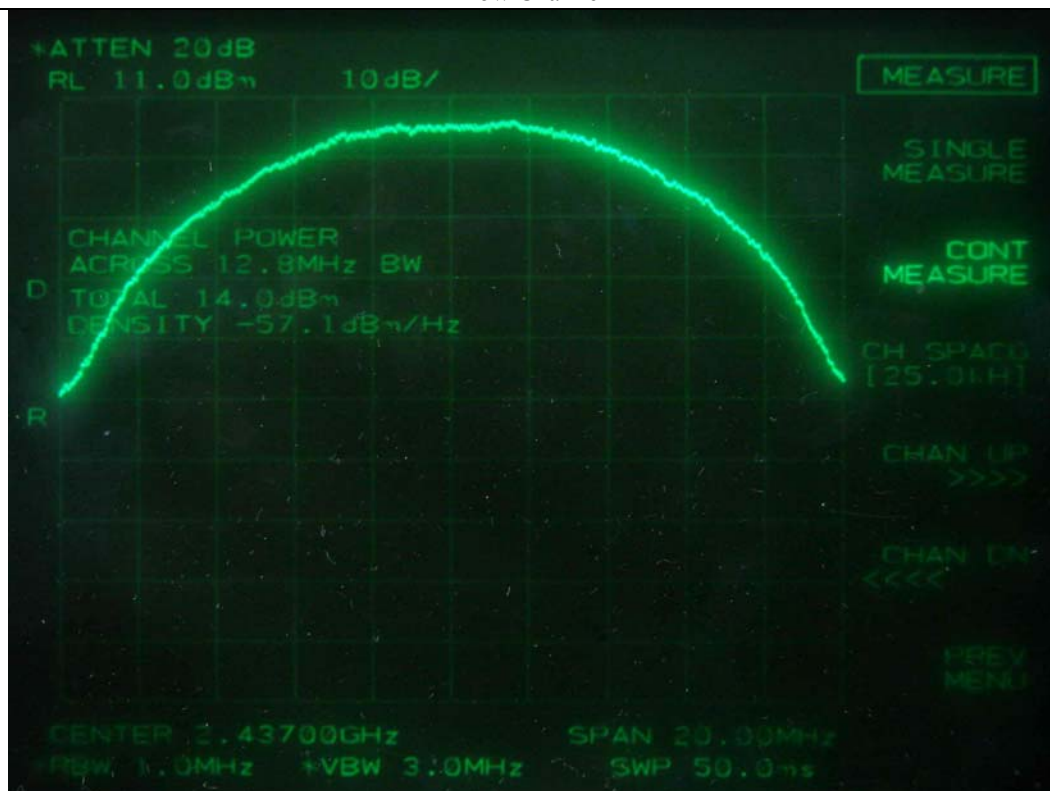
Remark: See next page for an overview sweep performed with peak detector.



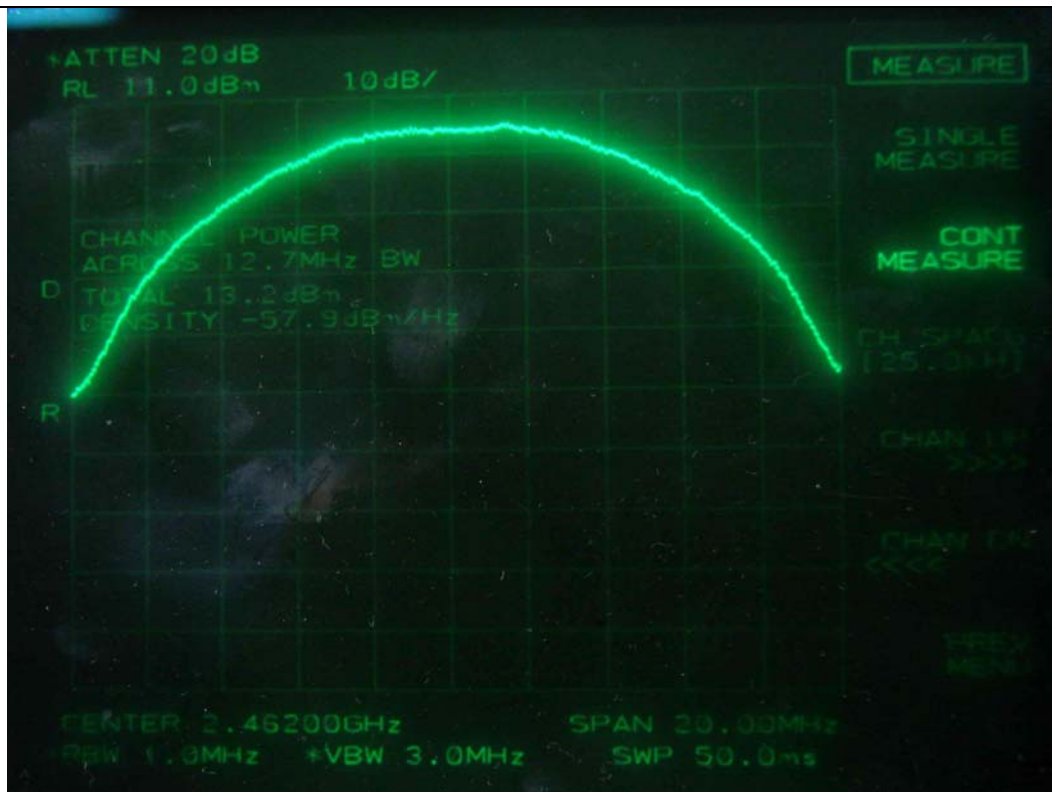
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

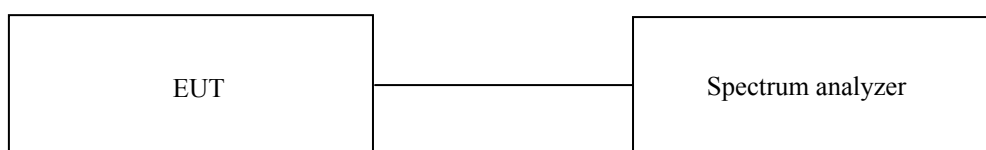
7.3 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

7.3.1 Operating environment

Temperature : 28 °C
Relative humidity : 45.7 % R.H.

7.3.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



7.3.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

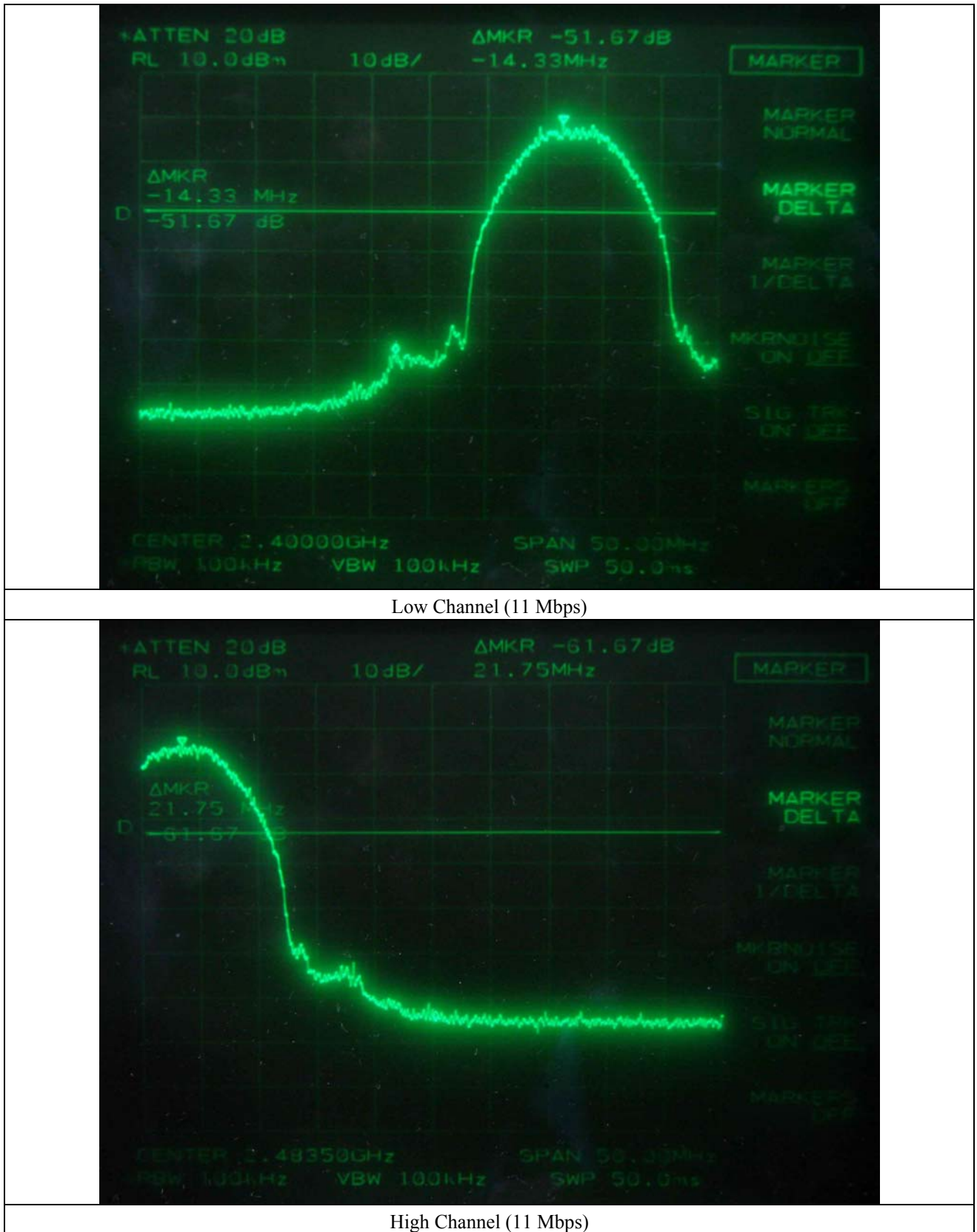
The frequency spectrum from 30 MHz to 25 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

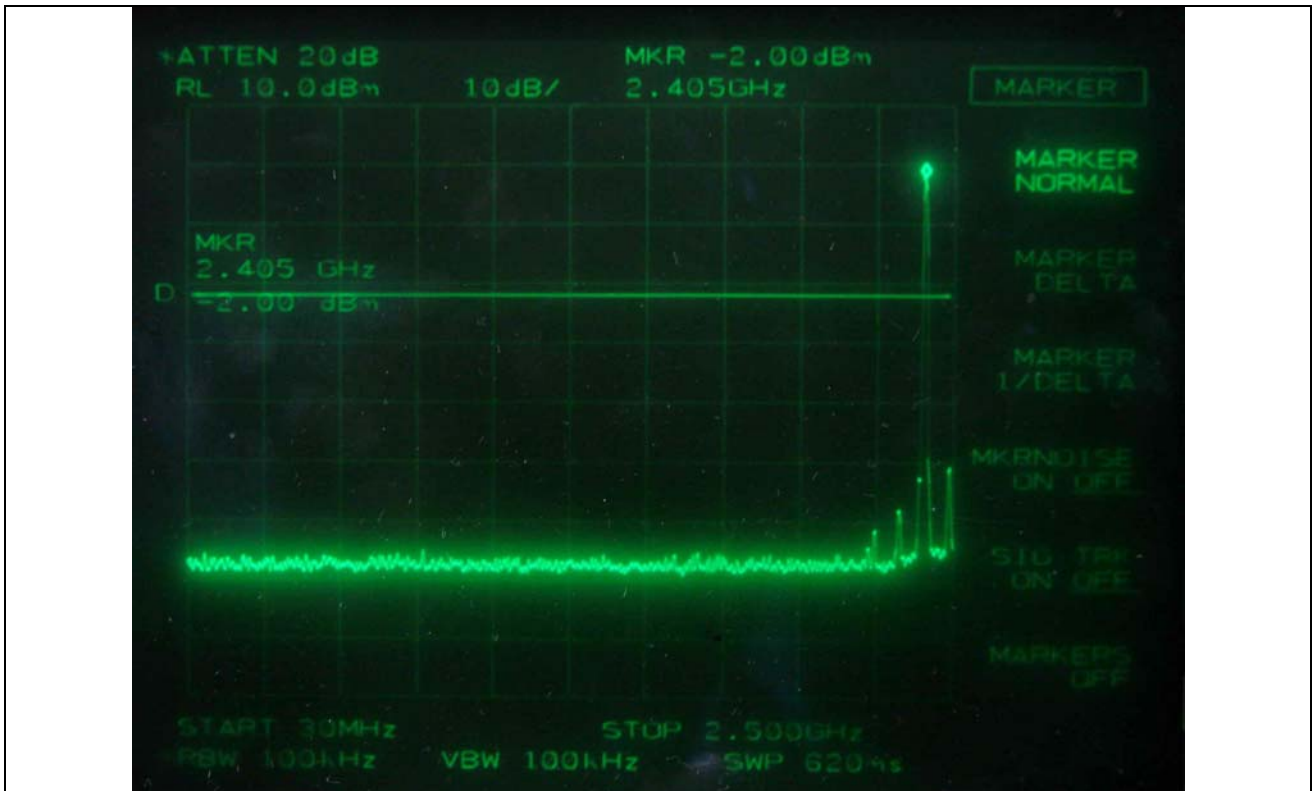
7.3.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)
■ -	8447D	Hewlett-Packard	Amplifier	2727A04987	Jun. 11, 2011(1Y)
■ -	83051A	Agilent	Preamplifier	3950M00201	Jun. 11, 2011(1Y)
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	Jul. 09, 2011(1Y)
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2011(2Y)
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

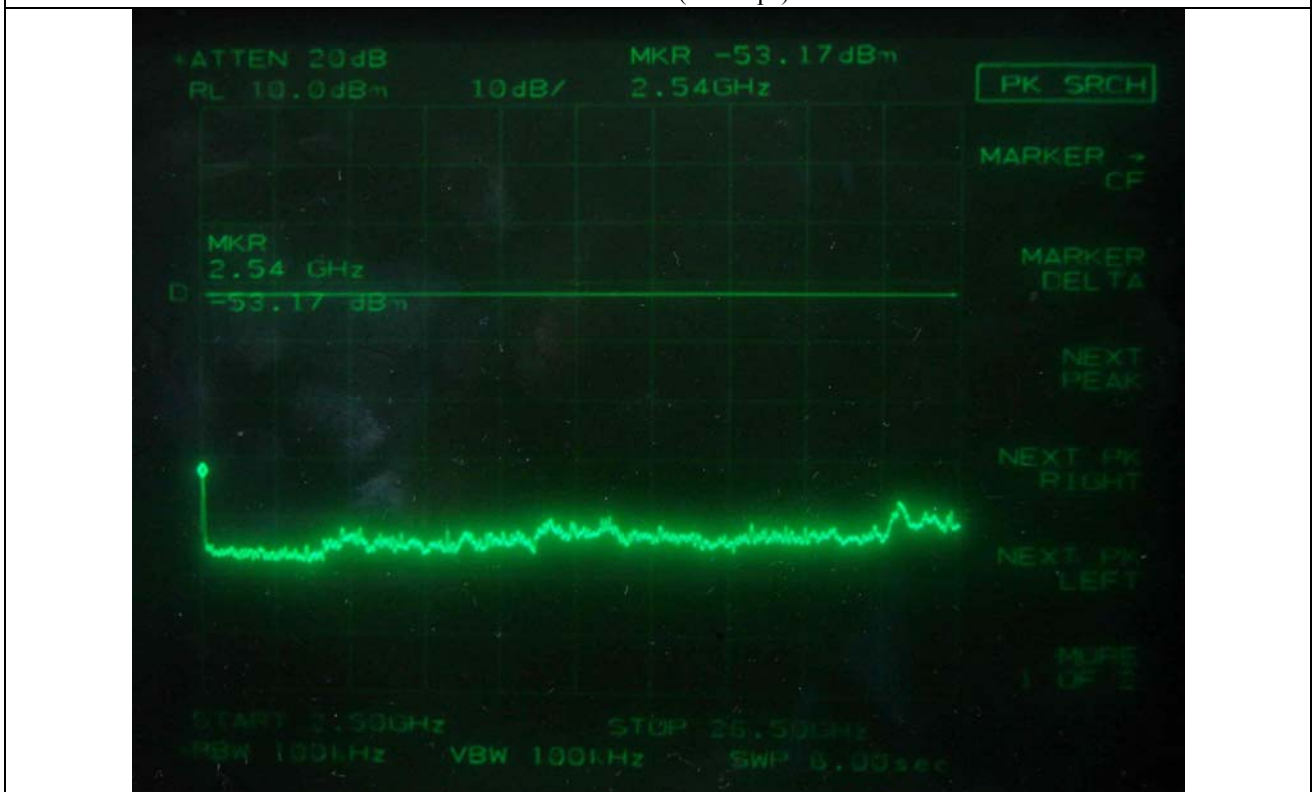
All test equipment used is calibrated on a regular basis.

7.3.5. Test data for conducted emission

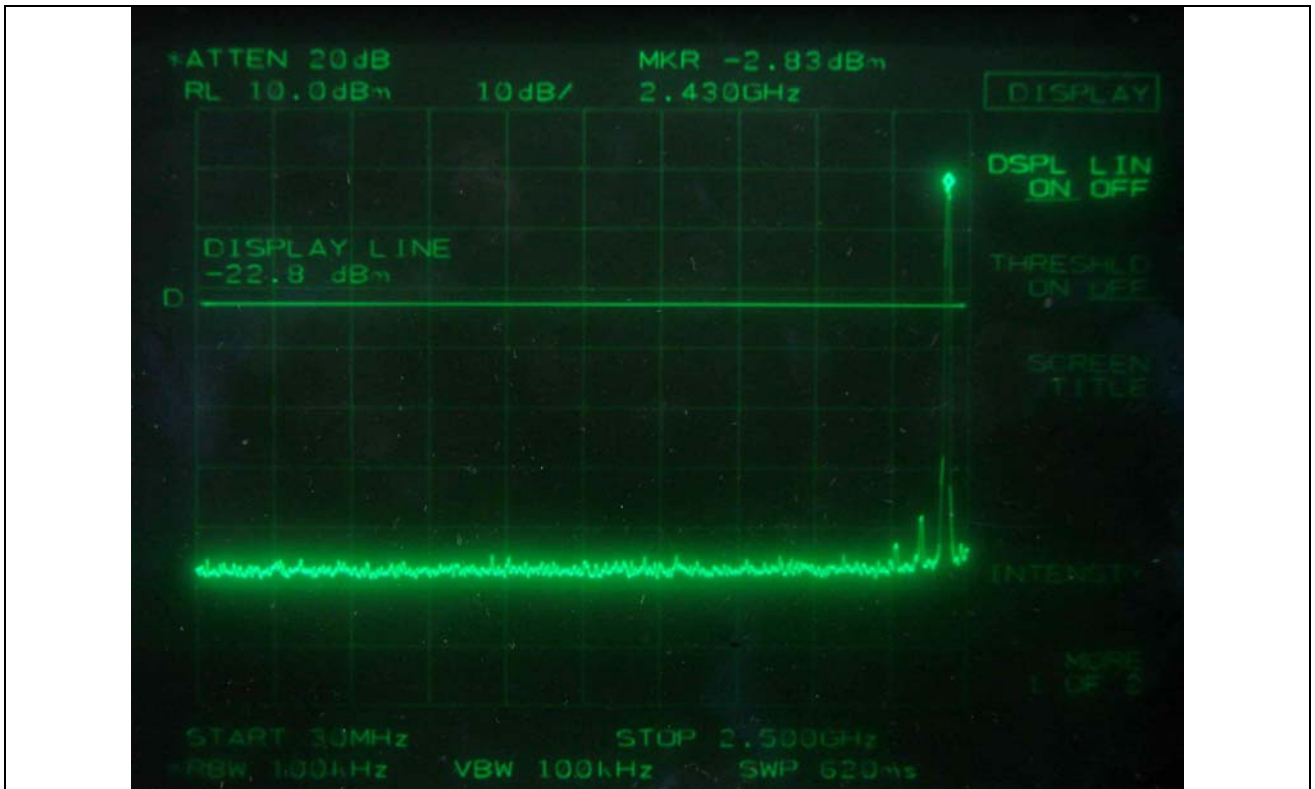




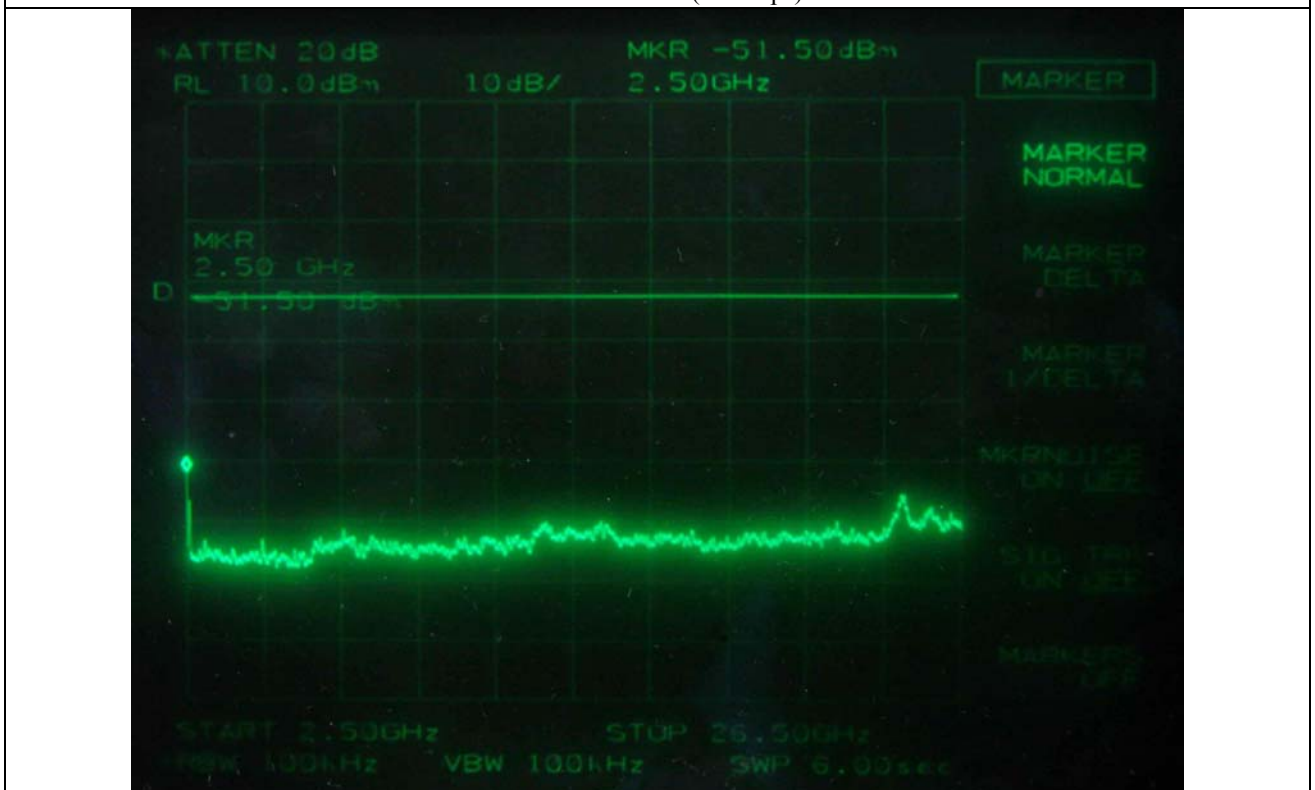
Low Channel (11 Mbps)



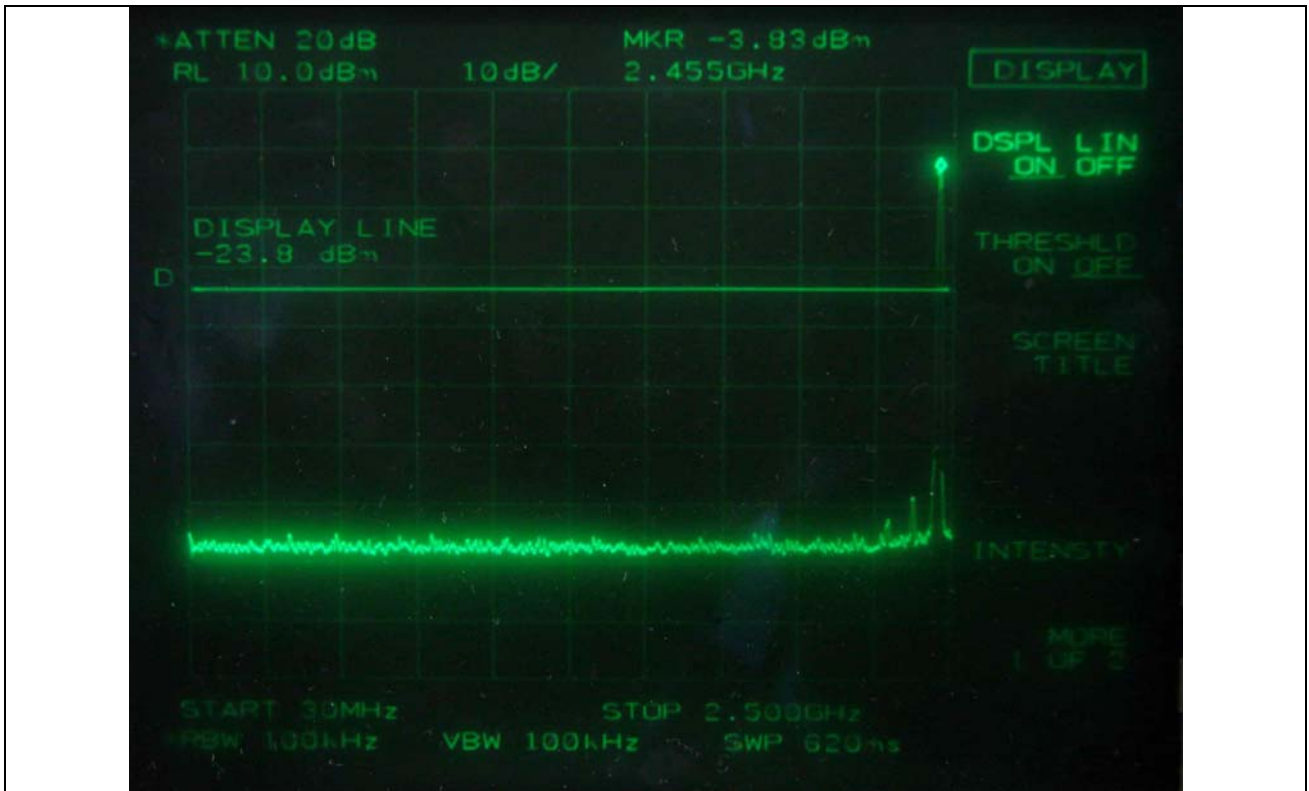
Low Channel (11 Mbps)



