



# TEST REPORT

**No.I16D00008-BLE**

***For***

**Client : LENOVO (SHANGHAI) ELECTRONICS  
TECHNOLOGY CO LTD**

**Production : Portable Tablet Computer**

**Brand Name : Lenovo**

**Model Name : Lenovo TB3-730F**

**FCC ID: O57TB3730F**

**IC ID 10407A-TB3730F**

**Standard: FCC Part15 / ANSI C63.10**

**RSS-247**

**Issued date: 2016-03-16**

**Note:**

Hardware and software version see page 8

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

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Tel: (+86)-021-63843300, E-Mail: [welcome@ecit.org.cn](mailto:welcome@ecit.org.cn)

**About EUT**

EUT Description	Portable Tablet Computer
Model name	Lenovo TB3-730F
Bluetooth Frequency	2402MHz-2480MHz
BLE Frequency	2402MHz-2480MHz
WLAN Frequency	2412MHz-2462MHz
GPS Frequency Band	1575.42MHz(L1)
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.4V

**Revision Version**

Report Number	Revision	Date	Memo
I16D00008-BLE	00	2016-03-07	Initial creation of test report
I16D00008-BLE	01	2016-03-15	Second creation of test report
I16D00008-BLE	02	2016-03-16	Third creation of test report

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## 1. Test Laboratory

### 1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

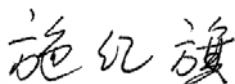
### 1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

### 1.3. Project data

Project Leader:	Wang Yaqiong
Testing Start Date:	2016-01-19
Testing End Date:	2016-03-05

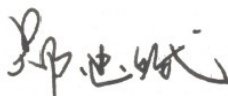
### 1.4. Signature



**Shi Hongqi**  
(Prepared this test report)



**Liu Jianquan**  
(Reviewed this test report)



**Zheng Zhongbin**  
Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: LENOVO (SHANGHAI) ELECTRONICS TECHNOLOGY CO LTD  
Address: NO 68 BUILDING 199 FENJU RD, CHINA (SHANGHAI) PILOT  
FREE TRADE ZONE, SHANGHAI, 200131CHINA  
Telephone: +86 186 1669 0577  
Postcode: 200131

### **2.2. Manufacturer Information**

Company Name: Lenovo PC HK Limited  
Address: 23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay,  
Hong Kong  
Telephone: +86 186 1669 0577  
Postcode: N/A

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

EUT Description	Portable Tablet Computer
Model name	Lenovo TB3-730F
BLE Frequency	2402MHz-2480Mhz
BLE Channel	Channel0-Channel39
BLE Modulation	GFSK
Extreme Temperature	-10/+55℃
Nominal Voltage	3.8V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.4V

Note: Photographs of EUT are shown in ANNEX A of this test report.

#### 3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N02 (Main Supply)	N/A	98999_1_13M14	TB3-730F_S009_16 0120_ROW	2016-01-19
N06 (Main Supply)	HZC2KG25	98999_1_13M14	TB3-730F_S009_16 0120_ROW	2016-01-19
N16 (Secondary Supply)	HZC2M754	98999_1_13M14	TB3-730F_S009_16 0120_ROW	2016-01-19

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---
AE2	---	---

\*AE ID: is used to identify the test sample in the lab internally.

#### 3.4. The difference between two provide EUT

##### Main Supply

Part Name	Model Name	supplier	Remark
LCD	TV070WSM-TL1 -38P0	BOE TECHNOLOGY GROUP CO.LTD	7"color TFT-LCD
Flash	KMQ820013M-B 419	SAMSUNG	eMMC+DDR3;16GByte+1 6Gb;B221;11.5*13*1mm

Speaker	XHB181331B08-09-B-RH	JiaShan Haosheng Electronic CO.,LTD	P98999AA1 SPEAKER BOX module
Front Camera	BLX2508W	Brodsands Electronics(ShenZhen)Co.,Ltd.	200WFF,GC2355C CSP,6.5*6.5*4.37,82°wide viewing angles
Back Camera	L545A00	NanChang O-Film TECH CO.,LTD	500WAF, SENSOR HI-545, 8.5*8.5*5.1mm, 67
Vibrator	HZF1027A-P02L 12	ShenZhen Hongzhifa Machinery&Electronic CO.,LTD	Cylindrical motor, diameter 4, size 4.7*4.7*11.4, lead wire, swing hammer radius
Back cover	P98999AA1	ShenZhen Lianmao Plastic CO.,LTD	
Battery	L13D1P31	Sunwoda Electronic CO.,LTD	3450mAh
USB Cable	XJ-007056	SHIN AN WIRE&CABLE CO.,LTD	MIC USB, 1m, black/REACH
Charger	EU: C-P57 US: C-P56	Acbel Electronic (Dongguan) CO., LTD	OUTPUT: 5V1A

