







ISO/IEC17025Accredited Lab.

Report No: FCC 1505170-04 File reference No: 2015-06-30

ShenZhen Netxeon Technology Co.,Ltd Applicant:

Product: TV BOX

Model No: i826, i818, i828

Trademark: N/A

FCC Part 15.247 Test Standards:

It is herewith confirmed and found to comply with the Test result:

requirements set up by ANSI C63.10, FCC Part 15 Subpart C, of

the evaluation Paragraph 15.247 regulations for

electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: June 30, 2015

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timewaytech.com

Date: 2015-06-30



Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

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The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

Date: 2015-06-30



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1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Room 512-519,5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen,

Guangdong China

Telephone: (755) 83448688 Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: ShenZhen Netxeon Technology Co.,Ltd

Address: Unit 708,7/F West, Building 202 Tai Ran Industrial Park, Chegongmiao, Shenzhen, China

Telephone: --Fax: ---

1.3 Description of EUT

Product: TV BOX

Manufacturer: ShenZhen Netxeon Technology Co.,Ltd

Address: Unit 708,7/F West,Building 202 Tai Ran Industrial

Park, Chegongmiao, Shenzhen, China

Brand Name: N/A
Model Number: i826
Additional Model Number: i818, i828

Type of Modulation GFSK, 月/4DQPSK, 8DPSK for Bluetooth

Frequency range 2402-2480MHz for Bluetooth

Channel Spacing 1MHz for Bluetooth

Frequency Selection By software

Channel Number 79 channel for Bluetooth

Antenna: Two Integral Antennas used and the maximum Gain 2dBi for each one

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2015-05-26 to 2015-06-30

The report refers only to the sample tested and does not apply to the bulk.

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1.6 Test Uncertainty Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB

Test Engineer 1.7

Terry lang The sample tested by

Print Name: Terry Tang

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2.0 Test Equipments					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2014-08-21	2015-08-20
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2014-08-22	2015-08-21
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2014-08-22	2015-08-21
Ultra Broadband ANT	R&S	HL562	100157	2014-08-23	2015-08-22
ESDV Test Receiver	R&S	ESDV	100008	2014-08-22	2015-08-21
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2014-08-21	2015-08-20
System Controller	CT	SC100	-		
Loop Antenna	EMCO	6502	00042960	2014-08-22	2015-08-21
ESPI Test Receiver	R&S	ESI26	838786/013	2014-08-22	2015-08-21
3m OATS	-		N/A	2014-08-21	2015-08-20
Horn Antenna	R&S	BBHA 9170	BBHA9170265	2014-08-23	2015-08-22
Horn Antenna	R&S	BBHA 9120D	9120D-631	2014-08-23	2015-08-22
Power meter	Anritsu	ML2487A	6K00003613	2014-08-22	2015-08-21
Power sensor	Anritsu	MA2491A	32263	2014-08-22	2015-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2014-08-23	2015-08-22
LISN	AFJ	LS16C	10010947251	2014-08-21	2015-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2014-08-22	2015-08-21
9*6*6 Anechoic			N/A	2014-08-21	2015-08-20
EMI Test Receiver	RS	ESCS30	100139	2014-08-22	2015-08-21

2.1 **Auxiliary Equipment**

Name	Model No.	Serial No.	Manufacturer	Cable	FCC ID/DOC
TF Card			Kingston		
U-Disk					
Mouse					
LCD Monitor	PH2450		SAMSUNG		DOC
	JHD-AP012U-				
Power Supply	050200AB		JHD		VOC

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3.0 **Technical Details**

3.1 **Summary of test results**

The EUT has been tested according to the following specifications:

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	PASS	Complies
Conducted Emissions	15.207(a), 15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247, ANSI 63.4:2009 and ANSI 63.10:2009

4.0 **EUT Modification**

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

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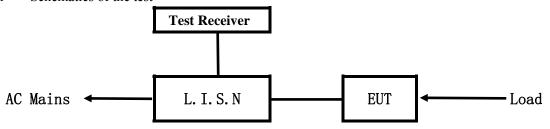
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5. **Power Line Conducted Emission Test**

5.1 Schematics of the test

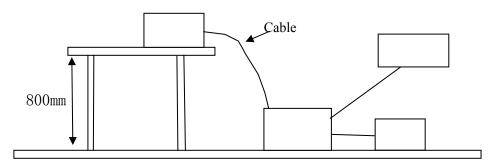


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 -2009.

Test Voltage: 120V~60Hz Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2009. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

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A. EUT

Device	Manufacturer	Model	FCC ID	
TV BOX	ShenZhen Netxeon Technology	i826, i818, i828	2AE6JI826	
IVDOX	Co.,Ltd	1020, 1010, 1020	2AL031020	

Internal Device B.

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating	
Power	ШЪ	HID AD012H 050200AD	Input: 100-240V~, 50/60Hz, 0.35A;	
Supply	JHD	JHD-AP012U-050200AB	Output: DC5V, 2A	

5.4 **EUT Operating Condition**

Operating condition is according to ANSI C63.10 -2009.

- Α Setup the EUT and simulators as shown on follow
- В Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.107, 15.207

Frequency	Class A Lim	its (dB µ V)	Class B Limits (dB μ V)		
(MHz)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level	
$0.15 \sim 0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*	
$0.50 \sim 5.00$	73.0	60.0	56.0	46.0	
$5.00 \sim 30.00$	73.0	60.0	60.0	50.0	

Notes:

- 1. *Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

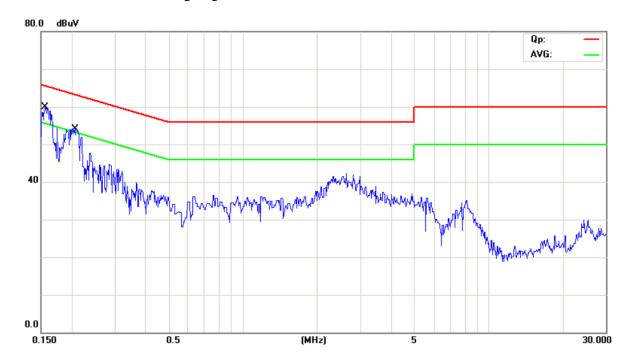
Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

EUT set Condition: Bluetooth MIMO Keeping TX mode

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1570	46.90	11.01	57.91	65.62	-7.71	QP	
2	0.1570	33.12	11.01	44.13	55.62	-11.49	AVG	
3	0.2077	40.98	11.06	52.04	63.30	-11.26	QP	
4	0.2077	28.26	11.06	39.32	53.30	-13.98	AVG	

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Conducted Emission on Neutral Terminal (150kHz to 30MHz) B:

EUT Operating Environment

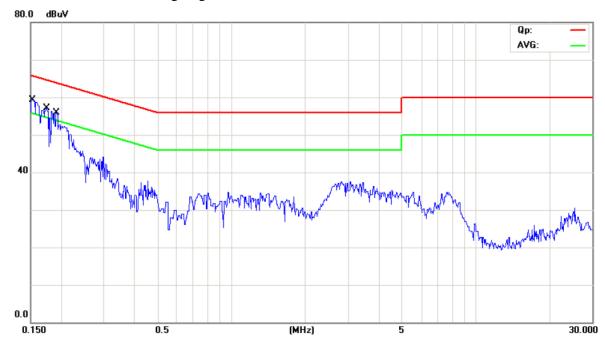
Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

EUT set Condition: Bluetooth MIMO Keeping TX mode

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1526	46.29	11.00	57.29	65.86	-8.57	QP	
2	0.1526	34.78	11.00	45.78	55.86	-10.08	AVG	
3	0.1736	44.09	11.02	55.11	64.79	-9.68	QP	
4	0.1736	32.47	11.02	43.49	54.79	-11.30	AVG	
5	0.1911	42.84	11.04	53.88	63.99	-10.11	QP	
6	0.1911	29.46	11.04	40.50	53.99	-13.49	AVG	

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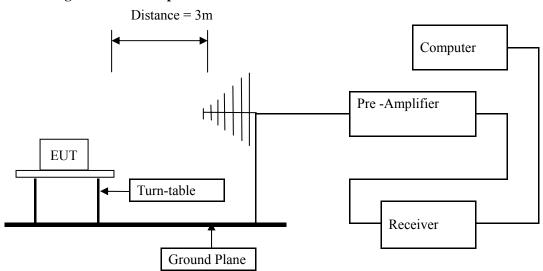
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6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10 –2009. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
- (3) The frequency spectrum from 30 MHz to 25GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup



- 6.2 Configuration of The EUT

 Same as section 5.3 of this report
- 6.3 EUT Operating Condition
 Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

Frequency Range (MHz)	Distance (m)	Field strength (dB µ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 5. All modulation have been tested ,GFSK was found as the worst case and only reported

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/Vertical (30MHz----1000MHz)

EUT set Condition: Bluetooth MIMO Keeping TX mode

Results: Pass

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \(\mu \)V/m)
304.200	32.26	Н	46.00
148.480	31.99	Н	43.50
924.160	42.91	V	40.00
116.640	31.94	V	43.50

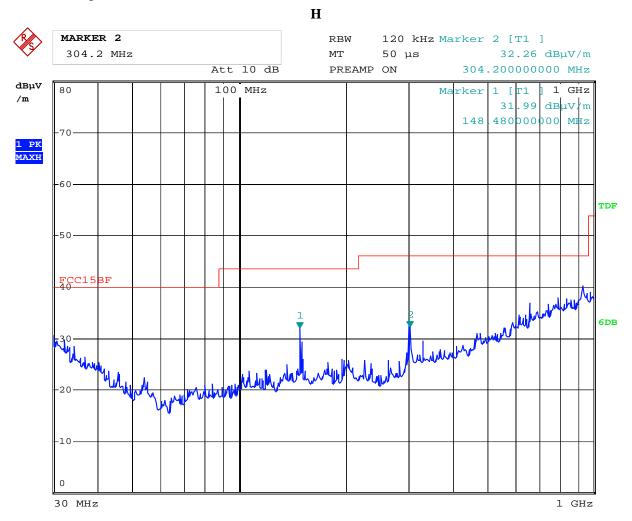
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Test Figure:



26.JUN.2015 16:31:41 Date:

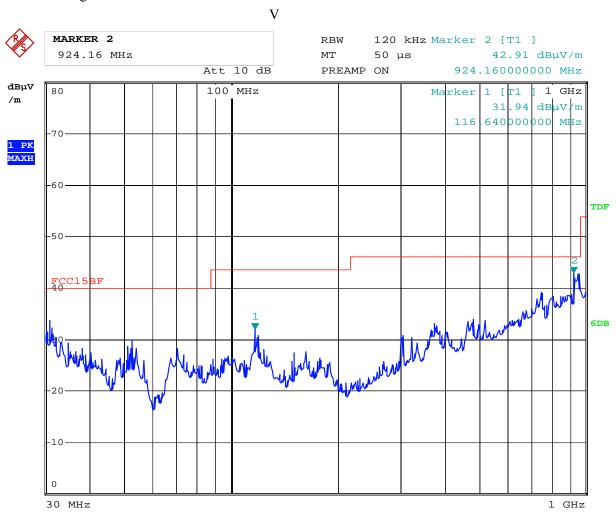
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Test Figure:



26.JUN.2015 16:34:11 Date:

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Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dB \u03ba V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4804	-	Н	74(Peak)/ 54(AV)
4804	-	V	74(Peak)/ 54(AV)
7206		H/V	74(Peak)/ 54(AV)
9608		H/V	74(Peak)/ 54(AV)
12010		H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

Operation Mode: Transmitting g under Middle Channel (2441MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \(\mu \)V/m)
4882		Н	74(Peak)/ 54(AV)
4882		V	74(Peak)/ 54(AV)
7323		H/V	74(Peak)/ 54(AV)
9764		H/V	74(Peak)/ 54(AV)
12205		H/V	74(Peak)/ 54(AV)
14646		H/V	74(Peak)/ 54(AV)
17087		H/V	74(Peak)/ 54(AV)
19528		H/V	74(Peak)/ 54(AV)
21969		H/V	74(Peak)/ 54(AV)
24410		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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Operation Mode: Transmitting under High Channel (2480MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4960	1	Н	74(Peak)/ 54(AV)
4960	•	V	74(Peak)/ 54(AV)
7440	-	H/V	74(Peak)/ 54(AV)
9920	-	H/V	74(Peak)/ 54(AV)
12400	-	H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840	-	H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

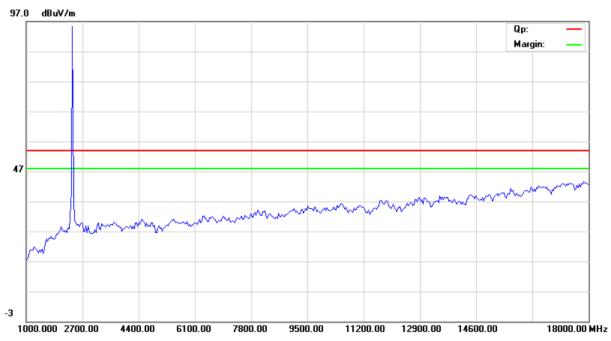
^{2.} Remark "---" means that the emissions level is too low to be measured

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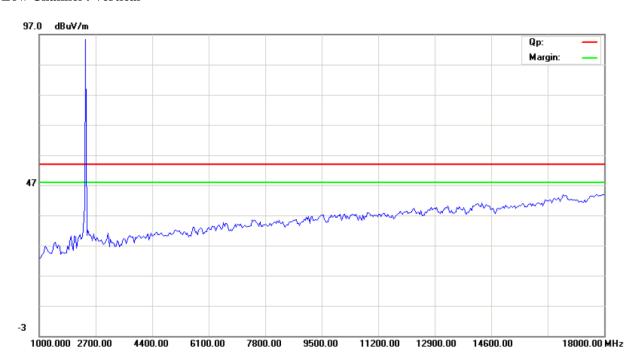


Please refer to the following test plots for details:

Low Channel: Horizontal



Low Channel: Vertical



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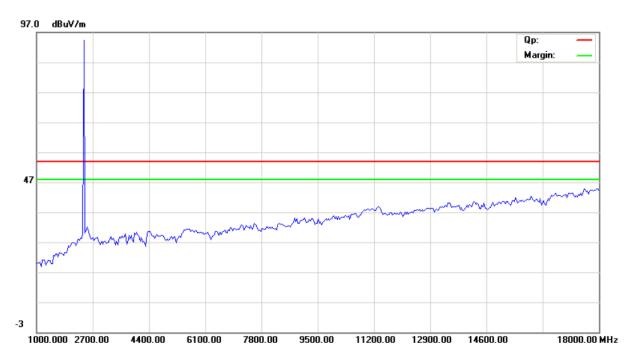
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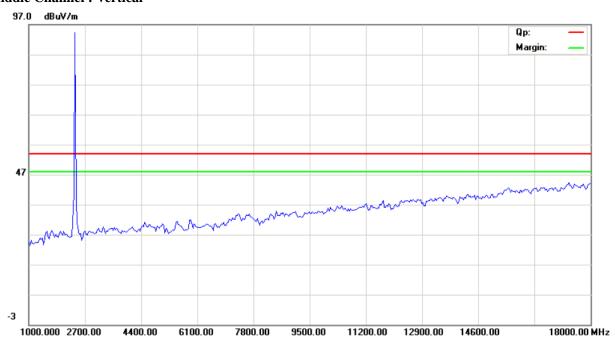
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Middle Channel: Horizontal



Middle Channel: Vertical



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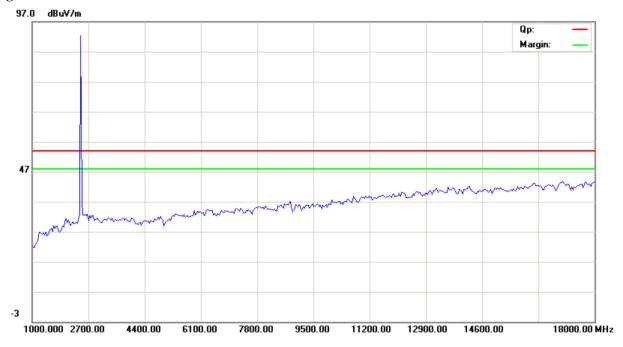
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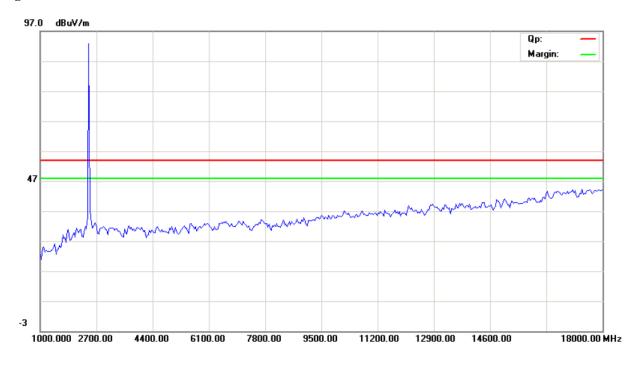
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High Channel: Horizontal



High Channel: Vertical



Note: for the radiated emissions above 18G, it is the floor noise.

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7.0 20dB Bandwidth Measurement

7.1 Regulation

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.2 Limits of 20dB Bandwidth Measurement

N/A

7.3 Test Procedure.

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span =3MHz, RBW =30 kHz, VBW=100 kHz, Sweep = auto Detector function = peak, Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

7.4 Test Result

Note: All modulation have been tested ,GFSK and $\Pi/4DQPSK$ was found as the worst case and reported

Antenna A

Type of Modulation: GFSK

EUT		TV BOX		i826, i818, i828
Mode	Ke	Keep Transmitting		DC5V
Temperat	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1040		Pass
Middle	2441	1040		Pass
High	2480	1046		Pass

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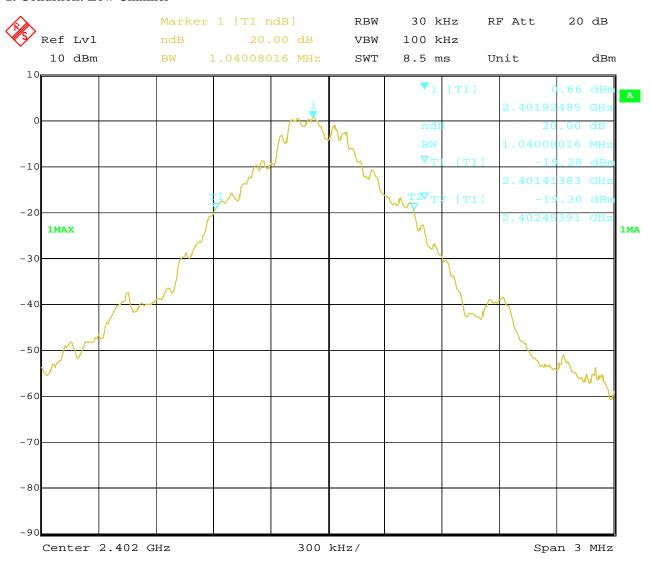
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Test Figure:

1. Condition: Low Channel

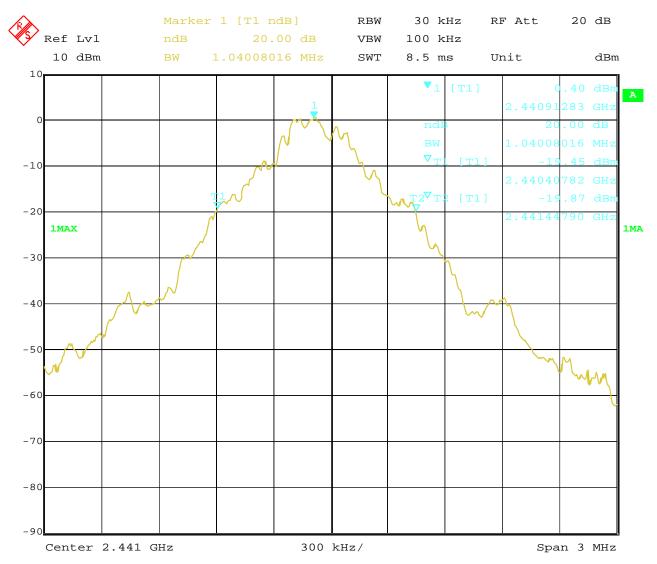


Date: 8.JUN.2015 16:21:57 Report No: FCC1505170-04 Page 24 of 84

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2. Condition: Middle Channel

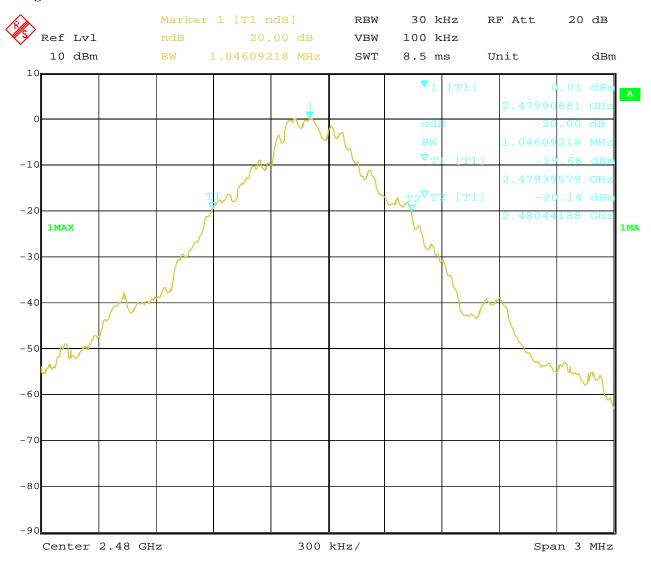


8.JUN.2015 Date: 16:21:14 Report No: FCC1505170-04 Page 25 of 84

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3. High Channel



8.JUN.2015 16:20:08 Date:

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Test Result

Type of Modulation: $\pi/4DQPSK$

EUT		TV BOX		i826, i818, i828
Mode	K	Keep Transmitting		DC5V
Temperat	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1299		Pass
Middle	2441	1287		Pass
High	2480	1287		Pass

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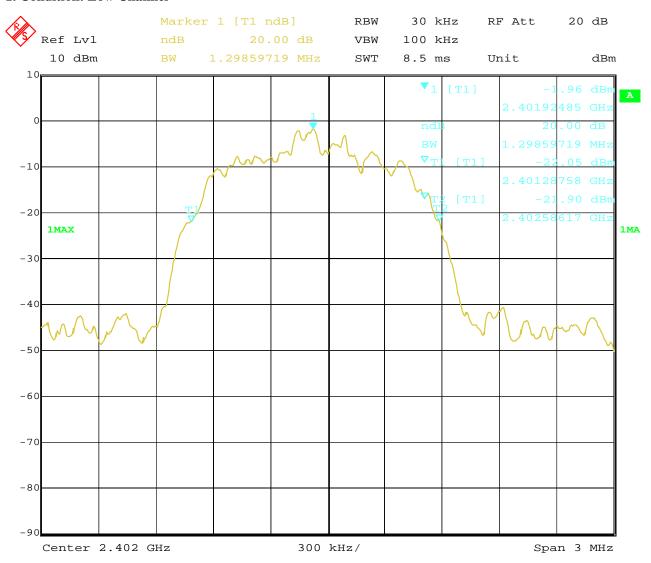
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Test Figure:

1. Condition: Low Channel



Date: 8.JUN.2015 16:17:08

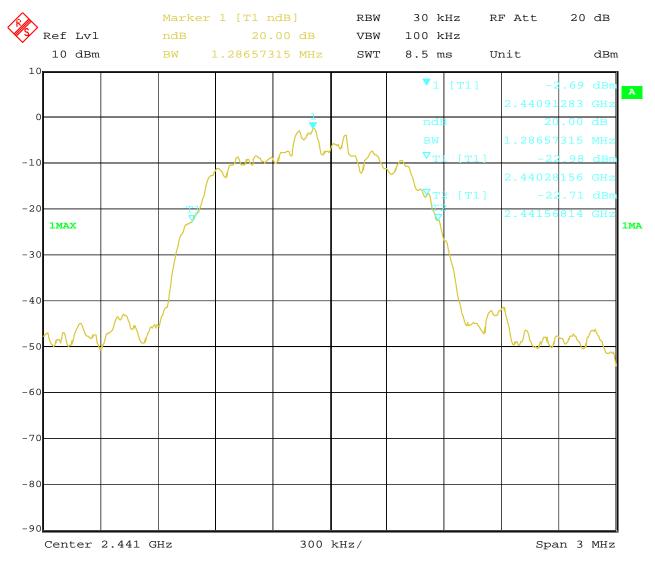
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2. Condition: Middle Channel



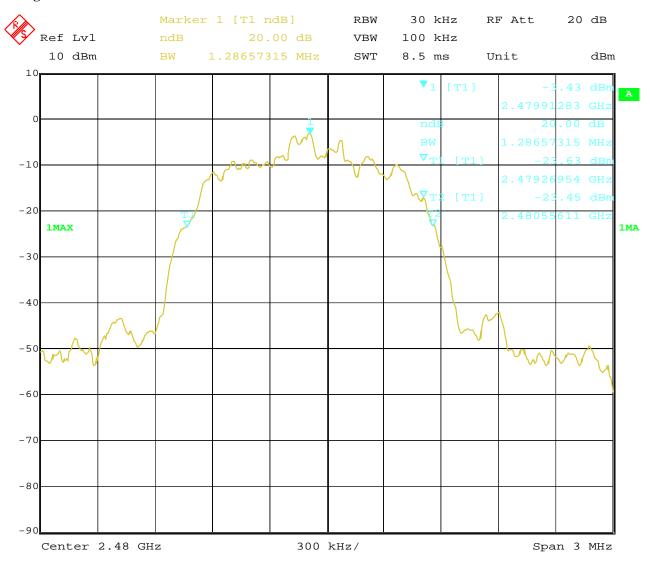
8.JUN.2015 16:18:22 Date:

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3. High Channel



8.JUN.2015 16:19:11 Date:

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Antenna B

Type of Modulation: GFSK

Type of M	oddiadon. Gron			
EUT		TV BOX	Model	i826, i818, i828
Mode	Keep Transmitting		Input Voltage	DC5V
Temperat	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1040		Pass
Middle	2441	1040		Pass
High	2480	1046		Pass

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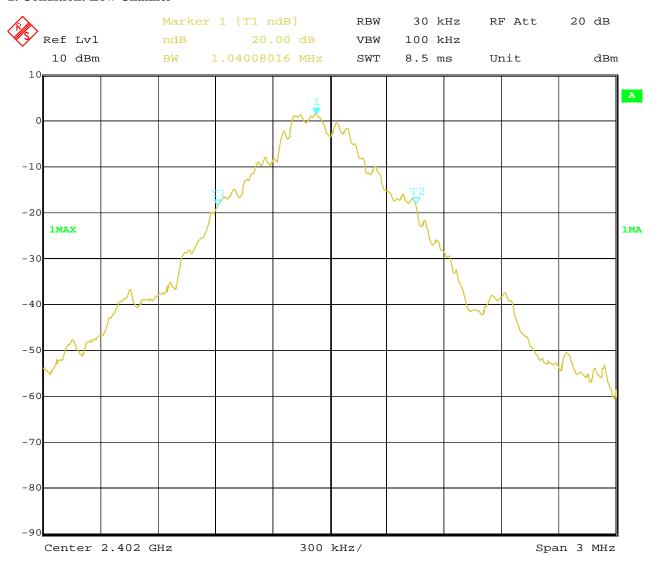
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Test Figure:

1. Condition: Low Channel

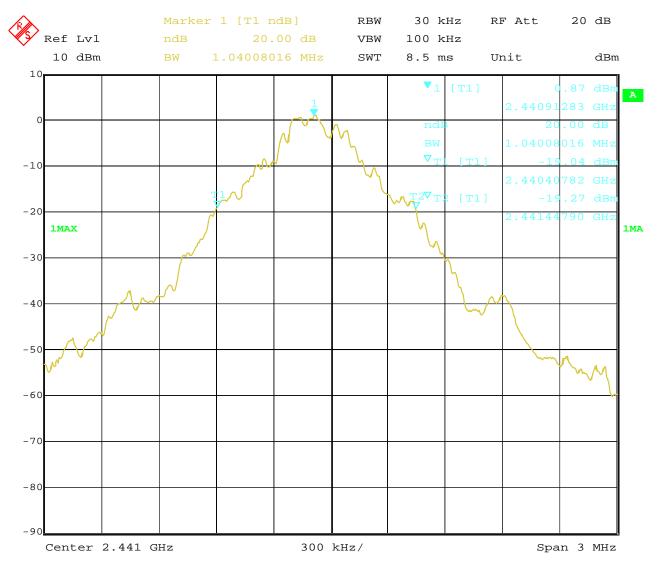


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2. Condition: Middle Channel