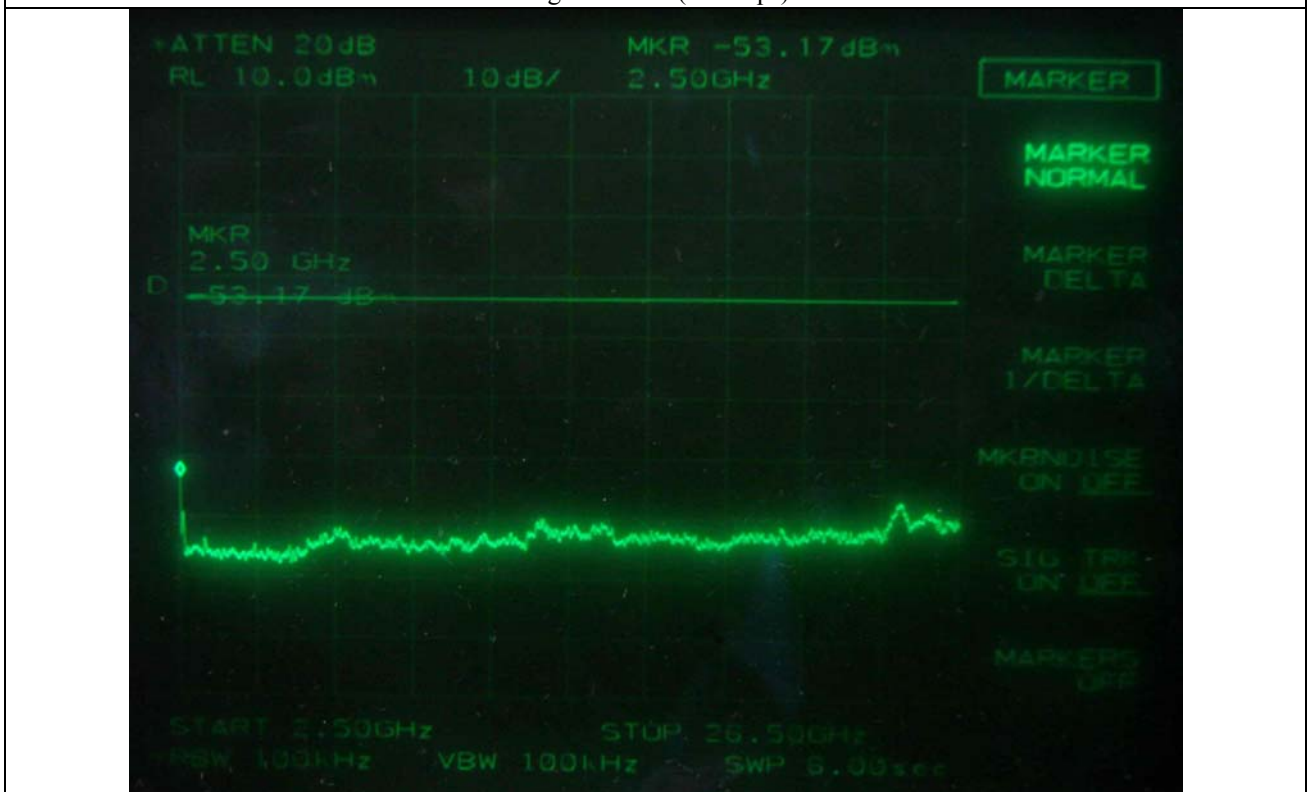
Middle Channel (11 Mbps)



Middle Channel (11 Mbps)



High Channel (11 Mbps)



High Channel (11 Mbps)

7.3.6. Test data for radiated emission (Enclosure type(with LCD))

7.3.6.1 Radiated Emission which fall in the Restricted Band

- . Test Date : November 18, 2011
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 25 GHz
- . Measurement distance : 3 m
- . Operating Condition : Low / High Channel
- . Result : PASSED BY -37.43 dB at High Channel (11 Mbps)

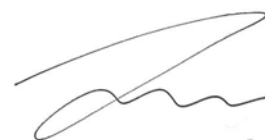
Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (1 Mbps)									
2 390.00	27.12	Peak	H	26.66	3.13	28.98	27.93	74.00	-46.07
	15.02	Average	H				15.83	54.00	-38.17
	27.78	Peak	V				28.59	74.00	-45.41
	15.12	Average	V				15.93	54.00	-38.07
Test Data for Low Channel (2 Mbps)									
2 390.00	27.25	Peak	H	26.66	3.13	28.98	28.06	74.00	-45.94
	15.13	Average	H				15.94	54.00	-38.06
	27.85	Peak	V				28.66	74.00	-45.34
	15.12	Average	V				15.93	54.00	-38.07
Test Data for Low Channel (5.5 Mbps)									
2 390.00	27.32	Peak	H	26.66	3.13	28.98	28.13	74.00	-45.87
	15.17	Average	H				15.98	54.00	-38.02
	27.96	Peak	V				28.77	74.00	-45.23
	15.05	Average	V				15.86	54.00	-38.14
Test Data for Low Channel (11 Mbps)									
2 390.00	27.36	Peak	H	26.66	3.13	28.98	28.17	74.00	-45.83
	15.10	Average	H				15.91	54.00	-38.09
	28.12	Peak	V				28.93	74.00	-45.07
	15.11	Average	V				15.92	54.00	-38.08

Tabulated test data for Restricted Band

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (1 Mbps)									
2 483.50	28.12	Peak	H	26.82	3.17	28.82	29.29	74.00	-44.71
	15.17	Average	H				16.34	54.00	-37.66
	28.45	Peak	V				29.62	74.00	-44.38
	15.20	Average	V				16.37	54.00	-37.63
Test Data for High Channel (2 Mbps)									
2 483.50	28.26	Peak	H	26.82	3.17	28.82	29.43	74.00	-44.57
	15.28	Average	H				16.45	54.00	-37.55
	28.67	Peak	V				29.84	74.00	-44.16
	15.27	Average	V				16.44	54.00	-37.56
Test Data for High Channel (5.5 Mbps)									
2 483.50	28.38	Peak	H	26.82	3.17	28.82	29.55	74.00	-44.45
	15.32	Average	H				16.49	54.00	-37.51
	28.73	Peak	V				29.90	74.00	-44.10
	15.38	Average	V				16.55	54.00	-37.45
Test Data for High Channel (11 Mbps)									
2 483.50	28.49	Peak	H	26.82	3.17	28.82	29.66	74.00	-44.34
	15.39	Average	H				16.56	54.00	-37.44
	28.97	Peak	V				30.14	74.00	-43.86
	15.40	Average	V				16.57	54.00	-37.43

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

7.3.6.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -17.63 dB at middle channel(2 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (1 Mbps)									
2 412.00	62.37	Peak	H	27.33	3.83		93.53	-	
	72.75	Peak	V				103.91	-	
4 824.00	35.18	Peak	H	31.63	6.55	26.10	47.27	74.00	-26.73
	23.28	Average	H				35.37	54.00	-18.63
	35.17	Peak	V				47.26	74.00	-26.74
	23.67	Average	V				35.76	54.00	-18.24
Test Data for Low Channel (2 Mbps)									
2 412.00	62.45	Peak	H	27.33	3.83		93.61	-	
	72.82	Peak	V				103.98	-	
4 824.00	35.33	Peak	H	31.63	6.55	26.10	47.42	74.00	-26.58
	23.25	Average	H				35.34	54.00	-18.66
	35.00	Peak	V				47.09	74.00	-26.91
	23.83	Average	V				35.92	54.00	-18.08
Test Data for Low Channel (5.5 Mbps)									
2 412.00	62.51	Peak	H	27.33	3.83		93.67	-	
	72.92	Peak	V				104.08	-	
4 824.00	35.67	Peak	H	31.63	6.55	26.10	47.76	74.00	-26.24
	23.67	Average	H				35.76	54.00	-18.24
	35.83	Peak	V				47.92	74.00	-26.08
	23.50	Average	V				35.59	54.00	-18.41

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (11 Mbps)									
2 412.00	62.87	Peak	H	27.33	3.83		94.03	-	
	73.10	Peak	V				104.26	-	
4 824.00	35.92	Peak	H	31.63	6.55	26.10	48.01	74.00	-25.99
	23.67	Average	H				35.76	54.00	-18.24
	35.50	Peak	V				47.59	74.00	-26.41
	23.50	Average	V				35.59	54.00	-18.41

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (1 Mbps)									
2 437.00	59.39	Peak	H	27.40	3.83		90.62	-	
	66.81	Peak	V				98.04	-	
4 874.00	35.82	Peak	H	31.72	6.59	26.10	48.03	74.00	-25.97
	23.83	Average	H				36.04	54.00	-17.96
	35.67	Peak	V				47.88	74.00	-26.12
	23.50	Average	V				35.71	54.00	-18.29
Test Data for Middle Channel (2 Mbps)									
2 437.00	59.44	Peak	H	27.40	3.83		90.67	-	
	67.25	Peak	V				98.48	-	
4 874.00	36.00	Peak	H	31.72	6.59	26.10	48.21	74.00	-25.79
	24.16	Average	H				36.37	54.00	-17.63
	35.50	Peak	V				47.71	74.00	-26.29
	23.67	Average	V				35.88	54.00	-18.12

Tabulated test data for Restricted Band

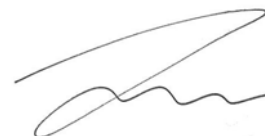
Test Data for Middle Channel (5.5 Mbps)									
2 437.00	60.04	Peak	H	27.40	3.83		91.27	-	
	67.47	Peak	V				98.70	-	
4 874.00	35.83	Peak	H	31.72	6.59	26.10	48.04	74.00	-25.96
	23.50	Average	H				35.71	54.00	-18.29
	35.67	Peak	V				47.88	74.00	-26.12
	23.17	Average	V				35.38	54.00	-18.62
Test Data for Middle Channel (11 Mbps)									
2 437.00	63.72	Peak	H	27.40	3.83		94.95	-	
	68.42	Peak	V				99.65	-	
4 874.00	35.84	Peak	H	31.72	6.59	26.10	48.05	74.00	-25.95
	23.61	Average	H				35.82	54.00	-18.18
	35.68	Peak	V				47.89	74.00	-26.11
	23.28	Average	V				35.49	54.00	-18.51

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (1 Mbps)									
2 462.00	60.40	Peak	H	27.48	3.83		91.71	-	
	68.60	Peak	V				99.91	-	
4 924.00	35.68	Peak	H	31.81	6.62	26.10	48.01	74.00	-25.99
	23.48	Average	H				35.81	54.00	-18.19
	35.33	Peak	V				47.66	74.00	-26.34
	23.57	Average	V				35.90	54.00	-18.10
Test Data for High Channel (2 Mbps)									
2 462.00	61.24	Peak	H	27.48	3.83		92.55	-	
	68.75	Peak	V				100.06	-	
4 924.00	35.68	Peak	H	31.81	6.62	26.10	48.01	74.00	-25.99
	23.84	Average	H				36.17	54.00	-17.83
	23.42	Peak	V				35.75	74.00	-38.25
	23.74	Average	V				36.07	54.00	-17.93

Test Data for High Channel (5.5 Mbps)									
2 462.00	62.82	Peak	H	27.48	3.83		94.13	-	
	69.47	Peak	V				100.78	-	
4 924.00	35.33	Peak	H	31.81	6.62	26.10	47.66	74.00	-26.34
	23.64	Average	H				35.97	54.00	-18.03
	35.67	Peak	V				48.00	74.00	-26.00
	23.18	Average	V				35.51	54.00	-18.49
Test Data for High Channel (11 Mbps)									
2 462.00	64.10	Peak	H	27.48	3.83		95.41	-	
	71.74	Peak	V				103.05	-	
4 924.00	35.52	Peak	H	31.81	6.62	26.10	47.85	74.00	-26.15
	23.40	Average	H				35.73	54.00	-18.27
	36.00	Peak	V				48.33	74.00	-25.67
	23.89	Average	V				36.22	54.00	-17.78

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

7.3.7. Test data for radiated emission (PCB type(without LCD))

7.3.7.1 Radiated Emission which fall in the Restricted Band

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Operating Condition : Low / High Channel
- Result : PASSED BY -37.43 dB at High Channel (11 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (1 Mbps)									
2 390.00	28.42	Peak	H	26.66	3.13	28.98	29.23	74.00	-44.77
	15.11	Average	H				15.92	54.00	-38.08
	27.45	Peak	V				28.26	74.00	-45.74
	15.10	Average	V				15.91	54.00	-38.09
Test Data for Low Channel (2 Mbps)									
2 390.00	28.65	Peak	H	26.66	3.13	28.98	29.46	74.00	-44.54
	15.14	Average	H				15.95	54.00	-38.05
	27.34	Peak	V				28.15	74.00	-45.85
	15.21	Average	V				16.02	54.00	-37.98
Test Data for Low Channel (5.5 Mbps)									
2 390.00	28.72	Peak	H	26.66	3.13	28.98	29.53	74.00	-44.47
	15.11	Average	H				15.92	54.00	-38.08
	27.62	Peak	V				28.43	74.00	-45.57
	15.11	Average	V				15.92	54.00	-38.08
Test Data for Low Channel (11 Mbps)									
2 390.00	28.48	Peak	H	26.66	3.13	28.98	29.29	74.00	-44.71
	15.10	Average	H				15.91	54.00	-38.09
	27.60	Peak	V				28.41	74.00	-45.59
	15.15	Average	V				15.96	54.00	-38.04

Tabulated test data for Restricted Band

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (1 Mbps)									
2 483.50	28.47	Peak	H	26.82	3.17	28.82	29.64	74.00	-44.36
	15.24	Average	H				16.41	54.00	-37.59
	27.58	Peak	V				28.75	74.00	-45.25
	15.24	Average	V				16.41	54.00	-37.59
Test Data for High Channel (2 Mbps)									
2 483.50	28.68	Peak	H	26.82	3.17	28.82	29.85	74.00	-44.15
	15.34	Average	H				16.51	54.00	-37.49
	27.62	Peak	V				28.79	74.00	-45.21
	15.14	Average	V				16.31	54.00	-37.69
Test Data for High Channel (5.5 Mbps)									
2 483.50	28.74	Peak	H	26.82	3.17	28.82	29.91	74.00	-44.09
	15.36	Average	H				16.53	54.00	-37.47
	27.35	Peak	V				28.52	74.00	-45.48
	15.33	Average	V				16.50	54.00	-37.50
Test Data for High Channel (11 Mbps)									
2 483.50	28.76	Peak	H	26.82	3.17	28.82	29.93	74.00	-44.07
	15.38	Average	H				16.55	54.00	-37.45
	27.96	Peak	V				29.13	74.00	-44.87
	15.40	Average	V				16.57	54.00	-37.43

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

7.3.7.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -17.78 dB at high channel(11 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (1 Mbps)									
2 412.00	61.84	Peak	H	27.33	3.83		93.00	-	
	73.77	Peak	V				104.93	-	
4 824.00	35.48	Peak	H	31.63	6.55	26.10	47.57	74.00	-26.43
	23.15	Average	H				35.24	54.00	-18.76
	35.62	Peak	V				47.71	74.00	-26.29
	23.66	Average	V				35.75	54.00	-18.25
Test Data for Low Channel (2 Mbps)									
2 412.00	61.87	Peak	H	27.33	3.83		93.03	-	
	73.82	Peak	V				104.98	-	
4 824.00	35.25	Peak	H	31.63	6.55	26.10	47.34	74.00	-26.66
	23.41	Average	H				35.50	54.00	-18.50
	35.48	Peak	V				47.57	74.00	-26.43
	23.15	Average	V				35.24	54.00	-18.76
Test Data for Low Channel (5.5 Mbps)									
2 412.00	62.26	Peak	H	27.33	3.83		93.42	-	
	74.52	Peak	V				105.68	-	
4 824.00	35.82	Peak	H	31.63	6.55	26.10	47.91	74.00	-26.09
	23.39	Average	H				35.48	54.00	-18.52
	35.48	Peak	V				47.57	74.00	-26.43
	23.58	Average	V				35.67	54.00	-18.33

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (11 Mbps)									
2 412.00	62.85	Peak	H	27.33	3.83		94.01	-	
	75.24	Peak	V				106.40	-	
4 824.00	35.74	Peak	H	31.63	6.55	26.10	47.83	74.00	-26.17
	23.14	Average	H				35.23	54.00	-18.77
	35.62	Peak	V				47.71	74.00	-26.29
	23.48	Average	V				35.57	54.00	-18.43

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (1 Mbps)									
2 437.00	59.52	Peak	H	27.40	3.83		90.75	-	
	66.79	Peak	V				98.02	-	
4 874.00	35.48	Peak	H	31.72	6.59	26.10	47.69	74.00	-26.31
	23.28	Average	H				35.49	54.00	-18.51
	35.47	Peak	V				47.68	74.00	-26.32
	23.69	Average	V				35.90	54.00	-18.10
Test Data for Middle Channel (2 Mbps)									
2 437.00	60.58	Peak	H	27.40	3.83		91.81	-	
	68.15	Peak	V				99.38	-	
4 874.00	35.84	Peak	H	31.72	6.59	26.10	48.05	74.00	-25.95
	23.78	Average	H				35.99	54.00	-18.01
	35.48	Peak	V				47.69	74.00	-26.31
	23.68	Average	V				35.89	54.00	-18.11

Tabulated test data for Restricted Band

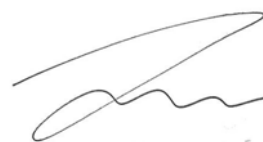
Test Data for Middle Channel (5.5 Mbps)									
2 437.00	61.48	Peak	H	27.40	3.83		92.71	-	
	70.39	Peak	V				101.62	-	
4 874.00	35.66	Peak	H	31.72	6.59	26.10	47.87	74.00	-26.13
	23.47	Average	H				35.68	54.00	-18.32
	35.28	Peak	V				47.49	74.00	-26.51
	23.44	Average	V				35.65	54.00	-18.35
Test Data for Middle Channel (11 Mbps)									
2 437.00	63.69	Peak	H	27.40	3.83		94.92	-	
	72.63	Peak	V				103.86	-	
4 874.00	35.18	Peak	H	31.72	6.59	26.10	47.39	74.00	-26.61
	23.39	Average	H				35.60	54.00	-18.40
	35.45	Peak	V				47.66	74.00	-26.34
	23.66	Average	V				35.87	54.00	-18.13

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (1 Mbps)									
2 462.00	60.25	Peak	H	27.48	3.83		91.56	-	
	68.35	Peak	V				99.66	-	
4 924.00	35.11	Peak	H	31.81	6.62	26.10	47.44	74.00	-26.56
	23.48	Average	H				35.81	54.00	-18.19
	35.68	Peak	V				48.01	74.00	-25.99
	23.47	Average	V				35.80	54.00	-18.20
Test Data for High Channel (2 Mbps)									
2 462.00	62.48	Peak	H	27.48	3.83		93.79	-	
	69.78	Peak	V				101.09	-	
4 924.00	35.69	Peak	H	31.81	6.62	26.10	48.02	74.00	-25.98
	23.48	Average	H				35.81	54.00	-18.19
	35.69	Peak	V				48.02	74.00	-25.98
	23.28	Average	V				35.61	54.00	-18.39

Test Data for High Channel (5.5 Mbps)									
2 462.00	63.74	Peak	H	27.48	3.83		95.05	-	
	70.35	Peak	V				101.66	-	
4 924.00	35.20	Peak	H	31.81	6.62	26.10	47.53	74.00	-26.47
	23.78	Average	H				36.11	54.00	-17.89
	35.28	Peak	V				47.61	74.00	-26.39
	23.17	Average	V				35.50	54.00	-18.50
Test Data for High Channel (11 Mbps)									
2 462.00	64.35	Peak	H	27.48	3.83		95.66	-	
	71.75	Peak	V				103.06	-	
4 924.00	35.69	Peak	H	31.81	6.62	26.10	48.02	74.00	-25.98
	23.89	Average	H				36.22	54.00	-17.78
	35.26	Peak	V				47.59	74.00	-26.41
	23.85	Average	V				36.18	54.00	-17.82

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

7.4 PEAK POWER SPECTRUL DENSITY

7.4.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

7.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth, and sweep time was set to span / 3 kHz. The sweep time was allowed to be longer than span / 3 kHz for a full response of the mixer in the spectrum analyzer.

The maximum level from the EUT in a 3 kHz bandwidth was measured with above condition.



7.4.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

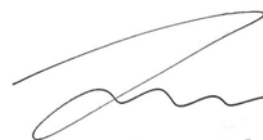
7.4.4 Test data

- Test Date : November 17, 2011

- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-15.33	8.00	-23.33
Middle	2 437	-16.33	8.00	-24.33
High	2 462	-16.83	8.00	-24.83

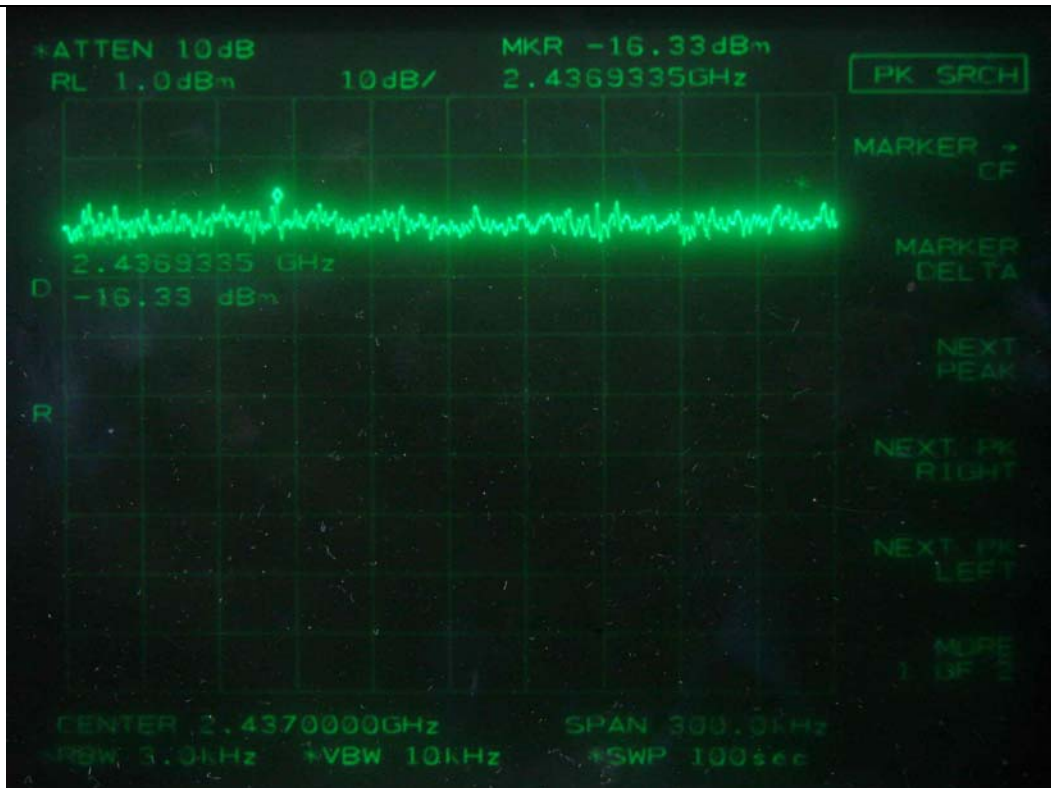
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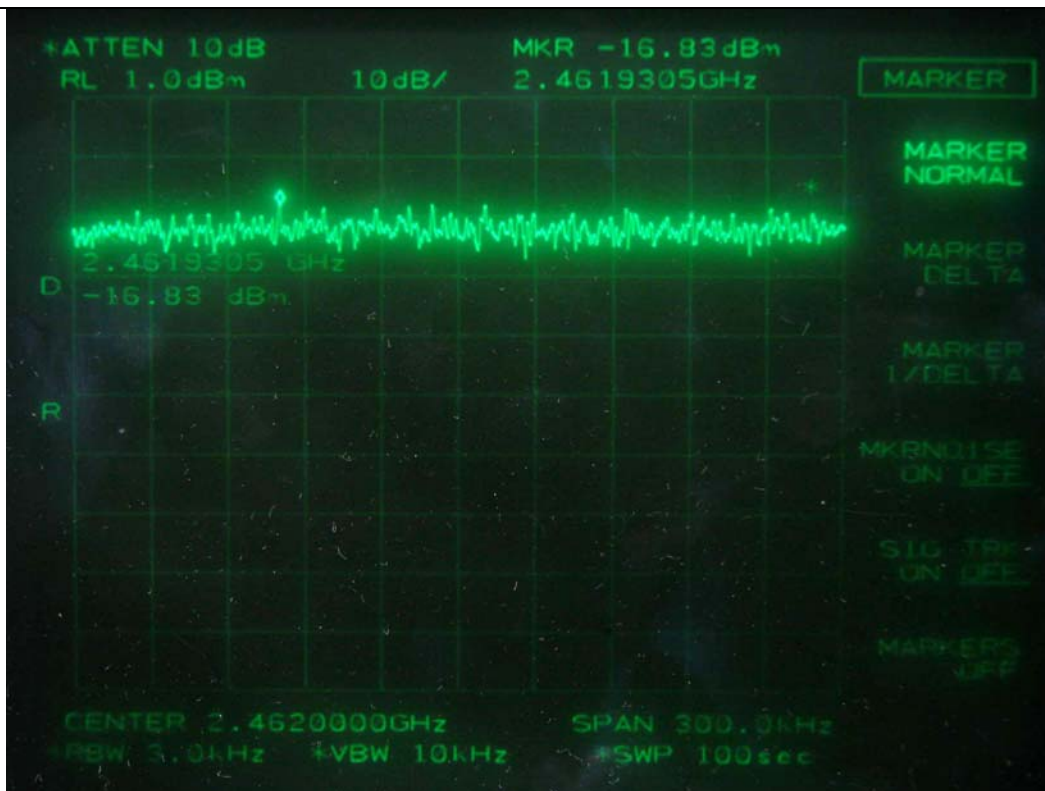
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