**Secondary Supply**

Part Name	Model Name	supplier	Remark
LCD	P070ACB-DB6	Innolux corporation	7"color TFT-LCD
Flash	H9TQ17ABJTM CUR-KUM	Hynix	eMMC+DDR3;16GByte+16Gb;B221;11.5*13*1mm
Speaker	DS1813DO-01-A SM4-FPC	Jiangsu Midi Acoustics Technology CO.,LTD	P98999AA1 SPEAKER BOX module
Front Camera	GV5968A1D	Shenzhen E-welly Electronic Co., LTD	200W FF,SP2508,6.5*6.5*4.35M M,3Plens, wide angle of view
Back Camera	FH545AB	Q Technology Limited	500WAF, SENSOR HI-545, 8.5*8.5*5.1mm, 67
Vibrator	Y0408L-4009300 72-4423	ChongQing LingLong Electronic CO.,LTD	Cylindrical motor, diameter 4, size 4.7*4.7*11.4, lead wire, swing hammer radius

Back cover	P98999AA1	Wingtech Mobile Communications Co.,Ltd	
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## ***RF Test Report***

Report No.: I16D00008-BLE

Battery	L13D1P31	Scud(Fujian)Electronic CO.,LTD	3450mAh
USB Cable	SWT-A039A	SAIBO ELECTRON TECHNOLOGY (HK) CO.,LTD	MIC USB, 1m, black/REACH
Charger	EU: C-P57 US: C-P56	ShenZhen Huntkey Electric CO., LTD	OUTPUT: 5V1A

## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15,Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2014
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems	2013
RSS-247	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	2015

## 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247(b)	RSS-247 5.4	P
Peak Power Spectral Density	15.247(e)	RSS-247 5.2	P
6dB Occupied Bandwidth	15.247(c)	RSS-247 5.2	P
Band Edges Compliance	15.247(d)	RSS-247 5.5	P
Transmitter Spurious Emission-Conducted	15.247	RSS-247 5.5	P
Transmitter Spurious Emission-Radiated	15.247,15.209,	RSS-247 5.5	P
AC Powerline Conducted Emission	15.107,15.207	RSS-247 Gen 3.2	NA

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity

Anom	Norm Air Pressure
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For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	22°C
Voltage	Vnom	3.8V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

**Note:**

- All the test data for each data were verified, but only the worst case was reported.
- The GFSK,  $\pi/4$  DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for  $\pi/4$  DQPSK, 3-DH1 for 8DPSK.
- The DC and low frequency voltages' measurement uncertainty is  $\pm 2\%$ .

**5.1. Notes**

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

**5.2. Statements**

The product name Lenovo TB3-730F, supporting WLAN/BT/BLE/GPS, manufactured by Lenovo PC HK Limited, is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

## 6. Test result

### 6.1. Peak Output Power-Conducted

#### 6.1.1 Measurement Limit

Standard	Limit (dBm)
FCC Part 15.247(b)(1)	< 30

#### 6.1.2 Test Condition:

Hopping Mode	RBW	VBW	Span	Sweptime
Hopping OFF	3MHz	10MHz	9MHz	Auto

#### 6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

1. The output power of EUT was connected to the spectrum analyzer by cable. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Measure the conducted output power and record the results it.

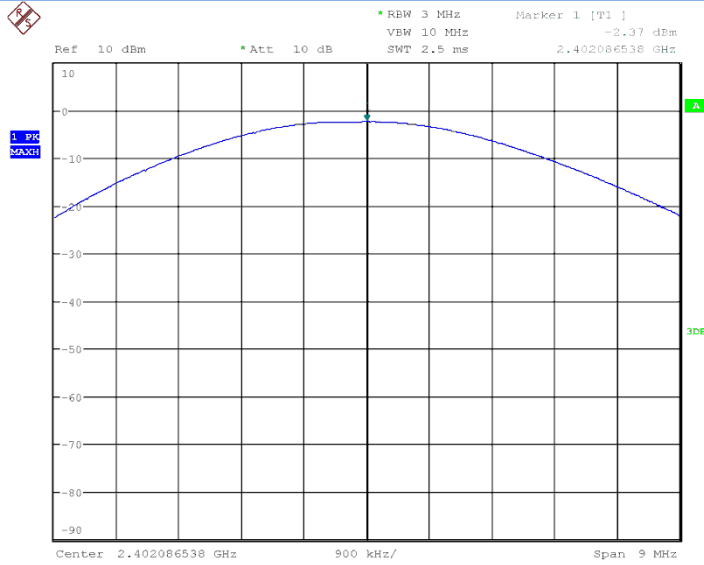
#### 6.1.4 Measurement Results:

##### For GFSK

Channel	Ch0 2402 MHz	Ch19 2440 MHz	CH39 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	-2.37	-0.45	-1.14	P
	Fig.1	Fig.2	Fig.3	

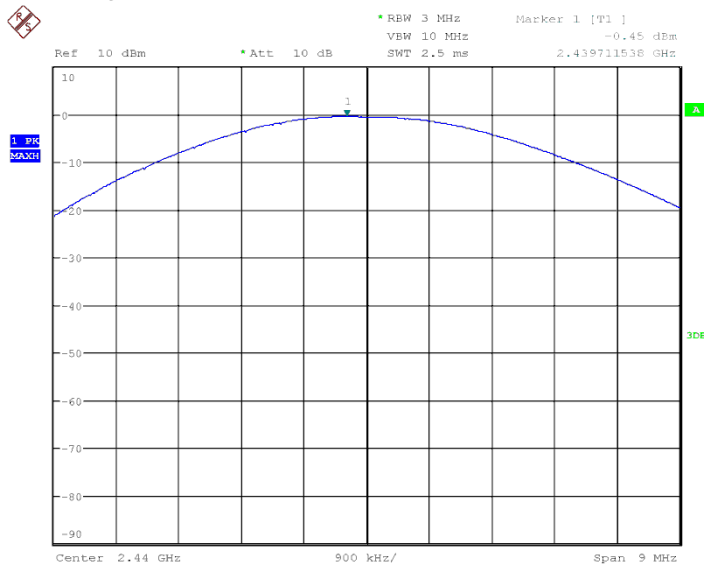
**Conclusion: PASS**

**Test graphs an below**



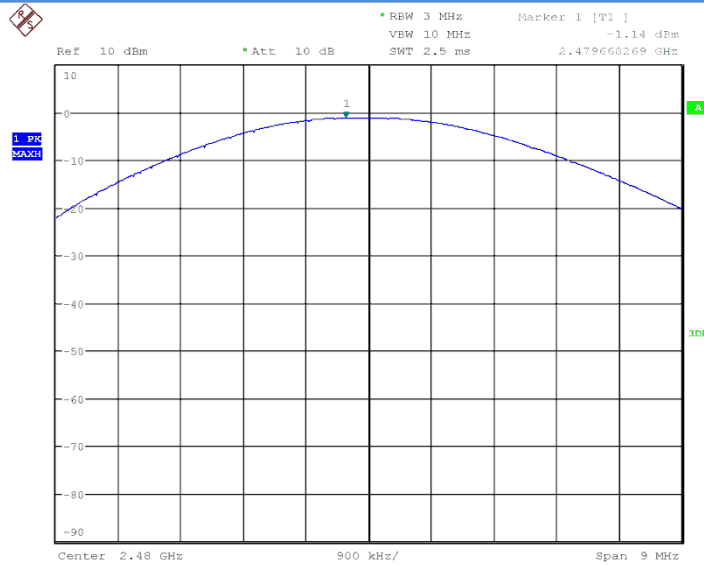
Date: 15.MAR.2016 12:49:09

Fig.1 Peak Conducted Output Power CH0, DH1



Date: 15.MAR.2016 12:49:53

Fig.2 Peak Conducted Output Power CH19, DH1



Date: 15.MAR.2016 12:50:41

Fig.3 Peak Conducted Output Power CH39, DH1

## 6.2. Peak Power Spectral Density

### 6.2.1 Measurement Limit:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

### 6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
6. Set the VBW  $\geq [3 \times \text{RBW}]$ .
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