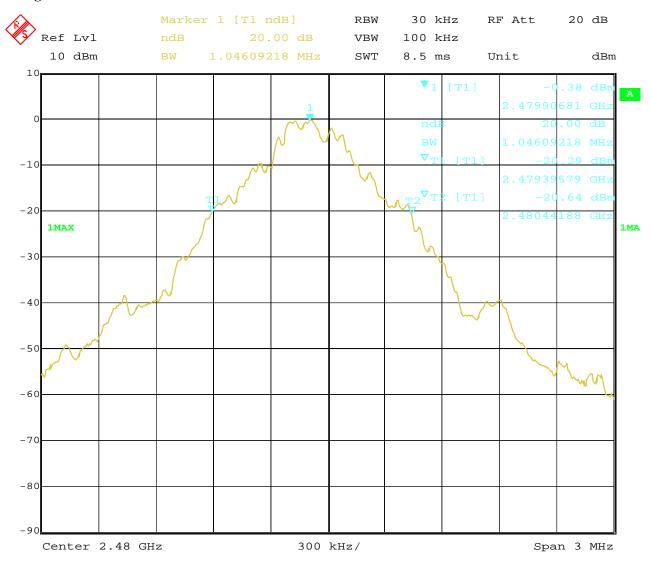
9.JUN.2015 10:29:57 Date:

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3. High Channel



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Test Result

Type of Modulation: $\pi/4DQPSK$

EUT		TV BOX		i826, i818, i828
Mode	Ko	eep Transmitting	Input Voltage	DC5V
Temperat	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1353		Pass
Middle	2441	1353		Pass
High	2480	1347		Pass

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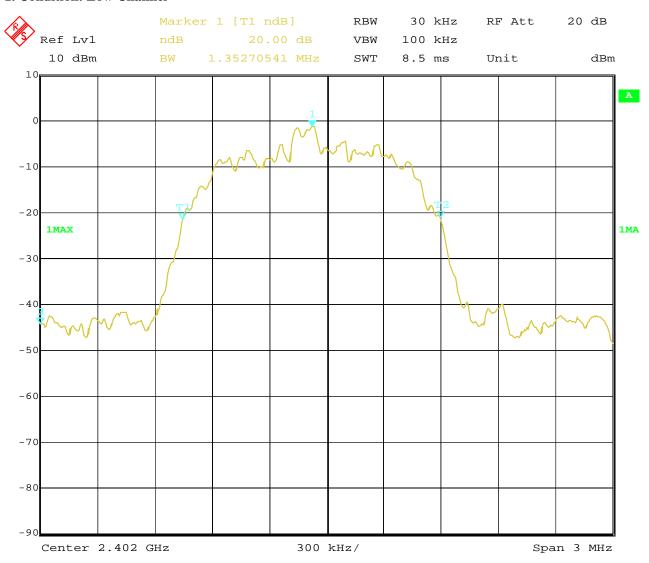
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Test Figure:

1. Condition: Low Channel

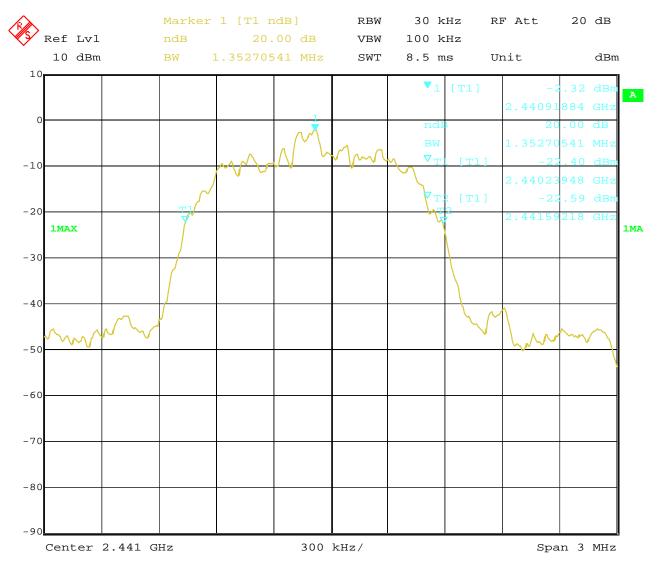


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2. Condition: Middle Channel



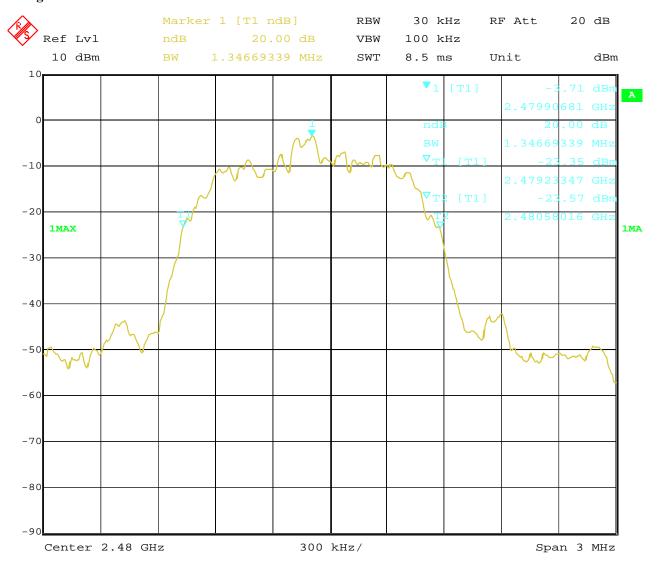
9.JUN.2015 10:39:22 Date:

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3. High Channel



9.JUN.2015 10:37:30 Date:

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8. Maximum Output Power

8.1 Regulation

According to §15.247(b)(1), 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 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW = 10MHz, RBW=3MHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
- 4. Repeat above procedures until all frequencies measured were complete.

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8.4Test Results

Note: All modulation have been tested ,GFSK and $\Pi/4DQPSK$ was found as the worst case and reported Type of Modulation: GFSK

type of Modula	ation: G	TON						
EUT	EUT TV BOX		Model	i826, i818, i828		}		
Mode		Keep	Transmitting	Input Voltage		DC5.0V		
Temperati	ure	2	4 deg. C,	Humidity		56% RH		
Channel	Frequ	ency	Antenna	Peak Power	Total Power	Limit	Pass/ Fail	
	(MF	Iz)	Port	Output (dBm)	(dBm)	(dBm)		
Low	240)2	A	3.38	6.67	30	Pass	
			В	3.91				
Middle	244	4 1	A	3.09	6.25	30	Pass	
			В	3.38				
High	248	30	A	2.89	5.67	30	Pass	
			В	2.40				

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

2. The worse case was recorded and MIMO technology was used for BT

Type of Modulation: JI/4DQPSK

EUT			ΓV BOX	Model	i826, i818, i828		
Mode		Keep	Transmitting	Input Voltage		DC5.0V	
Temperati	ure	2	4 deg. C,	Humidity		56% RH	
Channel	Frequ	ency	Antenna	Peak Power	Total Power	Limit	Pass/ Fail
	(MI	Hz)	Port	Output (dBm)	(dBm)	(dBm)	
Low	240	02	A	2.69	6.06	30	Pass
			В	3.38			
Middle	24	41	A	2.08	5.21	30	Pass
			В	2.32			
High	248	80	A	1.57	4.59	30	Pass
			В	1.57			

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

2. The worse case was recorded and MIMO technology was used for BT

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9. Carrier Frequency Separation

9.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

9.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) \geq 1% of the span; Video (or Average) Bandwidth (VBW) \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.

Note: All modulation have been tested ,GFSK and Π /4DQPSK was found as the worst case and reported

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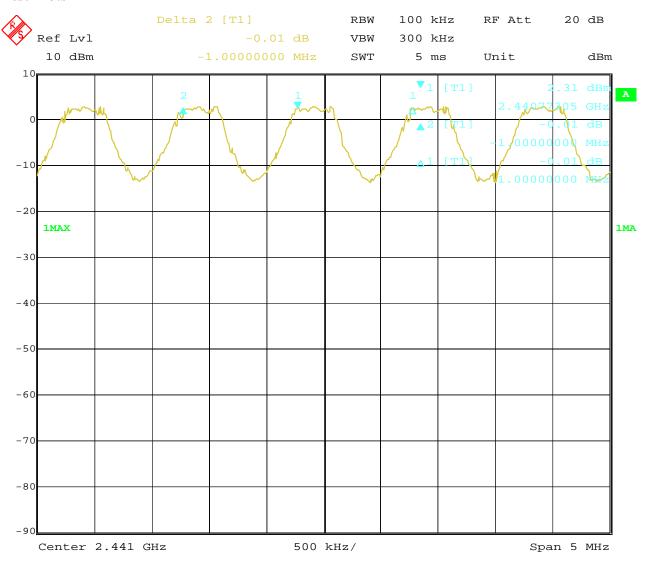


9.4Test Result

Type of Modulation: GFSK

EUT	TV BOX N		Model	i82	6, i818, i828
Mode	Hopping On In		Input Voltage		DC5V
Temperature	24 deg. C,		Humidity	56% RH	
Carrier Frequency Separation			Limit		Pass/ Fail
	1.000MHz	≥ 25 kHz or 2/3	of the 20 dB band	dwidth	Pass

Test Plots



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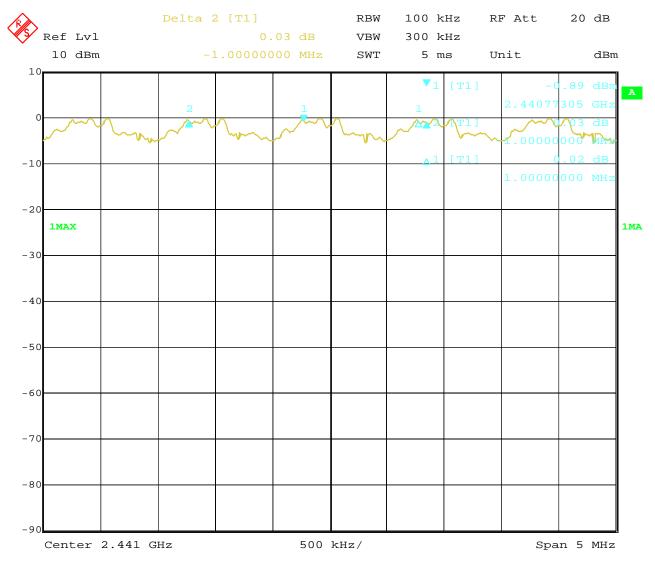
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EUT	TV BOX N		Model	i82	6, i818, i828
Mode	Hopping On II		Input Voltage	DC5V	
Temperature	24 deg. C,		Humidity	56% RH	
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		width	Pass

Test Plots



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10. Number of Hopping Channels

10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), 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.