8. TEST DATA FOR 802.11g WLAN MODE

8.1 MINIMUM 6 dB BANDWIDTH

8.1.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

8.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



8.1.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

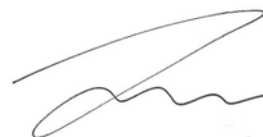
8.1.4 Test data

- Test Date : November 17, 2011

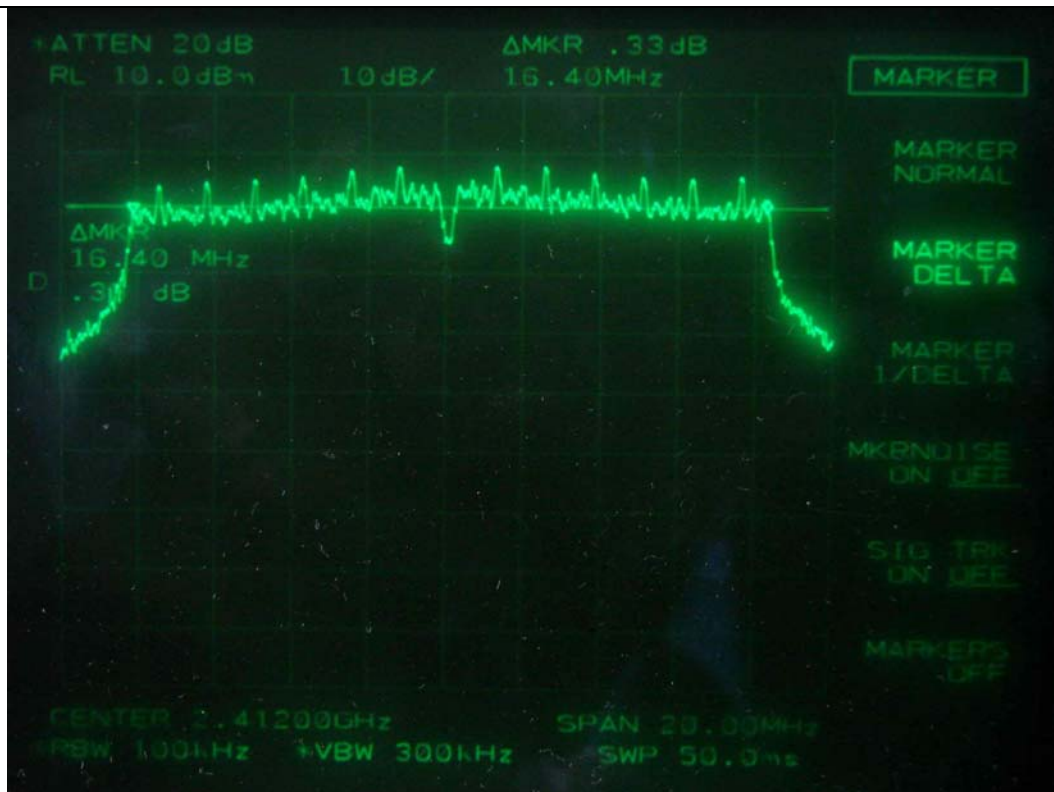
- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 412	16 400	500	-15 900
Middle	2 437	16 430	500	-15 930
High	2 462	16 430	500	-15 930

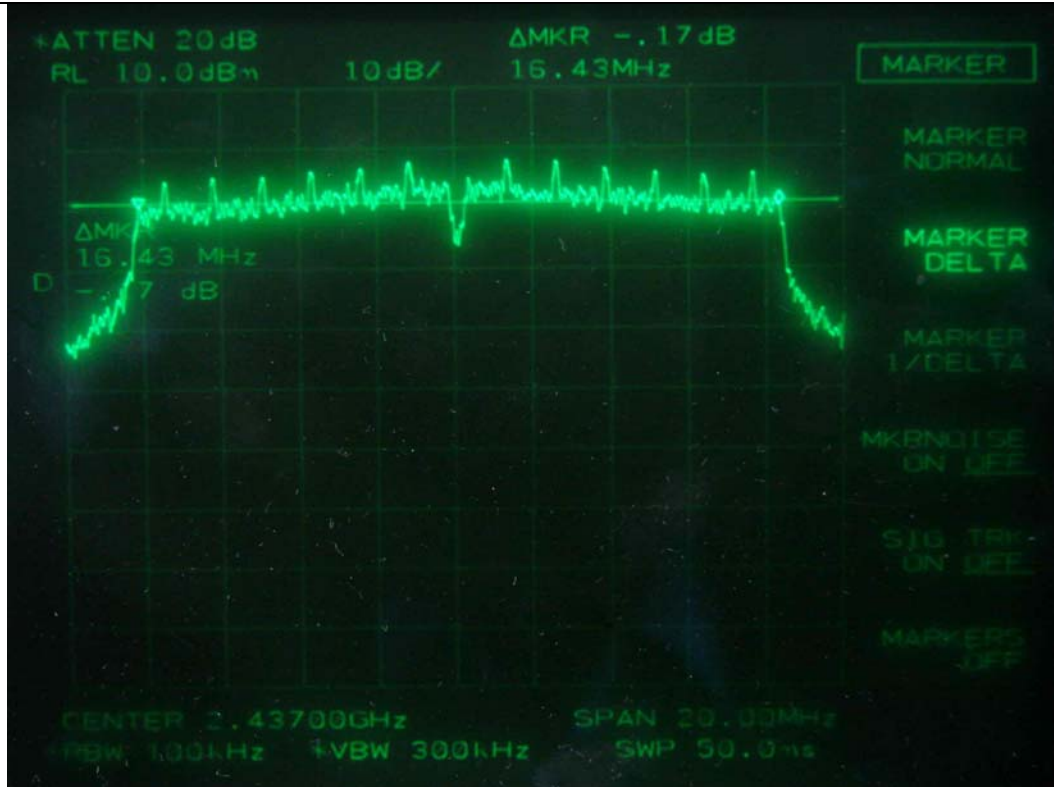
Remark: See next page for an overview sweep performed with peak detector.



Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

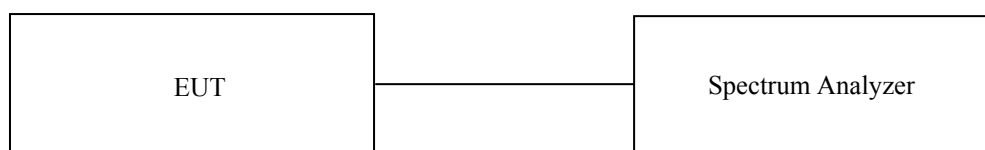
8.2 MAXIMUM PEAK OUTPUT POWER

8.2.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

8.2.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



8.2.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

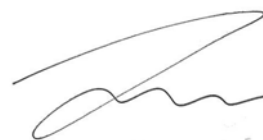
8.2.4 Test data

- Test Date : November 17, 2011

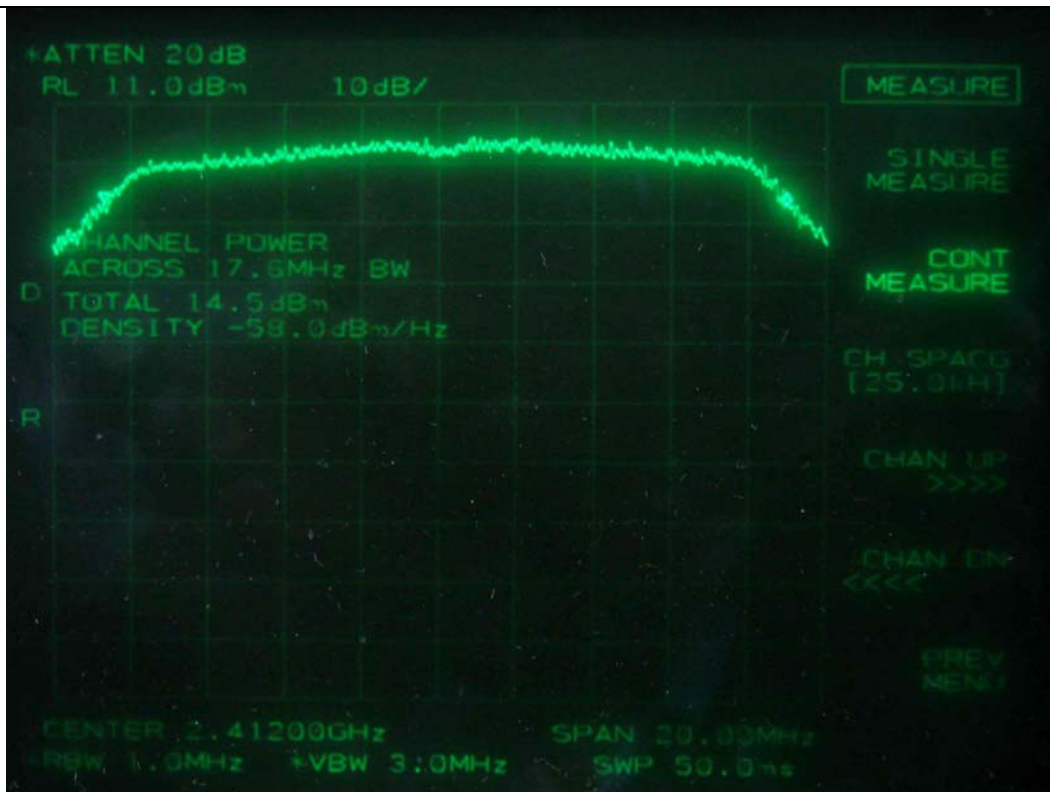
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99 % Occupied Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	17.60	14.50	30.00	-15.50
Middle	2 437	17.60	14.20	30.00	-15.80
High	2 462	17.60	13.00	30.00	-17.00

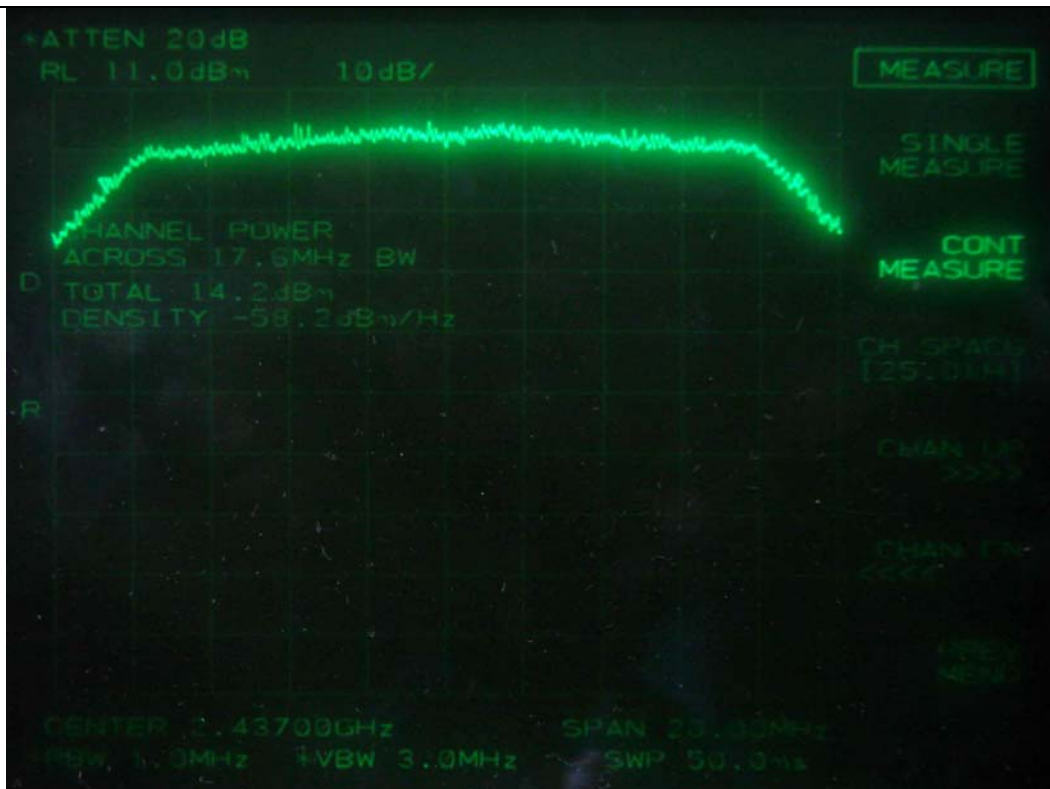
Remark: See next page for an overview sweep performed with peak detector.



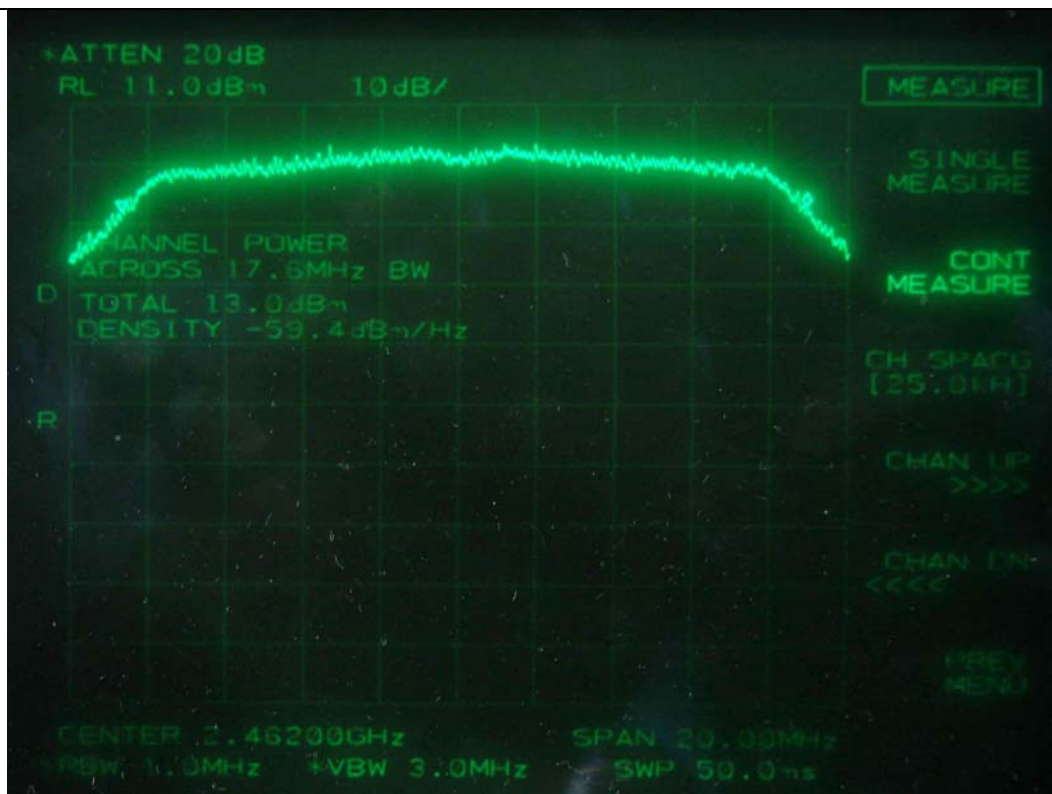
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

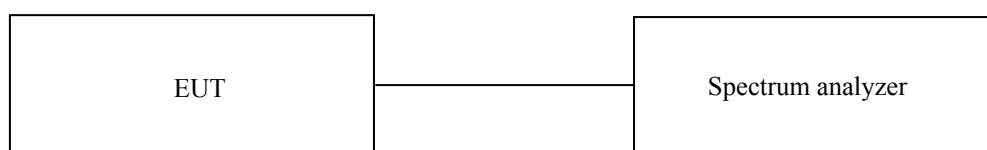
8.3 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

8.3.1 Operating environment

Temperature : 28 °C
Relative humidity : 45.7 % R.H.

8.3.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



8.3.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

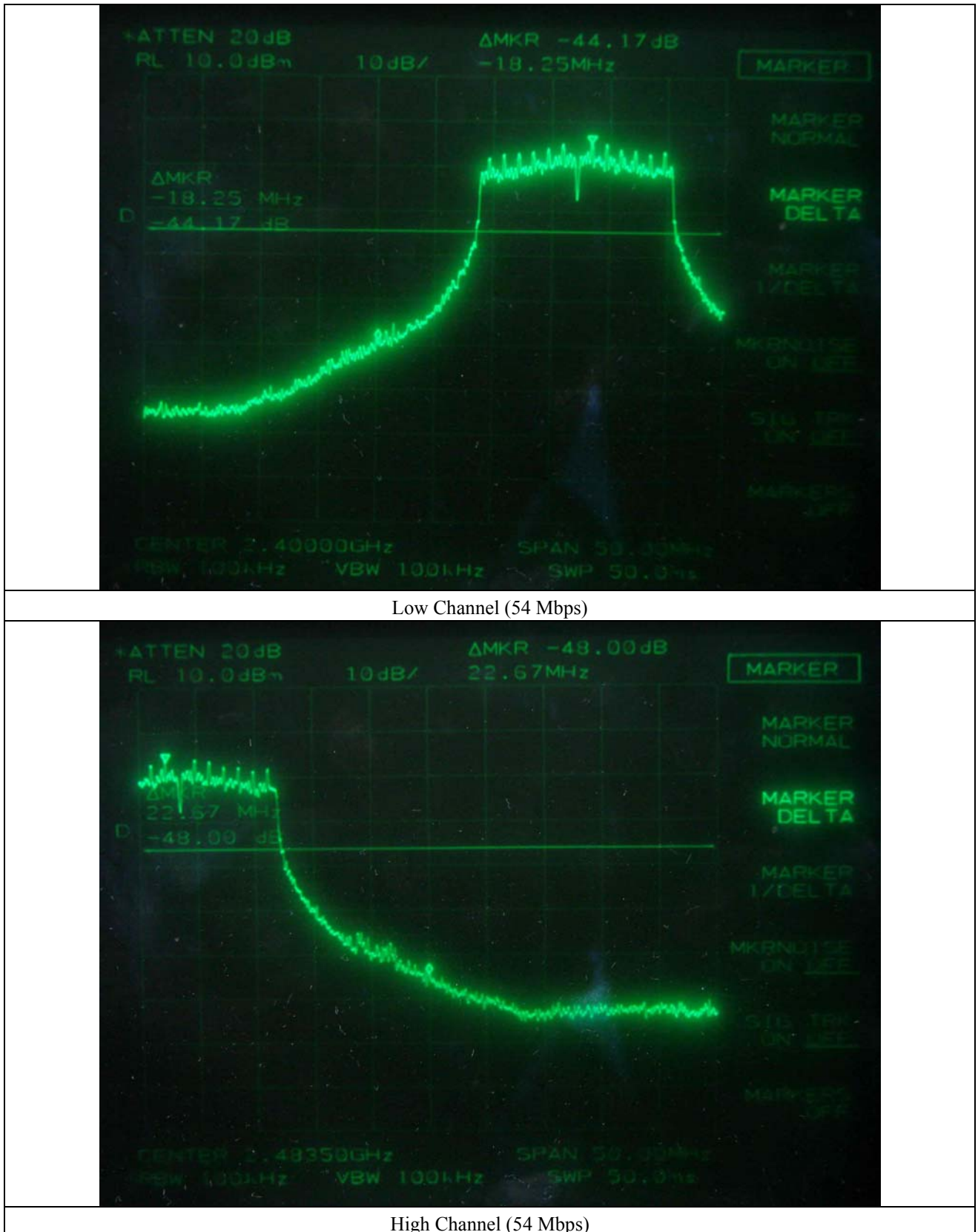
The frequency spectrum from 30 MHz to 25 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

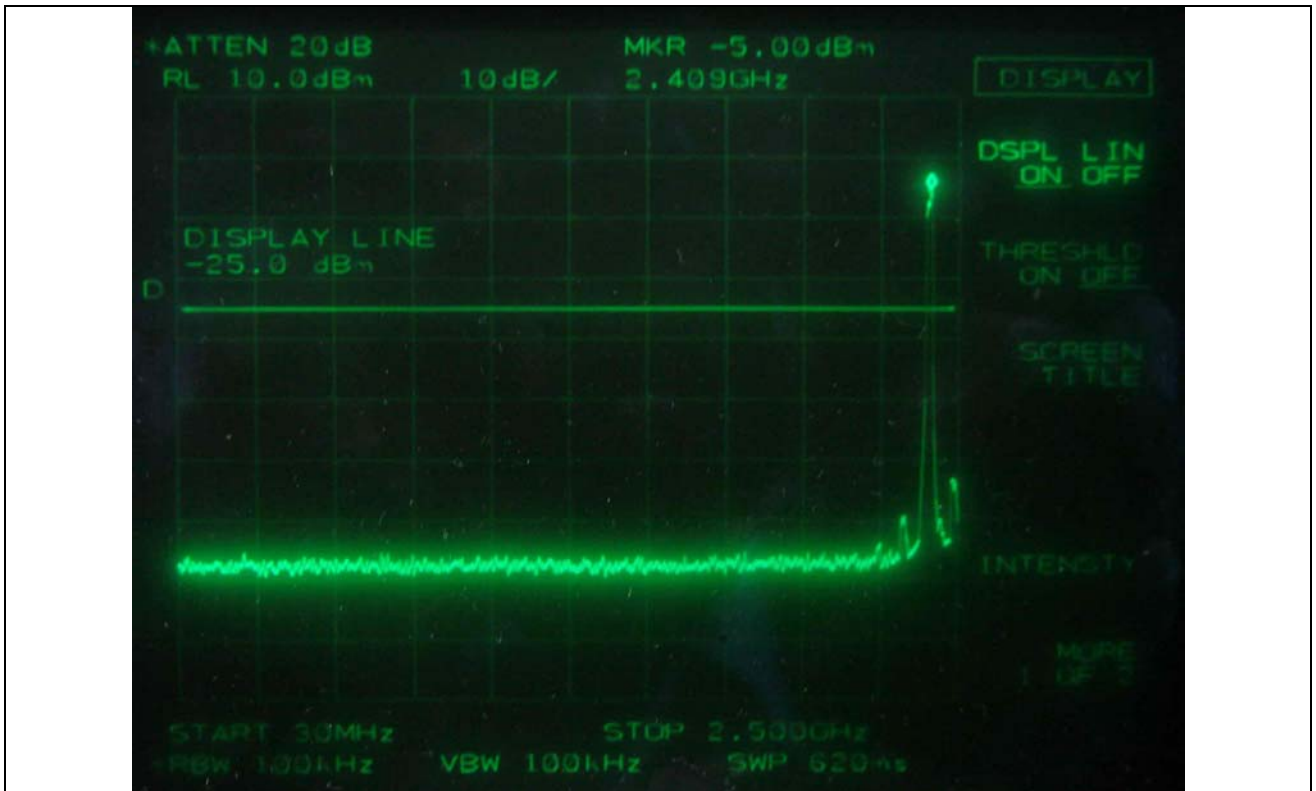
8.3.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)
■ -	8447D	Hewlett-Packard	Amplifier	2727A04987	Jun. 11, 2011(1Y)
■ -	83051A	Agilent	Preamplifier	3950M00201	Jun. 11, 2011(1Y)
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	Jul. 09, 2011(1Y)
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2011(2Y)
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.