## 6.2.3 Measurement Uncertainty:

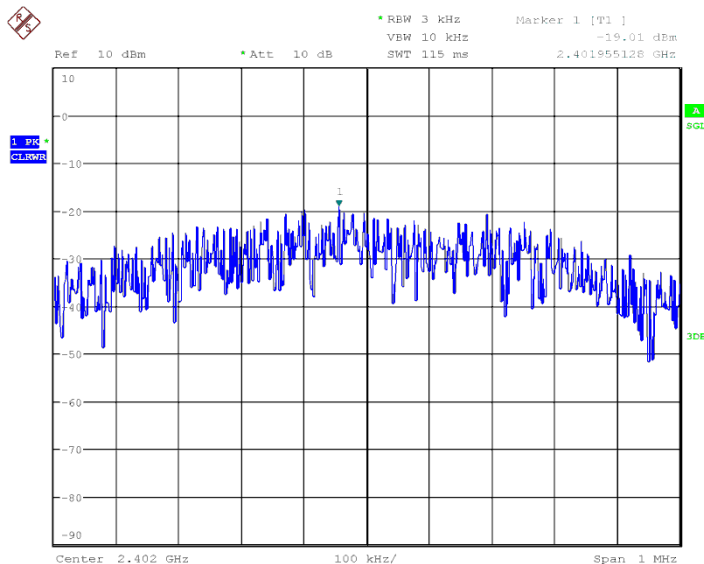
Measurement Uncertainty	$\pm 0.75\text{dB}$
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## 6.2.4 Measurement Results:

### 802.11b/g mode

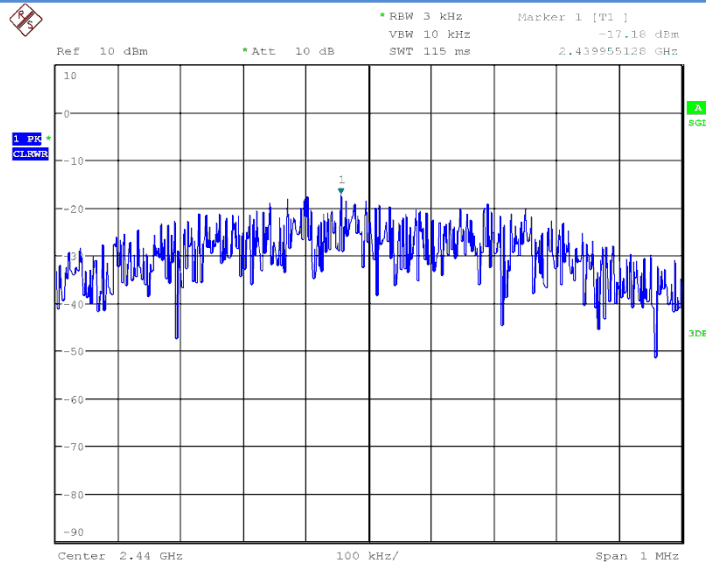
Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
BT4.0	00	Fig.4	-19.01	P
	19	Fig.5	-17.18	P
	39	Fig.6	-18.32	P

Test figure as below:



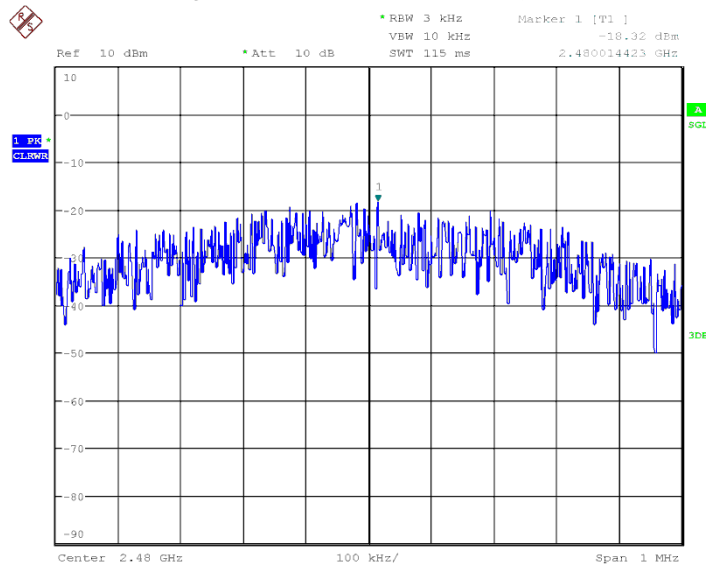
Date: 15.MAR.2016 12:52:43

Fig.4 Power spectral density: CH0



Date: 15.MAR.2016 12:53:43

Fig.5 Power spectral density: CH19



Date: 15.MAR.2016 12:54:37

Fig.6 Power spectral density: CH39

## 6.3. 6dB Bandwidth

### 6.3.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a) (1)	N/A

## 6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.7

1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
2. Enable the EUT transmit maximum power.
3. Set the spectrum analyzer as
4. Span: two or five times of OBW
5. RBW= 1% to 5% of the OBW; VBW $\geq$ 3RBW; Max Hold.
6. Select the max peak, and N DB DOWN=20dB.
7. Record the results.

