EMC TEST REPORT for Intentional Radiator

No. 131001017SHA-001

Applicant	: Hansong (Nanjing) Technology Ltd. 8th Kangping Road, Jiangning Economy & Technology Development Zone, Nanjing, 211106, China
Manufacturer	: Hansong (Nanjing) Technology Ltd. 8th Kangping Road, Jiangning Economy & Technology Development Zone, Nanjing, 211106, China
Product Name	: Wireless module
Type/Model	: HSDWAM83

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2012): Radio Frequency Devices

ANSI C63.4 (2009): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

RSS-210 Issue 8 (December 2010): Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

RSS-Gen Issue 3 (December 2010): General Requirements and Information for the Certification of Radiocommunication Equipment

Date of issue: Dec. 27, 2013

Prepared by:	Reviewed by:
Daniel Zhao (*Project Engineer*)	Jonny Jing (*Reviewer*)

Description of Test Facility

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IC Assigned Code: 2042B-1

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Content

1. General Information

1.1 Applicant Information

Applicant	:	Hansong (Nanjing) Technology Ltd. 8th Kangping Road, Jiangning Economy & Technology Development Zone, Nanjing, 211106, China
Name of contact	:	Wyn B. Wang
Tel	:	+86 25 66612888
Fax	:	+86 25 66612098
Manufacturer	:	Hansong (Nanjing) Technology Ltd. 8th Kangping Road, Jiangning Economy & Technology Development Zone, Nanjing, 211106, China
Sample received date	:	Nov. 22, 2013
Sample Identification No	:	20131122-21-001
Date of test	:	Nov. 23 – Dec. 20, 2013

1.2 Identification of the EUT

Product Name	:	Wireless module
Type/model	:	HSDWAM83
FCC ID	:	XCO-HSDWAM83
IC	:	7756A-HSDWAM83

1.3 Technical specification

Operation Frequency Band	:	2412 – 2464 MHz & 5736 – 5814 MHz 5180 – 5240 MHz(refer to report 131001017SHA-002)
Modulation	:	QPSK
Description of EUT	:	This is wireless module for data transmission.
Location for use	:	Indoor Only
Antenna description	:	<table><tr><th>model</th><th>Type</th><th>Gain (dBi</th><th>Frequency band(GHz)</th></tr><tr><td rowspan="2">Integral</td><td rowspan="2">PIFA</td><td>1.5</td><td>2.4-2.5</td></tr><tr><td>1.5</td><td>5.1-5.9</td></tr><tr><td rowspan="2">RC8WFI10042A</td><td rowspan="2">mono antenna</td><td>3.6</td><td>2.4-2.5</td></tr><tr><td>3.8</td><td>5.1-5.9</td></tr><tr><td rowspan="2">RC1WFI0901A</td><td rowspan="2">PIFA</td><td>4.2</td><td>2.4-2.5</td></tr><tr><td>4.5</td><td>5.1-5.9</td></tr></table>
Rating		DC 3.5 V
Signal terminal		No
Channel Description		9 channels, 2412MHz, 2438 MHz, 2464 MHz, 5736 MHz, 5762 MHz, 5814, MHz 5180 MHz, 5210 MHz, 5240 MHz

1.4 Mode of operation during the test / Test peripherals used

Within this test report, EUT was tested under 120V/60Hz (supplied by a control board with AC-DC adaptor). The EUT has transmitting as well as receiving modes, so both were assessed.
While testing transmitting mode of EUT, the internal modulation was used.
While testing receiving mode of EUT, the signal generator was employed to generate continuous answer signal.
Radiated emission testing was performed for three different antennas.

Model	Type	Gain (dBi	Frequency band(GHz)
Integral	PIFA	1.5	2.4-2.5
		1.5	5.1-5.9
RC8WFI10042A	mono antenna	3.6	2.4-2.5
		3.8	5.1-5.9
RC1WFI0901A	PIFA	4.2	2.4-2.5
		4.5	5.1-5.9

Test peripherals used:

Item No	Description	Band and Model	S/No
1	Mini-PCI control board	HanSang	/
2	Adaptor	GPE	/

2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2013-10-21	2014-10-20
Test Receiver	ESIB 26	R&S	EC 3045	2013-10-21	2014-10-20
Test Receiver	ESCI 7	R&S	EC4501	2012-12-29	2013-12-28
A.M.N.	ESH2-Z5	R&S	EC 3119	2013-1-9	2014-1-8
Ultra-broadband antenna	HL 562	R&S	EC 3046-1	2013-5-16	2014-5-15
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2013-5-16	2014-5-15
Horn antenna	HF 906	R&S	EC 3049	2013-5-13	2014-5-12
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2013-4-12	2014-4-11
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2013-4-12	2014-4-11
Log-period antenna	AT 1080	AR	EC 3044-7	2013-5-22	2014-5-21
Biconical antenna	3109PX	ETS	EC3564	2013-8-25	2014-8-24
Semi-anechoic chamber	-	Albatross project	EC 3048	2013-5-21	2014-5-20
Shielded room	-	Zhongyu	EC 2838	2009-1-12	2014-1-11
Shielded room	-	Zhongyu	EC 2839	2009-1-12	2014-1-11
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2013-2-1	2014-1-31
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2013-2-1	2014-1-31
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2013-2-1	2014-1-31
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2013-2-1	2014-1-31

2.2 Test Standard

47CFR Part 15:2012
ANSI C63.4: 2009
RSS-210 Issue 8: 2010
RSS-Gen Issue 3: 2010

2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-210 Issue 8 Annex 8	Pass
Maximum peak conducted output power	15.247(b)	RSS-210 Issue 8 Annex 8	Pass
Power spectrum density	15.247(e)	RSS-210 Issue 8 Annex 8	Pass
Radiated emission in restricted frequency bands	15.205 & 15.209	RSS-210 Issue 8 Clause 2	Pass
Emission in non-restricted frequency bands	15.247(d)	RSS-210 Issue 8 Annex 8	Pass
Power line conducted emission	15.207	RSS-Gen Issue 3 Clause 7.2.4	Pass
Occupied bandwidth	-	RSS-Gen Issue 3 Clause 4.6.1	Tested

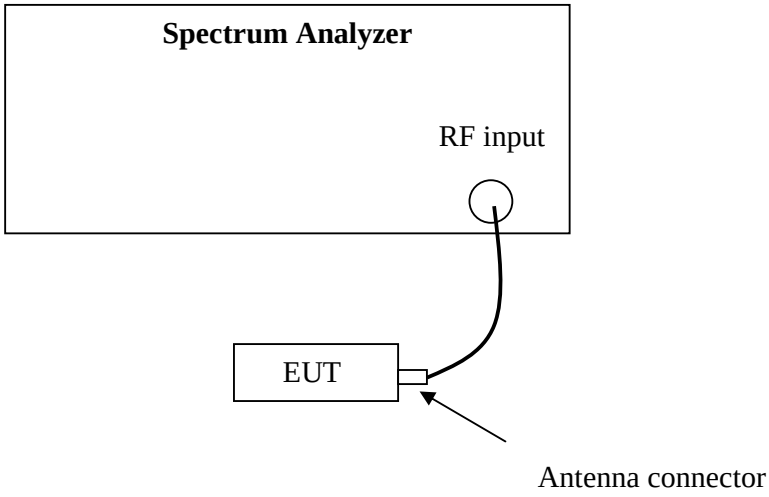
3. Minimum 6dB Bandwidth

Test result: PASS

3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Test Configuration



3.3 Test Procedure and test setup

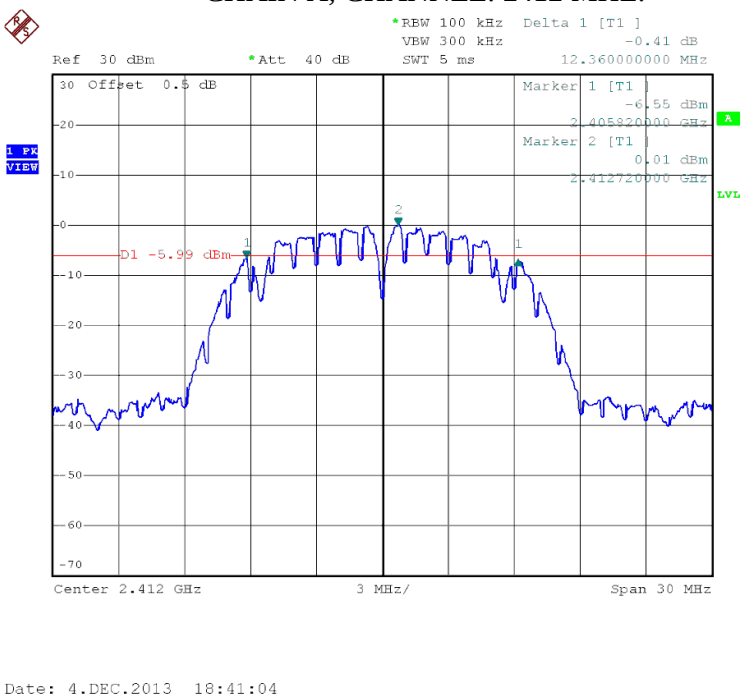
The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r01" for compliance to FCC 47CFR 15.247 requirements.

3.4 Test Protocol

Temperature : 18°C
Relative Humidity : 40%

Test frequency (MHz)	6 dB Bandwidth (MHz)		Limit (MHz)
	Port A	Port B	
2412	12.36	12.36	⩾0.5
2438	12.30	12.36	
2464	12.30	12.36	
5736	12.30	12.30	
5762	12.33	12.36	
5814	12.30	12.30	

CHAIN A, CHANNEL: 2412 MHZ:



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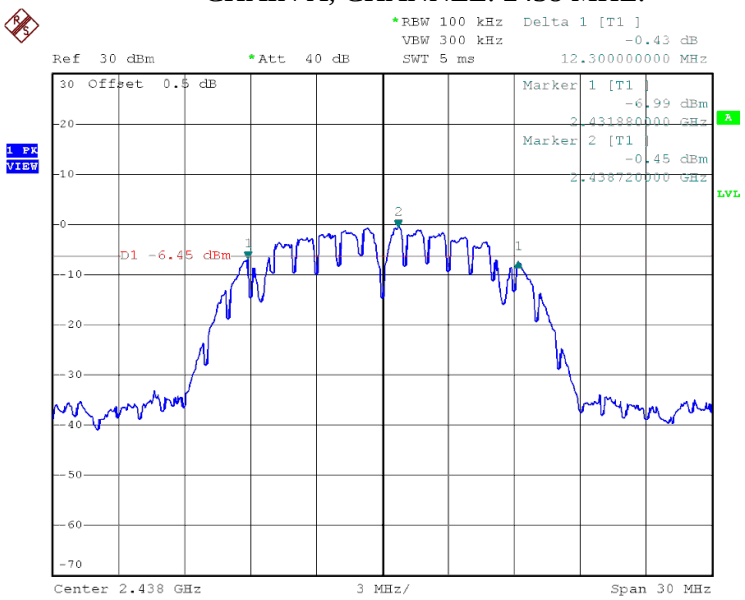

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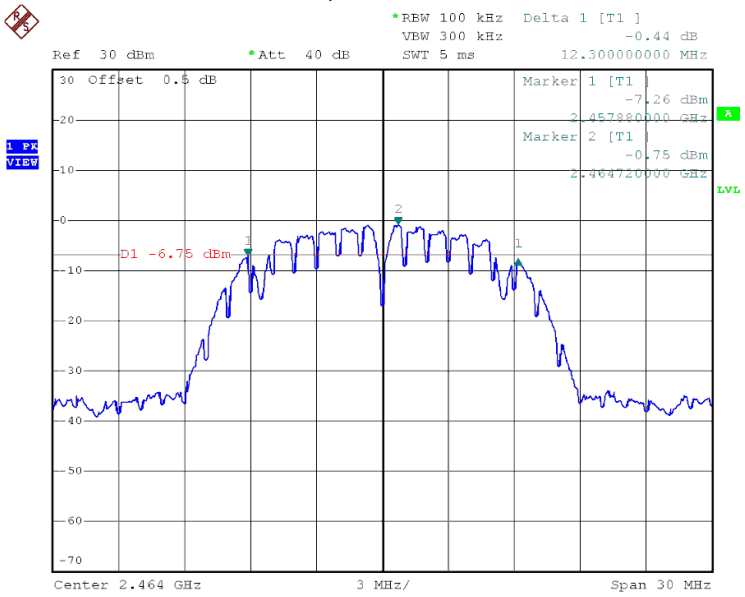

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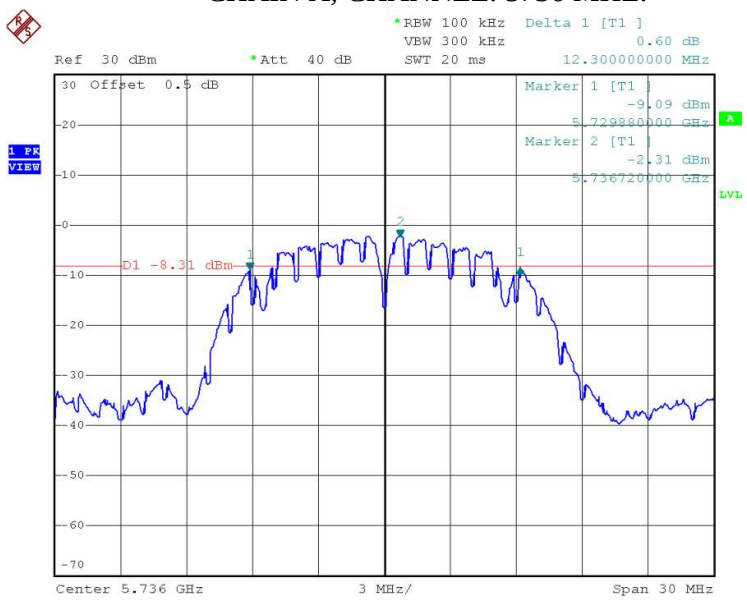

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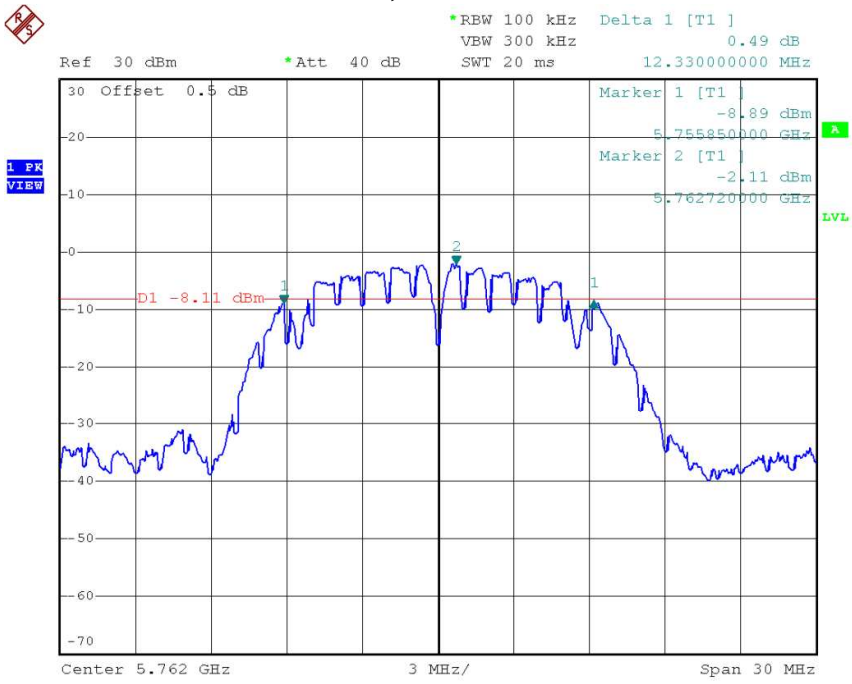