10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

10.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=100 kHz, VBW=300 kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

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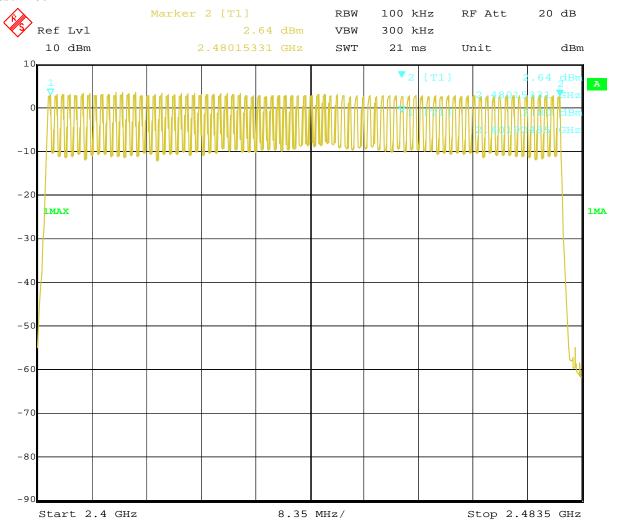


10.4Test Result

Type of Modulation: GFSK

EUT		TV BOX	Model	i82	6, i818, i828
Mode		Hopping On	Input Voltage		DC5V
Temperature		24 deg. C,	Humidity	56% RH	
Operating Frequency		Number of hopping channels		Limit	Pass/ Fail
2402-2480MHz		79		≥ 15	Pass

Test Plot



Date: 8.JUN.2015 16:35:49

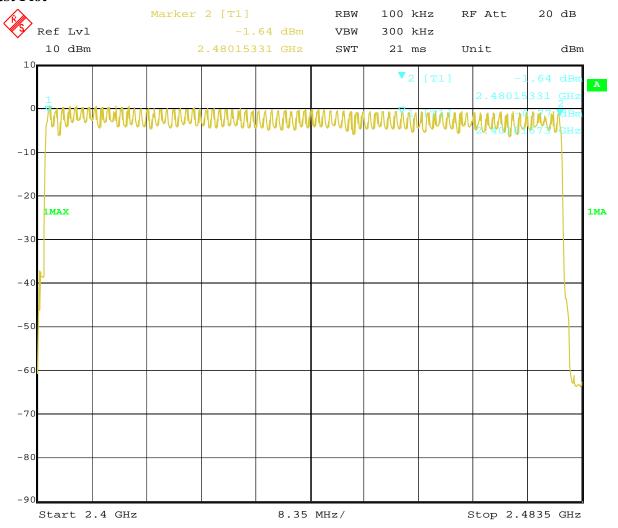
Date: 2015-06-30



Type of Modulation: √1/4DQPSK

EUT	TV BOX		Model		i826, i818, i828		
Mode	Hopping On		Input V	Input Voltage		DC5V	
Temperature		24 deg. C,		Humidity		56% RH	
Operating Frequency		Number of hopp channels	oing	Lin	nit	Pass/ Fail	
2402-2480MHz		79		≥	15	Pass	

Test Plot



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11. Time of Occupancy (Dwell Time)

11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

11.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW \geq RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
- 3. Measure the dwell time using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.
- 5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

Note: All modulation have been tested ,GFSK and Π /4DQPSK was found as the worst case and reported

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11.4 Test Result

Type of Modulation: GFSK

EUT	TV BC	TV BOX		Model	i826, i818, i828
Mode	Keep Trans	Keep Transmitting		ıt Voltage	DC5V
Temperatur	re 24 deg.	. С,	C, Humidity		56% RH
Channel	Reading	Hoping Ra	te	Actual	Limit
Low	2.99	266.667 ho	p/s	0.319	0.4s
Middle	2.97	266.667 ho	p/s	0.317	0.4s
High	3.01	266.667 ho	p/s	0.321	0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

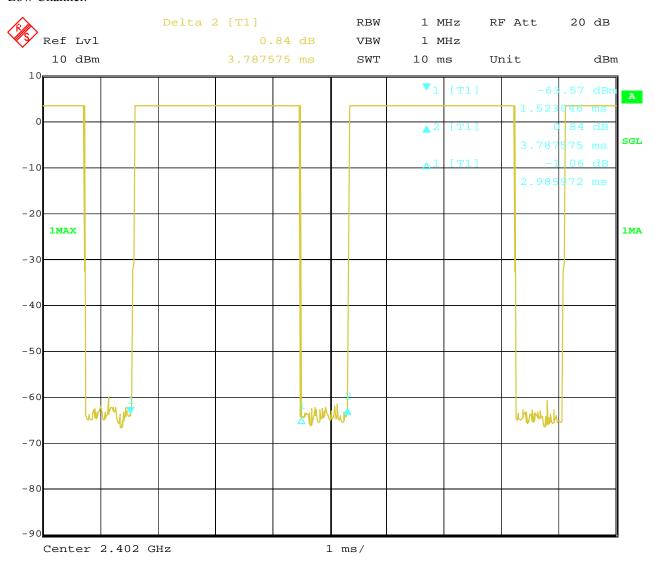
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Test Plots: Low Channel:



Date: 8.JUN.2015 17:55:47

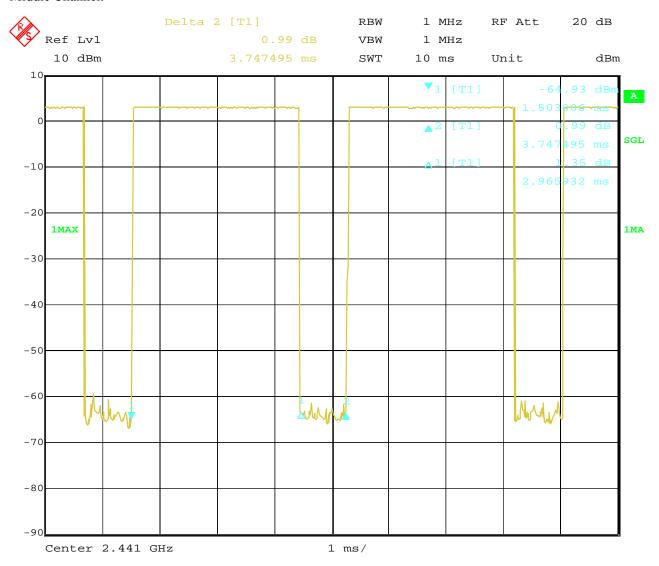
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Middle Channel:



8.JUN.2015 17:54:58 Date:

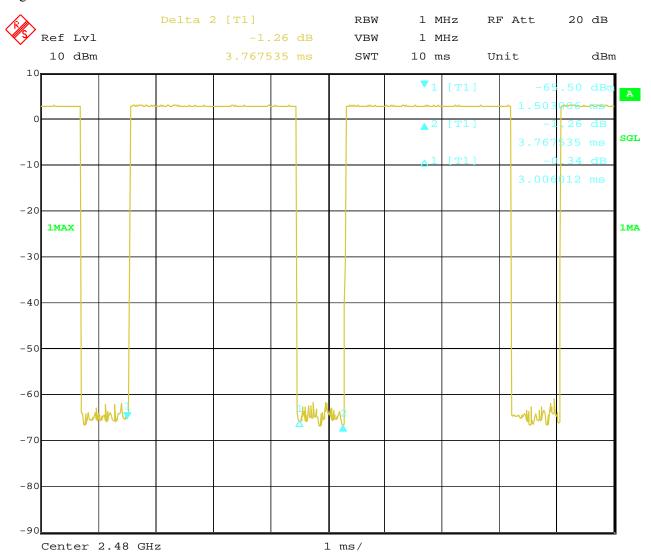
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High Channel



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Test Result

Type of Modulation: JI/4DQPSK

EUT	TV BC	TV BOX		Model	i826, i818, i828
Mode	Keep Trans	mitting Input Voltage		ıt Voltage	DC5V
Temperatur	e 24 deg.	. С,	C, Humidity		56% RH
Channel	Reading	Hoping Ra	te	Actual	Limit
Low	2.99	266.667 hoj	p/s	0.319	0.4s
Middle	2.99	266.667 hoj	p/s	0.319	0.4s
High	3.01	266.667 hoj	p/s	0.321	0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