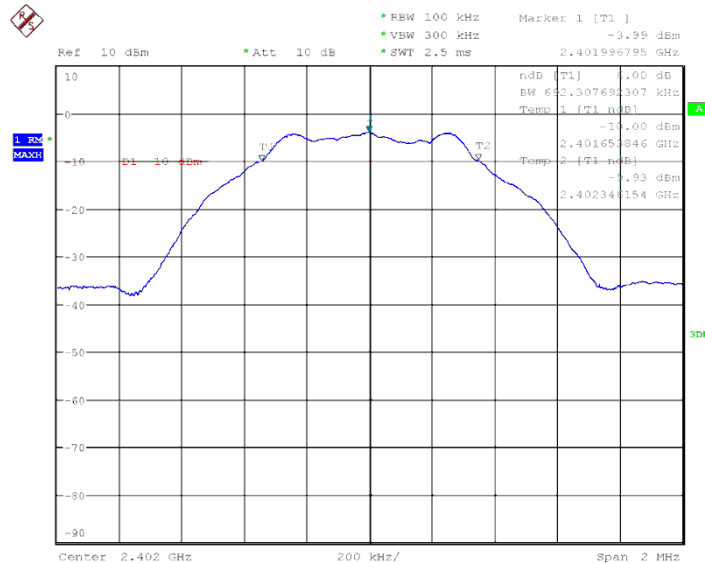
## Measurement Result:

### For GFSK

Channel	6dB Bandwidth (KHz)		Conclusion
0	Fig.7	692.308	P
39	Fig.8	692.308	P
78	Fig.9	685.897	P

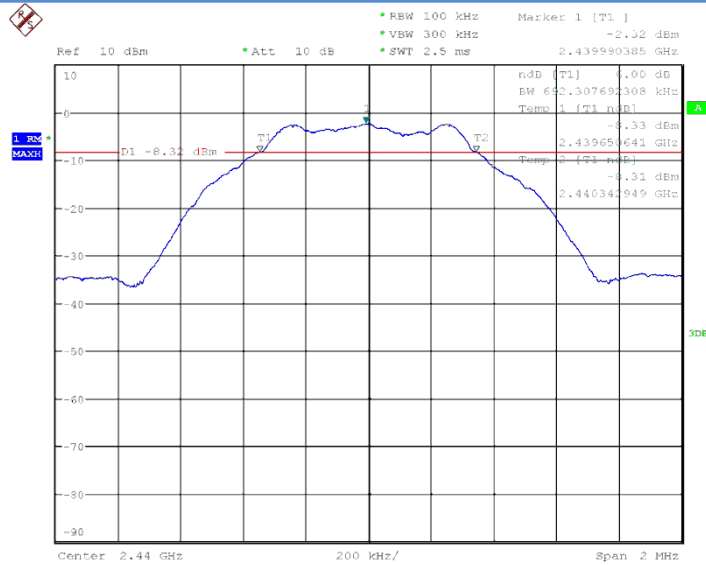
**Conclusion: PASS**

Test graphs as below:



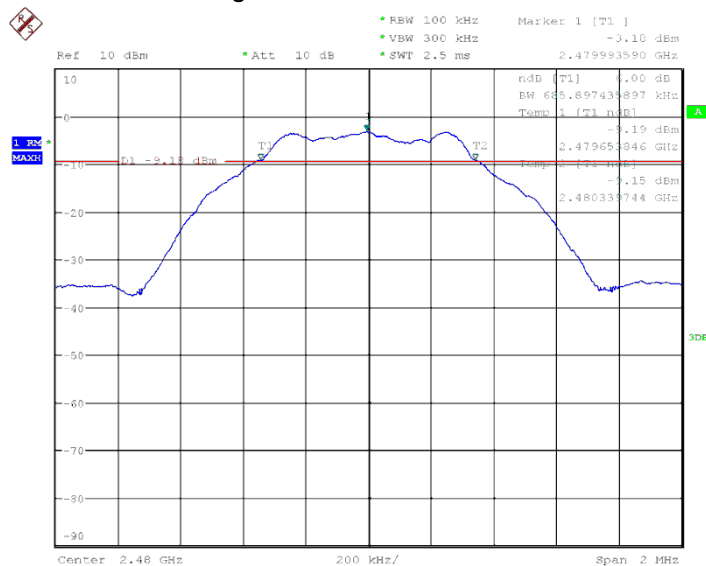
Date: 25.JAN.2016 12:33:33

Fig.7 6dB Bandwidth: Ch0



Date: 25.JAN.2016 12:35:02

Fig.8 6dB Bandwidth: Ch19



Date: 25.JAN.2016 12:36:44

Fig.9 6dB Bandwidth: Ch39

## 6.4. Frequency Band Edges-Conducted

### 6.4.1 Measurement Limit:

Standard	Limited(dBc)
FCC 47 CFR Part 15.247(d)	>20

### 6.4.2 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.6.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
3. Detector =peak, sweep time=auto couple, trace mode=max hold.
4. Allow sweep to continue until the trace stabilizes.