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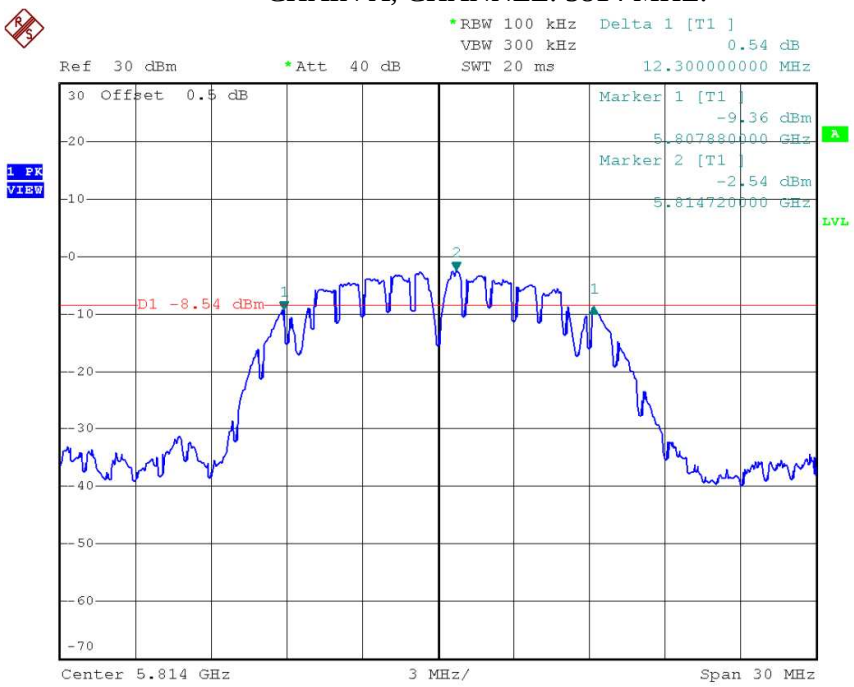

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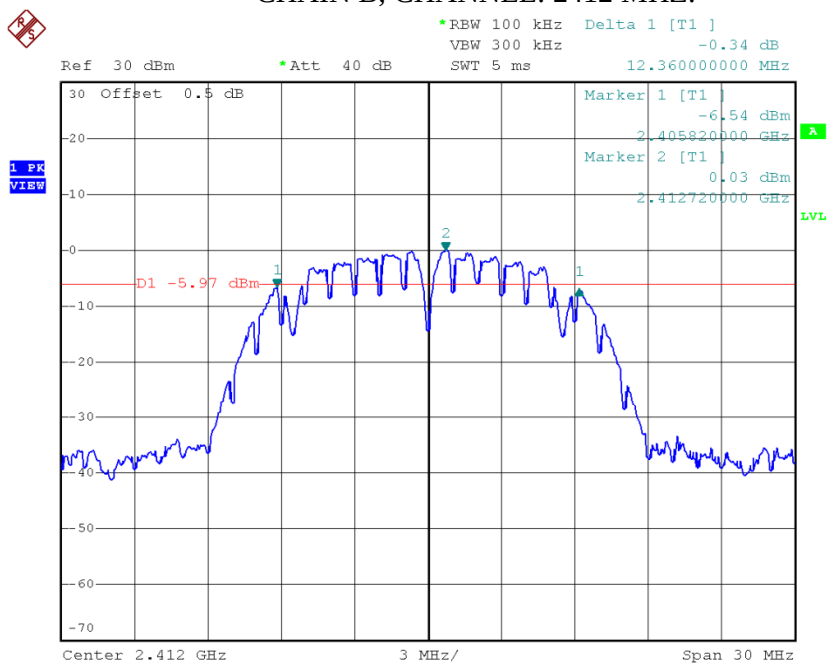

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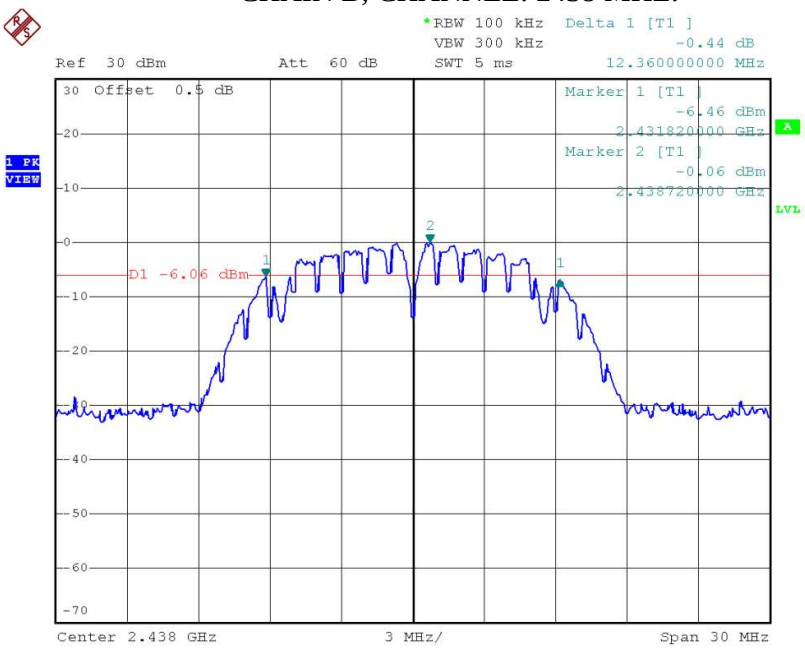

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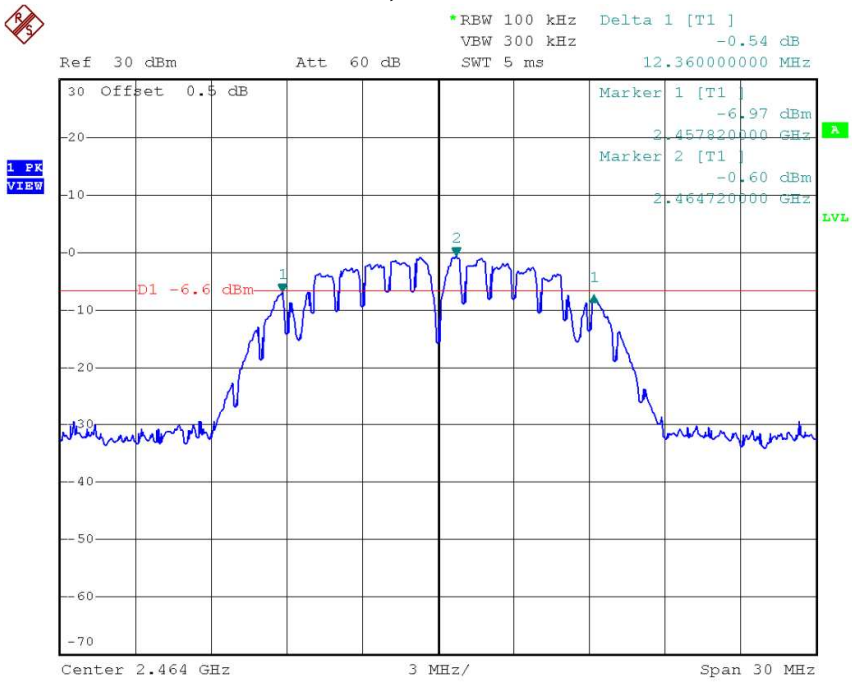

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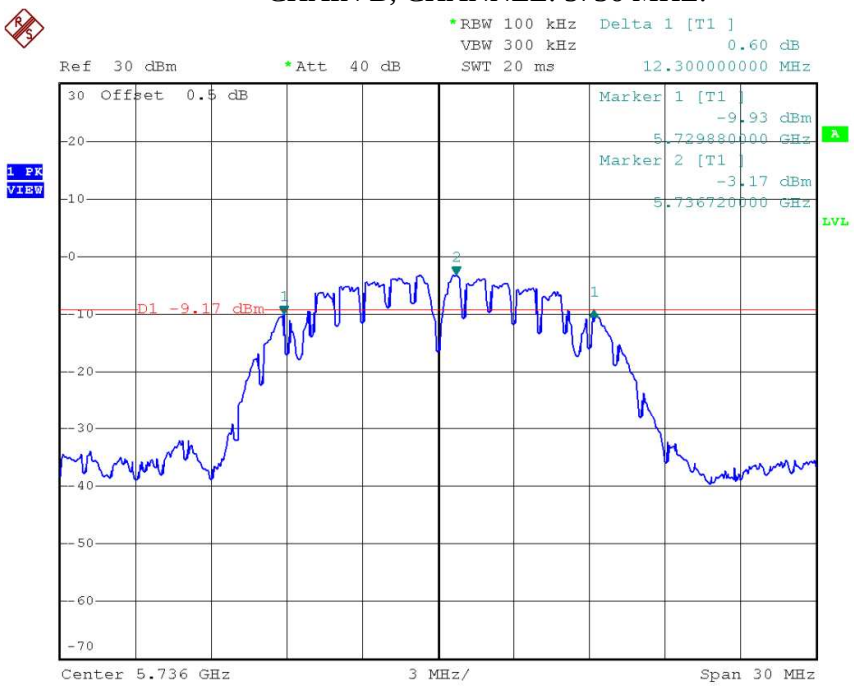

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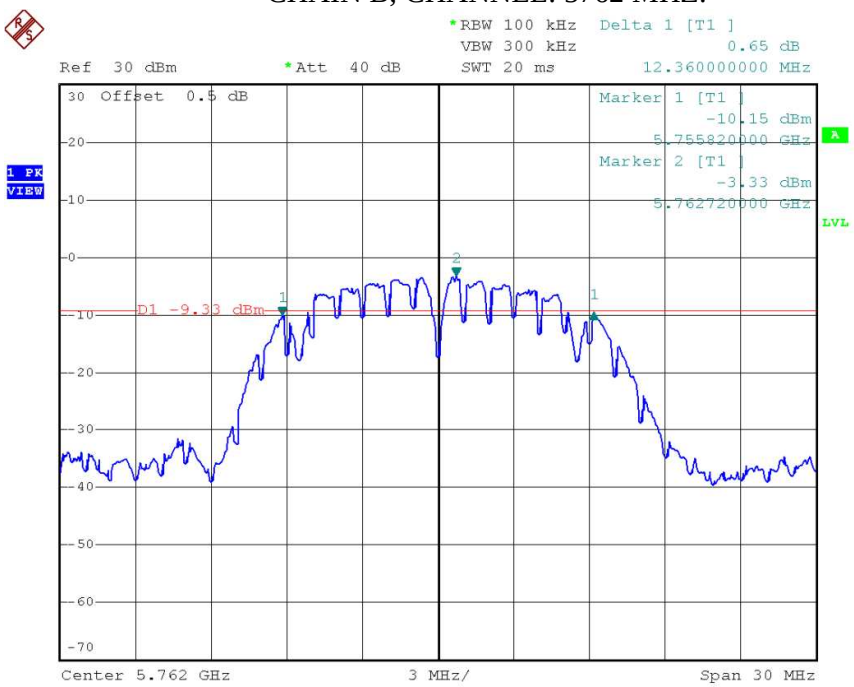

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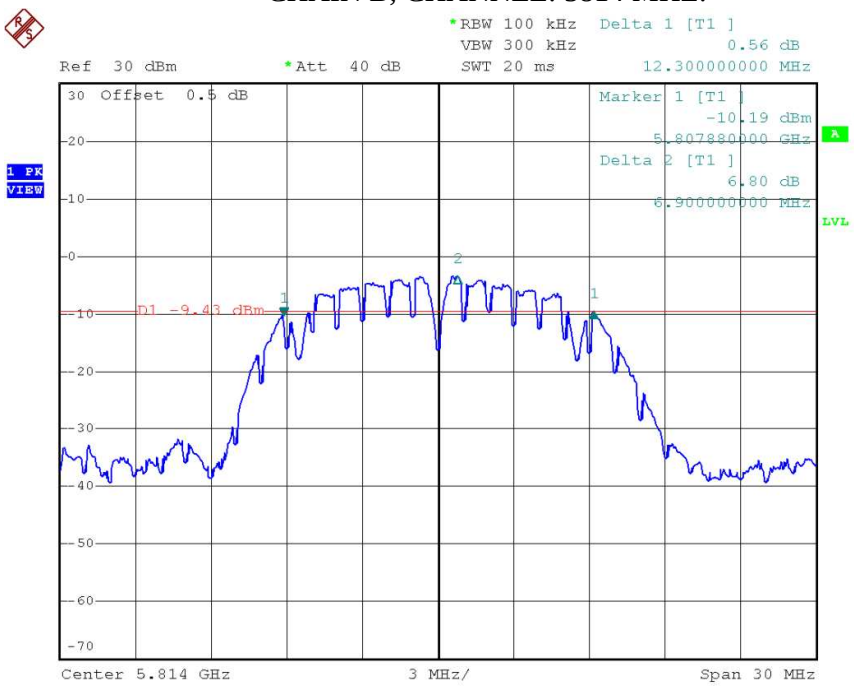


Date: 4.DEC.2013 18:34:33

4. Maximum peak conducted output power

Test result: Pass

4.1 Test limit

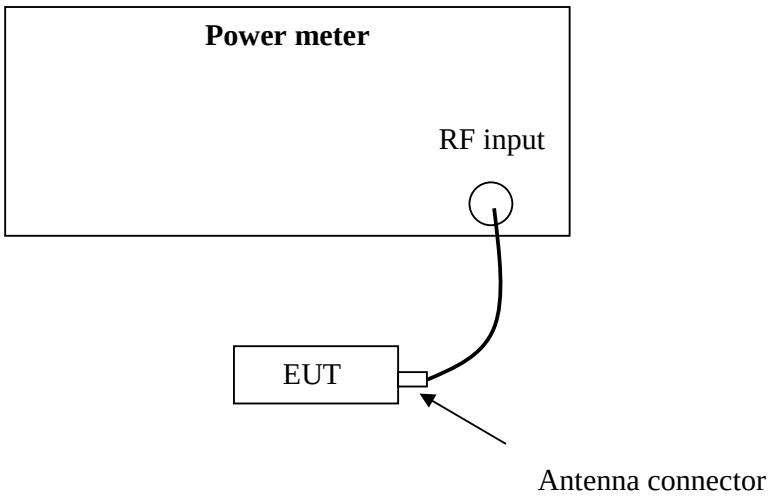
☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

☐ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

☒ For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Test Configuration



4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r01" for compliance to FCC 47CFR 15.247 requirements (clause 9.1.2).

4.4 Test protocol

Temperature : 18°C
Relative Humidity : 40%

Test frequency (MHz)	Cable loss (dB)	Measured output power (dBm)		Limit (dBm)
		Port A	Port B	
2412	0.50	**19.49**	19.48	≤30
2438	0.50	18.85	18.78	
2464	0.50	18.11	18.02	
5736	0.50	**16.95**	16.15	
5762	0.50	16.75	15.97	
5814	0.50	16.17	15.28	

Note:

2412 – 2464 MHz: The maximum EIRP of the EUT = 19.49dBm + 4.2dBi = 23.69 dBm = 233.88 mW which is lower than the EIRP limit (4W) of RSS-210.

5736 – 5814 MHz: The maximum EIRP of the EUT = 16.95dBm + 4.5dBi = 21.45 dBm = 139.64 mW which is lower than the EIRP limit (4W) of RSS-210.