Note: DH5 was the worse case

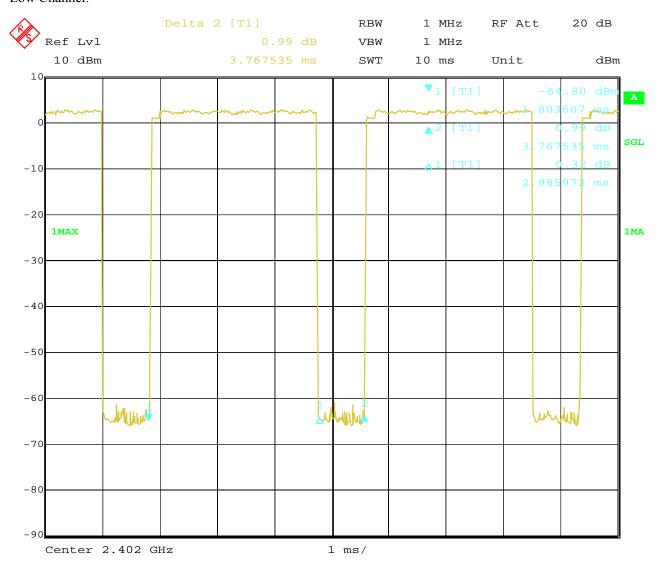
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Test Plots: Low Channel:



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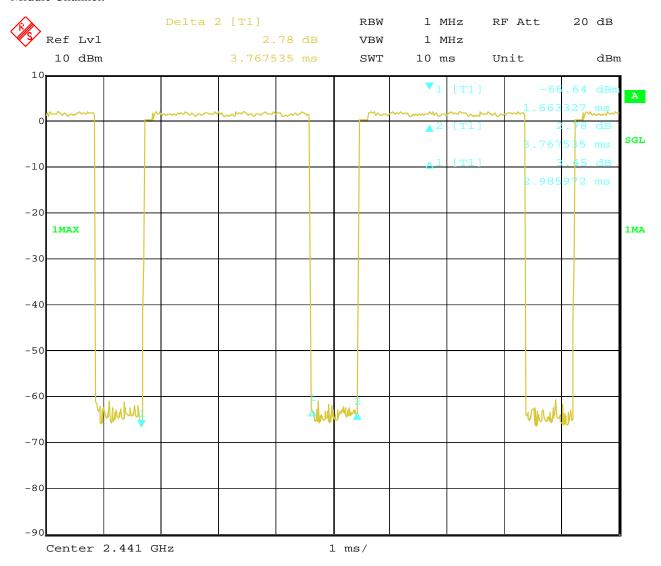
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Middle Channel:



9.JUN.2015 10:47:03 Date:

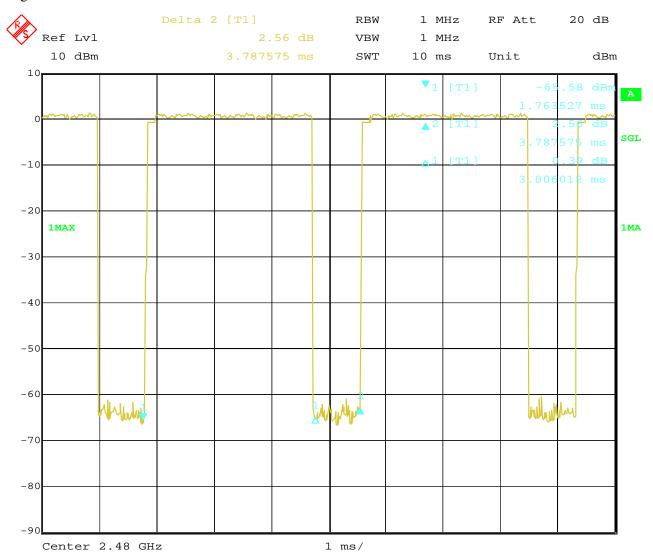
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High Channel



9.JUN.2015 10:48:38 Date:

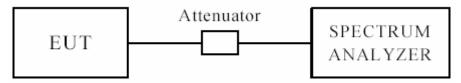
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12 Out of Band Measurement

12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

2. All modulation have been tested GFSK and JI/4DQPSK was found as the worst case and reported

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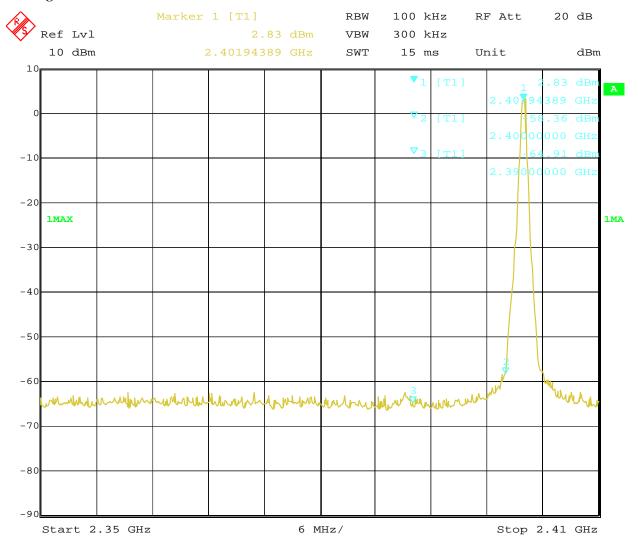
Antenna A

Type of Modulation: GFSK

12.4 Band-Edge Test Result

Product:	TV BOX	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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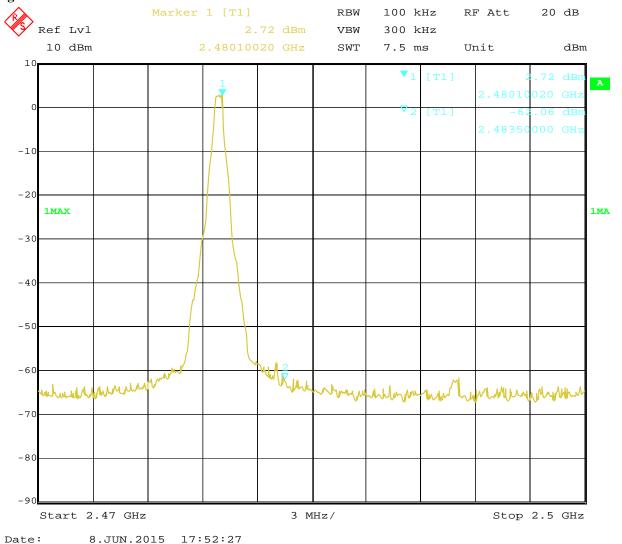


Type of Modulation: GFSK

Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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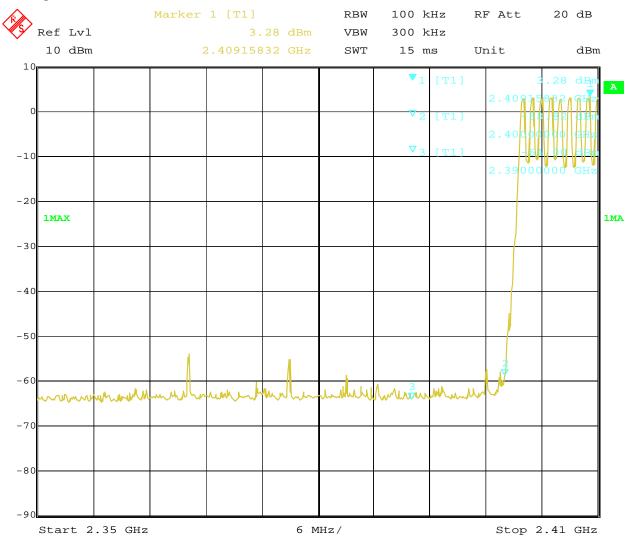


Type of Modulation: GFSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 17:42:51

Date: 2015-06-30

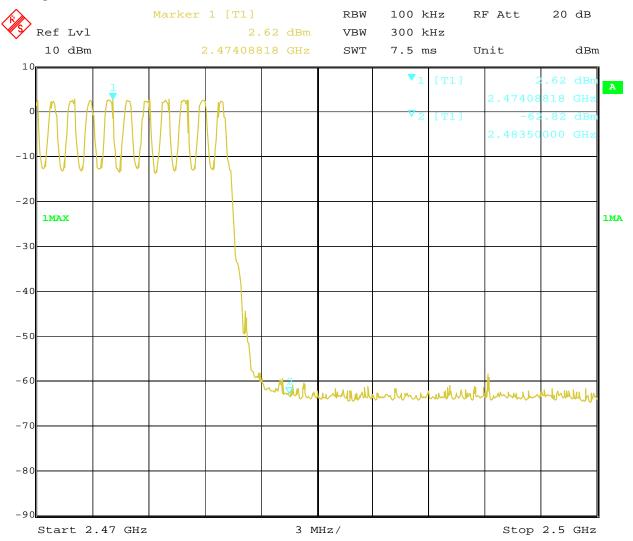


Type of Modulation: GFSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 17:47:06