8.3.5. Test data for conducted emission

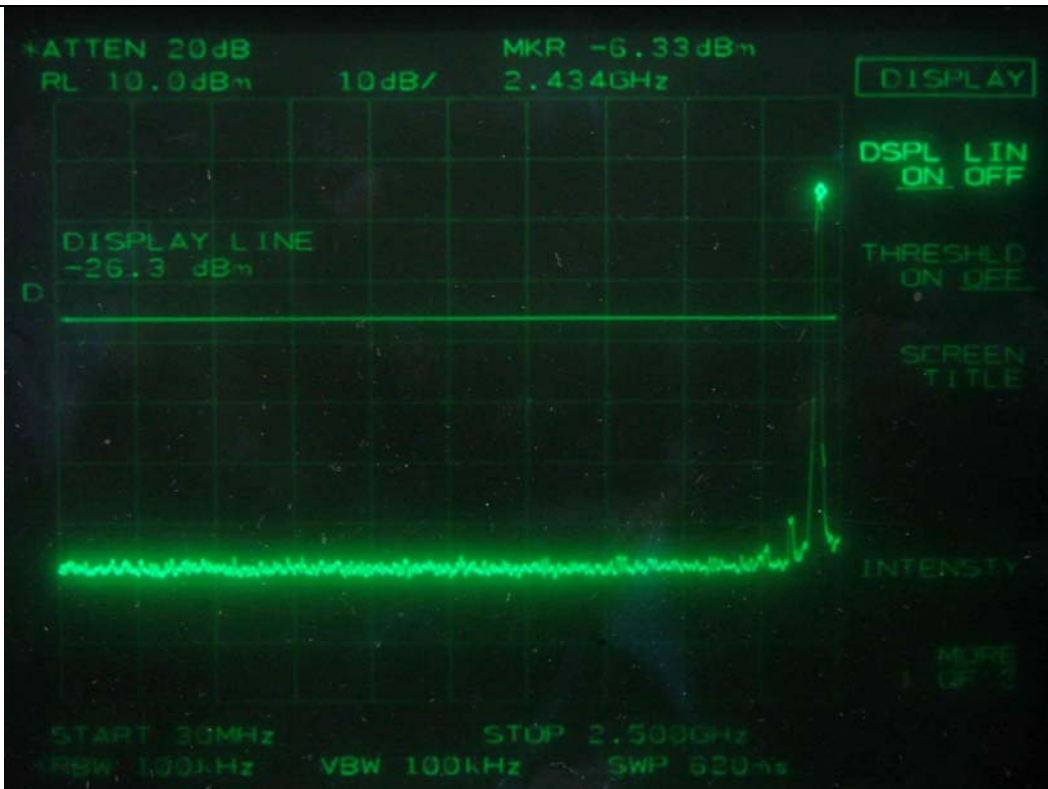




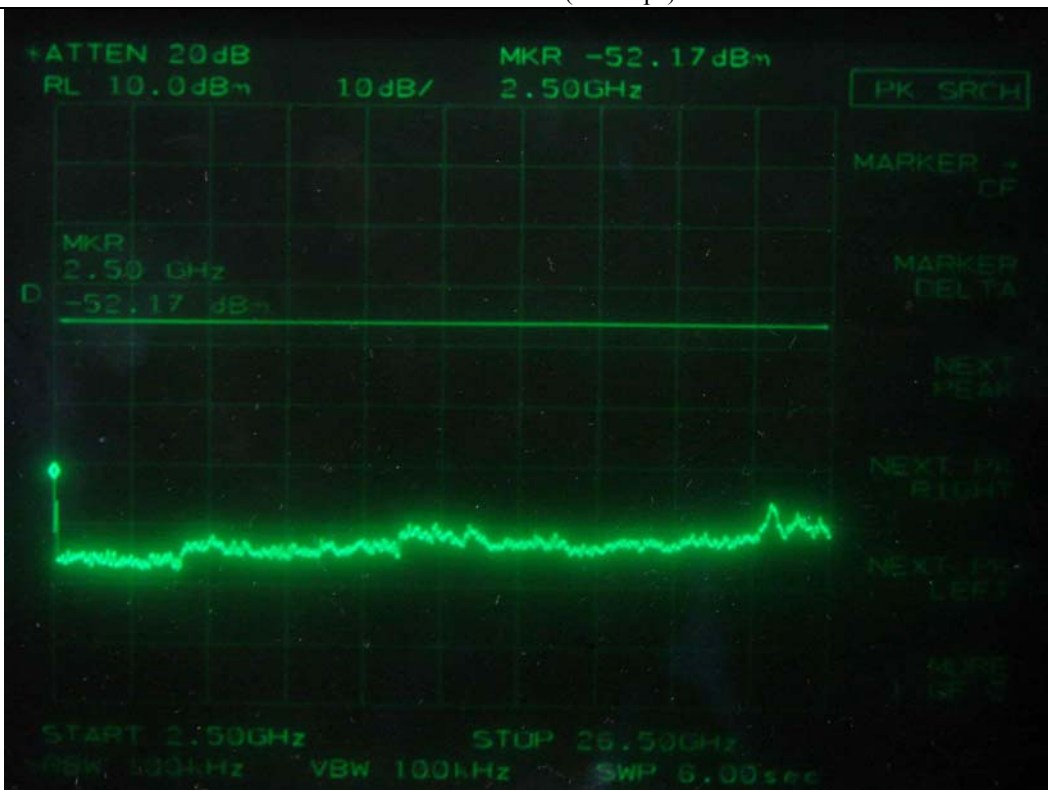
Low Channel (54 Mbps)



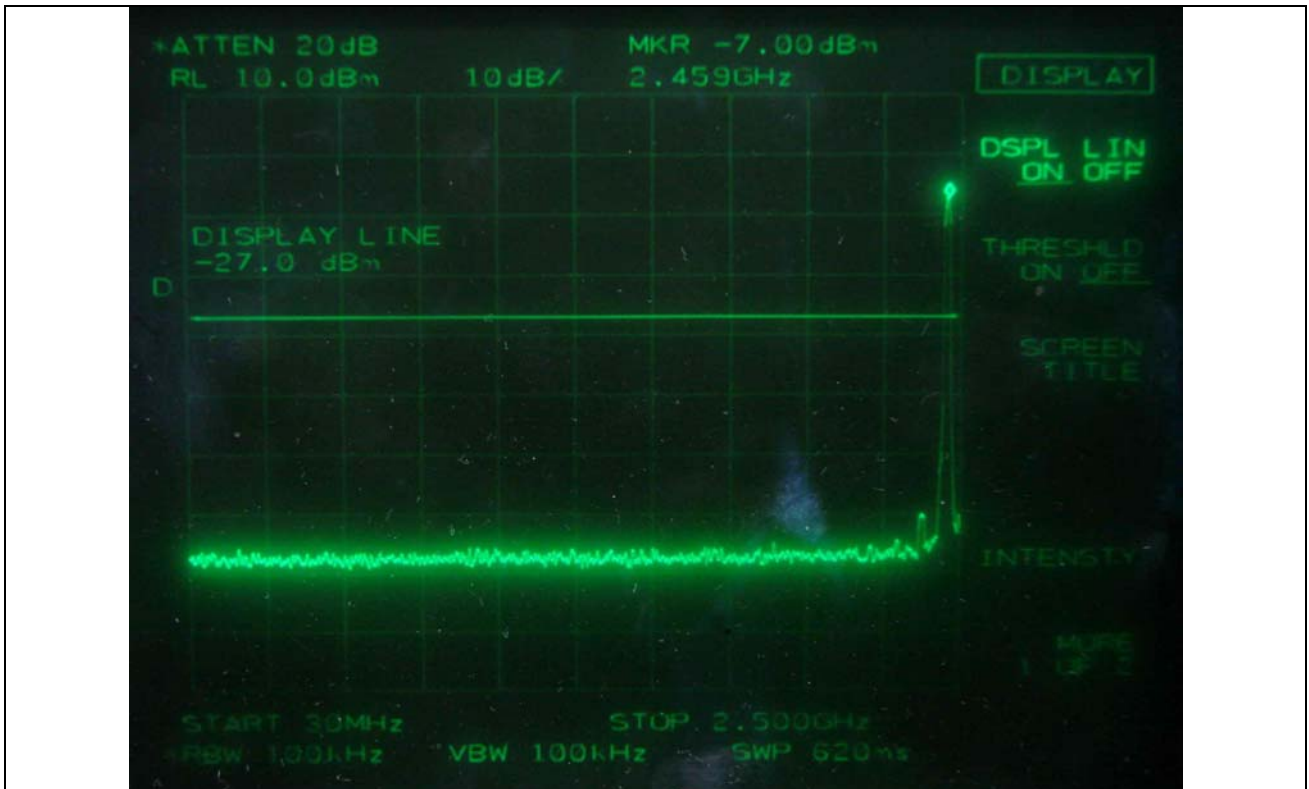
Low Channel (54 Mbps)



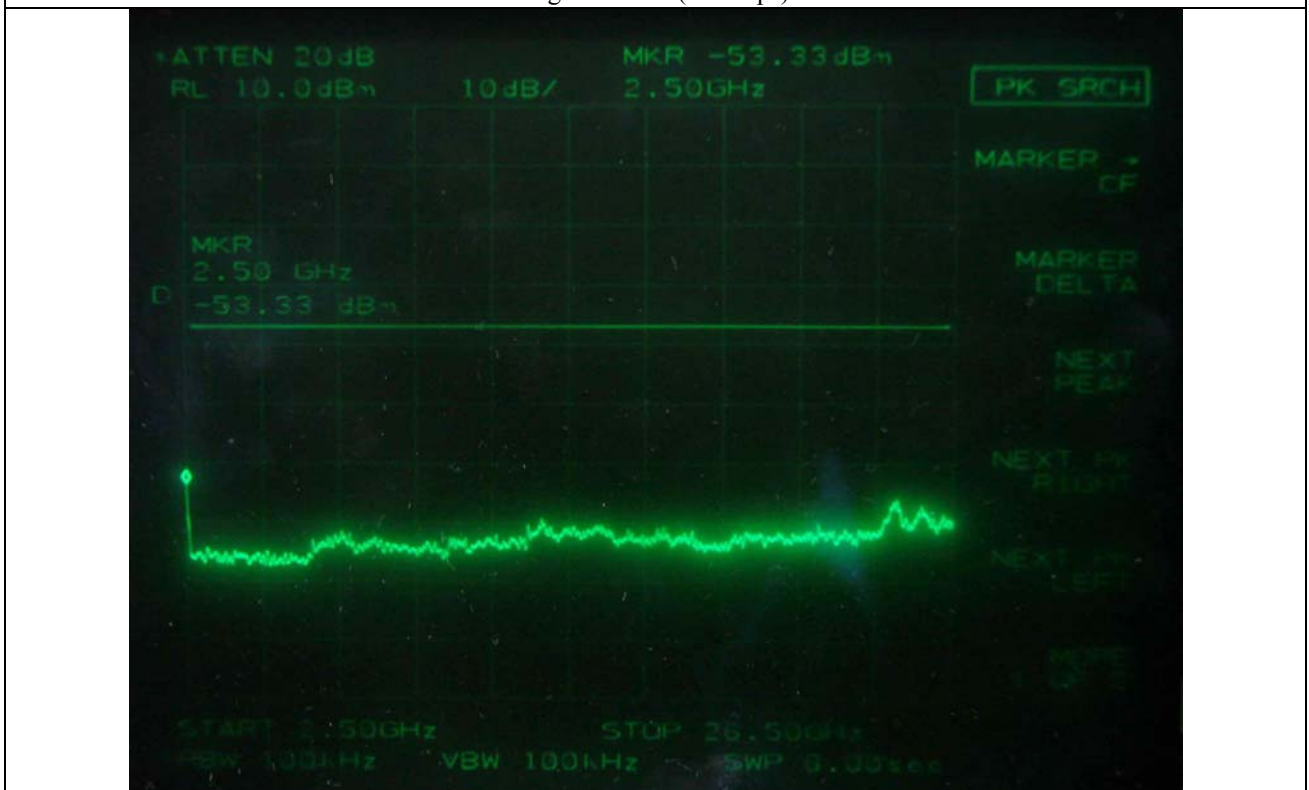
Middle Channel (54 Mbps)



Middle Channel (54 Mbps)



High Channel (54 Mbps)



High Channel (54 Mbps)

8.3.6. Test data for radiated emission (Enclosure type(with LCD))

8.3.6.1 Radiated Emission which fall in the Restricted Band

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Operating Condition : Low / High Channel
- Result : PASSED BY -36.46 dB at High Channel (36 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6 Mbps)									
2 390.00	27.48	Peak	H	26.66	3.13	28.98	28.29	74.00	-45.71
	15.11	Average	H				15.92	54.00	-38.08
	29.47	Peak	V				30.28	74.00	-43.72
	16.11	Average	V				16.92	54.00	-37.08
Test Data for Low Channel (18 Mbps)									
2 390.00	27.65	Peak	H	26.66	3.13	28.98	28.46	74.00	-45.54
	15.07	Average	H				15.88	54.00	-38.12
	29.58	Peak	V				30.39	74.00	-43.61
	16.13	Average	V				16.94	54.00	-37.06
Test Data for Low Channel (36 Mbps)									
2 390.00	27.73	Peak	H	26.66	3.13	28.98	28.54	74.00	-45.46
	15.17	Average	H				15.98	54.00	-38.02
	29.75	Peak	V				30.56	74.00	-43.44
	16.12	Average	V				16.93	54.00	-37.07
Test Data for Low Channel (54 Mbps)									
2 390.00	28.02	Peak	H	26.66	3.13	28.98	28.83	74.00	-45.17
	15.10	Average	H				15.91	54.00	-38.09
	29.61	Peak	V				30.42	74.00	-43.58
	16.17	Average	V				16.98	54.00	-37.02

Tabulated test data for Restricted Band

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6 Mbps)									
2 483.50	28.14	Peak	H	26.82	3.17	28.82	29.31	74.00	-44.69
	15.24	Average	H				16.41	54.00	-37.59
	29.10	Peak	V				30.27	74.00	-43.73
	16.18	Average	V				17.35	54.00	-36.65
Test Data for High Channel (18 Mbps)									
2 483.50	28.26	Peak	H	26.82	3.17	28.82	29.43	74.00	-44.57
	15.25	Average	H				16.42	54.00	-37.58
	29.11	Peak	V				30.28	74.00	-43.72
	16.24	Average	V				17.41	54.00	-36.59
Test Data for High Channel (36 Mbps)									
2 483.50	28.25	Peak	H	26.82	3.17	28.82	29.42	74.00	-44.58
	15.31	Average	H				16.48	54.00	-37.52
	29.15	Peak	V				30.32	74.00	-43.68
	16.37	Average	V				17.54	54.00	-36.46
Test Data for High Channel (54 Mbps)									
2 483.50	28.31	Peak	H	26.82	3.17	28.82	29.48	74.00	-44.52
	15.41	Average	H				16.58	54.00	-37.42
	29.18	Peak	V				30.35	74.00	-43.65
	16.24	Average	V				17.41	54.00	-36.59

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

8.3.6.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -17.96 dB at middle channel(6 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6 Mbps)									
2 412.00	64.94	Peak	H	27.33	3.83	-	96.10	-	
	73.09	Peak	V				104.25	-	
4 824.00	35.83	Peak	H	31.63	6.55	26.10	47.92	74.00	-26.08
	23.67	Average	H				35.76	54.00	-18.24
	38.50	Peak	V				50.59	74.00	-23.41
	23.67	Average	V				35.76	54.00	-18.24
Test Data for Low Channel (18 Mbps)									
2 412.00	64.32	Peak	H	27.33	3.83	-	95.48	-	
	73.44	Peak	V				104.60	-	
4 824.00	38.83	Peak	H	31.63	6.55	26.10	50.92	74.00	-23.08
	23.17	Average	H				35.26	54.00	-18.74
	35.67	Peak	V				47.76	74.00	-26.24
	23.48	Average	V				35.57	54.00	-18.43
Test Data for Low Channel (36 Mbps)									
2 412.00	64.75	Peak	H	27.33	3.83	-	95.91	-	
	73.62	Peak	V				104.78	-	
4 824.00	35.50	Peak	H	31.63	6.55	26.10	47.59	74.00	-26.41
	23.50	Average	H				35.59	54.00	-18.41
	35.33	Peak	V				47.42	74.00	-26.58
	23.17	Average	V				35.26	54.00	-18.74

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (54 Mbps)									
2 412.00	64.59	Peak	H	27.33	3.83	-	95.75	-	
	74.14	Peak	V				105.30	-	
4 824.00	35.33	Peak	H	31.63	6.55	26.10	47.42	74.00	-26.58
	23.17	Average	H				35.26	54.00	-18.74
	35.50	Peak	V				47.59	74.00	-26.41
	23.33	Average	V				35.42	54.00	-18.58

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (6 Mbps)									
2 437.00	64.45	Peak	H	27.40	3.83	-	95.68	-	
	71.27	Peak	V				102.50	-	
4 874.00	35.67	Peak	H	31.72	6.59	26.10	47.88	74.00	-26.12
	23.67	Average	H				35.88	54.00	-18.12
	35.50	Peak	V				47.71	74.00	-26.29
	23.83	Average	V				36.04	54.00	-17.96
Test Data for Middle Channel (18 Mbps)									
2 437.00	65.38	Peak	H	27.40	3.83	-	96.61	-	
	71.35	Peak	V				102.58	-	
4 874.00	35.83	Peak	H	31.72	6.59	26.10	48.04	74.00	-25.96
	23.50	Average	H				35.71	54.00	-18.29
	35.67	Peak	V				47.88	74.00	-26.12
	23.67	Average	V				35.88	54.00	-18.12

Tabulated test data for Restricted Band

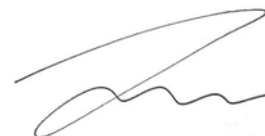
Test Data for Middle Channel (36 Mbps)									
2 437.00	65.80	Peak	H	27.40	3.83	-	97.03	-	
	71.57	Peak	V				102.80	-	
4 874.00	35.33	Peak	H	31.72	6.59	26.10	47.54	74.00	-26.46
	23.17	Average	H				35.38	54.00	-18.62
	35.67	Peak	V				47.88	74.00	-26.12
	23.33	Average	V				35.54	54.00	-18.46
Test Data for Middle Channel (54 Mbps)									
2 437.00	67.43	Peak	H	27.40	3.83	-	98.66	-	
	71.57	Peak	V				102.80	-	
4 874.00	35.67	Peak	H	31.72	6.59	26.10	47.88	74.00	-26.12
	23.50	Average	H				35.71	54.00	-18.29
	35.33	Peak	V				47.54	74.00	-26.46
	23.35	Average	V				35.56	54.00	-18.44

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6 Mbps)									
2 462.00	63.36	Peak	H	27.48	3.83	-	94.67	-	
	72.23	Peak	V				103.54	-	
4 924.00	35.67	Peak	H	31.81	6.62	26.10	48.00	74.00	-26.00
	23.67	Average	H				36.00	54.00	-18.00
	35.50	Peak	V				47.83	74.00	-26.17
	23.50	Average	V				35.83	54.00	-18.17
Test Data for High Channel (18 Mbps)									
2 462.00	63.76	Peak	H	27.48	3.83	-	95.07	-	
	72.45	Peak	V				103.76	-	
4 924.00	35.83	Peak	H	31.81	6.62	26.10	48.16	74.00	-25.84
	23.67	Average	H				36.00	54.00	-18.00
	35.50	Peak	V				47.83	74.00	-26.17
	23.67	Average	V				36.00	54.00	-18.00

Test Data for High Channel (36 Mbps)									
2 462.00	64.25	Peak	H	27.48	3.83	-	95.56	-	
	72.58	Peak	V				103.89	-	
4 924.00	35.92	Peak	H	31.81	6.62	26.10	48.25	74.00	-25.75
	23.00	Average	H				35.33	54.00	-18.67
	35.67	Peak	V				48.00	74.00	-26.00
	23.50	Average	V				35.83	54.00	-18.17
Test Data for High Channel (54 Mbps)									
2 462.00	65.24	Peak	H	27.48	3.83	-	96.55	-	
	72.64	Peak	V				103.95	-	
4 924.00	35.92	Peak	H	31.81	6.62	26.10	48.25	74.00	-25.75
	23.50	Average	H				35.83	54.00	-18.17
	35.67	Peak	V				48.00	74.00	-26.00
	23.67	Average	V				36.00	54.00	-18.00

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

8.3.7. Test data for radiated emission (PCB type(without LCD))

8.3.7.1 Radiated Emission which fall in the Restricted Band

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Operating Condition : Low / High Channel
- Result : PASSED BY -36.09 dB at High Channel (36 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6 Mbps)									
2 390.00	28.01	Peak	H	26.66	3.13	28.98	28.82	74.00	-45.18
	15.04	Average	H				15.85	54.00	-38.15
	29.04	Peak	V				29.85	74.00	-44.15
	16.02	Average	V				16.83	54.00	-37.17
Test Data for Low Channel (18 Mbps)									
2 390.00	28.16	Peak	H	26.66	3.13	28.98	28.97	74.00	-45.03
	15.14	Average	H				15.95	54.00	-38.05
	29.07	Peak	V				29.88	74.00	-44.12
	16.09	Average	V				16.90	54.00	-37.10
Test Data for Low Channel (36 Mbps)									
2 390.00	28.11	Peak	H	26.66	3.13	28.98	28.92	74.00	-45.08
	15.03	Average	H				15.84	54.00	-38.16
	29.08	Peak	V				29.89	74.00	-44.11
	16.15	Average	V				16.96	54.00	-37.04
Test Data for Low Channel (54 Mbps)									
2 390.00	28.07	Peak	H	26.66	3.13	28.98	28.88	74.00	-45.12
	15.11	Average	H				15.92	54.00	-38.08
	29.08	Peak	V				29.89	74.00	-44.11
	16.19	Average	V				17.00	54.00	-37.00

Tabulated test data for Restricted Band

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6 Mbps)									
2 483.50	29.58	Peak	H	26.82	3.17	28.82	30.75	74.00	-43.25
	15.42	Average	H				16.59	54.00	-37.41
	29.63	Peak	V				30.80	74.00	-43.20
	16.23	Average	V				17.40	54.00	-36.60
Test Data for High Channel (18 Mbps)									
2 483.50	29.67	Peak	H	26.82	3.17	28.82	30.84	74.00	-43.16
	15.16	Average	H				16.33	54.00	-37.67
	29.56	Peak	V				30.73	74.00	-43.27
	16.42	Average	V				17.59	54.00	-36.41
Test Data for High Channel (36 Mbps)									
2 483.50	29.62	Peak	H	26.82	3.17	28.82	30.79	74.00	-43.21
	15.21	Average	H				16.38	54.00	-37.62
	29.63	Peak	V				30.80	74.00	-43.20
	16.74	Average	V				17.91	54.00	-36.09
Test Data for High Channel (54 Mbps)									
2 483.50	29.65	Peak	H	26.82	3.17	28.82	30.82	74.00	-43.18
	15.39	Average	H				16.56	54.00	-37.44
	29.65	Peak	V				30.82	74.00	-43.18
	16.29	Average	V				17.46	54.00	-36.54

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

8.3.7.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -17.83 dB at high channel(6 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6 Mbps)									
2 412.00	64.82	Peak	H	27.33	3.83	-	95.98	-	
	73.16	Peak	V				104.32	-	
4 824.00	35.68	Peak	H	31.63	6.55	26.10	47.77	74.00	-26.23
	23.44	Average	H				35.53	54.00	-18.47
	35.39	Peak	V				47.48	74.00	-26.52
	23.07	Average	V				35.16	54.00	-18.84
Test Data for Low Channel (18 Mbps)									
2 412.00	64.85	Peak	H	27.33	3.83	-	96.01	-	
	73.42	Peak	V				104.58	-	
4 824.00	35.41	Peak	H	31.63	6.55	26.10	47.50	74.00	-26.50
	23.17	Average	H				35.26	54.00	-18.74
	35.39	Peak	V				47.48	74.00	-26.52
	23.47	Average	V				35.56	54.00	-18.44
Test Data for Low Channel (36 Mbps)									
2 412.00	64.52	Peak	H	27.33	3.83	-	95.68	-	
	43.68	Peak	V				74.84	-	
4 824.00	35.48	Peak	H	31.63	6.55	26.10	47.57	74.00	-26.43
	23.68	Average	H				35.77	54.00	-18.23
	35.68	Peak	V				47.77	74.00	-26.23
	23.85	Average	V				35.94	54.00	-18.06

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (54 Mbps)									
2 412.00	64.67	Peak	H	27.33	3.83	-	95.83	-	
	74.25	Peak	V				105.41	-	
4 824.00	35.84	Peak	H	31.63	6.55	26.10	47.93	74.00	-26.07
	23.62	Average	H				35.71	54.00	-18.29
	35.74	Peak	V				47.83	74.00	-26.17
	23.17	Average	V				35.26	54.00	-18.74

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (6 Mbps)									
2 437.00	64.49	Peak	H	27.40	3.83	-	95.72	-	
	71.34	Peak	V				102.57	-	
4 874.00	35.47	Peak	H	31.72	6.59	26.10	47.68	74.00	-26.32
	23.14	Average	H				35.35	54.00	-18.65
	35.98	Peak	V				48.19	74.00	-25.81
	23.44	Average	V				35.65	54.00	-18.35
Test Data for Middle Channel (18 Mbps)									
2 437.00	65.25	Peak	H	27.40	3.83	-	96.48	-	
	71.48	Peak	V				102.71	-	
4 874.00	35.62	Peak	H	31.72	6.59	26.10	47.83	74.00	-26.17
	23.44	Average	H				35.65	54.00	-18.35
	35.68	Peak	V				47.89	74.00	-26.11
	23.71	Average	V				35.92	54.00	-18.08

Tabulated test data for Restricted Band

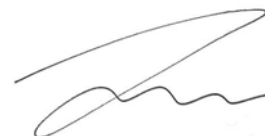
Test Data for Middle Channel (36 Mbps)									
2 437.00	65.82	Peak	H	27.40	3.83	-	97.05	-	
	71.82	Peak	V				103.05	-	
4 874.00	35.68	Peak	H	31.72	6.59	26.10	47.89	74.00	-26.11
	23.47	Average	H				35.68	54.00	-18.32
	35.08	Peak	V				47.29	74.00	-26.71
	23.84	Average	V				36.05	54.00	-17.95
Test Data for Middle Channel (54 Mbps)									
2 437.00	67.53	Peak	H	27.40	3.83	-	98.76	-	
	71.62	Peak	V				102.85	-	
4 874.00	35.62	Peak	H	31.72	6.59	26.10	47.83	74.00	-26.17
	23.47	Average	H				35.68	54.00	-18.32
	35.48	Peak	V				47.69	74.00	-26.31
	23.20	Average	V				35.41	54.00	-18.59

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6 Mbps)									
2 462.00	63.42	Peak	H	27.48	3.83	-	94.73	-	
	72.35	Peak	V				103.66	-	
4 924.00	35.62	Peak	H	31.81	6.62	26.10	47.95	74.00	-26.05
	23.48	Average	H				35.81	54.00	-18.19
	35.22	Peak	V				47.55	74.00	-26.45
	23.84	Average	V				36.17	54.00	-17.83
Test Data for High Channel (18 Mbps)									
2 462.00	63.72	Peak	H	27.48	3.83	-	95.03	-	
	72.73	Peak	V				104.04	-	
4 924.00	35.62	Peak	H	31.81	6.62	26.10	47.95	74.00	-26.05
	23.75	Average	H				36.08	54.00	-17.92
	35.20	Peak	V				47.53	74.00	-26.47
	23.15	Average	V				35.48	54.00	-18.52

Test Data for High Channel (36 Mbps)									
2 462.00	64.28	Peak	H	27.48	3.83	-	95.59	-	
	72.38	Peak	V				103.69	-	
4 924.00	35.77	Peak	H	31.81	6.62	26.10	48.10	74.00	-25.90
	23.40	Average	H				35.73	54.00	-18.27
	35.47	Peak	V				47.80	74.00	-26.20
	23.15	Average	V				35.48	54.00	-18.52
Test Data for High Channel (54 Mbps)									
2 462.00	65.62	Peak	H	27.48	3.83	-	96.93	-	
	72.58	Peak	V				103.89	-	
4 924.00	35.26	Peak	H	31.81	6.62	26.10	47.59	74.00	-26.41
	23.18	Average	H				35.51	54.00	-18.49
	35.24	Peak	V				47.57	74.00	-26.43
	23.58	Average	V				35.91	54.00	-18.09

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

8.4 PEAK POWER SPECTRUL DENSITY

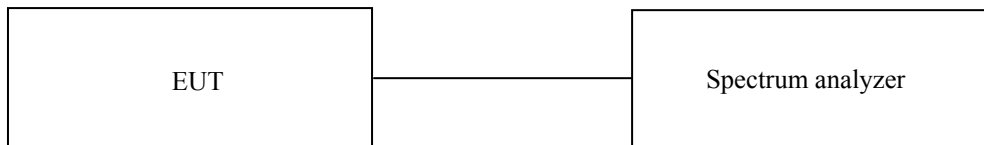
8.4.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

8.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth, and sweep time was set to span / 3 kHz. The sweep time was allowed to be longer than span / 3 kHz for a full response of the mixer in the spectrum analyzer.