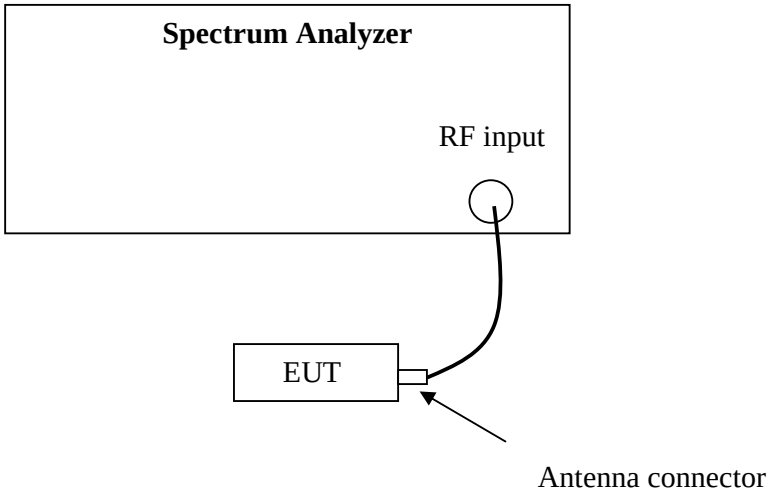
5. Power spectrum density

Test result: **Pass**

5.1 Test limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Configuration



5.3 Test procedure and test setup

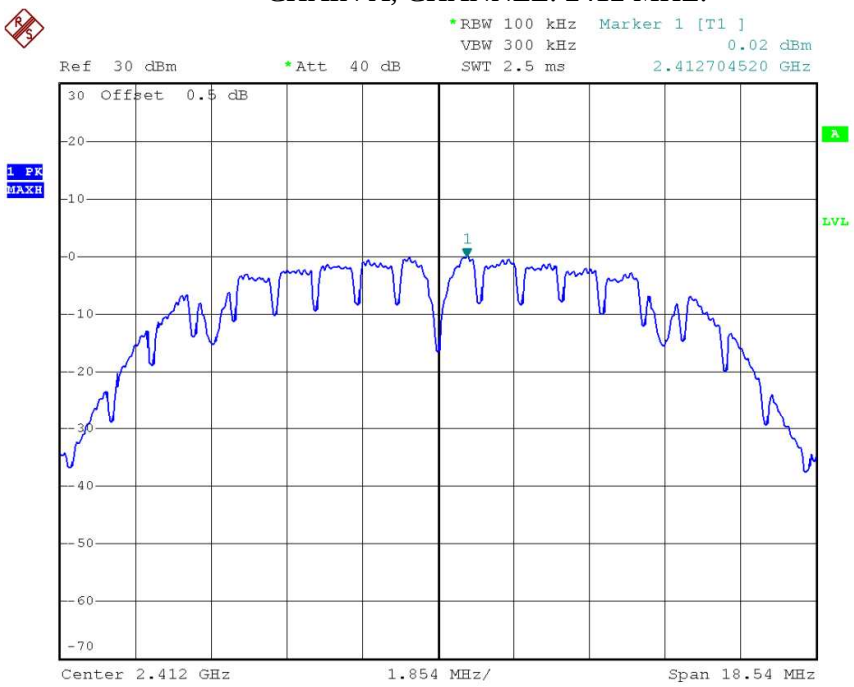
The power output per FCC §15.247(e) was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r01" (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

5.4 Test Protocol

Temperature : 18 °C
Relative Humidity: 40 %

Test frequency (MHz)	Cable loss (dB)	Spectrum Density (dBm/100kHz)		Limit (dBm/3kHz)
		Port A	Port B	
2412	0.50	0.02	0.07	≤8.00
2438	0.50	-0.44	0.00	
2464	0.50	-0.79	-0.73	
5736	0.50	-2.34	-3.05	
5762	0.50	-2.15	-3.40	
5814	0.50	-2.52	-3.44	

CHAIN A, CHANNEL: 2412 MHZ:



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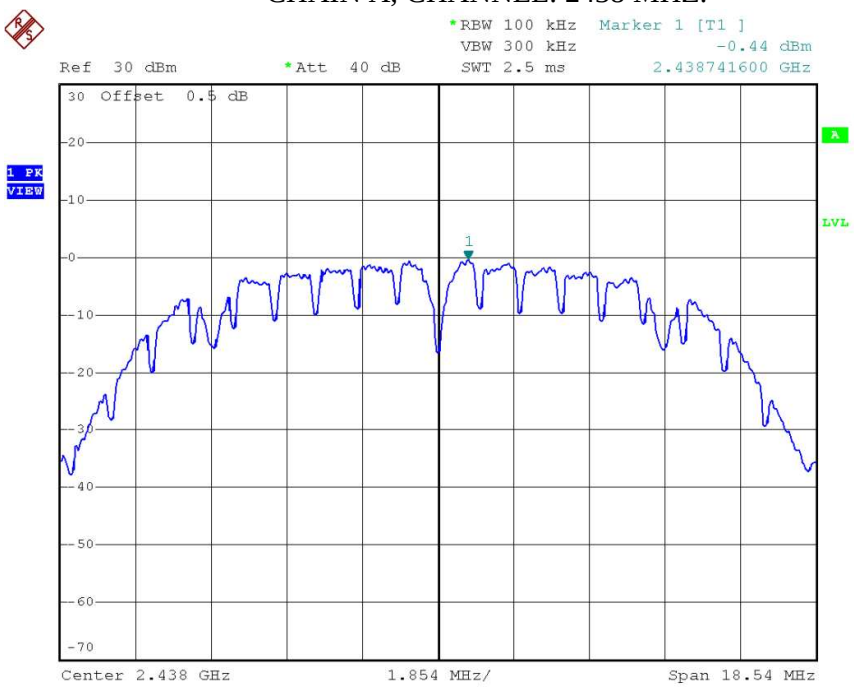

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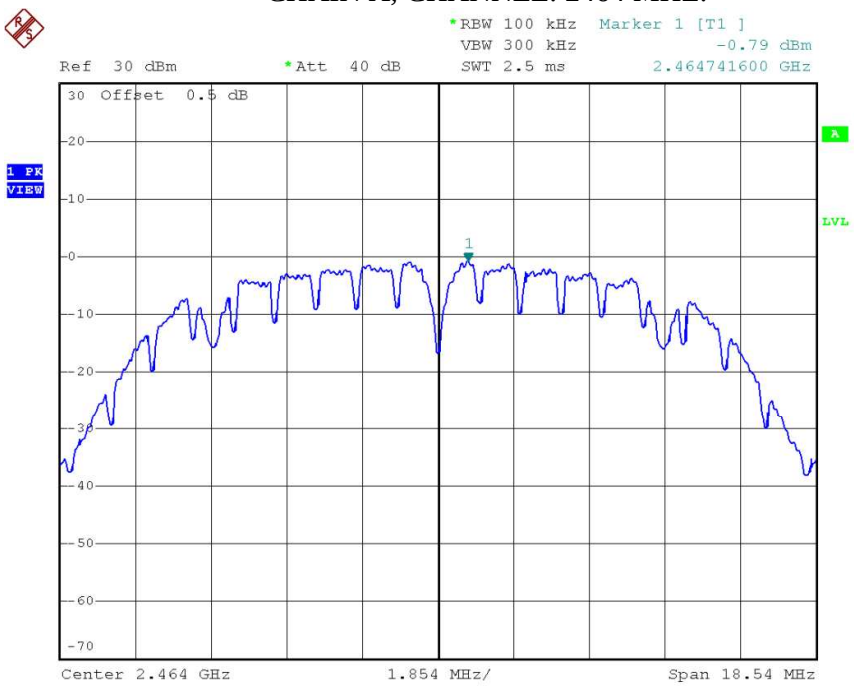

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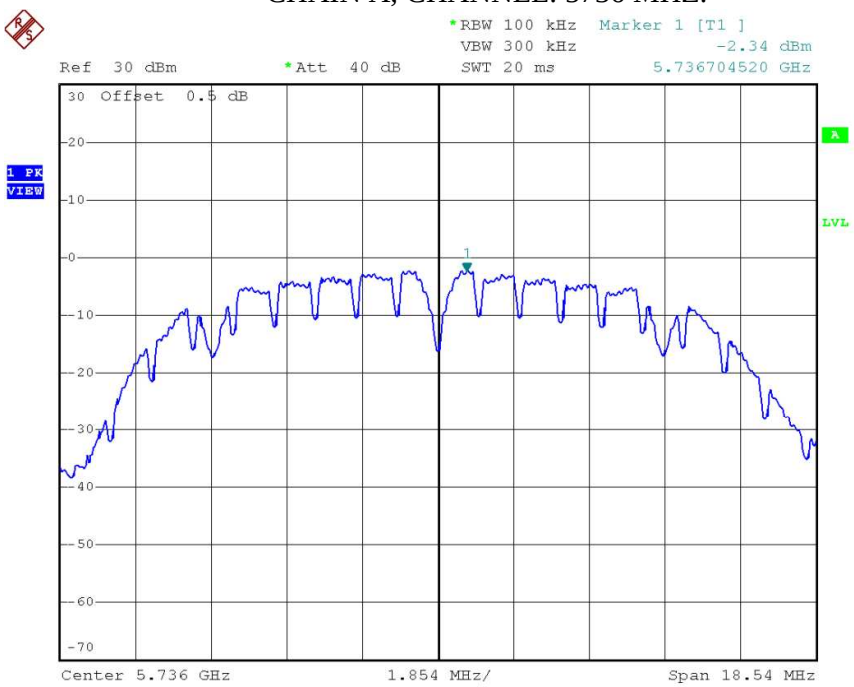

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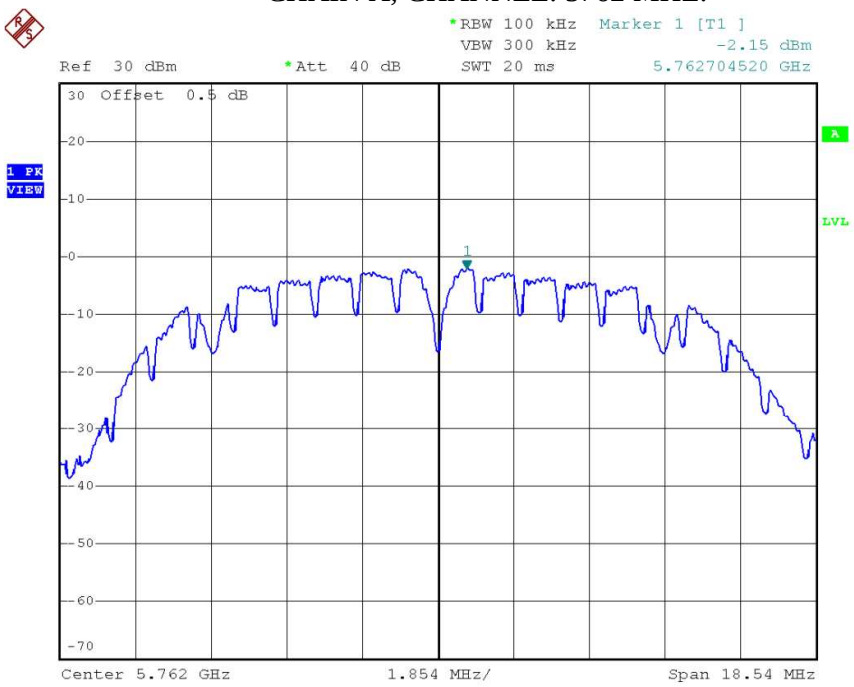

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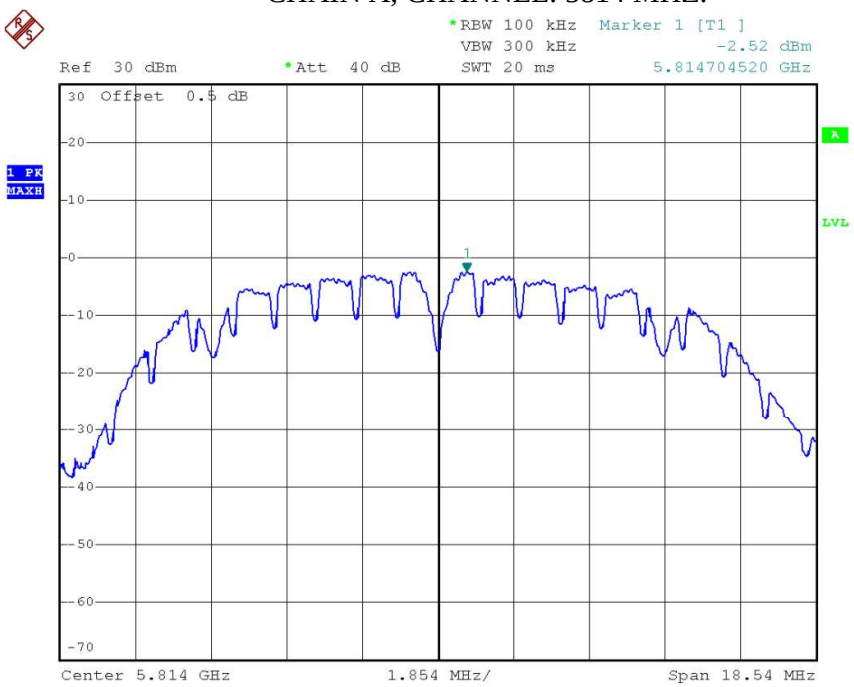

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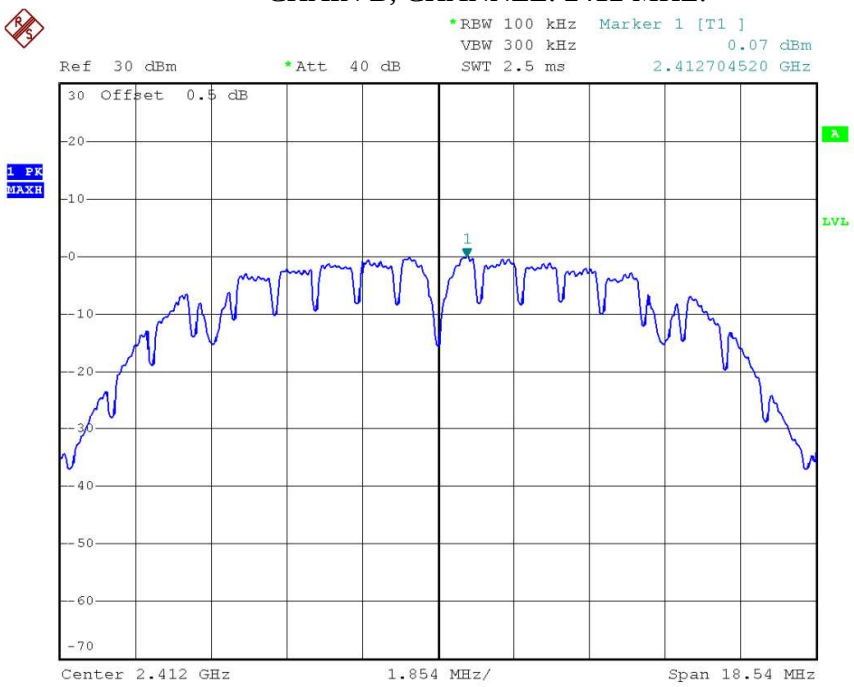