Date: 2015-06-30

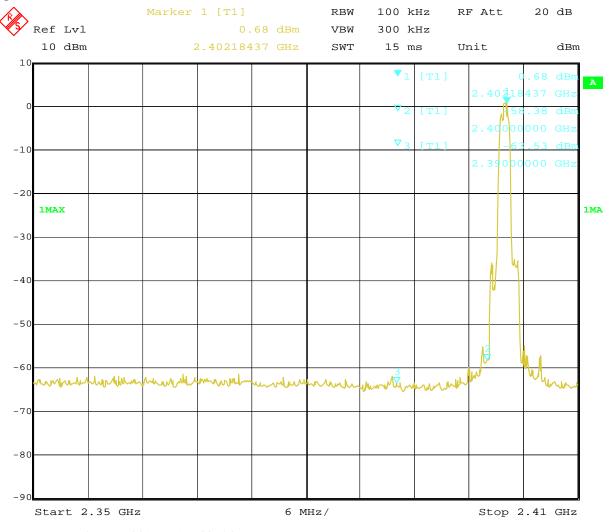


Type of Modulation: Л/4DQPSK

Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 15:40:30

Date: 2015-06-30

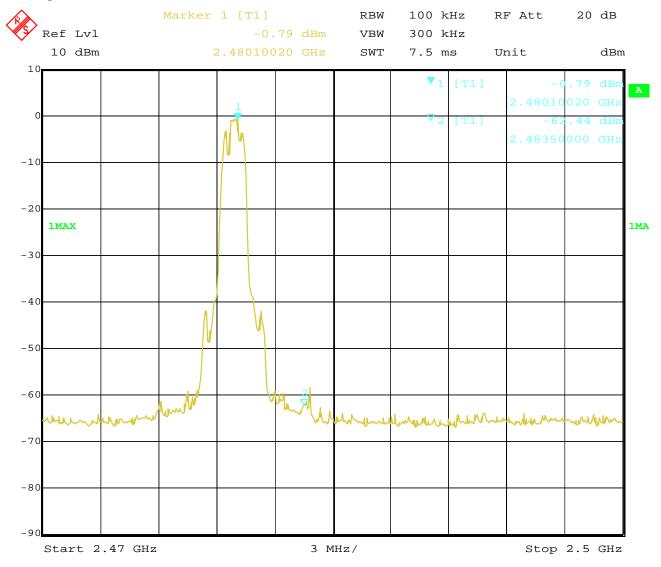


Type of Modulation: Л/4DQPSK

Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 15:41:51

Date: 2015-06-30

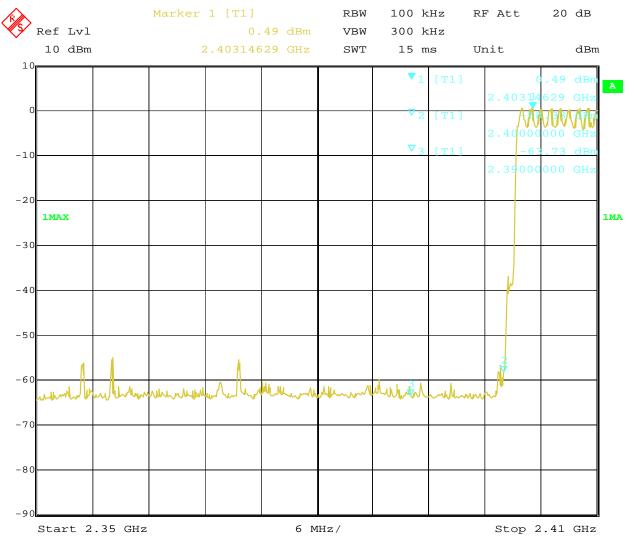


Type of Modulation: Л/4DQPSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 17:33:56

Date: 2015-06-30

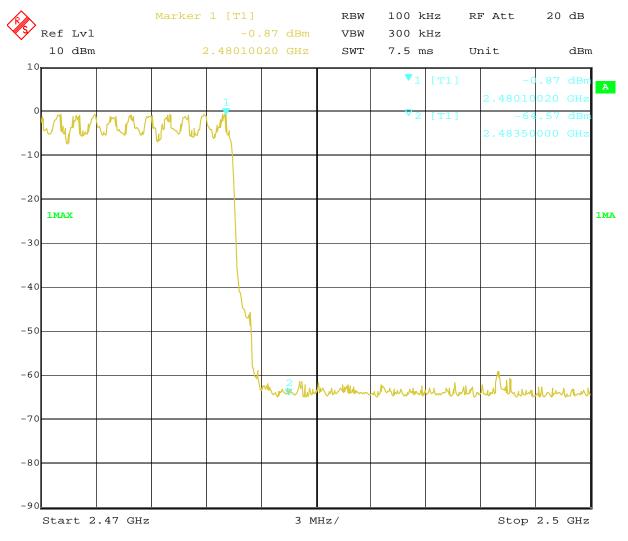


Type of Modulation: Л/4DQPSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



8.JUN.2015 17:26:08 Date:

Date: 2015-06-30



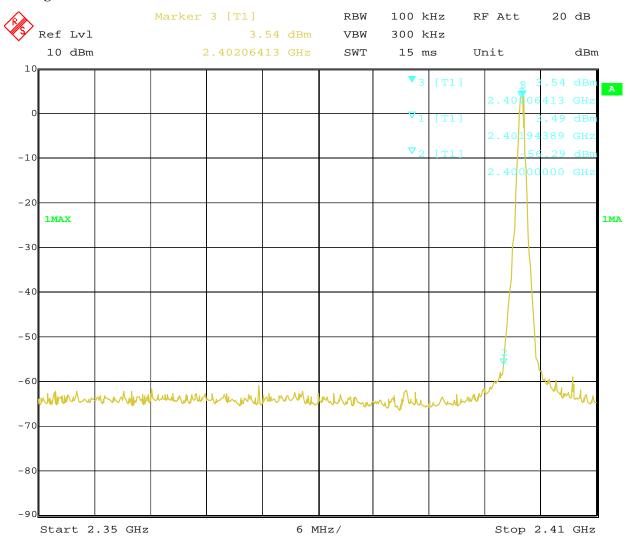
Antenna B

Type of Modulation: GFSK

12.4 Band-Edge Test Result

Product:	TV BOX	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



9.JUN.2015 Date: 10:28:03

Date: 2015-06-30

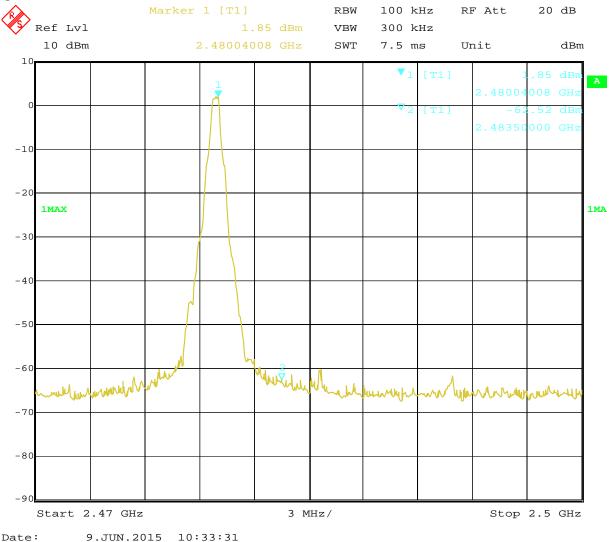


Type of Modulation: GFSK

Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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adopt any other remedies which may be appropriate.

Date: 2015-06-30

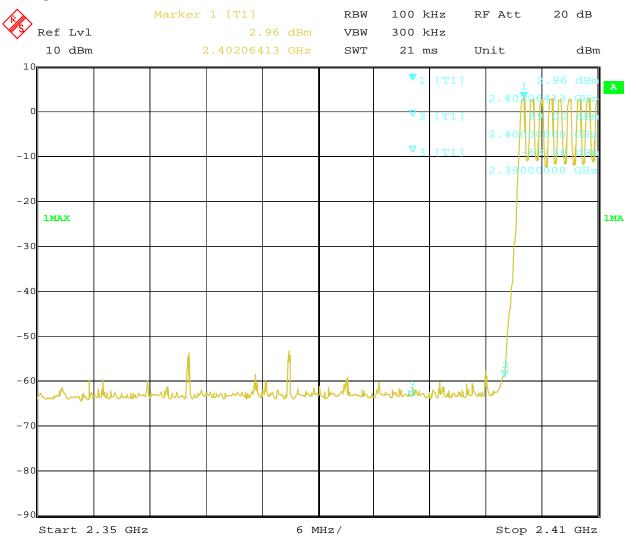


Type of Modulation: GFSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 19:01:05