The maximum level from the EUT in a 3 kHz bandwidth was measured with above condition.



8.4.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

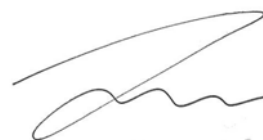
8.4.4 Test data

- Test Date : November 17, 2011

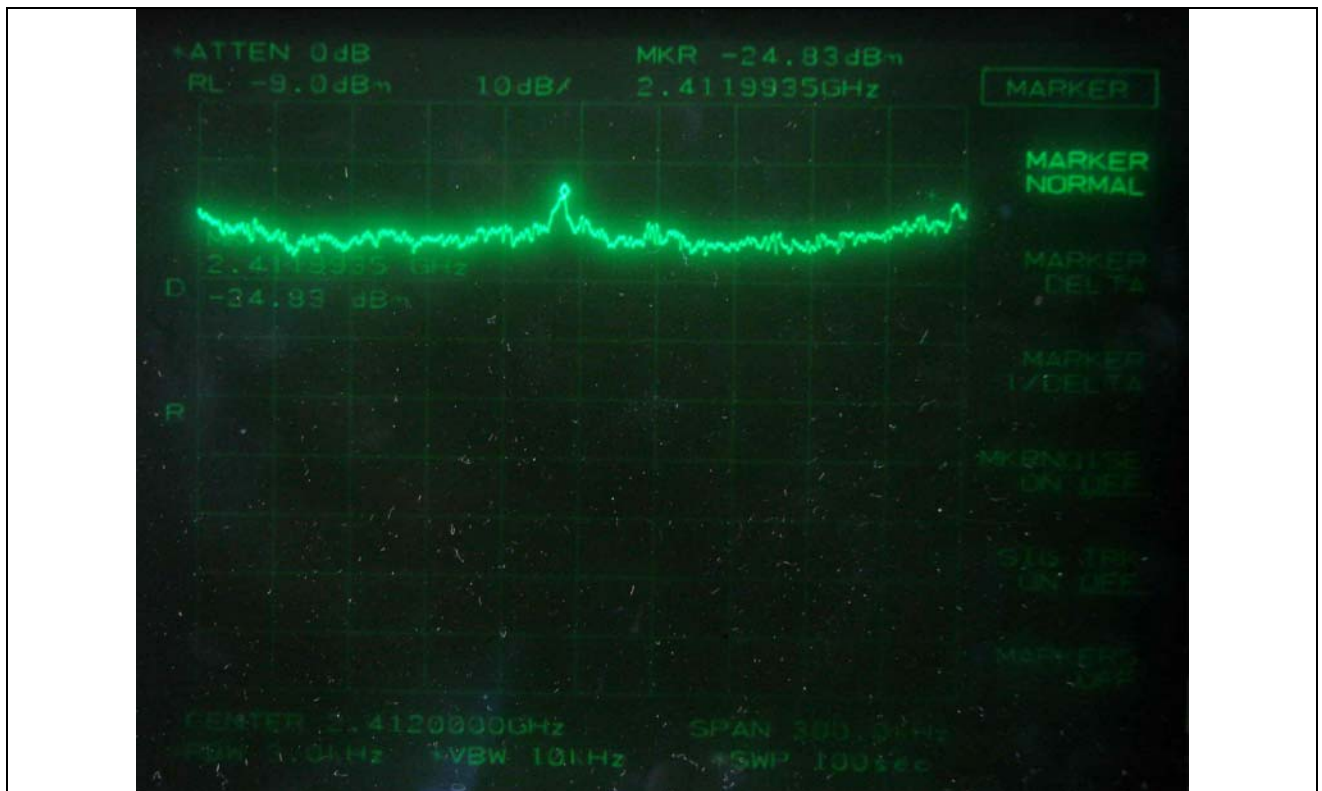
- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-24.83	8.00	-32.83
Middle	2 437	-27.00	8.00	-35.00
High	2 462	-26.67	8.00	-34.67

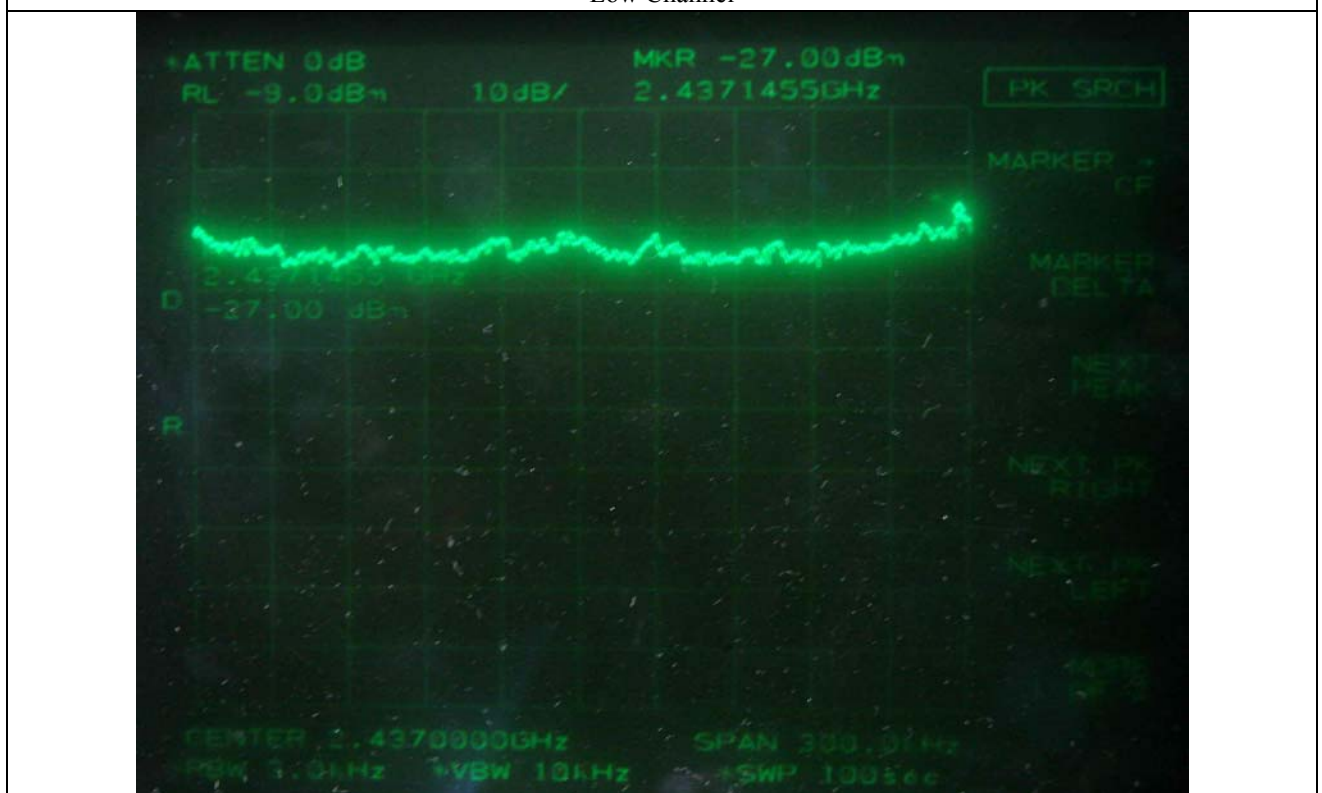
Remark: See next page for measurement data.



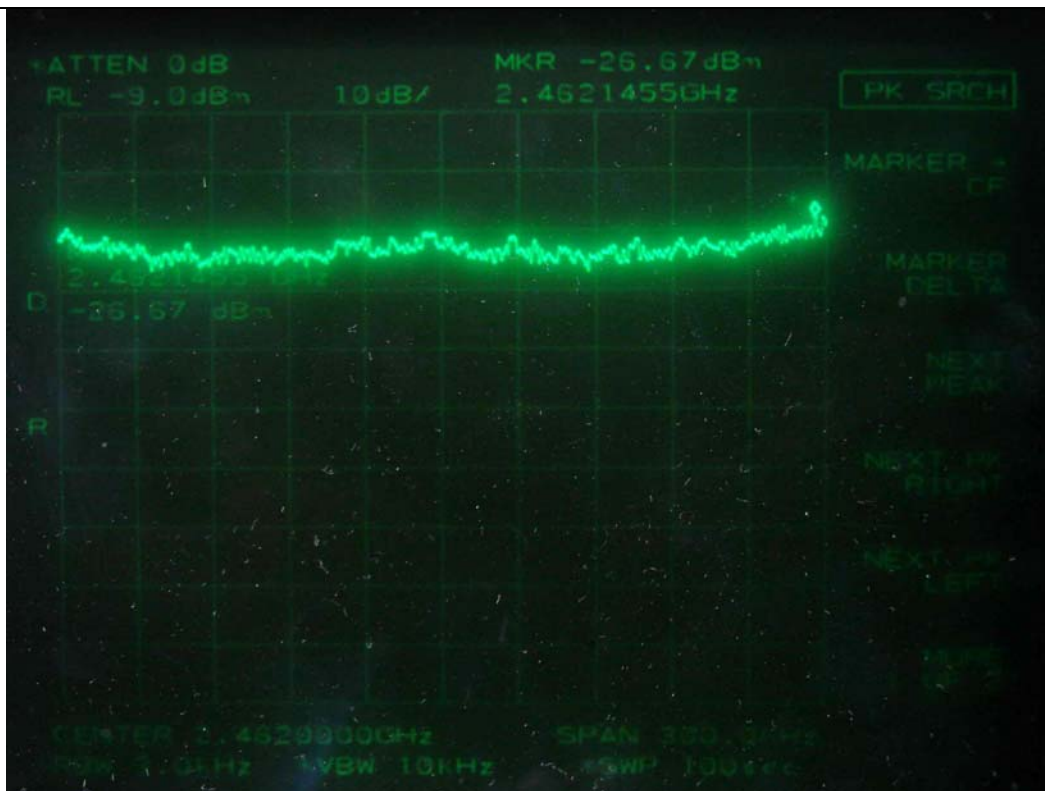
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

9. TEST DATA FOR 802.11n WLAN MODE

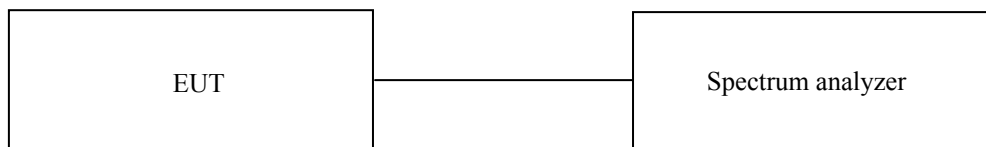
9.1 MINIMUM 6 dB BANDWIDTH

9.1.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

9.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



9.1.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

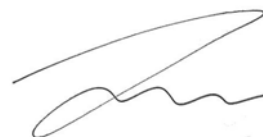
9.1.4 Test data

- Test Date : November 17, 2011

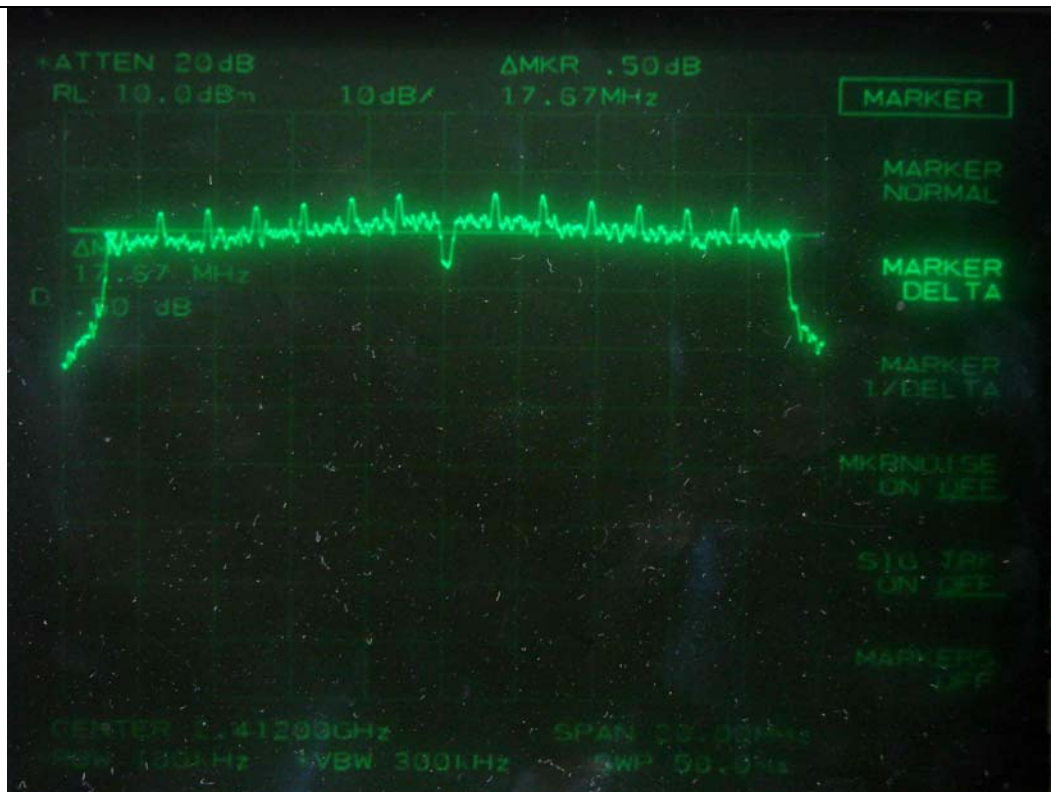
- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 412	17 670	500	-17 170
Middle	2 437	17 670	500	-17 170
High	2 462	17 600	500	-17 100

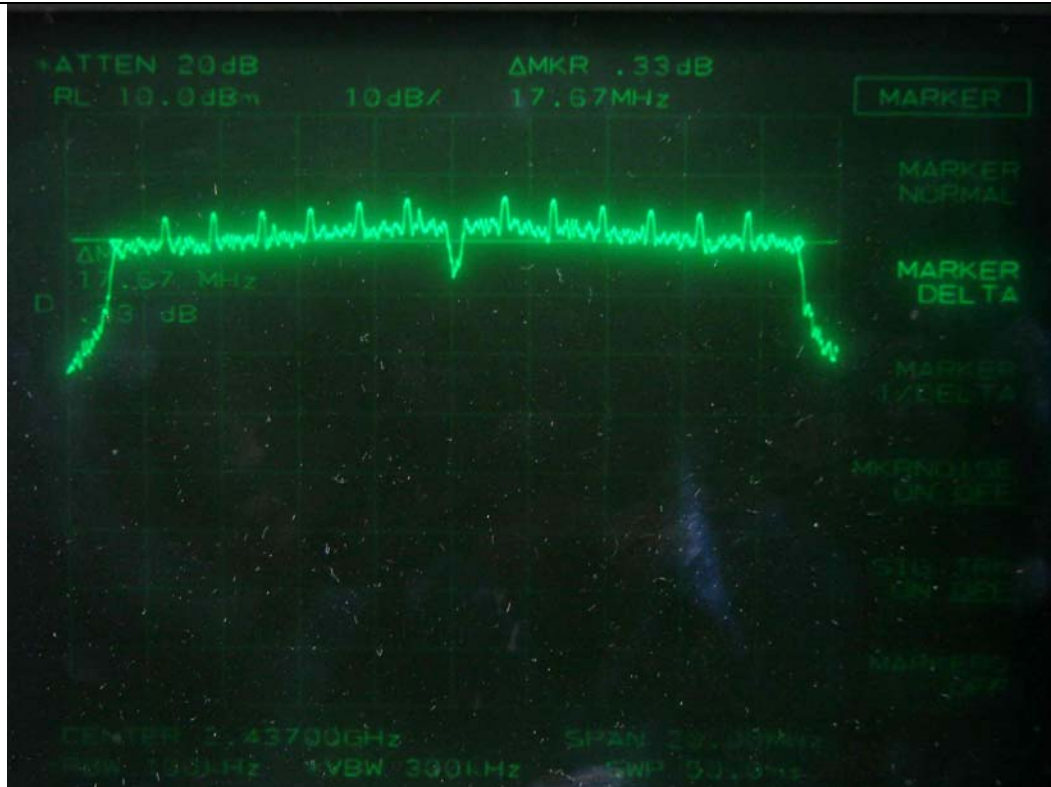
Remark: See next page for an overview sweep performed with peak detector.



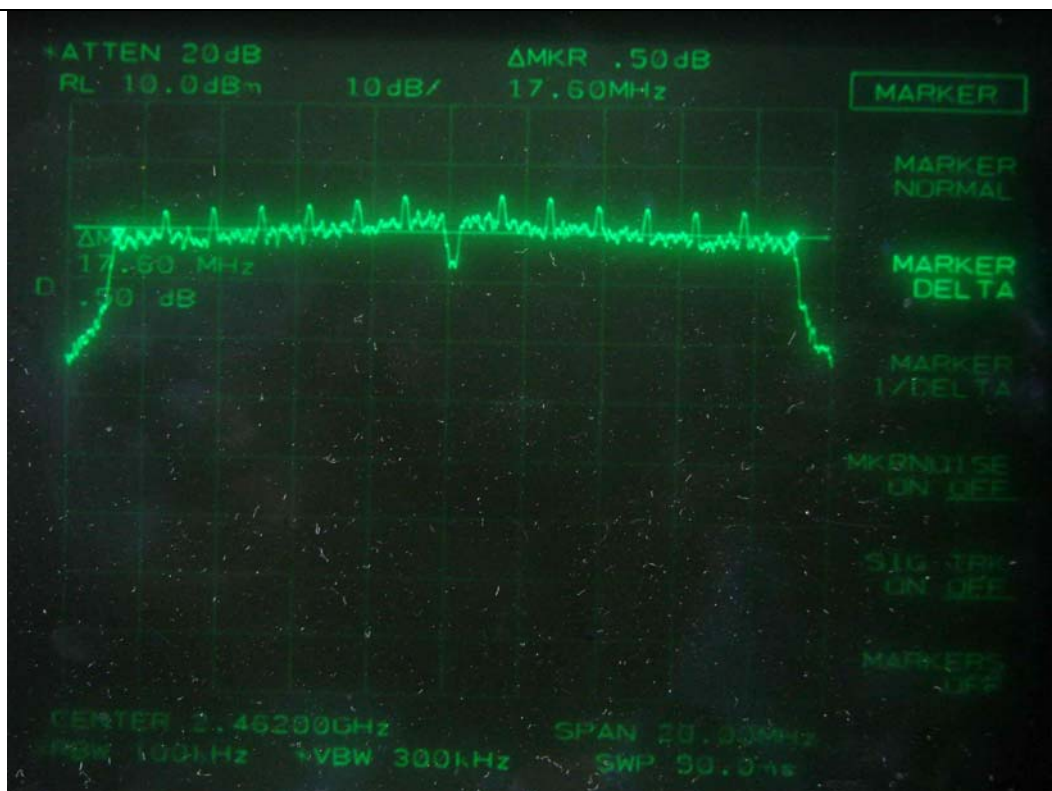
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

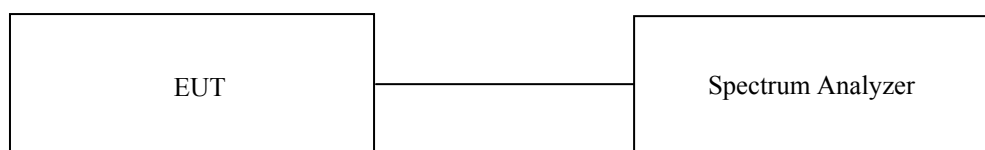
9.2 MAXIMUM PEAK OUTPUT POWER

9.2.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

9.2.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.



9.2.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

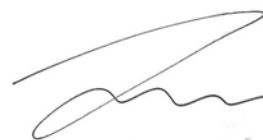
9.2.4 Test data

- Test Date : November 17, 2011

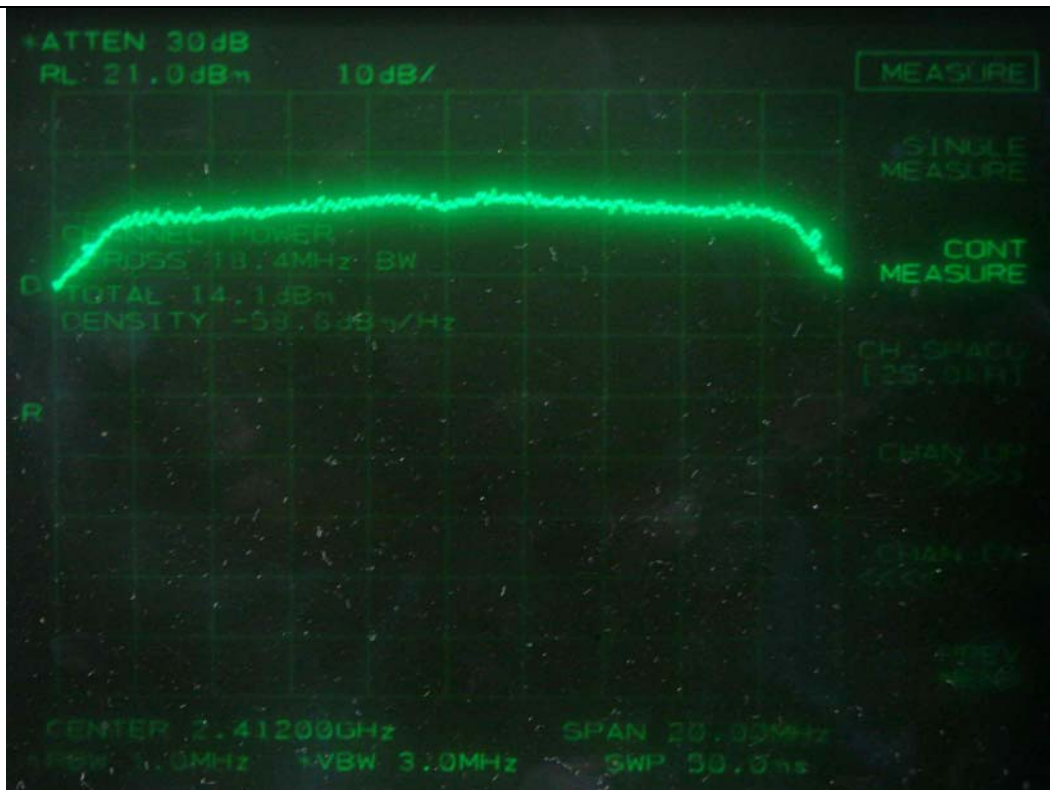
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99 % Occupied Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	18.43	14.10	30.00	-15.90
Middle	2 437	18.47	14.20	30.00	-15.80
High	2 462	18.43	12.10	30.00	-17.90

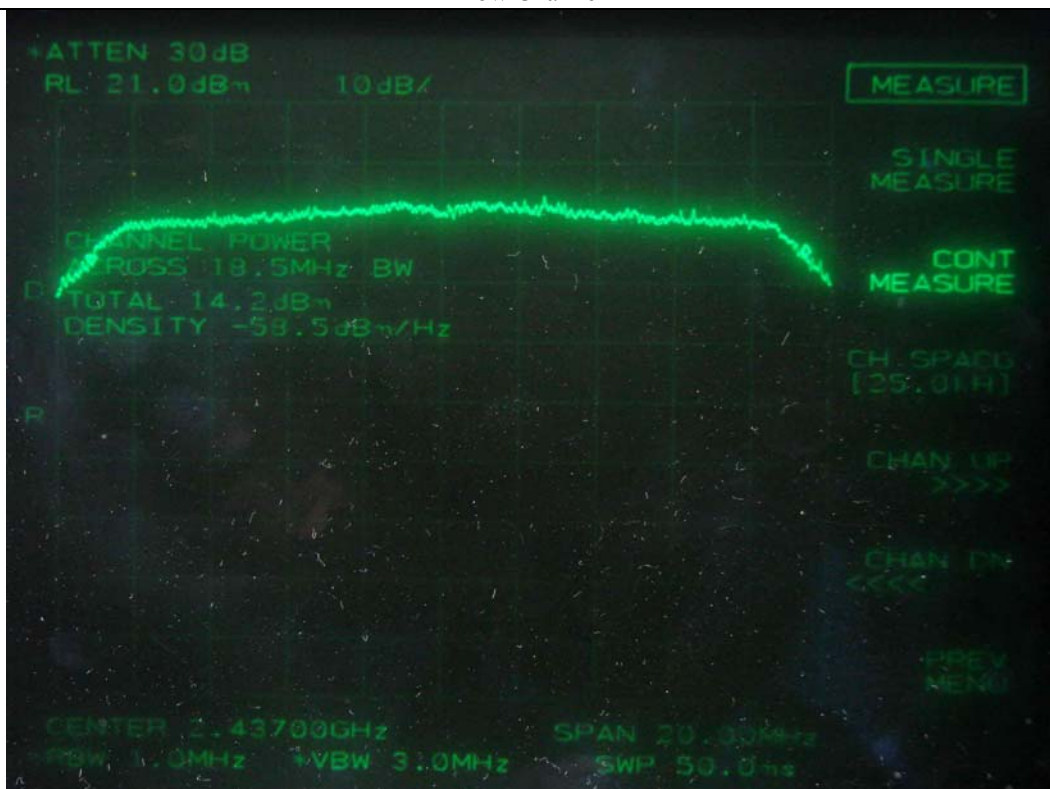
Remark: See next page for an overview sweep performed with peak detector.