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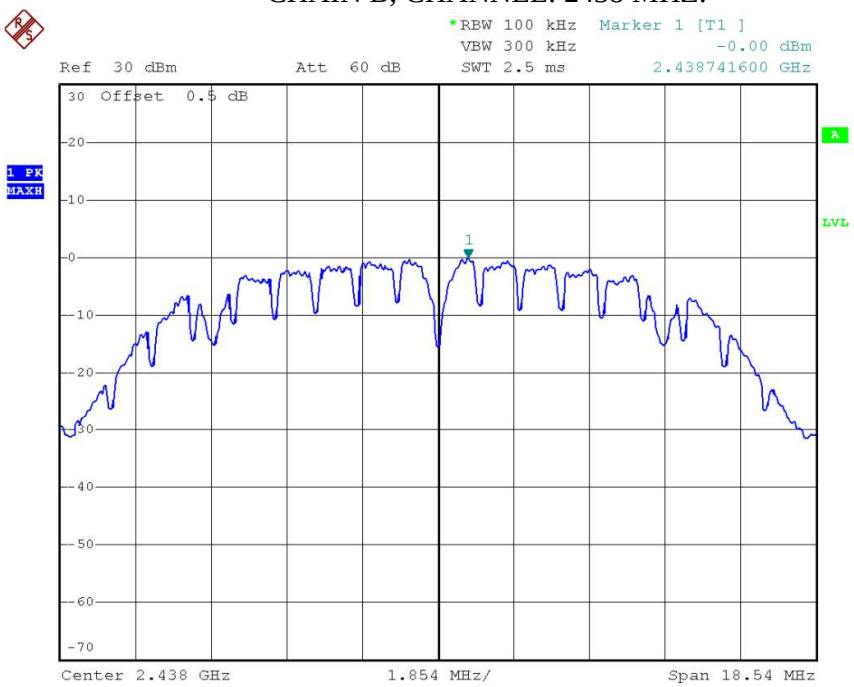

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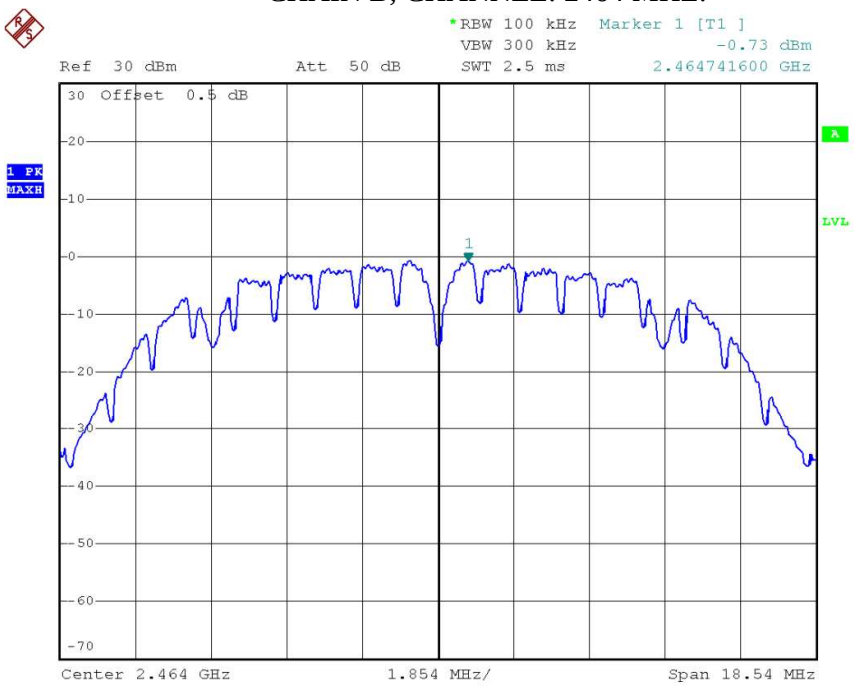

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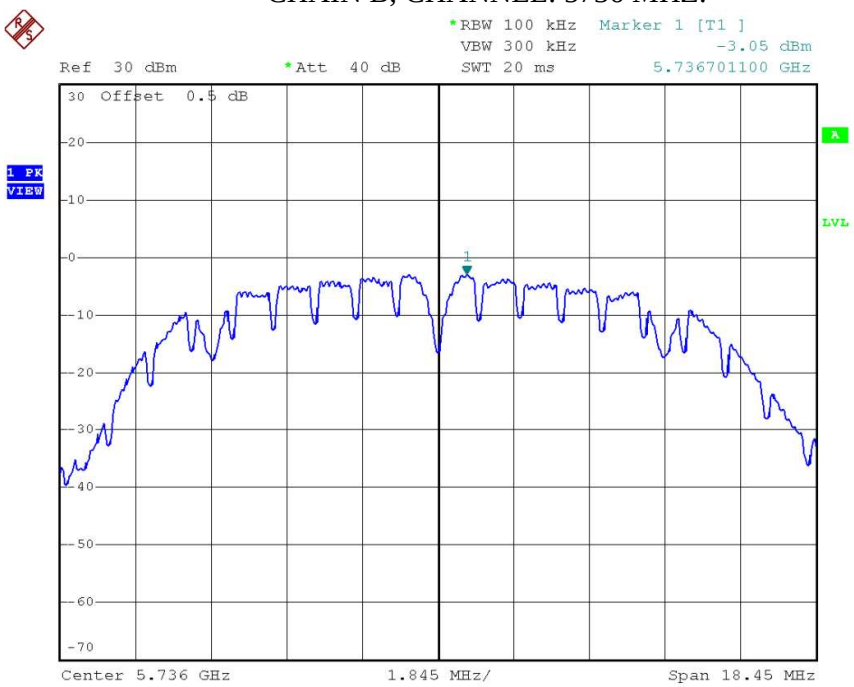

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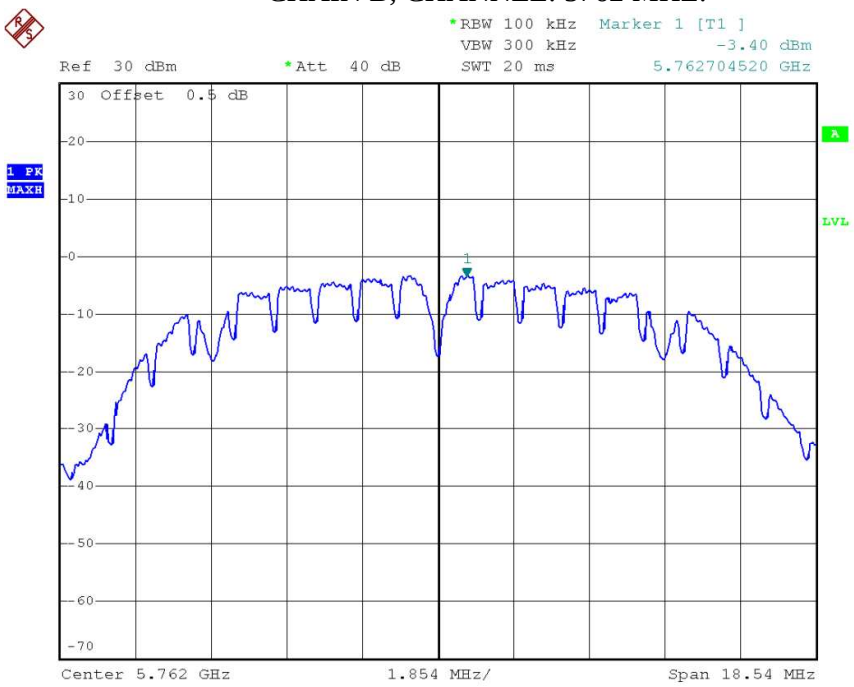

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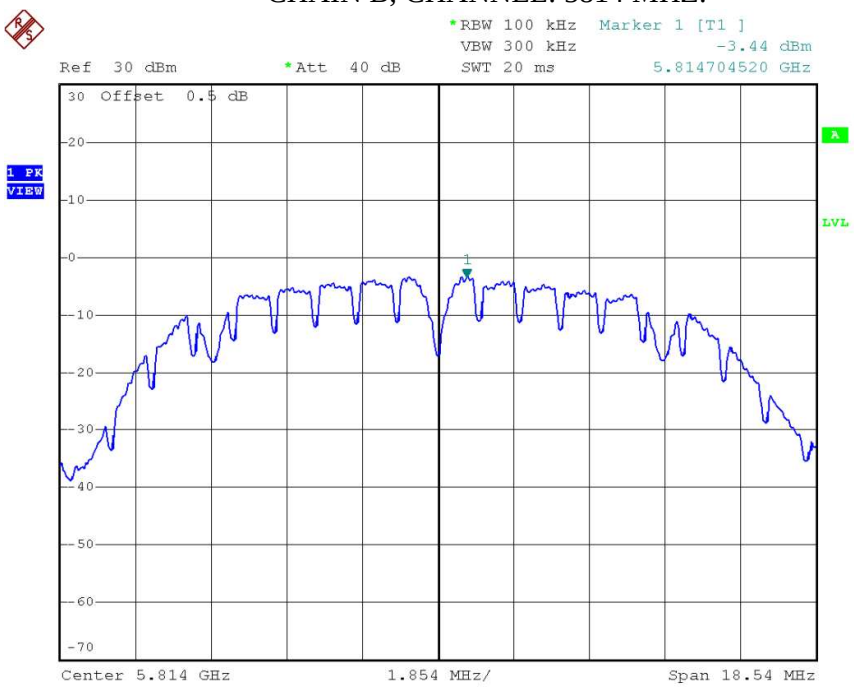

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6. Radiated emission in restricted frequency bands

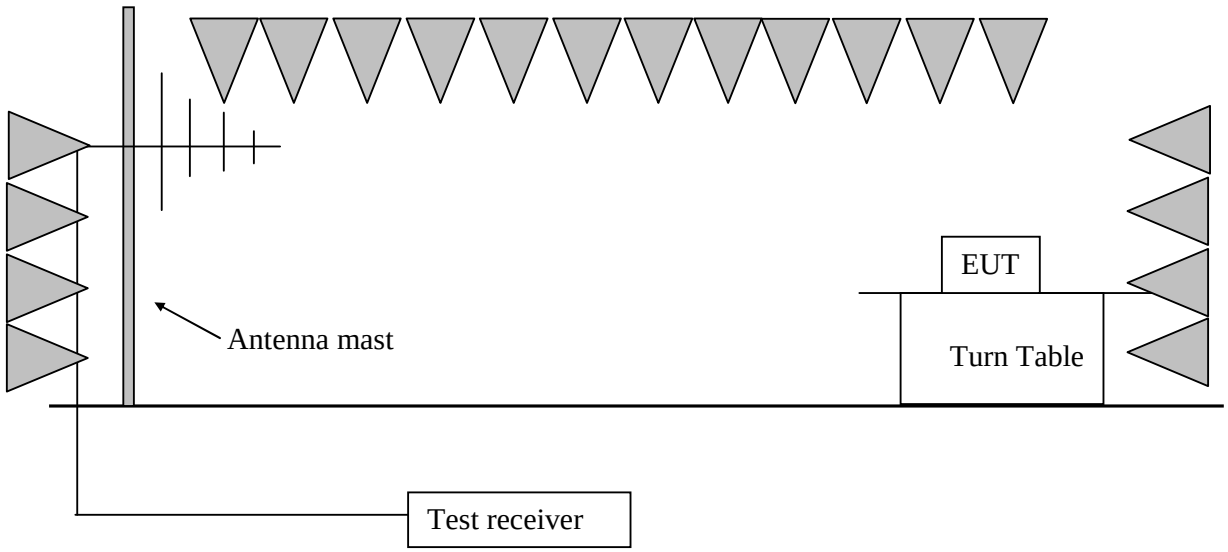
Test result: PASS

6.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

6.2 Test Configuration



6.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.
The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.
The EUT was tested according to DTS test procedure of KDB558074 D01 DTS “Meas Guidance v03r01” (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

6.4 Test protocol

Emission below 1 GHz:

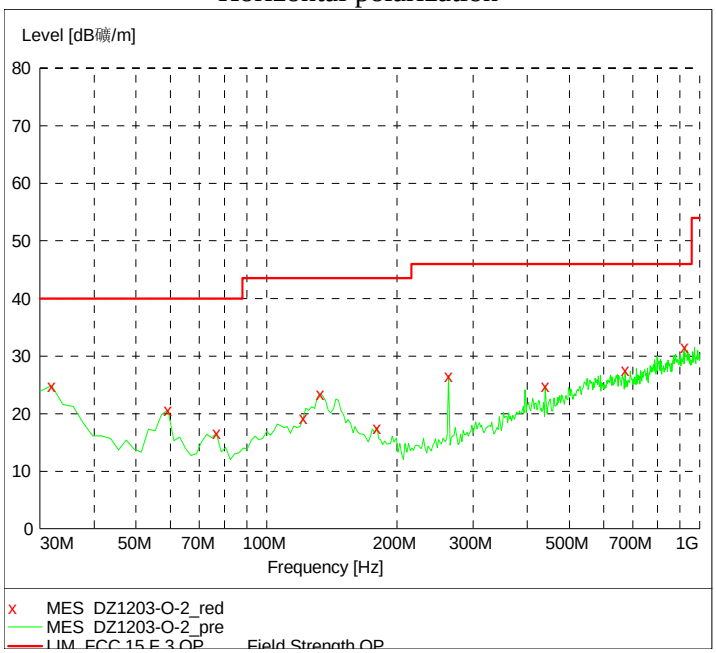
Worst case (With PCBA (RC1WFI0901A)):

Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
V	37.78	14.00	20.00	40.00	20.00	PK
H	133.03	25.50	15.70	43.50	18.00	PK
H	263.27	24.40	25.20	46.00	20.80	PK
H	440.16	18.90	24.90	46.00	21.10	PK
H	673.43	22.60	27.60	46.00	18.40	PK
H	924.19	25.20	31.60	46.00	14.40	PK

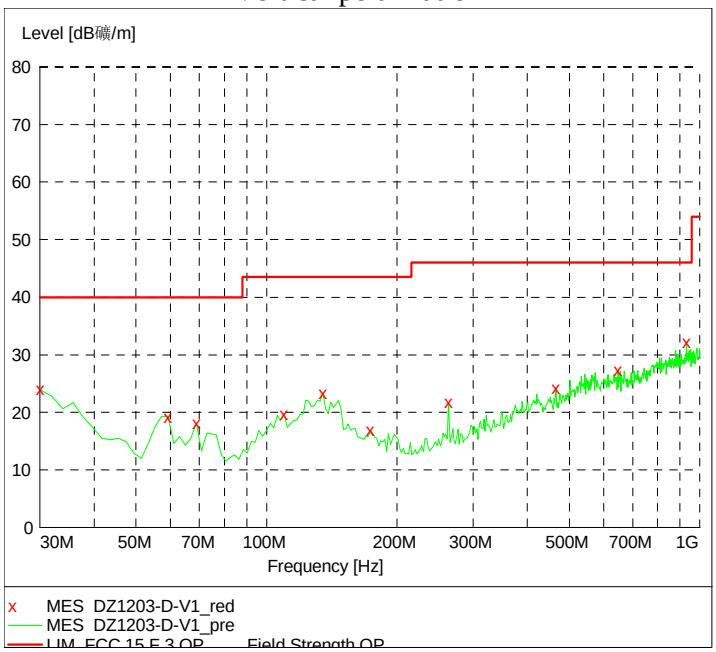
Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = limit – Corrected Reading
4. If the PK reading is lower than QP limit, the QP test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

Horizontal polarization



Vertical polarization



Emission above 1GHz:
With integral antenna:

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2412.00	34.10	97.40	Fundamental	/	PK
	V	2390.00	34.10	59.80	74.00	14.20	PK
	V	2390.00	34.10	48.60	54.00	5.40	AV
	H	4824.00	-3.50	42.80	54.00	11.20	PK
	H	7250.00	2.90	44.20	54.00	9.80	PK
	H	12060.00	7.60	47.00	54.00	7.00	PK
2438	V	2438.00	34.30	100.20	Fundamental	/	PK
	H	4876.00	-3.50	42.80	54.00	16.40	PK
	H	7314.00	2.90	44.20	54.00	9.80	PK
	V	12190.00	7.60	47.00	54.00	7.00	PK
2464	V	2464.00	34.40	97.30	Fundamental	/	PK
	V	2483.50	34.40	54.40	74.00	19.60	PK
	V	2483.50	34.40	44.00	54.00	10.00	AV
	H	4928.00	-3.50	42.80	54.00	11.20	PK
	H	7392.00	2.90	44.20	54.00	9.80	PK
	V	12320.00	10.40	47.00	54.00	7.00	PK