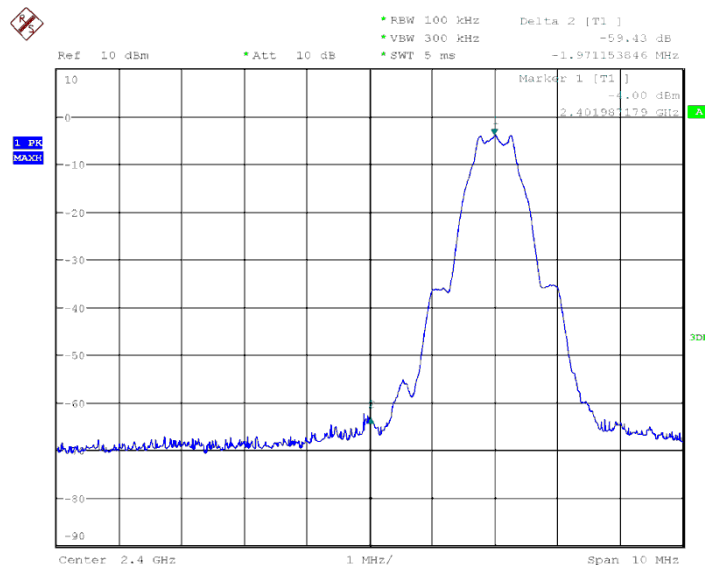
## 6.4.3 Measurement results

For GFSK

Channel	Band Edge Power (dBc)	Conclusion
00	Fig.10	P
39	Fig.11	P

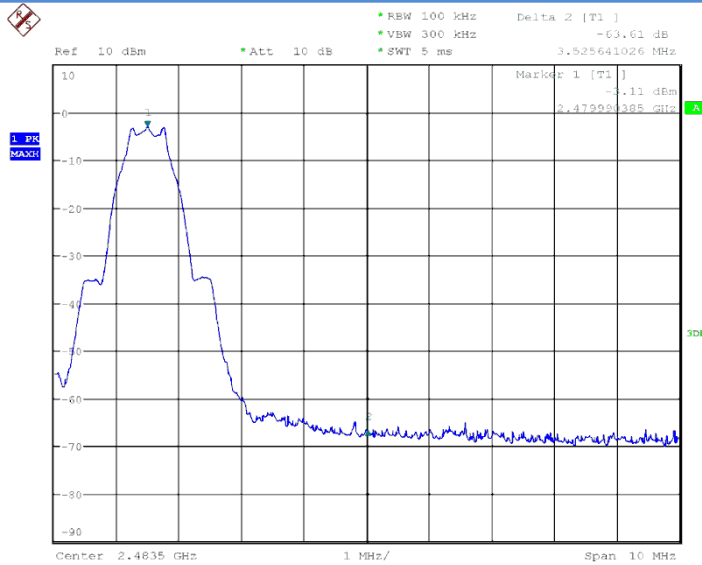
**Conclusion: PASS**

Test graphs an below



Date: 25.JAN.2016 12:40:52

Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF



Date: 25.JAN.2016 12:42:40

Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

## 6.5. Conducted Emission

### 6.5.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

### 6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

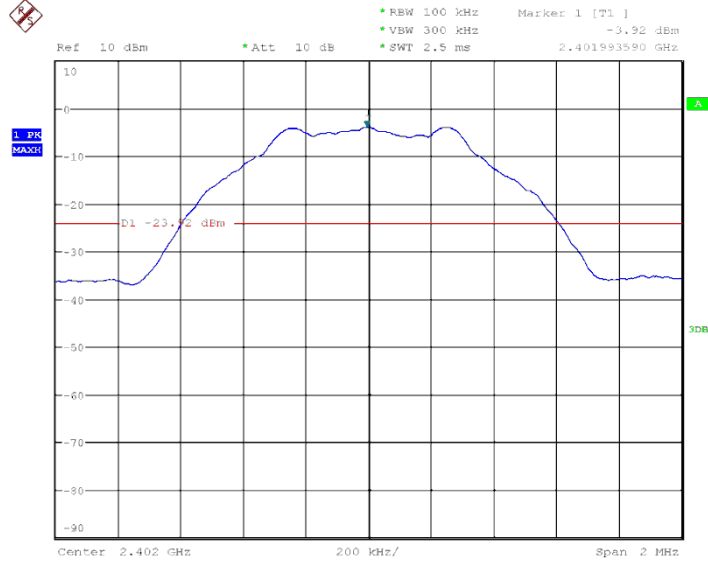
### 6.5.3 Measurement Results:

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	Center Freq.	Fig.12	P
	30MHz~26GHz	Fig.13	P
Ch19 2440MHz	Center Freq.	Fig.14	P
	30MHz~26GHz	Fig.15	P
Ch39 2480MHz	Center Freq.	Fig.16	P

	30MHz~26GHz	Fig.17	P
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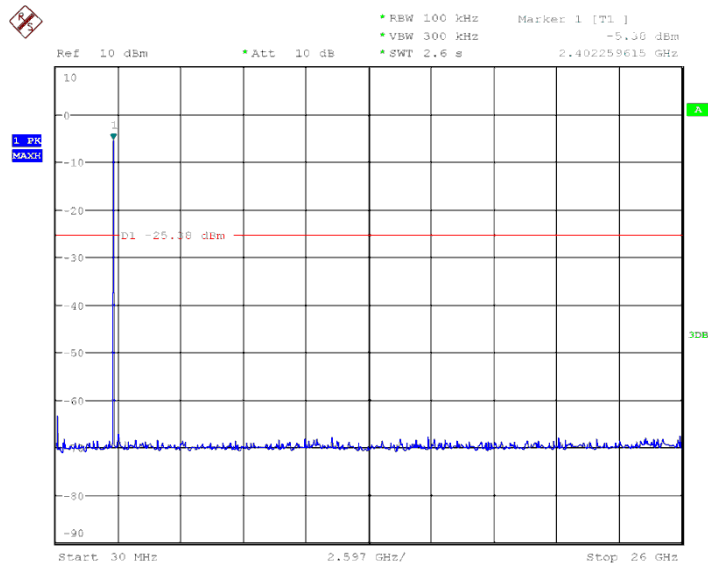
**Conclusion: PASS**