Date: 2015-06-30

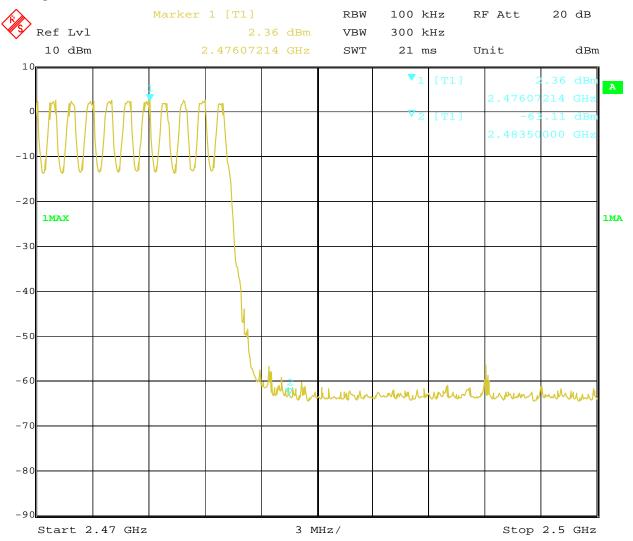


Type of Modulation: GFSK

Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 19:03:37

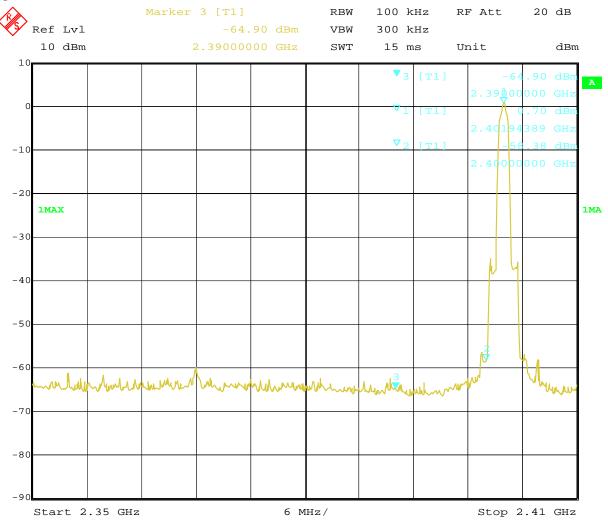
Date: 2015-06-30



Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 9.JUN.2015 10:27:17

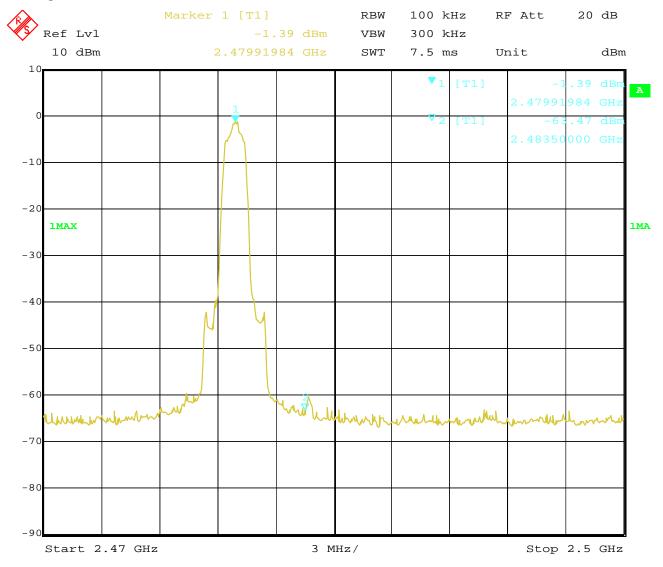
Date: 2015-06-30



Band-Edge Test Result 12.4

Product:	TV BOX	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 9.JUN.2015 10:35:14

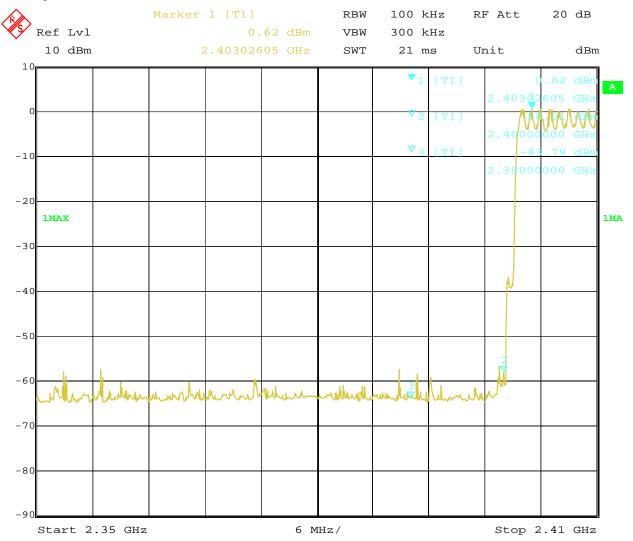
Date: 2015-06-30



Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 8.JUN.2015 18:53:22

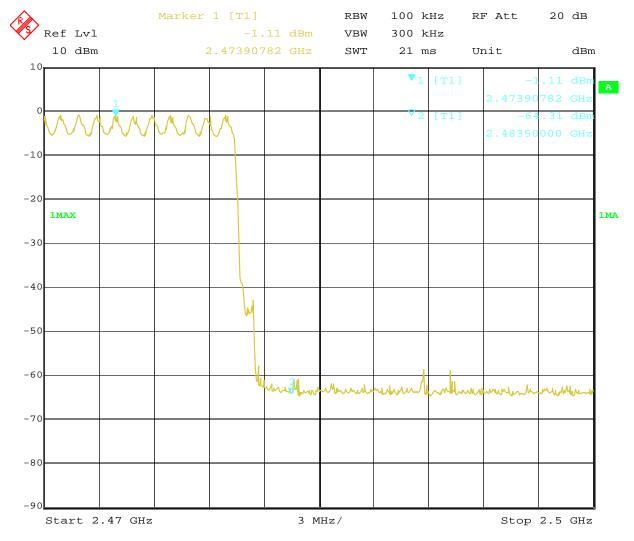
Date: 2015-06-30



Band-Edge Test Result

Product:	TV BOX	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	DC5V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



8.JUN.2015 18:50:06 Date:

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Type of Modulation: GFSK

12.4 Restricted band Measurement

Product:	TV BOX		Test Mode:	Low Channel
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400MHz	PK (dBµV/m)	42.5(H)/43.3(V)	T :	74(dBµV/m)
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$
2390MHz	PK (dBµV/m)	37.2(H)/ 38.6(V)	Limit	$74(dB\mu V/m)$
	AV (dBμV/m)			$54(dB\mu V/m)$

12.4 Restricted band Measurement

EUT	TV BOX		Test Mode:	High Channel
Mode	Bluetooth MIM	O Keeping TX mode	Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.5MHz	PK (dBµV/m)	41.3(H)/ 42.4(V)	Limit	$74(dB\mu V/m)$
	AV (dBμV/m)			54(dBμV/m)

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Restricted band Measurement 12.4

Product:	TV BOX		Test Mode:	Hopping On
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400MHz	PK (dBμV/m)	43.6(H)/ 44.1(V)	T ::4	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	54(dBμV/m)
2390MHz	PK (dBμV/m)	38.3(H)/38.9(V)	Limit	74(dBμV/m)
	AV (dBμV/m)			54(dBμV/m)

12.4 Restricted band Measurement

EUT	TV BOX		Test Mode:	Hopping On
Mode	Bluetooth MIM	IO Keeping TX mode	Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.5MHz	PK (dBμV/m)	41.7(H)/ 43.5(V)	T ::4	74(dBμV/m)
	AV (dBμV/m)		Limit	54(dBμV/m)

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Type of Modulation: Л/4DQPSK

12.4 Restricted band Measurement

Product:	TV BOX		Test Mode:	Low Channel
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400MHz	PK (dBµV/m)	42.9(H)/ 43.9(V)	T ::4	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$
2390MHz	PK (dBµV/m)	38.8(H)/ 39.2(V)	Limit	$74(dB\mu V/m)$
	AV (dBμV/m)		LIIIII	54(dBμV/m)

12.4 Restricted band Measurement

EUT	TV BOX		Test Mode:	High Channel
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.5MHz	PK (dBµV/m)	40.7(H)/ 41.8(V)	T ::4	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	54(dBμV/m)

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12.4 Restricted band Measurement

Product:	TV BOX		Test Mode:	Hopping On
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400MHz	PK (dBµV/m)	42.1(H)/ 44.6(V)	Limit	74(dBμV/m)
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$
2390MHz	PK (dBµV/m)	38.6(H)/40.1(V)	Limit	$74(dB\mu V/m)$
	AV (dBμV/m)			54(dBµV/m)

12.4 Restricted band Measurement

EUT	TV BOX		Test Mode:	Hopping On
Mode	Bluetooth MIMO Keeping TX mode		Input Voltage	DC5.0V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.5MHz	PK (dBµV/m)	42.3(H)/ 42.6(V)	T ::4	$74(dB\mu V/m)$
	AV (dBμV/m)		Limit	54(dBμV/m)

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13.0 Antenna Requirement

13.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected constructions

Two Integral antennas used. The maximum is 2.0dBi for each one.

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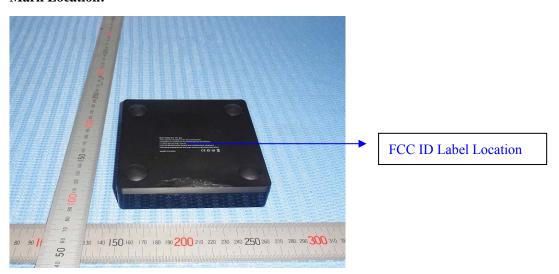
14.0 FCC ID/IC Label

FCC ID: 2AE6JI826

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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15.0 Photo of testing

Conducted Emission Test Setup:



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Radiated Emission Test Setup:





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Photographs - EUT

Outside view





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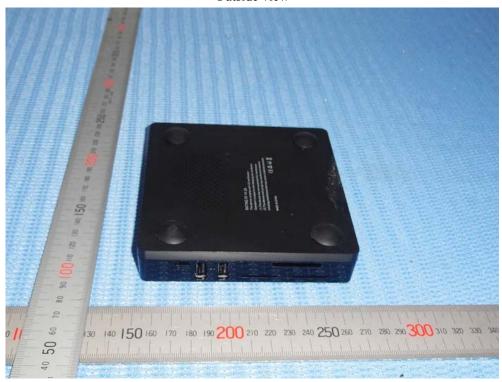
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Outside view





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Inside view





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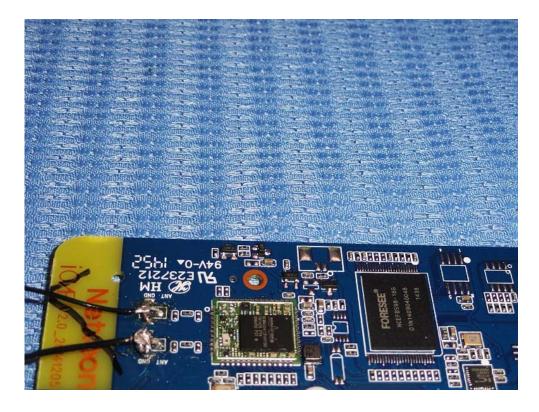
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Inside view





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Inside view





End of the report

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