Remark: 1. For fundamental & restrict emission at 2310 - 2390MHz and 2483.5-2450MHz test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB, Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV. Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

With integral antenna:

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
5736	V	5736.00	32.10	100.10	Fundamental	/	PK
	V	11472.00	7.30	46.40	54.00	7.60	PK
5762	V	5762.00	32.10	99.90	Fundamental	/	PK
	V	11524.00	7.30	46.40	54.00	7.60	PK
5814	V	5814.00	32.10	97.80	Fundamental	/	PK
	V	11628.00	7.30	46.40	54.00	7.60	PK

Remark: 1. For fundamental test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

With mono-antenna (RC8WFI10042A):

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2412.00	34.10	103.20	Fundamental	/	PK
	V	2390.00	34.10	60.80	74.00	13.20	PK
	V	2390.00	34.10	49.40	54.00	4.60	AV
	H	4824.00	-3.50	42.80	54.00	11.20	PK
	H	7250.00	2.90	44.20	54.00	9.80	PK
	H	12060.00	7.60	47.00	54.00	7.00	PK
2438	V	2438.00	34.30	102.40	Fundamental	/	PK
	H	4876.00	-3.50	42.80	54.00	16.40	PK
	H	7314.00	2.90	44.20	54.00	9.80	PK
	V	12190.00	7.60	47.00	54.00	7.00	PK
2464	V	2464.00	34.40	100.50	Fundamental	/	PK
	V	2483.50	34.40	55.60	74.00	18.40	PK
	V	2483.50	34.40	46.10	54.00	7.90	AV
	H	4928.00	-3.50	42.80	54.00	11.20	PK
	H	7392.00	2.90	44.20	54.00	9.80	PK
	V	12320.00	10.40	47.00	54.00	7.00	PK

Remark: 1. For fundamental & restrict emission at 2310 - 2390MHz and 2483.5-2450MHz test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

With mono-antenna (RC8WFI10042A):

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
5736	V	5736.00	32.10	103.00	Fundamental	/	PK
	V	11472.00	7.30	46.40	54.00	7.60	PK
5762	V	5762.00	32.10	102.40	Fundamental	/	PK
	V	11524.00	7.30	46.40	54.00	7.60	PK
5814	V	5814.00	32.10	102.60	Fundamental	/	PK
	V	11628.00	7.30	46.40	54.00	7.60	PK

Remark: 1. For fundamental test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

With PIFA antenna (RC1WFI0901A):

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2412.00	34.10	104.50	Fundamental	/	PK
	V	2390.00	34.10	62.60	74.00	11.40	PK
	V	2390.00	34.10	52.10	54.00	1.90	AV
	H	4824.00	-3.50	42.80	54.00	11.20	PK
	H	7250.00	2.90	44.20	54.00	9.80	PK
	H	12060.00	7.60	47.00	54.00	7.00	PK
2438	V	2438.00	34.30	105.30	Fundamental	/	PK
	H	4876.00	-3.50	42.80	54.00	16.40	PK
	H	7314.00	2.90	44.20	54.00	9.80	PK
	V	12190.00	7.60	47.00	54.00	7.00	PK
2464	V	2464.00	34.40	105.50	Fundamental	/	PK
	V	2483.50	34.40	58.70	74.00	15.30	PK
	V	2483.50	34.40	48.10	54.00	5.90	AV
	H	4928.00	-3.50	42.80	54.00	11.20	PK
	H	7392.00	2.90	44.20	54.00	9.80	PK
	V	12320.00	10.40	47.00	54.00	7.00	PK

Remark: 1. For fundamental & restrict emission at 2310 - 2390MHz and 2483.5-2450MHz test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

With PIFA antenna (RC1WFI0901A):

Chan. Fre. (MHz)	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
5736	V	5736.00	32.10	105.50	Fundamental	/	PK
	V	11472.00	7.30	46.40	54.00	7.60	PK
5762	V	5762.00	32.10	104.90	Fundamental	/	PK
	V	11524.00	7.30	46.40	54.00	7.60	PK
5814	V	5814.00	32.10	105.10	Fundamental	/	PK
	V	11628.00	7.30	46.40	54.00	7.60	PK

Remark: 1. For fundamental test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

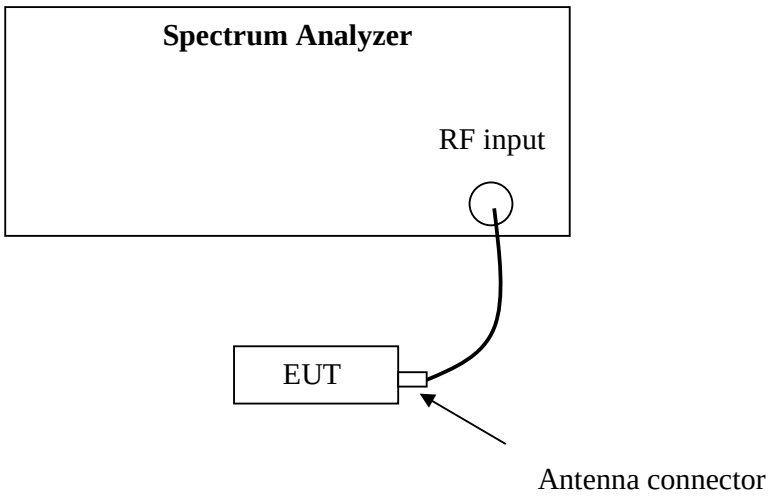
7. Emission outside the frequency band (in non-restricted frequency bands)

Test result: **PASS**

7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

7.2 Test Configuration



7.3 Test procedure and test setup

The Emission outside the frequency Band per FCC §15.247(d) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.
The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r01" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

7.4 Test protocol

Temperature : 25 °C

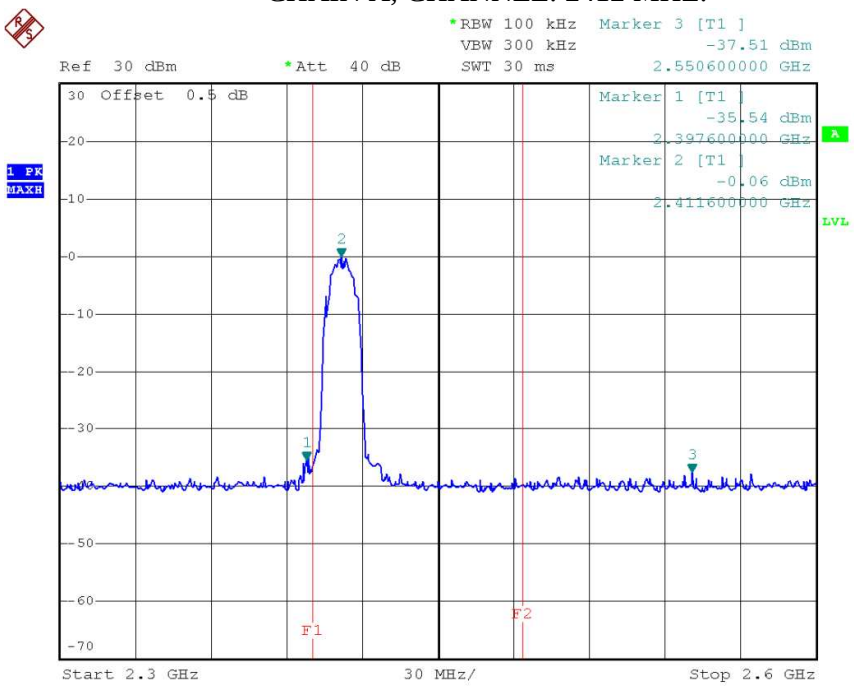
Relative Humidity: 55 %

Port A (Chain A):

Test frequency (MHz)	Cable loss (dB)	Max reading among band (dBm)	The most restrict Attenuation outside band (dB)	Limit (dB)
2412	0.50	-0.06	35.48	≥20
2438	0.50	-0.37	38.32	
2464	0.50	-0.71	37.90	
5736	0.50	-2.14	31.55	
5762	0.50	-1.97	36.49	
5814	0.50	-2.62	35.10	

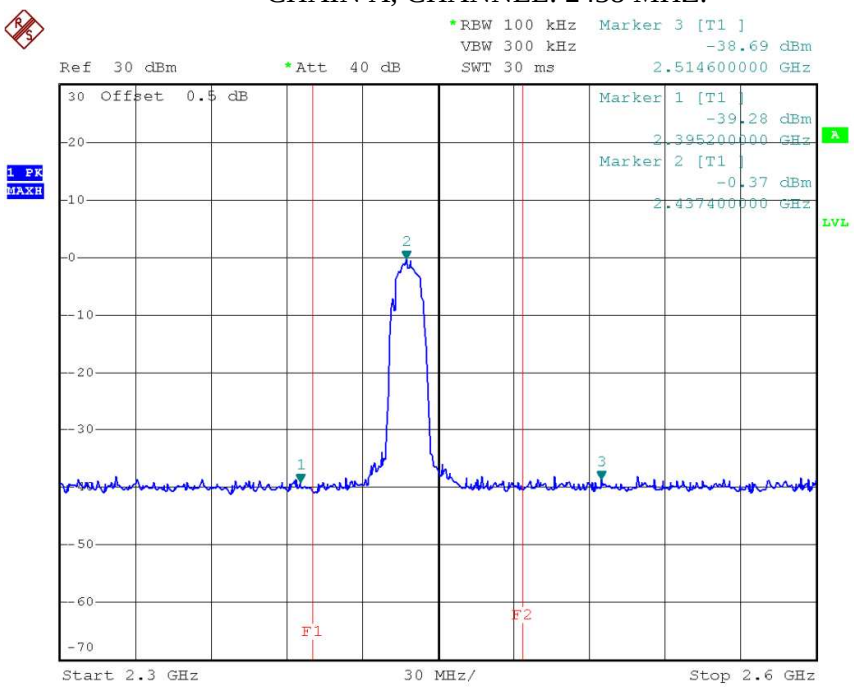
Note: The test was performed from 9kHz to 26GHz and the graph of band edge emission is listed below.

CHAIN A, CHANNEL: 2412 MHZ:



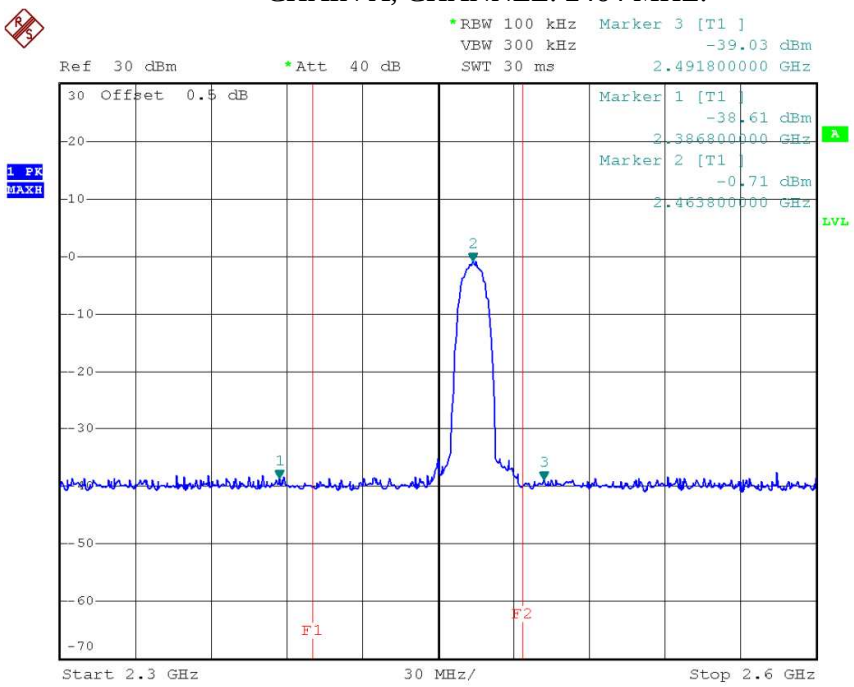
Date: 4.DEC.2013 19:51:31

CHAIN A, CHANNEL: 2438 MHZ:



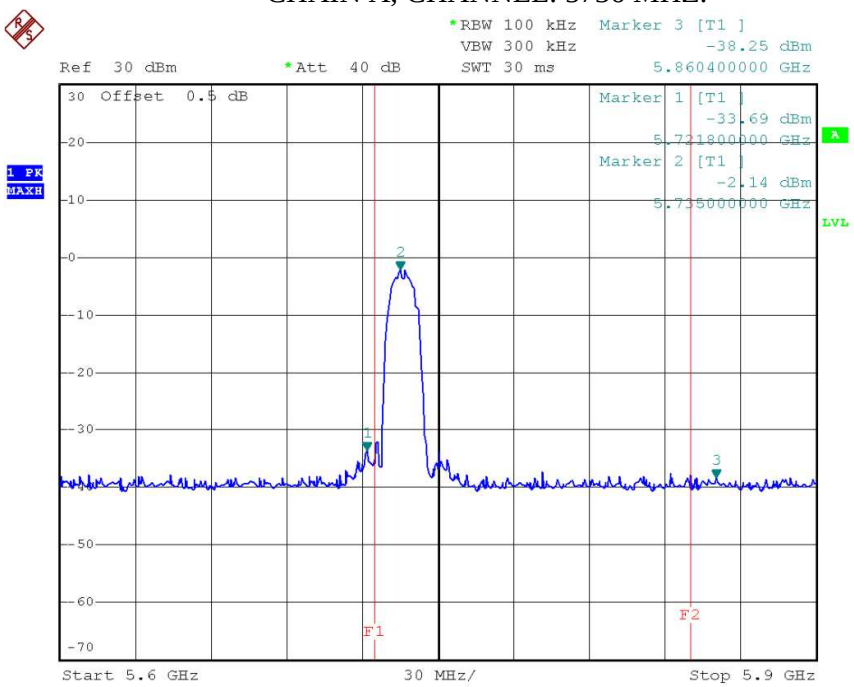
Date: 4.DEC.2013 19:52:17

CHAIN A, CHANNEL: 2464 MHZ:



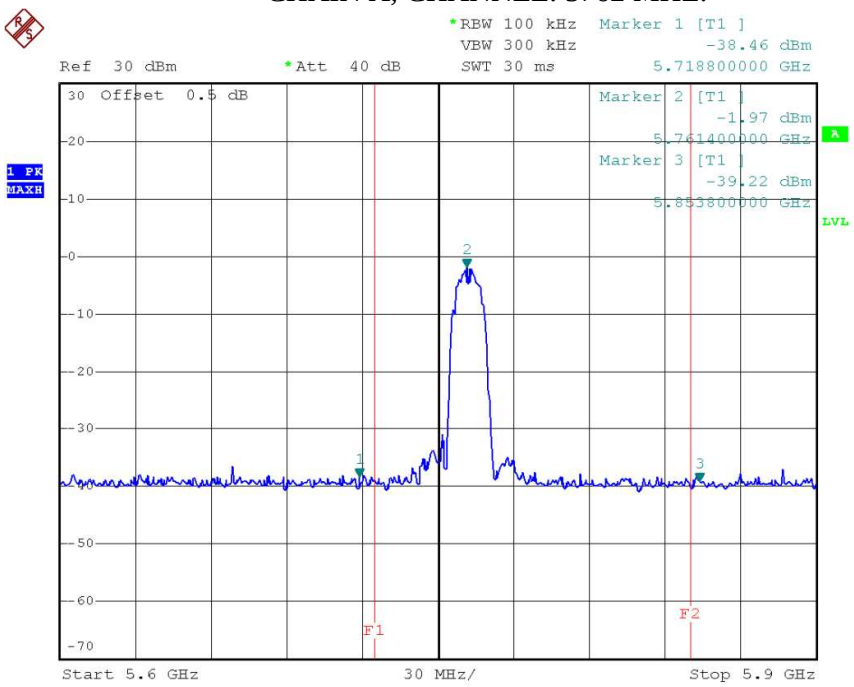
Date: 4.DEC.2013 19:53:20

CHAIN A, CHANNEL: 5736 MHZ:



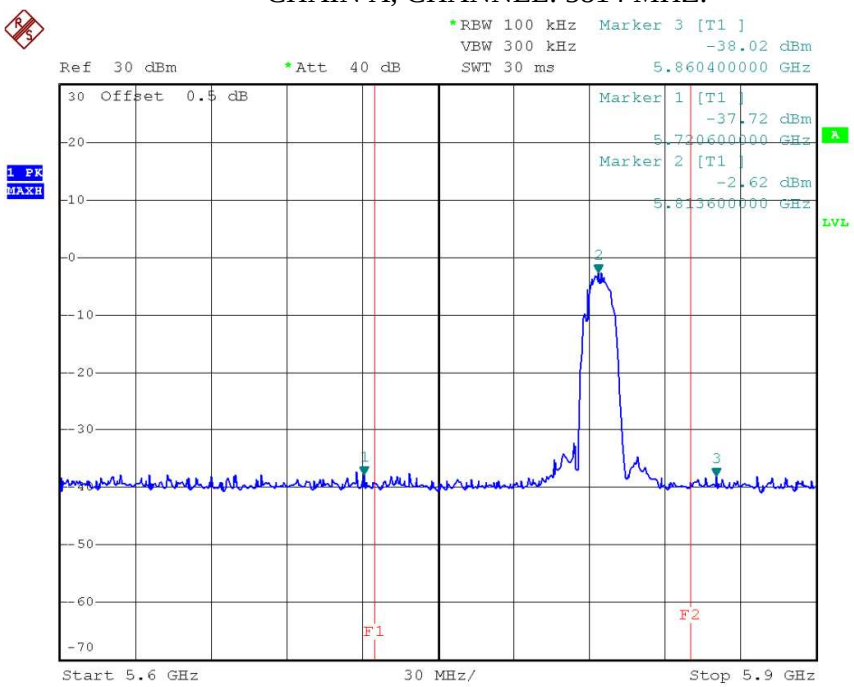
Date: 4.DEC.2013 19:49:53

CHAIN A, CHANNEL: 5762 MHZ:



Date: 4.DEC.2013 19:47:33

CHAIN A, CHANNEL: 5814 MHZ:



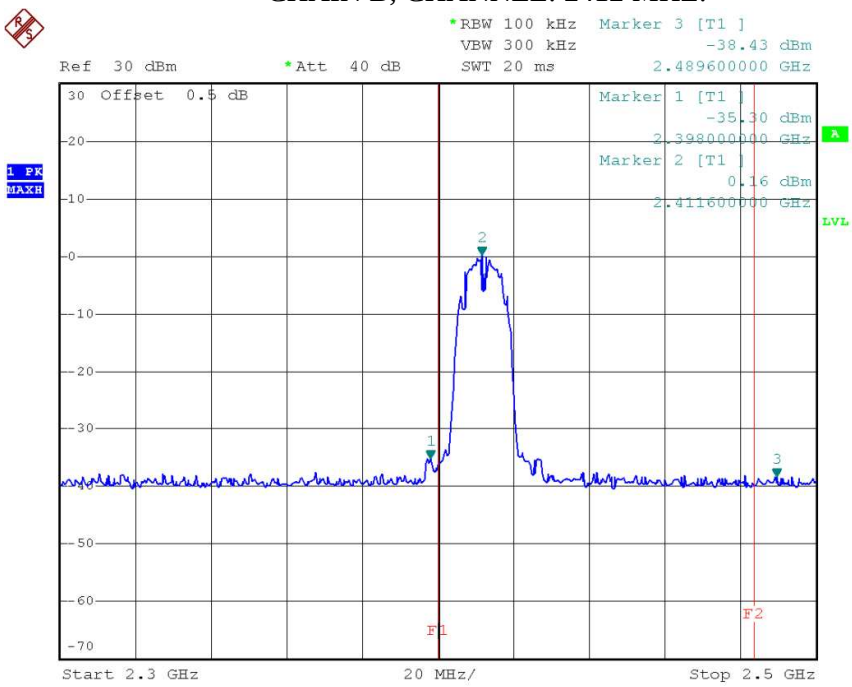
Date: 4.DEC.2013 19:48:27

Port B (Chain B):

Test frequency (MHz)	Cable loss (dB)	Max reading among band (dBm)	The most restrict Attenuation outside band (dB)	Limit (dB)
2412	0.50	0.16	35.46	≥20
2438	0.50	-0.31	37.82	
2464	0.50	-0.76	36.99	
5736	0.50	-2.91	31.52	
5762	0.50	-2.98	35.04	
5814	0.50	-3.29	33.75	

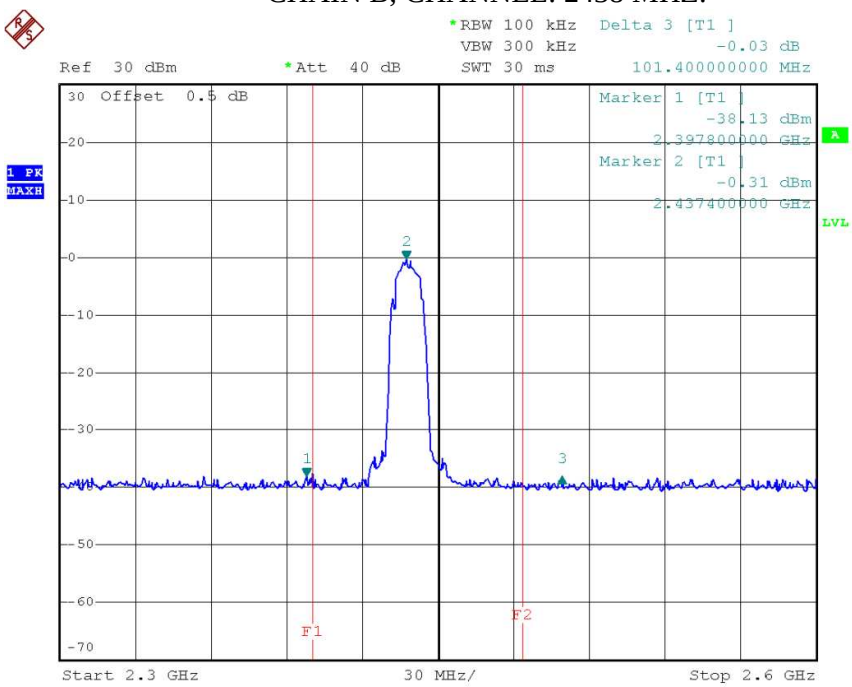
Note: The test was performed from 9 kHz to 26 GHz and the graph of band edge emission is listed below.

CHAIN B, CHANNEL: 2412 MHZ:



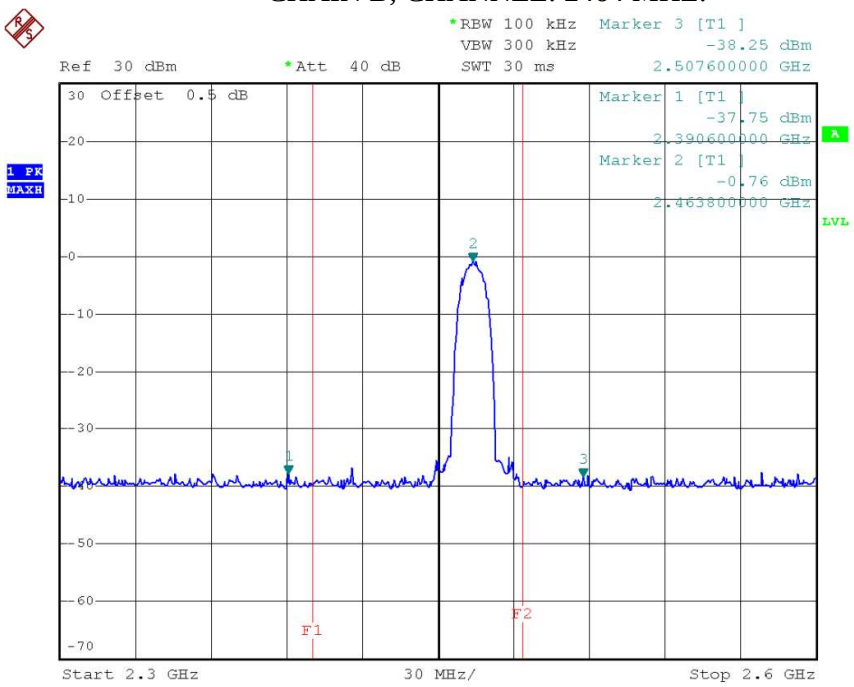
Date: 4.DEC.2013 19:18:51

CHAIN B, CHANNEL: 2438 MHZ:



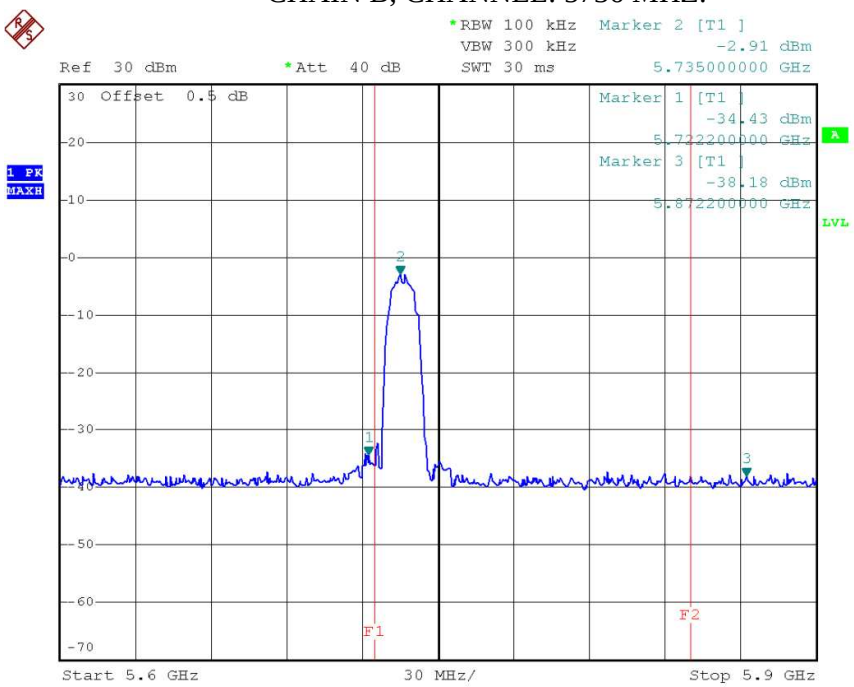
Date: 4.DEC.2013 19:23:39

CHAIN B, CHANNEL: 2464 MHZ:



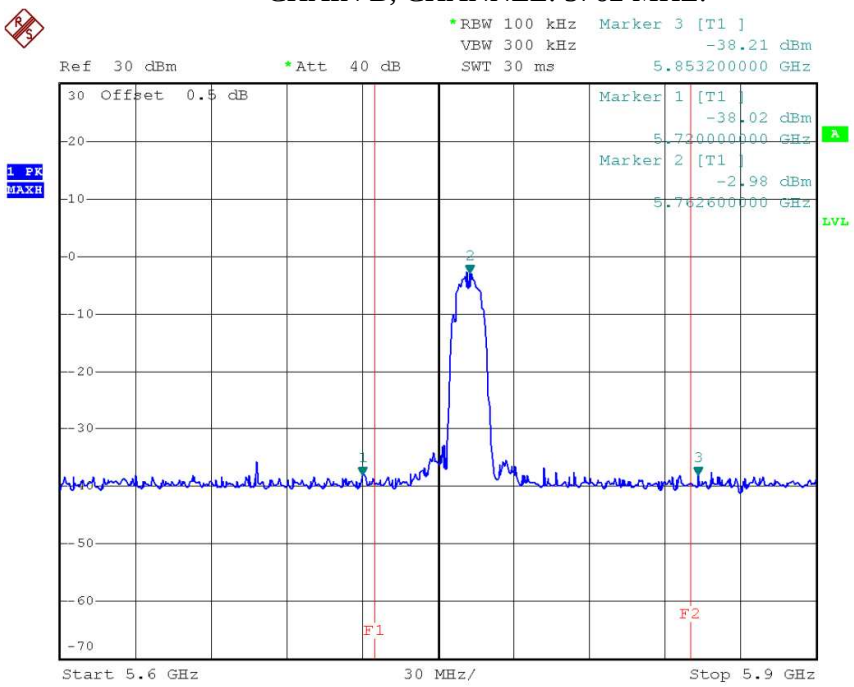
Date: 4.DEC.2013 19:25:12

CHAIN B, CHANNEL: 5736 MHZ:



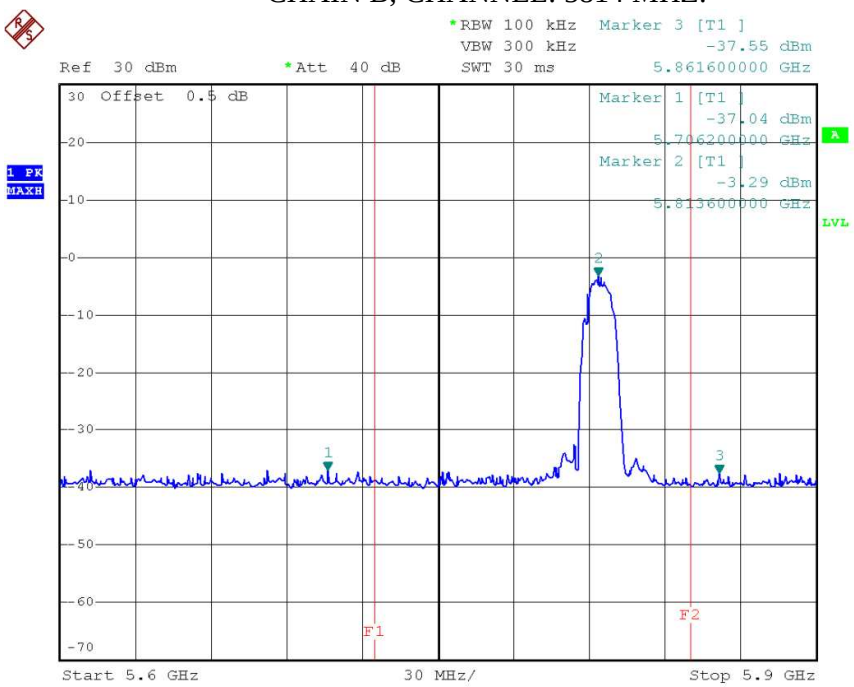
Date: 4.DEC.2013 19:34:30

CHAIN B, CHANNEL: 5762 MHZ:



Date: 4.DEC.2013 19:41:23

CHAIN B, CHANNEL: 5814 MHZ:



Date: 4.DEC.2013 19:43:07

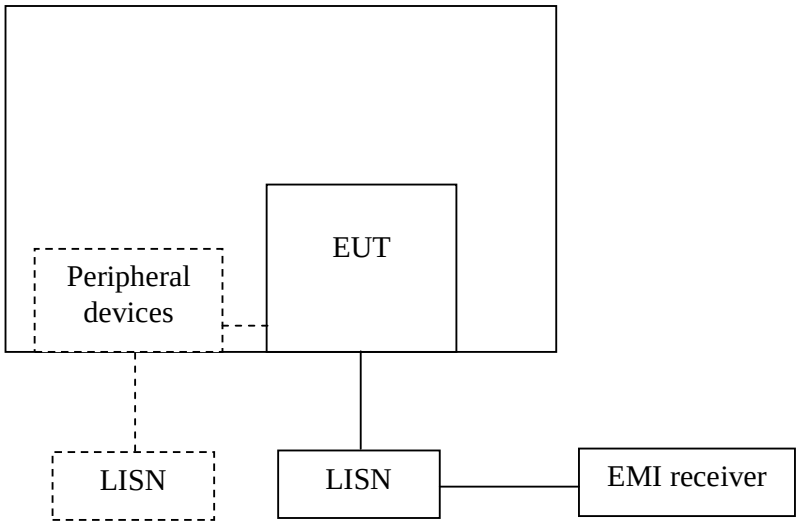
8. Power line conducted emission

Test result: **Pass**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.		