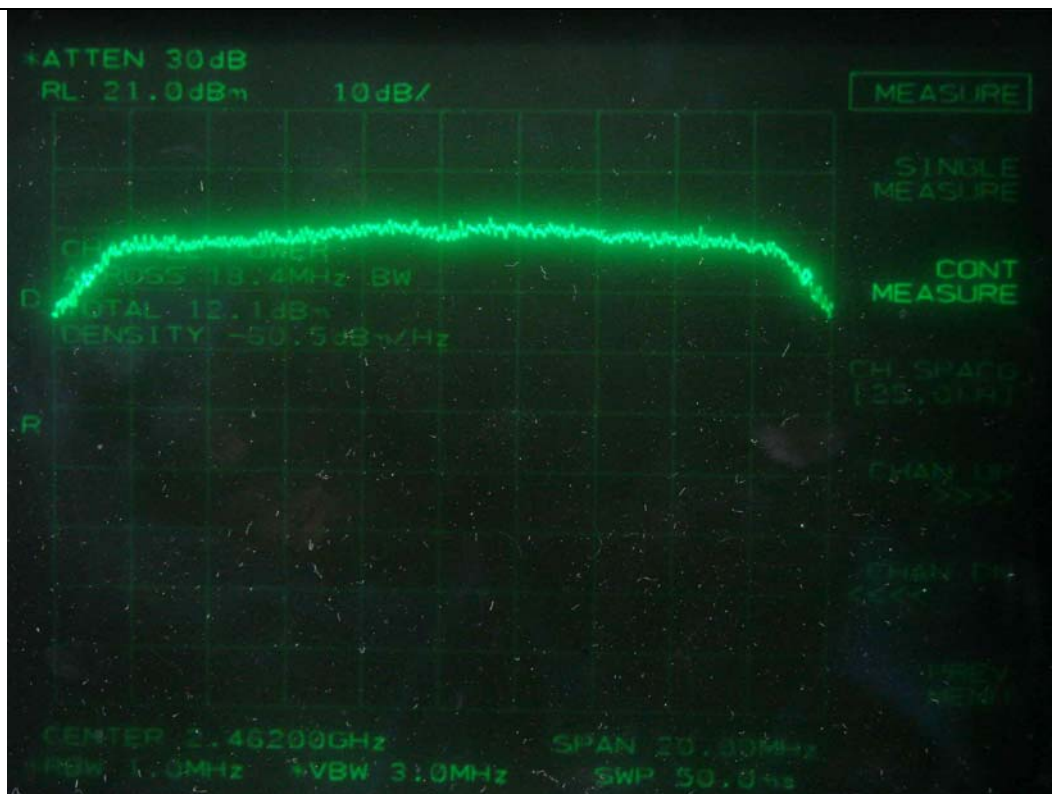
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



High Channel

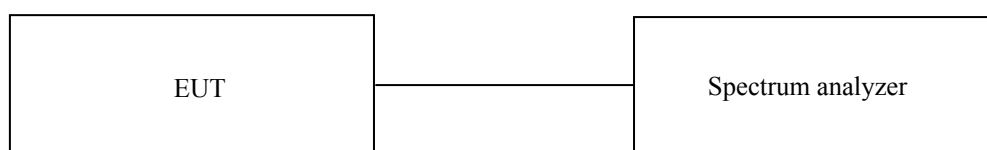
9.3 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

9.3.1 Operating environment

Temperature : 28 °C
Relative humidity : 45.7 % R.H.

9.3.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



9.3.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

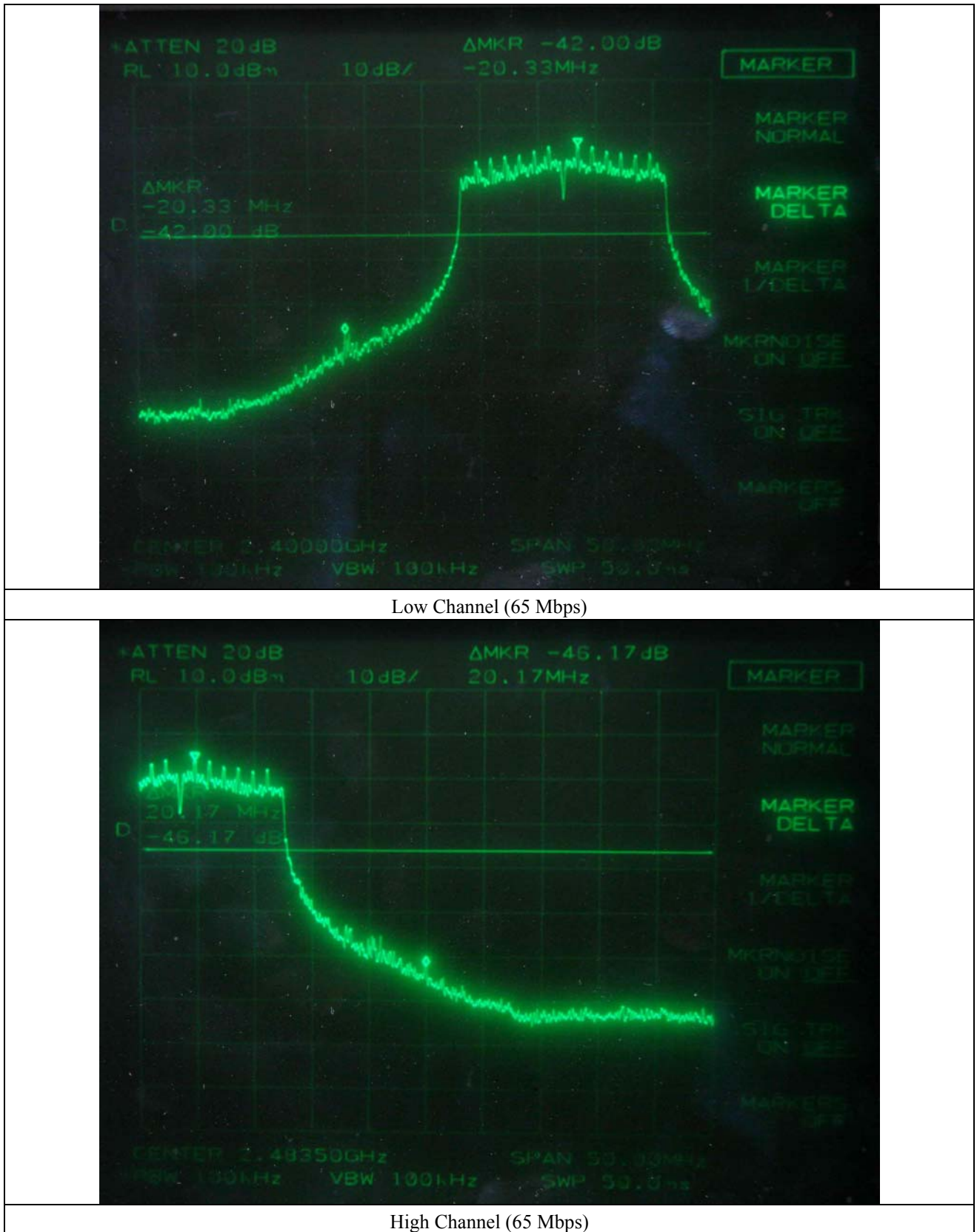
The frequency spectrum from 30 MHz to 25 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

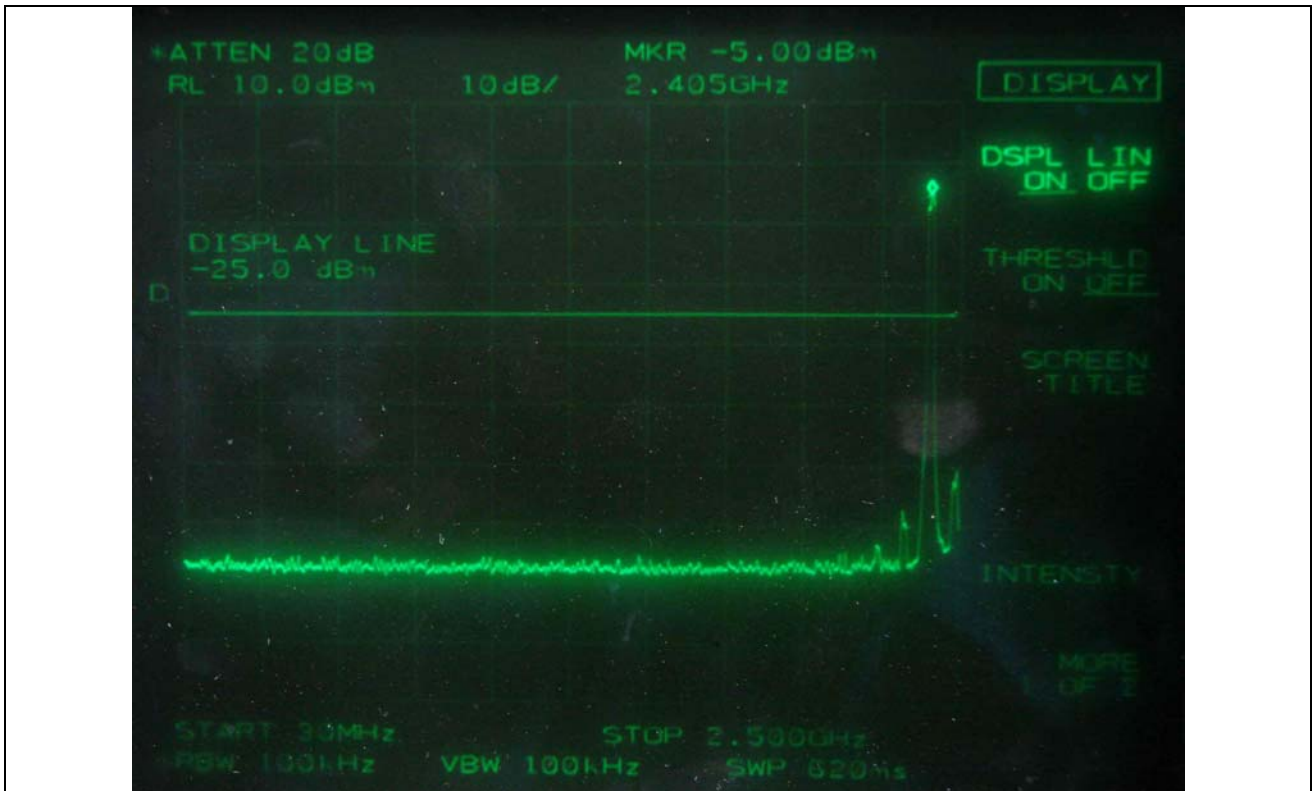
9.3.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)
■ -	8447D	Hewlett-Packard	Amplifier	2727A04987	Jun. 11, 2011(1Y)
■ -	83051A	Agilent	Preamplifier	3950M00201	Jun. 11, 2011(1Y)
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	Jul. 09, 2011(1Y)
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2011(2Y)
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

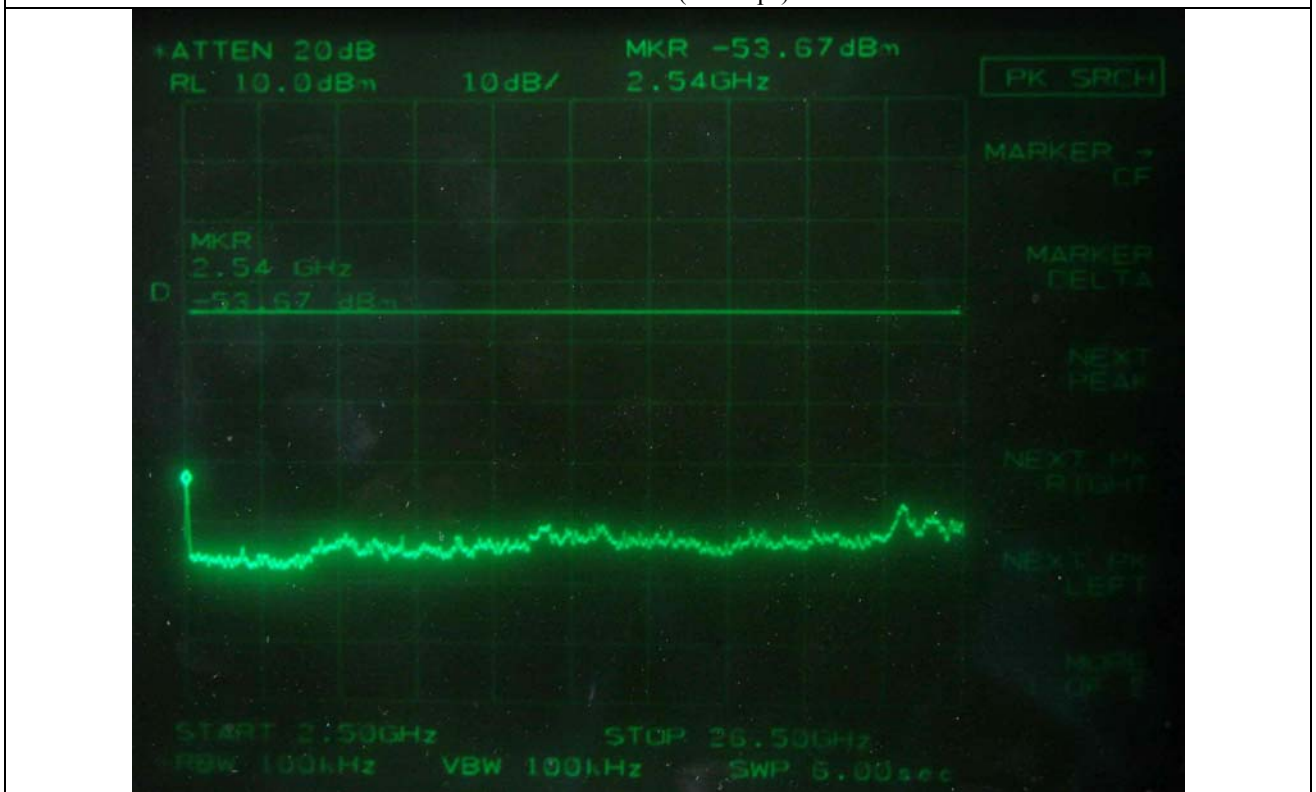
All test equipment used is calibrated on a regular basis.

9.3.5. Test data for conducted emission

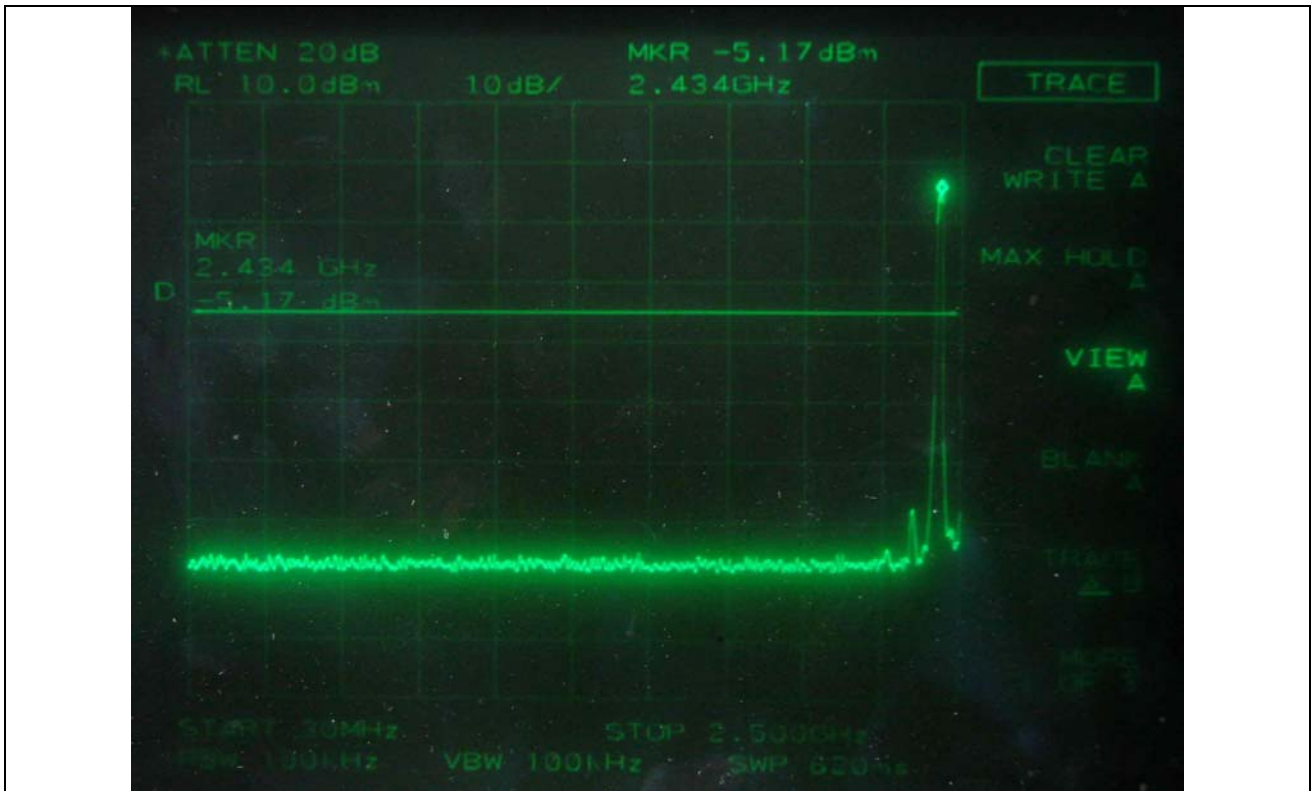




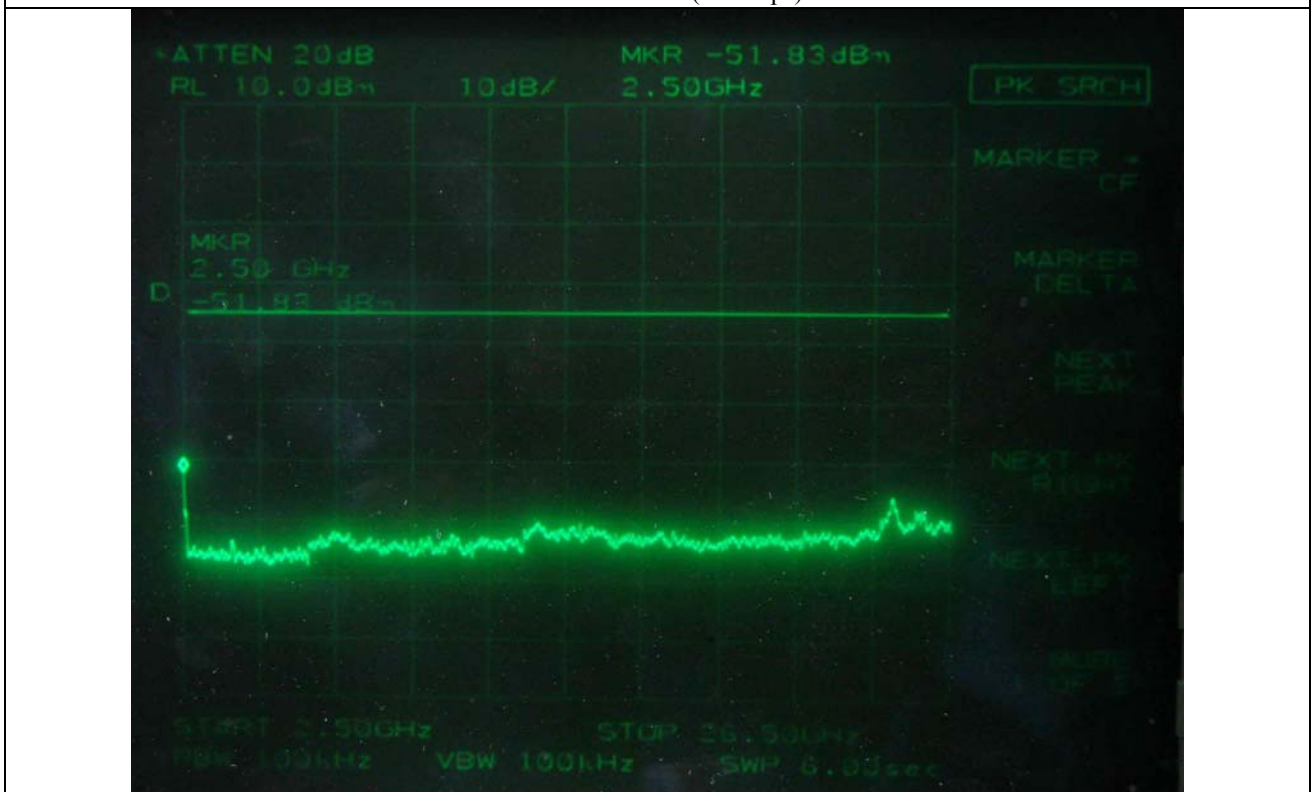
Low Channel (65 Mbps)



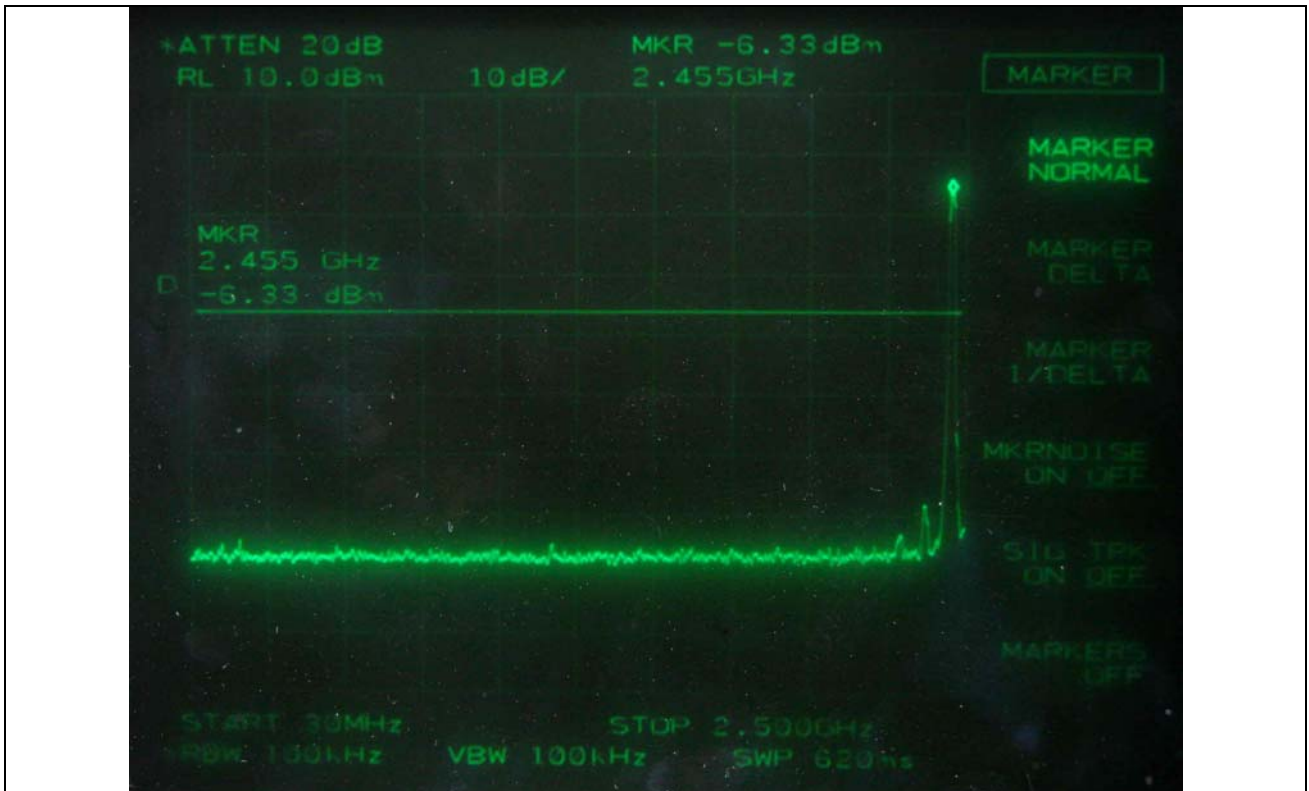
Low Channel (65 Mbps)