8.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

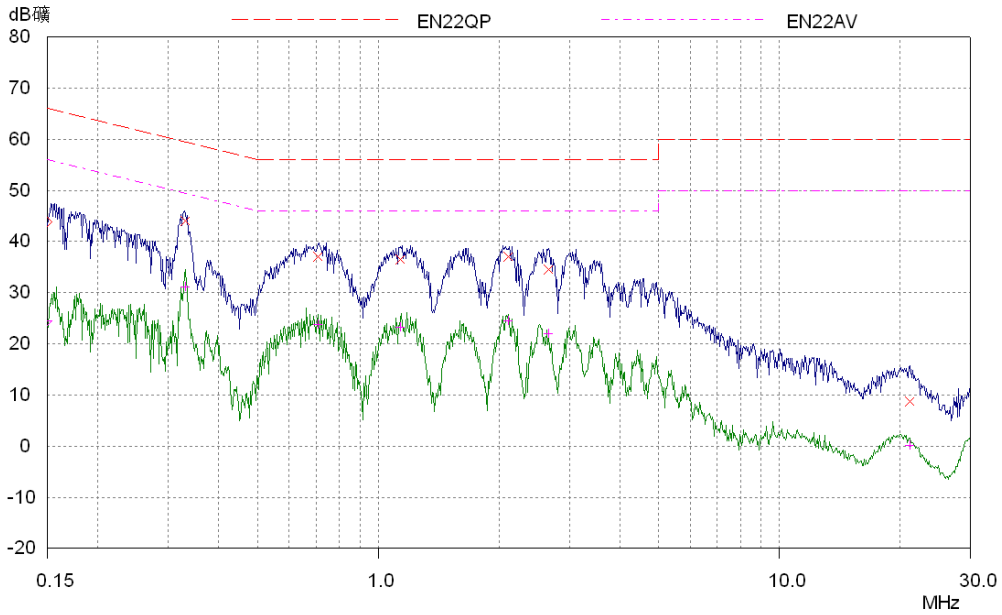
8.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
The bandwidth of the test receiver is set at 9 kHz.

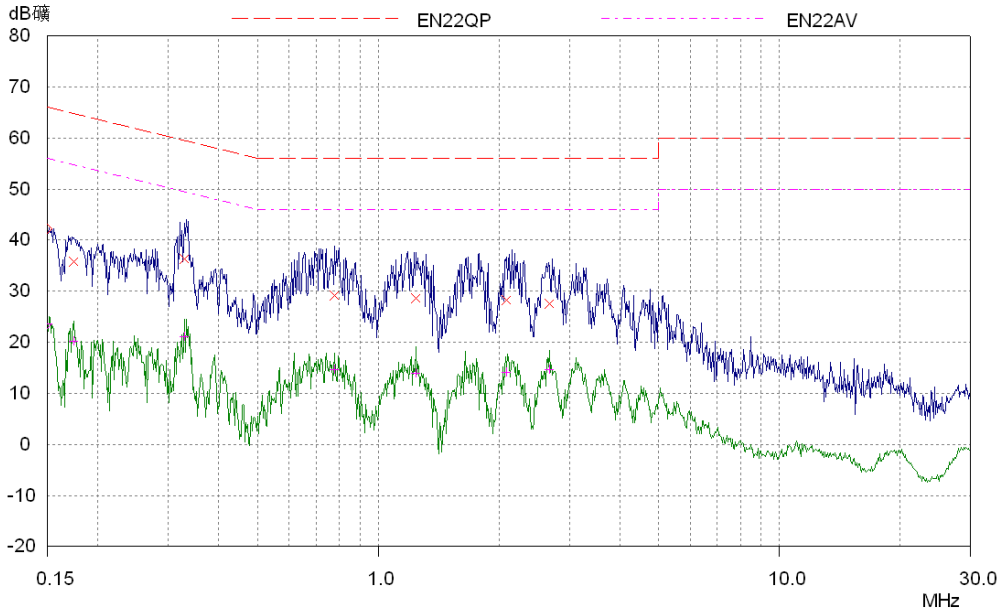
8.4 Test protocol

Frequency (MHz)	Correct Factor (dB)	Line	Corrected Reading (dBuV)		Limit (dBuV)		Margin (dB)	
			QP	AV	QP	AV	QP	AV
0.33	3.00	L	43.95	31.05	59.44	49.44	15.49	18.39
0.71	3.00	L	36.98	23.73	56.00	46.00	19.02	22.27
1.14	3.00	L	36.44	23.17	56.00	46.00	19.56	22.83
2.11	3.10	L	37.07	24.48	56.00	46.00	18.93	21.52
2.66	3.10	L	34.47	22.05	56.00	46.00	21.53	23.95
21.18	3.40	L	8.76	0.14	60.00	50.00	51.24	49.86
Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading.								

L line:



N Line:


dBµV
EN22QP
EN22AV
80
70
60
50
40
30
20
10
0
-10
-20
0.15
1.0
10.0
30.0
MHz

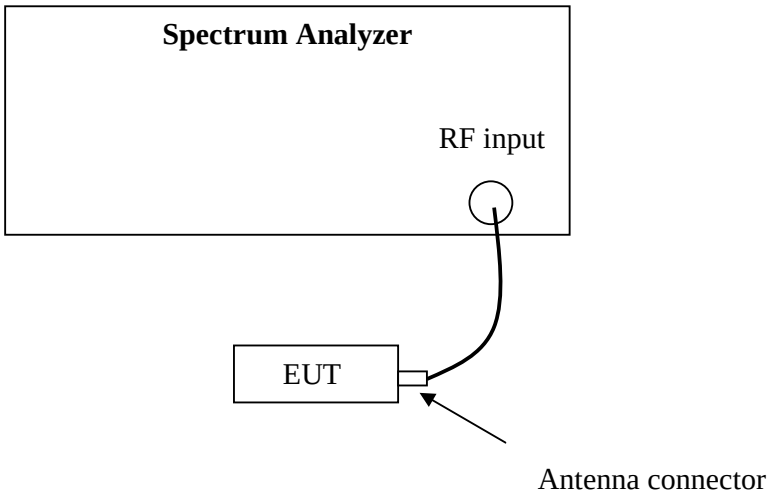
9. Occupied Bandwidth

Test Status: Tested

9.1 Test limit

None

9.2 Test Configuration



9.3 Test procedure and test setup

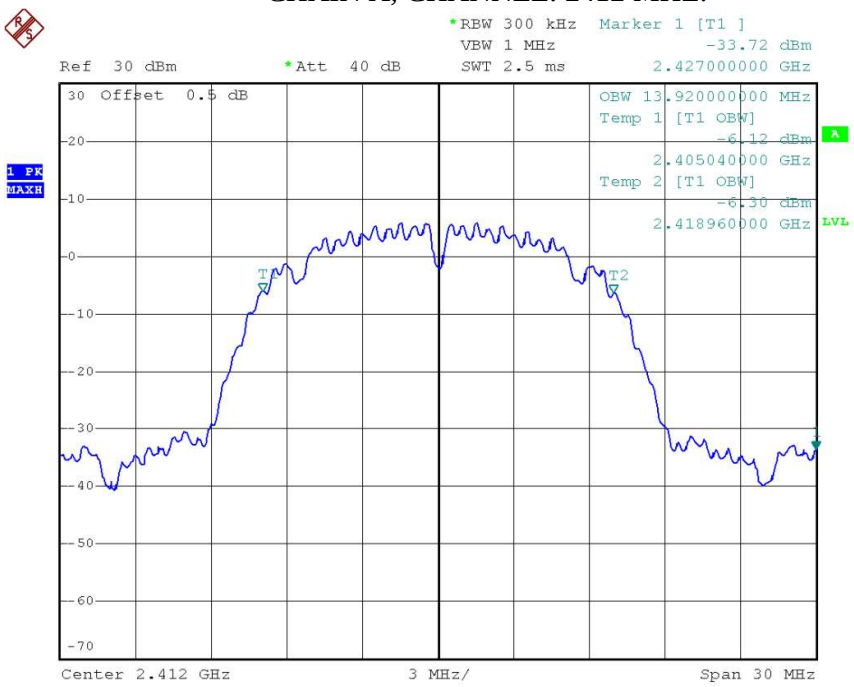
The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer.

9.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %

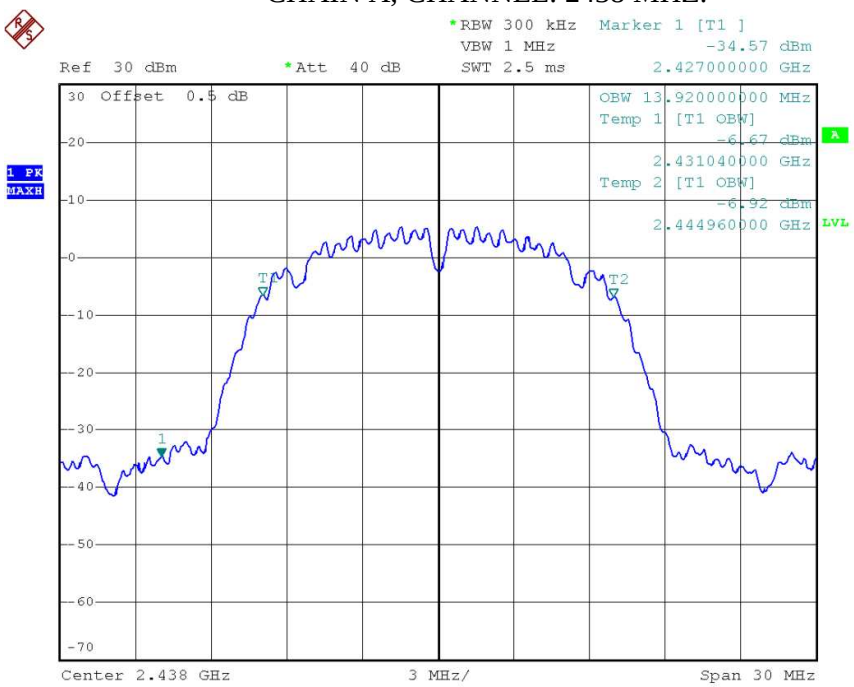
Test frequency	99% Bandwidth (MHz)	
(MHz)	Port A	Port B
2412	13.92	13.92
2438	13.92	13.92
2464	13.92	13.92
5736	13.92	13.98
5762	13.92	13.92
5814	13.92	13.98

CHAIN A, CHANNEL: 2412 MHZ:



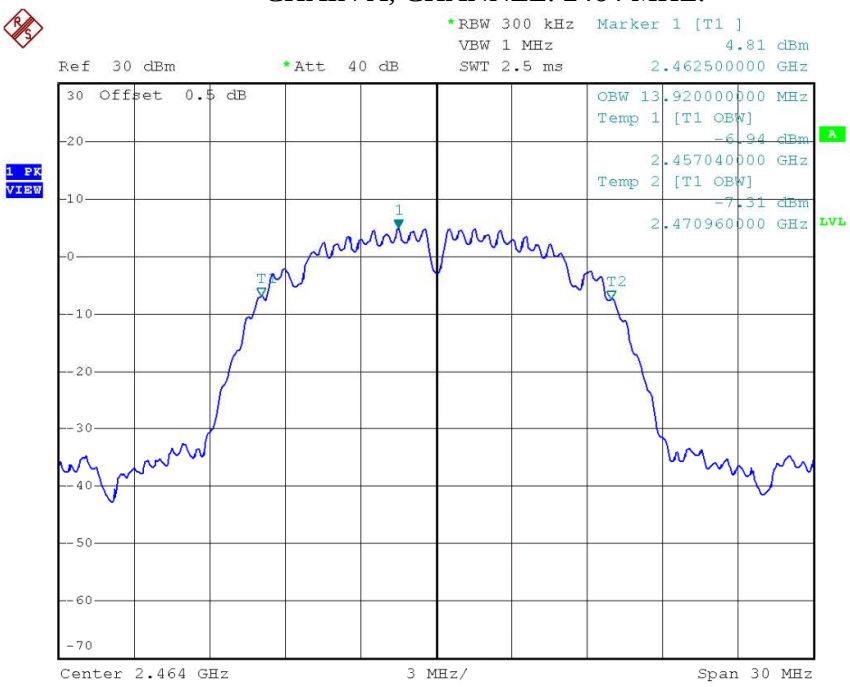
Date: 4.DEC.2013 18:58:42

CHAIN A, CHANNEL: 2438 MHZ:



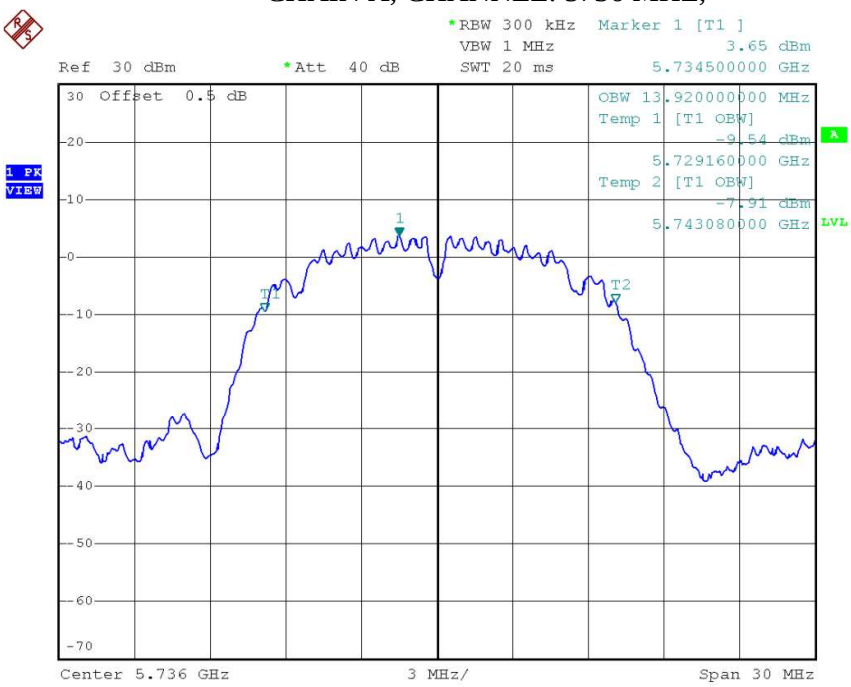
Date: 4.DEC.2013 18:59:15

CHAIN A, CHANNEL: 2464 MHZ:



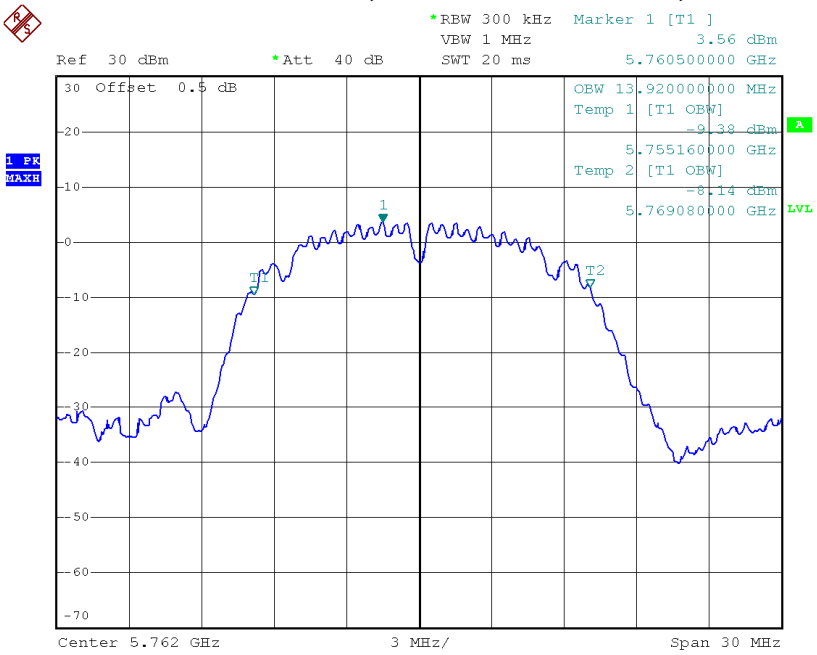
Date: 4.DEC.2013 18:55:12

CHAIN A, CHANNEL: 5736 MHZ,



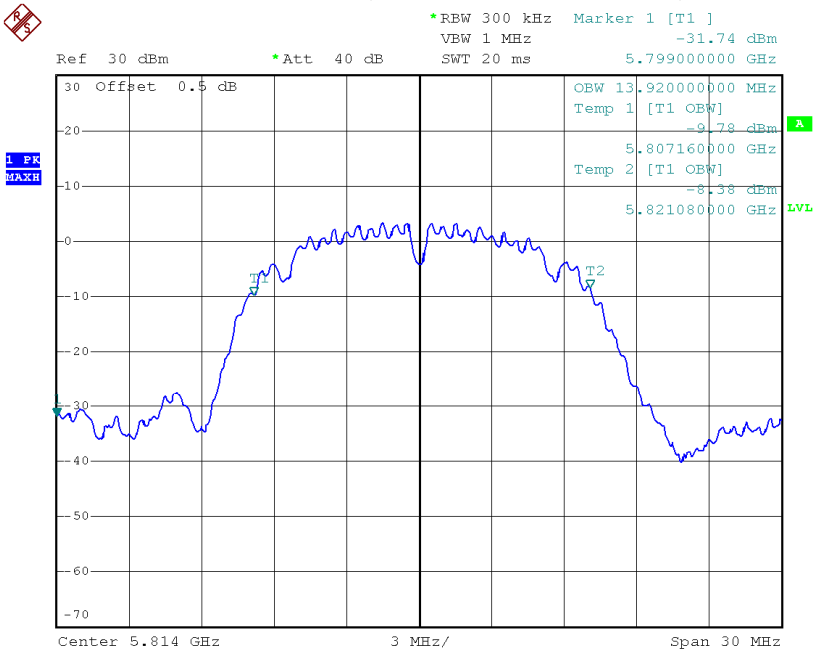
Date: 4.DEC.2013 18:56:09

CHAIN A, CHANNEL: 5762 MHZ,



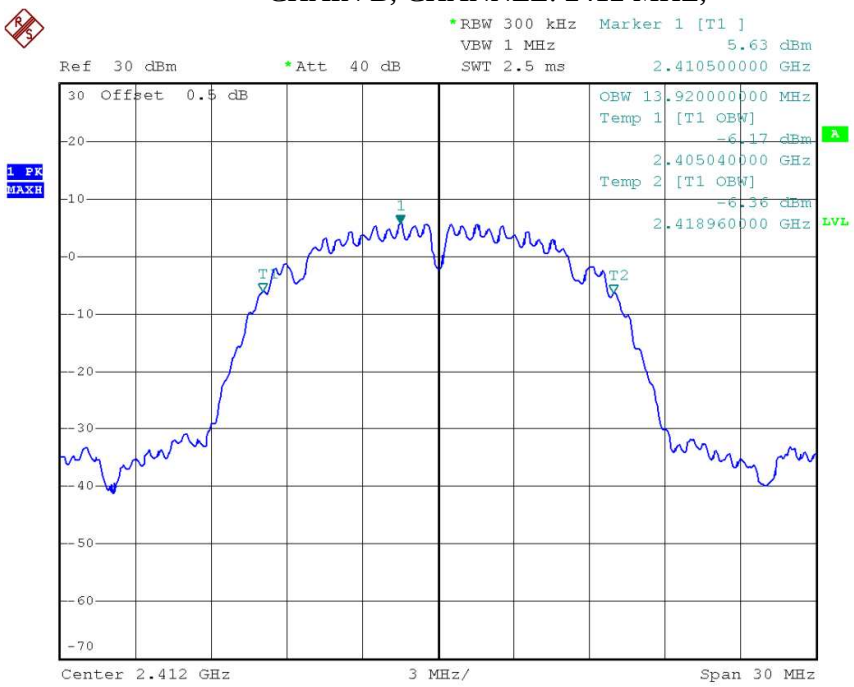
Date: 4.DEC.2013 18:57:20

CHAIN A, CHANNEL: 5814 MHZ,



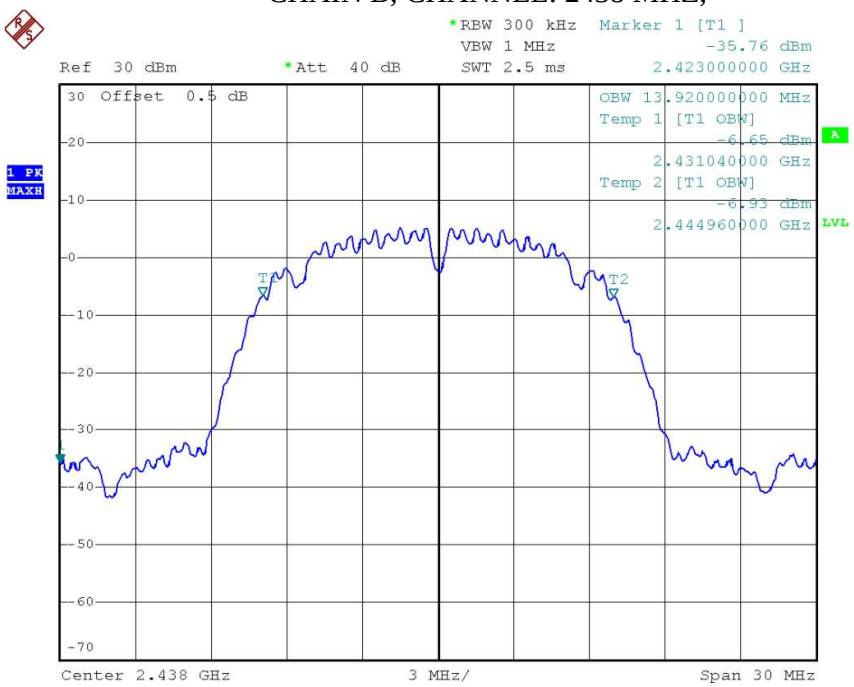
Date: 4.DEC.2013 18:57:49

CHAIN B, CHANNEL: 2412 MHZ,



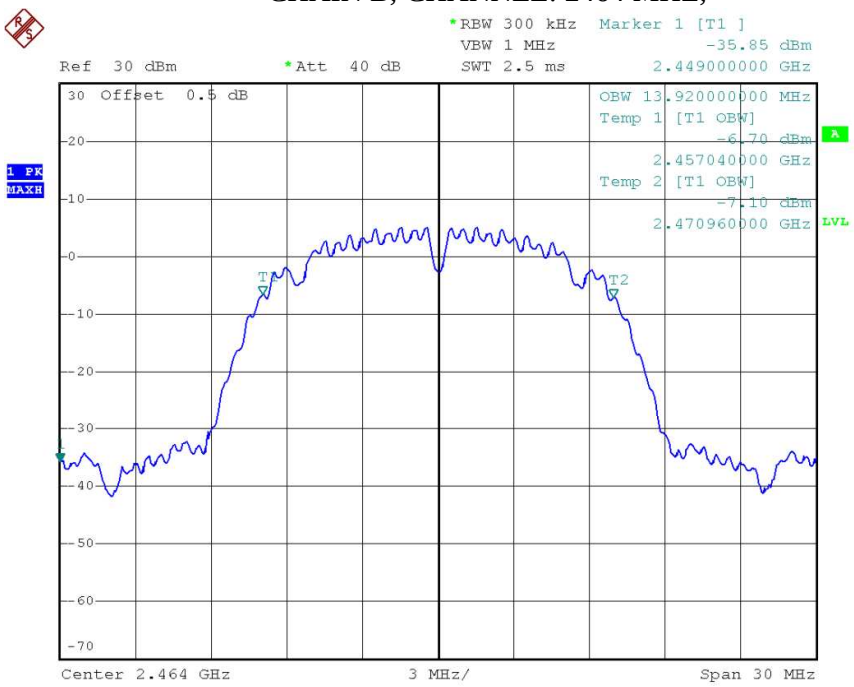
Date: 4.DEC.2013 19:10:20

CHAIN B, CHANNEL: 2438 MHZ,



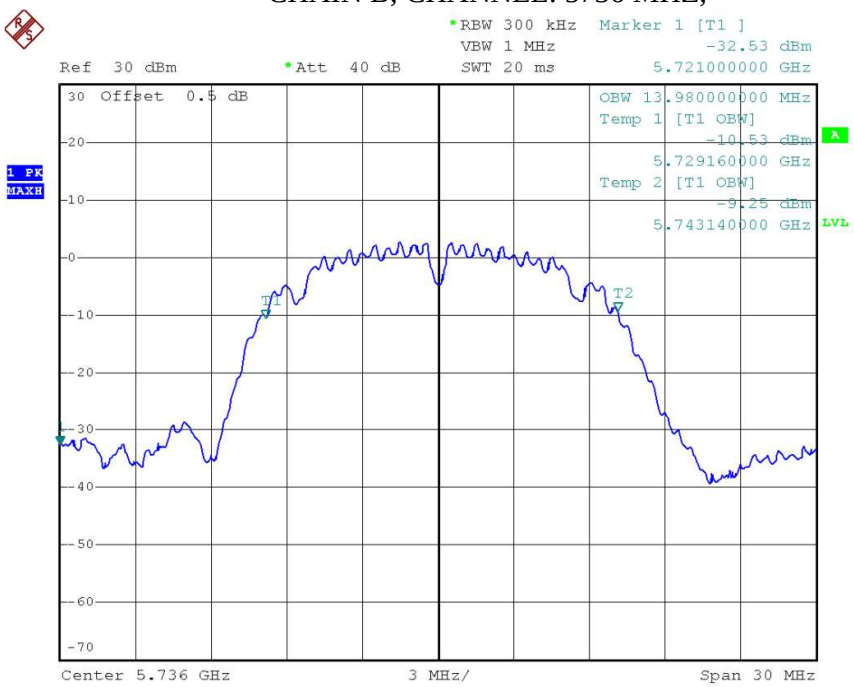
Date: 4.DEC.2013 19:10:44

CHAIN B, CHANNEL: 2464 MHZ,



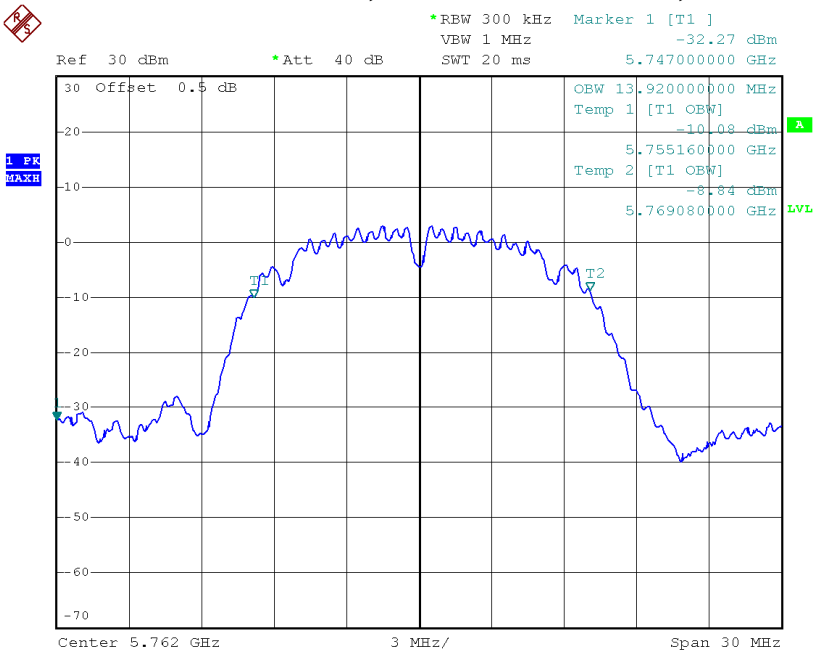
Date: 4.DEC.2013 19:11:23

CHAIN B, CHANNEL: 5736 MHZ,



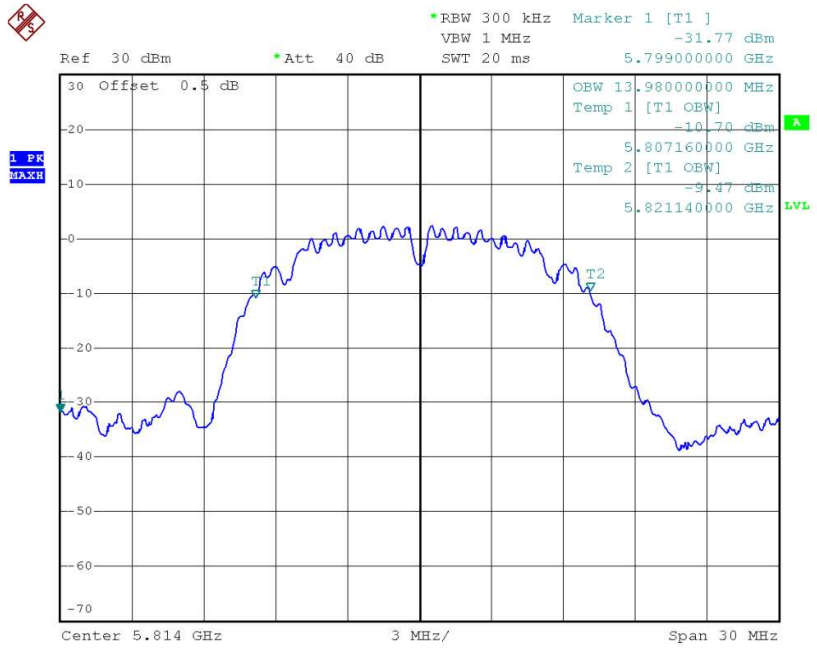
Date: 4.DEC.2013 19:11:55

CHAIN B, CHANNEL: 5762 MHZ,



Date: 4.DEC.2013 19:12:28

CHAIN B, CHANNEL: 5814 MHZ,



Date: 4.DEC.2013 19:13:52