Middle Channel (65 Mbps)



Middle Channel (65 Mbps)



High Channel (65 Mbps)



High Channel (65 Mbps)

9.3.6. Test data for radiated emission (Enclosure type(with LCD))

9.3.6.1 Radiated Emission which fall in the Restricted Band

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Operating Condition : Low / High Channel
- Result : PASSED BY -36.25 dB at High Channel (58.5 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6.5 Mbps)									
2 390.00	28.23	Peak	H	26.66	3.13	28.98	29.04	74.00	-44.96
	15.10	Average	H				15.91	54.00	-38.09
	31.02	Peak	V				31.83	74.00	-42.17
	16.15	Average	V				16.96	54.00	-37.04
Test Data for Low Channel (26 Mbps)									
2 390.00	28.42	Peak	H	26.66	3.13	28.98	29.23	74.00	-44.77
	15.14	Average	H				15.95	54.00	-38.05
	31.08	Peak	V				31.89	74.00	-42.11
	16.12	Average	V				16.93	54.00	-37.07
Test Data for Low Channel (58.5 Mbps)									
2 390.00	28.45	Peak	H	26.66	3.13	28.98	29.26	74.00	-44.74
	15.08	Average	H				15.89	54.00	-38.11
	31.08	Peak	V				31.89	74.00	-42.11
	16.25	Average	V				17.06	54.00	-36.94
Test Data for Low Channel (65 Mbps)									
2 390.00	28.29	Peak	H	26.66	3.13	28.98	29.10	74.00	-44.90
	15.11	Average	H				15.92	54.00	-38.08
	31.10	Peak	V				31.91	74.00	-42.09
	16.21	Average	V				17.02	54.00	-36.98

Tabulated test data for Restricted Band

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6.5 Mbps)									
2 483.50	28.33	Peak	H	26.82	3.17	28.82	29.50	74.00	-44.50
	15.21	Average	H				16.38	54.00	-37.62
	29.35	Peak	V				30.52	74.00	-43.48
	16.18	Average	V				17.35	54.00	-36.65
Test Data for High Channel (26 Mbps)									
2 483.50	28.34	Peak	H	26.82	3.17	28.82	29.51	74.00	-44.49
	15.32	Average	H				16.49	54.00	-37.51
	29.68	Peak	V				30.85	74.00	-43.15
	16.25	Average	V				17.42	54.00	-36.58
Test Data for High Channel (58.5 Mbps)									
2 483.50	28.32	Peak	H	26.82	3.17	28.82	29.49	74.00	-44.51
	15.28	Average	H				16.45	54.00	-37.55
	29.98	Peak	V				31.15	74.00	-42.85
	16.58	Average	V				17.75	54.00	-36.25
Test Data for High Channel (65 Mbps)									
2 483.50	28.31	Peak	H	26.82	3.17	28.82	29.48	74.00	-44.52
	15.40	Average	H				16.57	54.00	-37.43
	30.00	Peak	V				31.17	74.00	-42.83
	16.54	Average	V				17.71	54.00	-36.29

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

9.3.6.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -17.97 dB at middle channel(26 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6.5 Mbps)									
2 412.00	72.50	Peak	H	27.33	3.83	-	103.66	-	
	78.42	Peak	V				109.58	-	
4 824.00	35.82	Peak	H	31.63	6.55	26.10	47.91	74.00	-26.09
	23.48	Average	H				35.57	54.00	-18.43
	35.48	Peak	V				47.57	74.00	-26.43
	23.61	Average	V				35.70	54.00	-18.30
Test Data for Low Channel (26 Mbps)									
2 412.00	72.31	Peak	H	27.33	3.83	-	103.47	-	
	78.56	Peak	V				109.72	-	
4 824.00	35.74	Peak	H	31.63	6.55	26.10	47.83	74.00	-26.17
	23.17	Average	H				35.26	54.00	-18.74
	35.62	Peak	V				47.71	74.00	-26.29
	23.28	Average	V				35.37	54.00	-18.63
Test Data for Low Channel (58.5 Mbps)									
2 412.00	72.64	Peak	H	27.33	3.83	-	103.80	-	
	78.97	Peak	V				110.13	-	
4 824.00	35.67	Peak	H	31.63	6.55	26.10	47.76	74.00	-26.24
	23.37	Average	H				35.46	54.00	-18.54
	35.33	Peak	V				47.42	74.00	-26.58
	23.48	Average	V				35.57	54.00	-18.43

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (65 Mbps)									
2 412.00	72.87	Peak	H	27.33	3.83	-	104.03	-	
	79.75	Peak	V				110.91	-	
4 824.00	35.38	Peak	H	31.63	6.55	26.10	47.47	74.00	-26.53
	23.34	Average	H				35.43	54.00	-18.57
	35.50	Peak	V				47.59	74.00	-26.41
	23.36	Average	V				35.45	54.00	-18.55

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (6.5 Mbps)									
2 437.00	64.21	Peak	H	27.40	3.83	-	95.44	-	
	69.99	Peak	V				101.22	-	
4 874.00	35.64	Peak	H	31.72	6.59	26.10	47.85	74.00	-26.15
	23.68	Average	H				35.89	54.00	-18.11
	35.48	Peak	V				47.69	74.00	-26.31
	23.74	Average	V				35.95	54.00	-18.05
Test Data for Middle Channel (26 Mbps)									
2 437.00	64.39	Peak	H	27.40	3.83	-	95.62	-	
	70.38	Peak	V				101.61	-	
4 874.00	35.84	Peak	H	31.72	6.59	26.10	48.05	74.00	-25.95
	23.62	Average	H				35.83	54.00	-18.17
	35.65	Peak	V				47.86	74.00	-26.14
	23.82	Average	V				36.03	54.00	-17.97

Tabulated test data for Restricted Band

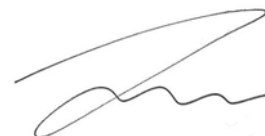
Test Data for Middle Channel (58.5 Mbps)									
2 437.00	64.48	Peak	H	27.40	3.83	-	95.71	-	
	70.83	Peak	V				102.06	-	
4 874.00	35.88	Peak	H	31.72	6.59	26.10	48.09	74.00	-25.91
	23.58	Average	H				35.79	54.00	-18.21
	35.71	Peak	V				47.92	74.00	-26.08
	23.64	Average	V				35.85	54.00	-18.15
Test Data for Middle Channel (65 Mbps)									
2 437.00	64.44	Peak	H	27.40	3.83	-	95.67	-	
	71.57	Peak	V				102.80	-	
4 874.00	35.68	Peak	H	31.72	6.59	26.10	47.89	74.00	-26.11
	23.52	Average	H				35.73	54.00	-18.27
	35.62	Peak	V				47.83	74.00	-26.17
	23.48	Average	V				35.69	54.00	-18.31

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6.5 Mbps)									
2 462.00	55.42	Peak	H	27.48	3.83	-	86.73	-	
	71.67	Peak	V				102.98	-	
4 924.00	35.64	Peak	H	31.81	6.62	26.10	47.97	74.00	-26.03
	23.58	Average	H				35.91	54.00	-18.09
	35.48	Peak	V				47.81	74.00	-26.19
	23.48	Average	V				35.81	54.00	-18.19
Test Data for High Channel (26 Mbps)									
2 462.00	56.30	Peak	H	27.48	3.83	-	87.61	-	
	71.85	Peak	V				103.16	-	
4 924.00	35.62	Peak	H	31.81	6.62	26.10	47.95	74.00	-26.05
	23.48	Average	H				35.81	54.00	-18.19
	35.44	Peak	V				47.77	74.00	-26.23
	23.24	Average	V				35.57	54.00	-18.43

Test Data for High Channel (58.5 Mbps)									
2 462.00	57.69	Peak	H	27.48	3.83	-	89.00	-	
	72.18	Peak	V				103.49	-	
4 924.00	35.48	Peak	H	31.81	6.62	26.10	47.81	74.00	-26.19
	23.08	Average	H				35.41	54.00	-18.59
	35.68	Peak	V				48.01	74.00	-25.99
	23.68	Average	V				36.01	54.00	-17.99
Test Data for High Channel (65 Mbps)									
2 462.00	58.23	Peak	H	27.48	3.83	-	89.54	-	
	72.23	Peak	V				103.54	-	
4 924.00	35.75	Peak	H	31.81	6.62	26.10	48.08	74.00	-25.92
	23.18	Average	H				35.51	54.00	-18.49
	35.44	Peak	V				47.77	74.00	-26.23
	23.38	Average	V				35.71	54.00	-18.29

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

9.3.7. Test data for radiated emission (PCB type(without LCD))

9.3.7.1 Radiated Emission which fall in the Restricted Band

- . Test Date : November 18, 2011
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 25 GHz
- . Measurement distance : 3 m
- . Operating Condition : Low / High Channel
- . Result : PASSED BY -36.44 dB at Low Channel (58.5 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6.5 Mbps)									
2 390.00	27.53	Peak	H	26.66	3.13	28.98	28.34	74.00	-45.66
	15.02	Average	H				15.83	54.00	-38.17
	30.21	Peak	V				31.02	74.00	-42.98
	16.05	Average	V				16.86	54.00	-37.14
Test Data for Low Channel (26 Mbps)									
2 390.00	27.38	Peak	H	26.66	3.13	28.98	28.19	74.00	-45.81
	15.08	Average	H				15.89	54.00	-38.11
	30.21	Peak	V				31.02	74.00	-42.98
	16.17	Average	V				16.98	54.00	-37.02
Test Data for Low Channel (58.5 Mbps)									
2 390.00	27.84	Peak	H	26.66	3.13	28.98	28.65	74.00	-45.35
	15.62	Average	H				16.43	54.00	-37.57
	30.17	Peak	V				30.98	74.00	-43.02
	16.75	Average	V				17.56	54.00	-36.44
Test Data for Low Channel (65 Mbps)									
2 390.00	27.51	Peak	H	26.66	3.13	28.98	28.32	74.00	-45.68
	15.11	Average	H				15.92	54.00	-38.08
	30.12	Peak	V				30.93	74.00	-43.07
	16.73	Average	V				17.54	54.00	-36.46

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

-Continued

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6.5 Mbps)									
2 483.50	27.85	Peak	H	26.82	3.17	28.82	29.02	74.00	-44.98
	15.36	Average	H				16.53	54.00	-37.47
	29.63	Peak	V				30.80	74.00	-43.20
	16.10	Average	V				17.27	54.00	-36.73
Test Data for High Channel (26 Mbps)									
2 483.50	27.48	Peak	H	26.82	3.17	28.82	28.65	74.00	-45.35
	15.72	Average	H				16.89	54.00	-37.11
	29.58	Peak	V				30.75	74.00	-43.25
	16.18	Average	V				17.35	54.00	-36.65
Test Data for High Channel (58.5 Mbps)									
2 483.50	27.46	Peak	H	26.82	3.17	28.82	28.63	74.00	-45.37
	15.94	Average	H				17.11	54.00	-36.89
	29.63	Peak	V				30.80	74.00	-43.20
	16.20	Average	V				17.37	54.00	-36.63
Test Data for High Channel (65 Mbps)									
2 483.50	27.97	Peak	H	26.82	3.17	28.82	29.14	74.00	-44.86
	15.39	Average	H				16.56	54.00	-37.44
	29.48	Peak	V				30.65	74.00	-43.35
	16.28	Average	V				17.45	54.00	-36.55



Tested by: Chang-Uk, Jun / Engineer

9.3.7.2 Spurious & Harmonic Radiated Emission

- Test Date : November 18, 2011
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3 m
- Result : PASSED BY -18.19 dB at low channel(65 Mbps)

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel (6.5 Mbps)									
2 412.00	72.63	Peak	H	27.33	3.83	-	103.79	-	
	78.57	Peak	V				109.73	-	
4 824.00	35.68	Peak	H	31.63	6.55	26.10	47.77	74.00	-26.23
	23.20	Average	H				35.29	54.00	-18.71
	35.10	Peak	V				47.19	74.00	-26.81
	23.48	Average	V				35.57	54.00	-18.43
Test Data for Low Channel (26 Mbps)									
2 412.00	72.42	Peak	H	27.33	3.83	-	103.58	-	
	78.68	Peak	V				109.84	-	
4 824.00	35.15	Peak	H	31.63	6.55	26.10	47.24	74.00	-26.76
	23.50	Average	H				35.59	54.00	-18.41
	35.44	Peak	V				47.53	74.00	-26.47
	23.47	Average	V				35.56	54.00	-18.44
Test Data for Low Channel (58.5 Mbps)									
2 412.00	72.82	Peak	H	27.33	3.83	-	103.98	-	
	79.48	Peak	V				110.64	-	
4 824.00	35.62	Peak	H	31.63	6.55	26.10	47.71	74.00	-26.29
	23.47	Average	H				35.56	54.00	-18.44
	35.17	Peak	V				47.26	74.00	-26.74
	23.44	Average	V				35.53	54.00	-18.47

Tabulated test data for Restricted Band

-Continued

Test Data for Low Channel (65 Mbps)									
2 412.00	72.78	Peak	H	27.33	3.83	-	103.94	-	
	79.64	Peak	V				110.80	-	
4 824.00	35.18	Peak	H	31.63	6.55	26.10	47.27	74.00	-26.73
	23.72	Average	H				35.81	54.00	-18.19
	35.69	Peak	V				47.78	74.00	-26.22
	23.40	Average	V				35.49	54.00	-18.51

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Middle Channel (6.5 Mbps)									
2 437.00	64.35	Peak	H	27.40	3.83	-	95.58	-	
	70.23	Peak	V				101.46	-	
4 874.00	35.82	Peak	H	31.72	6.59	26.10	48.03	74.00	-25.97
	23.44	Average	H				35.65	54.00	-18.35
	35.17	Peak	V				47.38	74.00	-26.62
	23.50	Average	V				35.71	54.00	-18.29
Test Data for Middle Channel (26 Mbps)									
2 437.00	64.58	Peak	H	27.40	3.83	-	95.81	-	
	70.92	Peak	V				102.15	-	
4 874.00	35.72	Peak	H	31.72	6.59	26.10	47.93	74.00	-26.07
	23.41	Average	H				35.62	54.00	-18.38
	35.81	Peak	V				48.02	74.00	-25.98
	23.41	Average	V				35.62	54.00	-18.38

Tabulated test data for Restricted Band

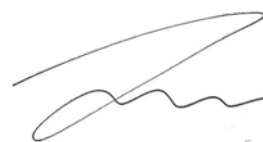
Test Data for Middle Channel (58.5 Mbps)									
2 437.00	64.81	Peak	H	27.40	3.83	-	96.04	-	
	71.48	Peak	V				102.71	-	
4 874.00	35.22	Peak	H	31.72	6.59	26.10	47.43	74.00	-26.57
	23.83	Average	H				36.04	54.00	-17.96
	35.10	Peak	V				47.31	74.00	-26.69
	23.50	Average	V				35.71	54.00	-18.29
Test Data for Middle Channel (65 Mbps)									
2 437.00	64.65	Peak	H	27.40	3.83	-	95.88	-	
	71.42	Peak	V				102.65	-	
4 874.00	35.12	Peak	H	31.72	6.59	26.10	47.33	74.00	-26.67
	23.58	Average	H				35.79	54.00	-18.21
	35.47	Peak	V				47.68	74.00	-26.32
	23.66	Average	V				35.87	54.00	-18.13

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for High Channel (6.5 Mbps)									
2 462.00	55.34	Peak	H	27.48	3.83	-	86.65	-	
	71.75	Peak	V				103.06	-	
4 924.00	35.45	Peak	H	31.81	6.62	26.10	47.78	74.00	-26.22
	23.47	Average	H				35.80	54.00	-18.20
	35.66	Peak	V				47.99	74.00	-26.01
	23.80	Average	V				36.13	54.00	-17.87
Test Data for High Channel (26 Mbps)									
2 462.00	56.82	Peak	H	27.48	3.83	-	88.13	-	
	71.65	Peak	V				102.96	-	
4 924.00	35.47	Peak	H	31.81	6.62	26.10	47.80	74.00	-26.20
	23.62	Average	H				35.95	54.00	-18.05
	35.11	Peak	V				47.44	74.00	-26.56
	23.05	Average	V				35.38	54.00	-18.62

Test Data for High Channel (58.5 Mbps)									
2 462.00	57.86	Peak	H	27.48	3.83	-	89.17	-	
	72.12	Peak	V				103.43	-	
4 924.00	35.26	Peak	H	31.81	6.62	26.10	47.59	74.00	-26.41
	23.41	Average	H				35.74	54.00	-18.26
	35.20	Peak	V				47.53	74.00	-26.47
	23.94	Average	V				36.27	54.00	-17.73
Test Data for High Channel (65 Mbps)									
2 462.00	58.42	Peak	H	27.48	3.83	-	89.73	-	
	72.32	Peak	V				103.63	-	
4 924.00	35.20	Peak	H	31.81	6.62	26.10	47.53	74.00	-26.47
	23.46	Average	H				35.79	54.00	-18.21
	35.15	Peak	V				47.48	74.00	-26.52
	23.72	Average	V				36.05	54.00	-17.95

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical



Tested by: Chang-Uk, Jun / Engineer

9.4 PEAK POWER SPECTRUL DENSITY

9.4.1 Operating environment

Temperature : 25 °C
Relative humidity : 48 % R.H.

9.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth, and sweep time was set to span / 3 kHz. The sweep time was allowed to be longer than span / 3 kHz for a full response of the mixer in the spectrum analyzer.

The maximum level from the EUT in a 3 kHz bandwidth was measured with above condition.



9.4.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ - 8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011(1Y)

All test equipment used is calibrated on a regular basis.

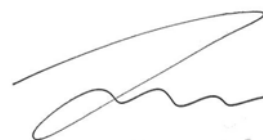
9.4.4 Test data

- Test Date : November 17, 2011

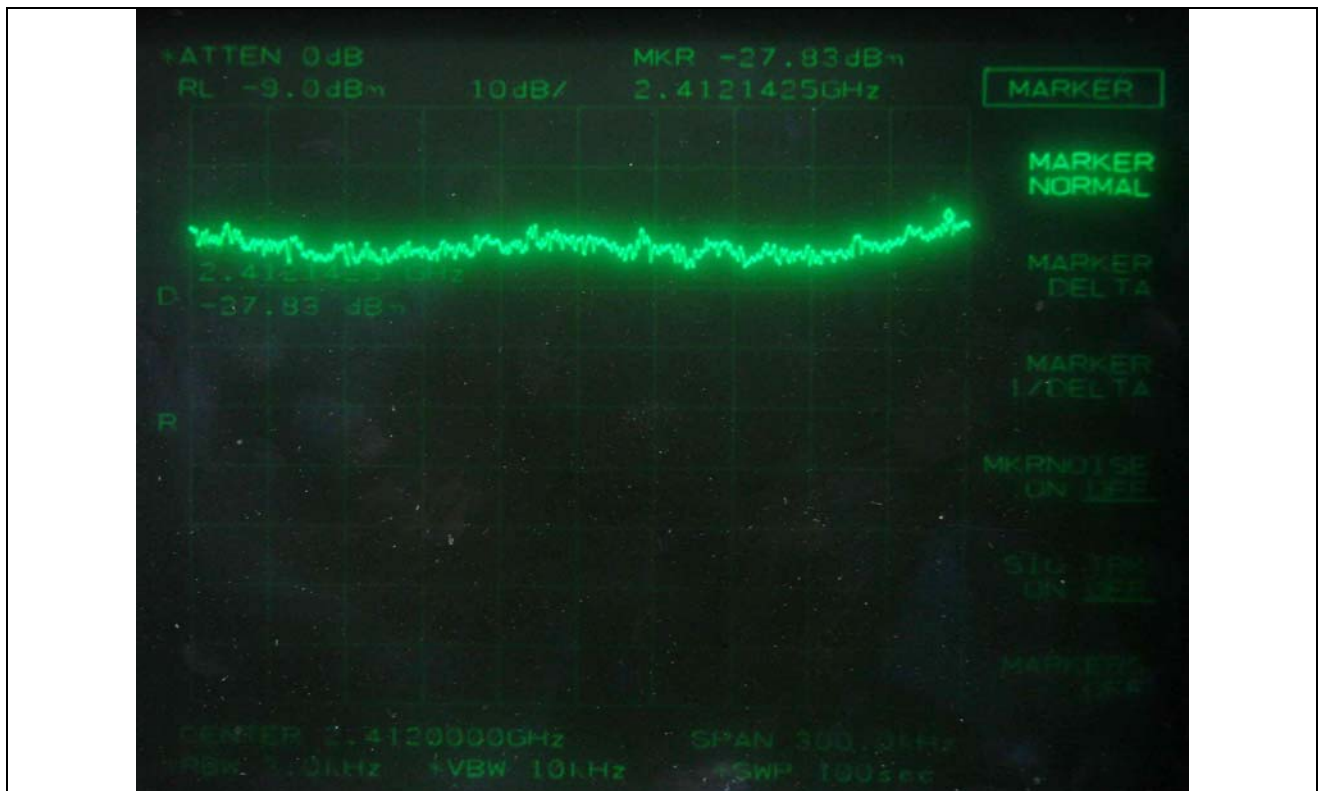
- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-27.83	8.00	-35.83
Middle	2 437	-29.00	8.00	-37.00
High	2 462	-29.00	8.00	-37.00

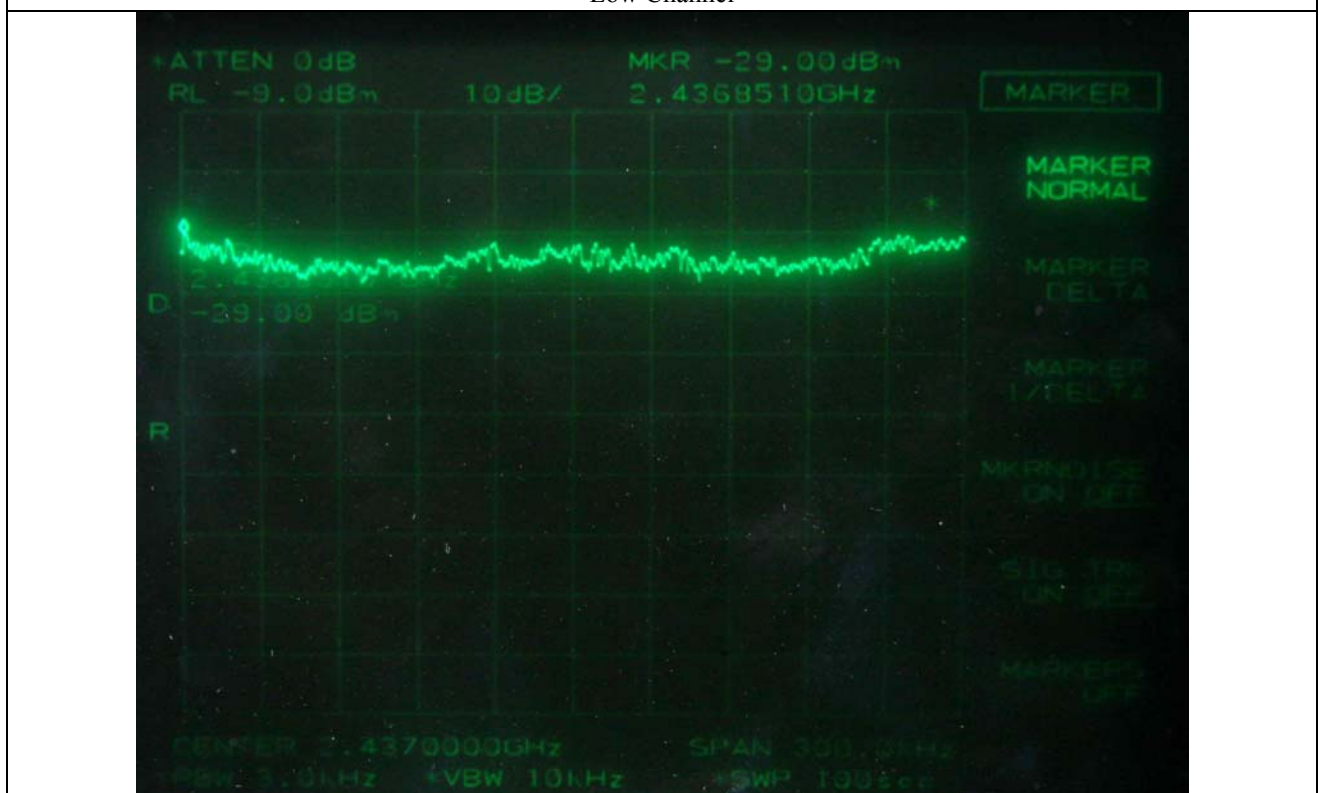
Remark: See next page for measurement data.



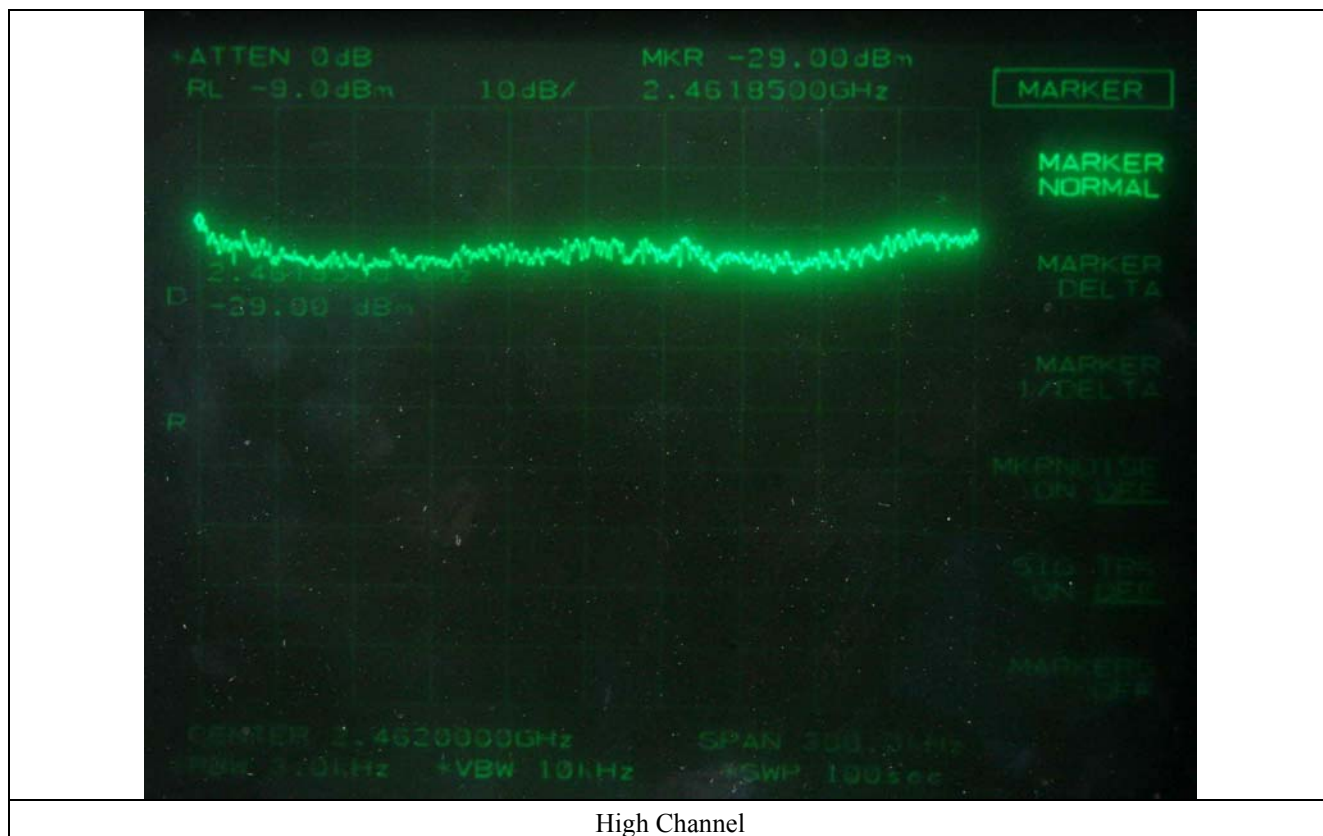
Tested by: Chang-Uk, Jun / Engineer



Low Channel



Middle Channel



10. MAXIMUM PERMISSIBLE EXPOSURE

10.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment is 1 mW/cm²

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * S)}$$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 100 * d (m)

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

10.2 Calculated MPE Safe Distance

10.2.1 FOR 802.11b WLAN MODE

According to above equation, the following result was obtained.

Peak Output Power		Antenna Gain		Safe Distance	Power Density (mW/cm ²)	FCC Limit
(dBm)	(mW)	Log	Linear	(cm)	@ 20 cm Separation	(mW/cm ²)
14.40	27.54	5	3.16	2.63	0.017 3	1

According to above table, safe distance, $D = 0.282 * \sqrt{(27.54 * 3.16)} = 2.63 \text{ cm}$.

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 27.54 * 3.16 / (4 * 3.14 * 20^2) = 0.017 3$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

10.2.2 FOR 802.11g WLAN MODE

According to above equation, the following result was obtained.

Peak Output Power		Antenna Gain		Safe Distance	Power Density (mW/cm ²)	FCC Limit
(dBm)	(mW)	Log	Linear	(cm)	@ 20 cm Separation	(mW/cm ²)
14.50	28.18	5	3.16	2.61	0.017 7	1

According to above table, safe distance, $D = 0.282 * \sqrt{(28.18 * 3.16)} = 2.61$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 28.18 * 3.16 / (4 * 3.14 * 20^2) = 0.017 7$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

10.2.3 FOR 802.11n WLAN MODE

According to above equation, the following result was obtained.

Peak Output Power		Antenna Gain		Safe Distance	Power Density (mW/cm ²)	FCC Limit
(dBm)	(mW)	Log	Linear	(cm)	@ 20 cm Separation	(mW/cm ²)
14.20	26.30	5	3.16	2.57	0.016 5	1

According to above table, safe distance, $D = 0.282 * \sqrt{(26.30 * 3.16)} = 2.57$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 26.30 * 3.16 / (4 * 3.14 * 20^2) = 0.016 5$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

10. RADIATED EMISSION TEST

10.1 Operating environment

Temperature : 23 °C
Relative humidity : 38 %R.H.

10.2 Test set-up

The radiated emissions measurements were on the 3 m, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

10.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ - ESVD	Rohde & Schwarz	Test Receiver	8384537018	Oct. 20, 2011(1Y)
■ - 8568B	HP	Spectrum Analyzer	3001A04955	Jun. 11, 2011(1Y)
■ - 8447D	Hewlett Packard	Amplifier	2727A04987	Jun. 11, 2011(1Y)
■ - MA240	HD GmbH	Antenna Master	N/A	N/A
■ - HD100	HD GmbH	Position Controller	N/A	N/A
■ - DS420S	HD GmbH	Turn Table	N/A	N/A
□ - VHA9103	Schwarzbeck	Biconical Antenna	91031852	Mar. 30, 2010(2Y)
□ - 9108-A(494)	Schwarzbeck	Log Periodic Antenna	62281001	Mar. 30, 2010(2Y)
■ - VULB9163	Schwarzbeck	TRILOG Broadband Antenna	VULB9163-202	May 27, 2010(2Y)

All test equipment used is calibrated on a regular basis.

10.4 Test data for Enclosure type(with LCD)

- Test Date : November 18, 2011
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m
- Result : PASSED
- Channel : Low

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.85	20.60	H	1.00	125.00	13.93	2.54	37.07	43.52	-6.45
250.23	12.40	V	1.00	155.00	17.40	3.40	33.20	46.02	-12.82
375.23	16.60	H	1.00	127.00	16.60	3.85	37.05	46.02	-8.97
383.84	16.60	H	1.00	120.00	16.89	3.94	37.43	46.02	-8.59
401.21	17.80	H	1.00	117.00	17.47	4.11	39.38	46.02	-6.64
417.25	16.50	H	1.00	141.00	17.78	4.24	38.52	46.02	-7.50

Tabulated test data for Radiated Electromagnetic Field

- Channel : Middle

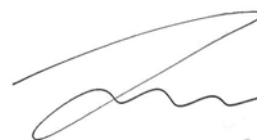
Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.74	20.10	H	1.00	124.00	13.93	2.54	36.57	43.52	-6.95
250.11	12.10	V	1.00	153.00	17.39	3.40	32.89	46.02	-13.13
375.32	16.40	H	1.00	132.00	16.60	3.85	36.85	46.02	-9.17
383.75	16.50	H	1.00	122.00	16.89	3.94	37.33	46.02	-8.69
401.33	17.70	H	1.00	115.00	17.48	4.11	39.29	46.02	-6.73
417.75	16.40	H	1.00	146.00	17.79	4.24	38.43	46.02	-7.59

Tabulated test data for Radiated Electromagnetic Field

-. Channel : High

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.44	20.50	H	1.00	125.00	13.91	2.55	36.96	43.52	-6.56
250.23	12.60	V	1.00	155.00	17.40	3.40	33.40	46.02	-12.62
375.42	16.70	H	1.00	128.00	16.60	3.85	37.15	46.02	-8.87
383.54	16.40	H	1.00	124.00	16.88	3.94	37.22	46.02	-8.80
401.53	17.40	H	1.00	116.00	17.48	4.11	38.99	46.02	-7.03
417.62	16.50	H	1.00	144.00	17.79	4.24	38.53	46.02	-7.49

Tabulated test data for Radiated Electromagnetic Field



Tested by: Chang-Uk, Jun / Engineer

10.5 Test data for PCB type(without LCD)

- Test Date : November 18, 2011
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m
- Result : PASSED
- Channel : Low

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.85	22.10	H	1.00	125.00	13.93	2.54	38.57	43.52	-4.95
250.23	15.10	V	1.00	142.00	17.40	3.40	35.90	46.02	-10.12
375.23	17.80	H	1.00	127.00	16.60	3.85	38.25	46.02	-7.77
383.84	18.00	H	1.00	120.00	16.89	3.94	38.83	46.02	-7.19
401.24	18.50	H	1.00	117.00	17.47	4.11	40.08	46.02	-5.94
417.25	17.80	H	1.00	141.00	17.78	4.24	39.82	46.02	-6.20

Tabulated test data for Radiated Electromagnetic Field

- Channel : Middle

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.82	22.40	H	1.00	124.00	13.93	2.54	38.87	43.52	-4.65
250.12	15.30	V	1.00	144.00	17.40	3.40	36.10	46.02	-9.92
375.32	17.40	H	1.00	125.00	16.60	3.85	37.85	46.02	-8.17
383.45	18.30	H	1.00	126.00	16.88	3.93	39.11	46.02	-6.91
402.15	18.20	H	1.00	118.00	17.49	4.12	39.81	46.02	-6.21
417.42	17.40	H	1.00	143.00	17.79	4.24	39.43	46.02	-6.59

Tabulated test data for Radiated Electromagnetic Field

-. Channel : High

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
125.84	22.30	H	1.00	124.00	13.93	2.54	38.77	43.52	-4.75
250.12	15.40	V	1.00	144.00	17.40	3.40	36.20	46.02	-9.82
374.21	17.60	H	1.00	125.00	16.56	3.84	38.00	46.02	-8.02
383.24	18.30	H	1.00	127.00	16.87	3.93	39.10	46.02	-6.92
401.21	18.40	H	1.00	118.00	17.47	4.11	39.98	46.02	-6.04
417.28	17.60	H	1.00	143.00	17.79	4.24	39.63	46.02	-6.39

Tabulated test data for Radiated Electromagnetic Field



Tested by: Chang-Uk, Jun / Engineer

11. CONDUCTED EMISSION TEST

11.1 Operating environment

Temperature : 21 °C
Relative humidity : 43 % R.H.

11.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	Jun. 13, 2011 (1Y)
■ -	NSLK 8128	Schwarzbeck	AMN	8128-216	Jun. 10, 2011 (1Y)
□ -	3825/2	EMCO	AMN	9109-1867	Jun. 10, 2010 (1Y)

All test equipment used is calibrated on a regular basis.

11.4 Test data for Enclosure type(with LCD)

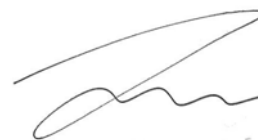
- Test Date : November 18, 2011
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Test Result : Passed by -3.17 dB at 0.72 MHz under peak mode

Frequency (MHz)	Line	Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
0.15	N	57.10	66.00	-8.90
0.18	N	54.82	64.49	-9.67
0.23	H	50.79	62.27	-11.48
0.64	N	52.20	56.00	-3.80
0.72	N	52.83	56.00	-3.17
8.47	N	47.53	60.00	-12.47
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
8.47	N	35.69	50.00	-14.31
11.89	N	38.15	50.00	-11.85
16.90	H	39.25	50.00	-10.75
17.64	N	39.02	50.00	-10.98

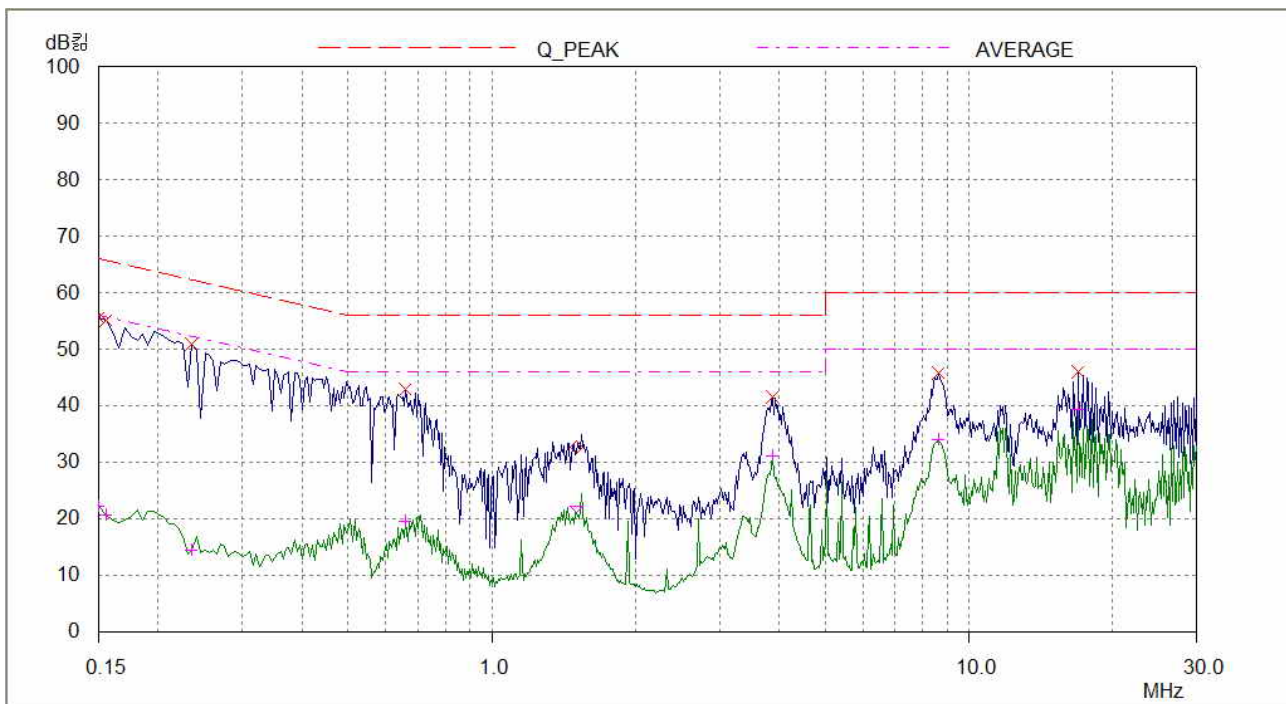
Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral Line

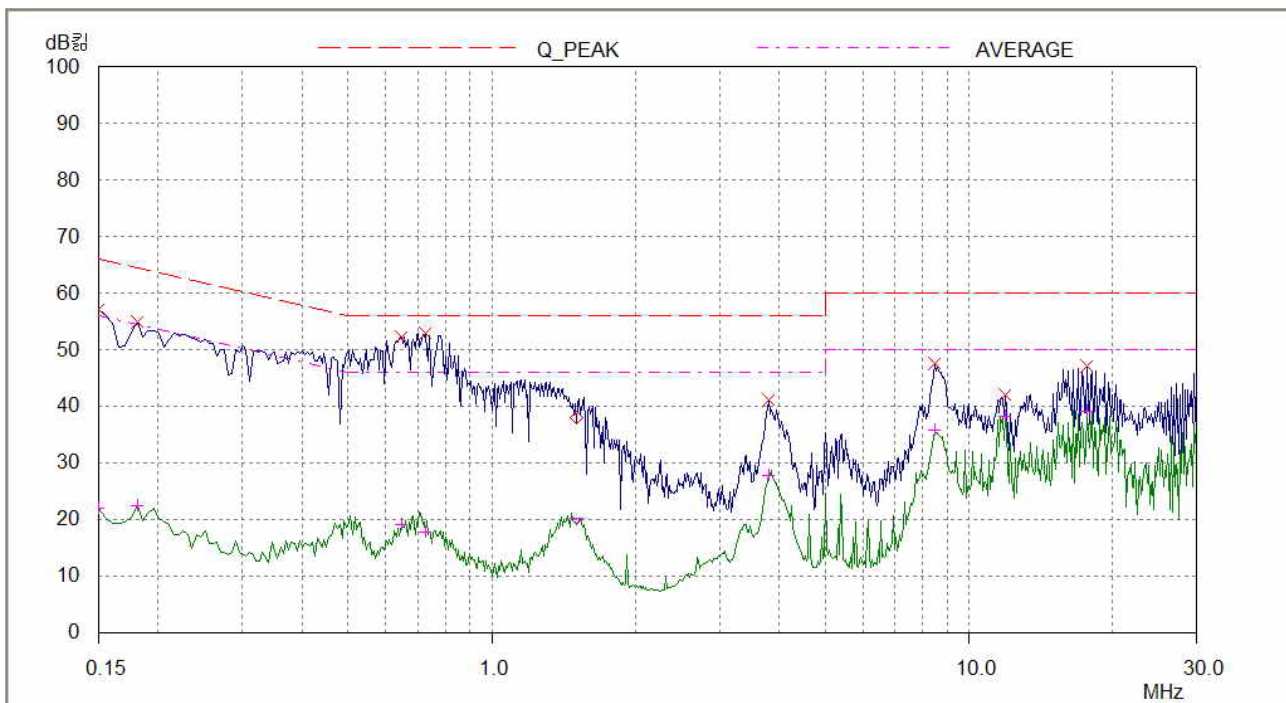
See next page for an overview sweep performed with peak and average detector modes.



Tested by: Chang-Uk, Jun / Engineer



HOT LINE



NEUTRAL LINE

11.5 Test data for PCB type(without LCD)

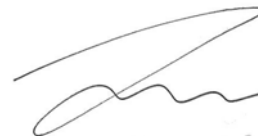
- Test Date : November 18, 2011
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Test Result : Passed by -1.48 dB at 19.21 MHz under average mode

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
17.29	H	43.81	60.00	-16.19
18.83	H	48.58	60.00	-11.42
19.21	N	51.87	60.00	-8.13
19.60	H	45.93	60.00	-14.07
20.74	N	47.93	60.00	-12.07
21.13	N	51.44	60.00	-8.56
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
18.83	H	45.74	50.00	-4.26
19.21	N	48.52	50.00	-1.48
20.75	H	44.44	50.00	-5.56
21.13	N	42.77	50.00	-7.23

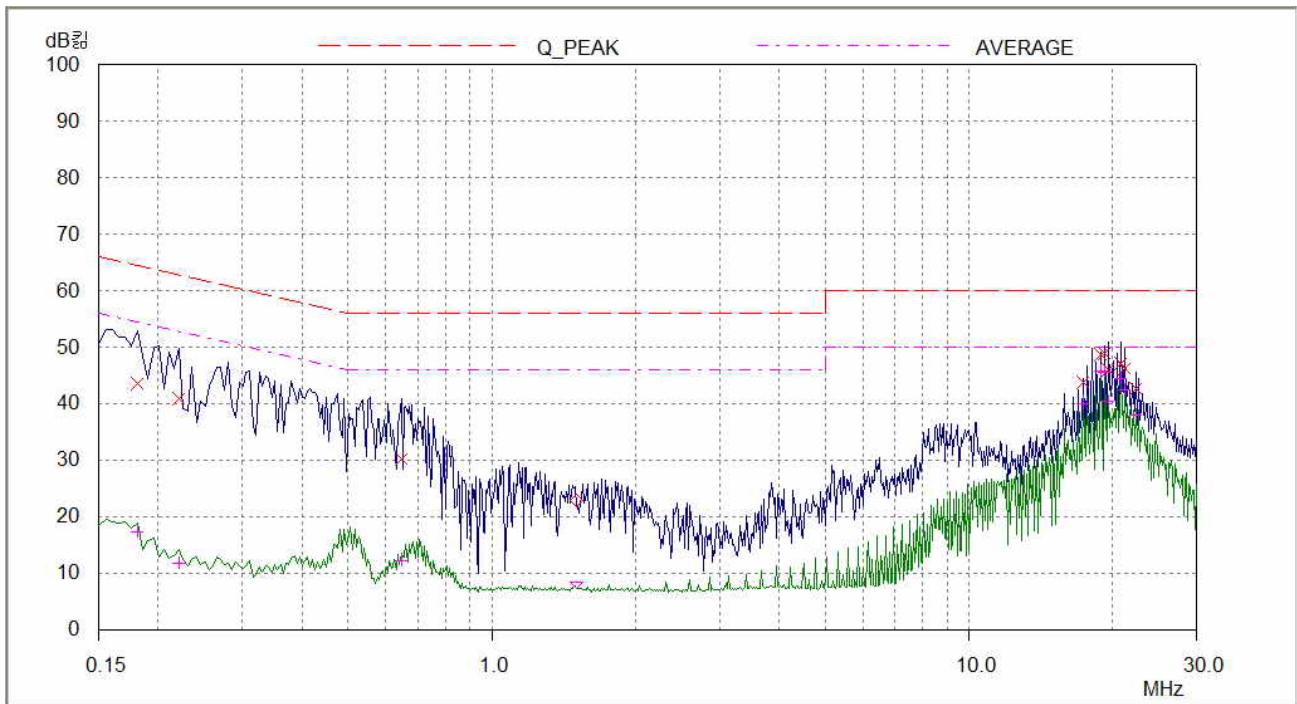
Line Conducted Emissions Tabulated Data

Remark : “H”: Hot Line, “N”: Neutral Line

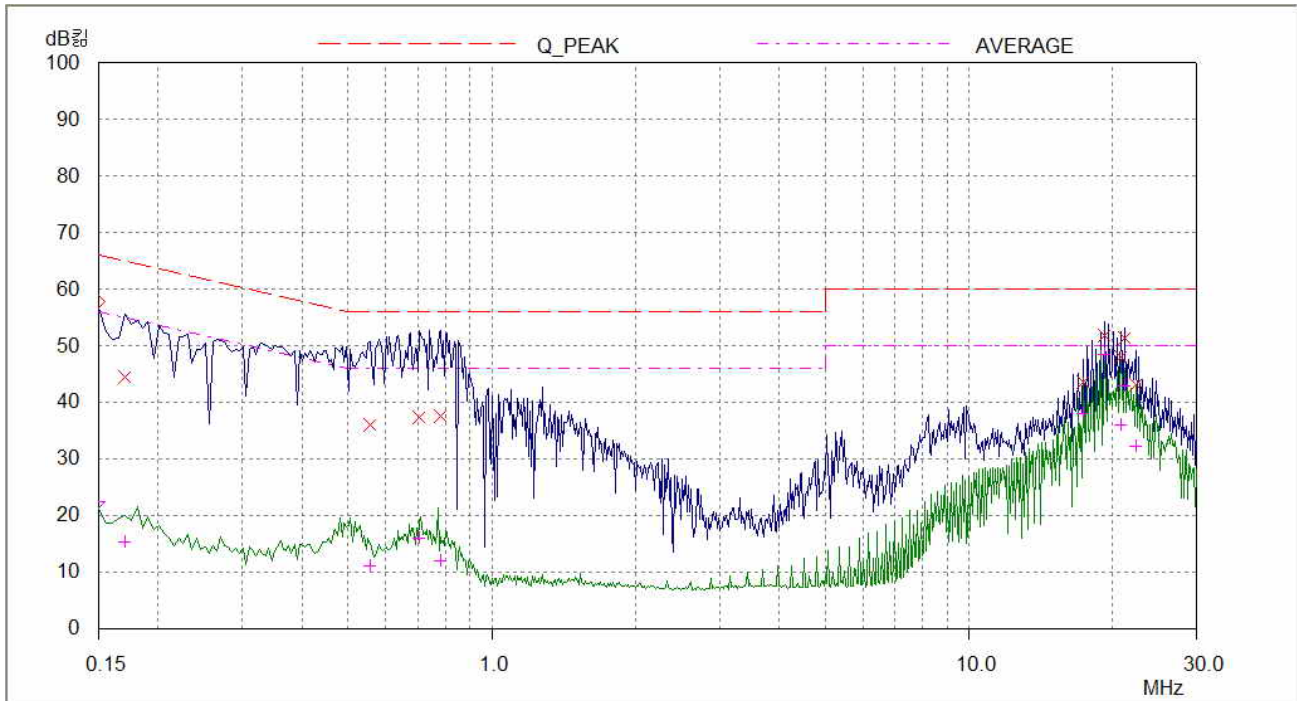
See next page for an overview sweep performed with quasi-peak and average detector modes.



Tested by: Chang-Uk, Jun / Engineer



HOT LINE



NEUTRAL LINE