**Test graphs as below**



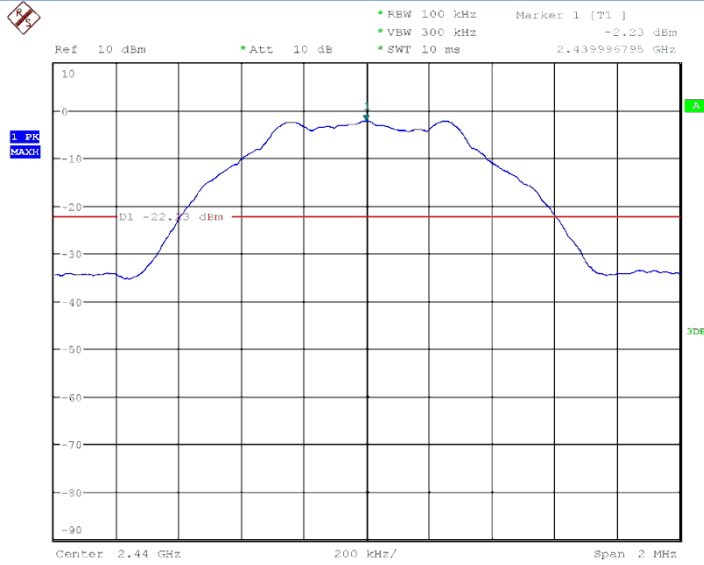
Date: 25.JAN.2016 12:48:22

**Fig.12 Conducted spurious emission: Ch0, 2402MHz**



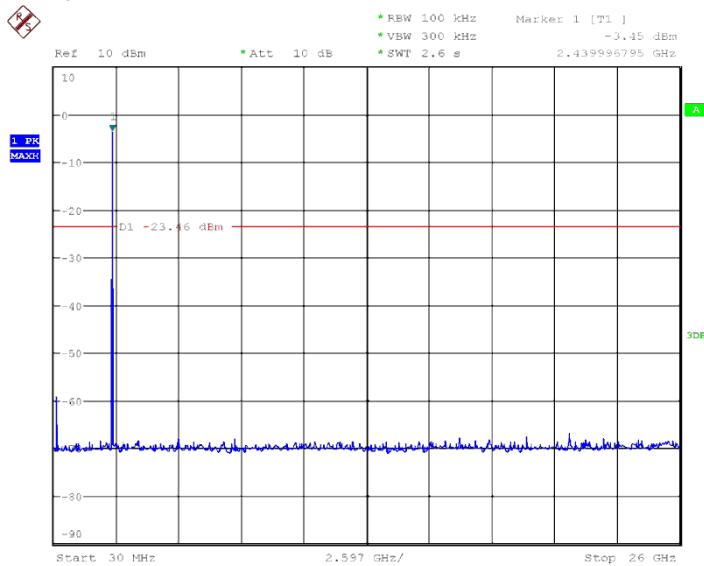
Date: 25.JAN.2016 12:49:54

**Fig.13 Conducted spurious emission: Ch0, 30MHz~26GHz**



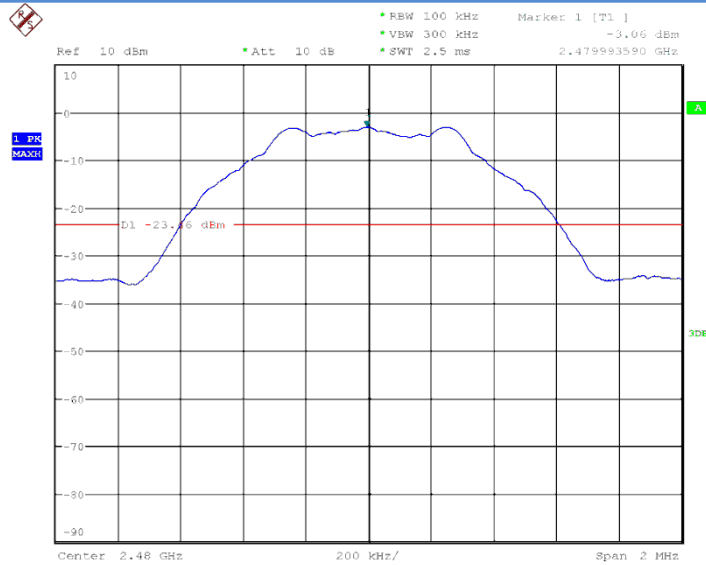
Date: 25.JAN.2016 12:51:57

Fig.14 Conducted spurious emission: Ch19, 2441MHz



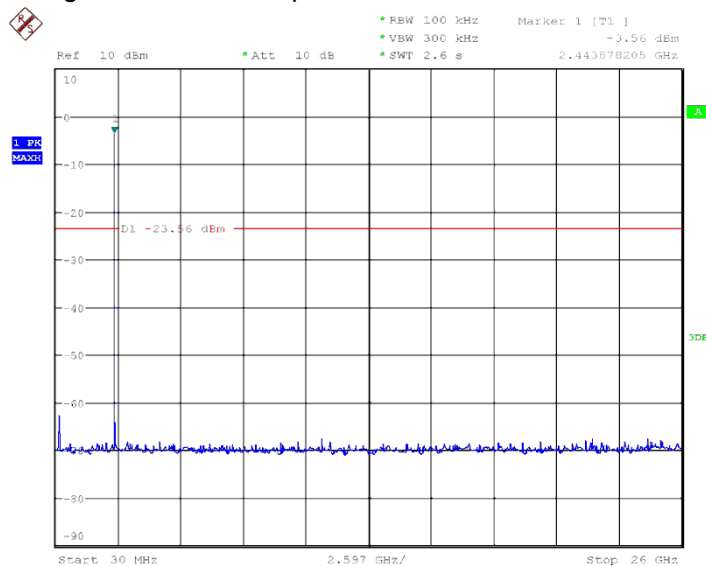
Date: 25.JAN.2016 12:53:54

Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz



Date: 25.JAN.2016 12:59:48

Fig.16 Conducted spurious emission: Ch39, 2480MHz



Date: 25.JAN.2016 13:03:30

Fig.17 Conducted spurious emission: Ch39, 30MHz~26GHz

## 6.6. Radiated Emission

### 6.6.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, 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) (see 15.205(c)).

## Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

## 6.6.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

## 6.6.3 Measurement Results:

A "reference path loss" is established and  $A_{Rpi}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$A_{Rpi} = \text{Cable loss} + \text{Antenna Gain} - \text{Preamplifier gain}$$

Result= $P_{Mea} + A_{Rpi}$

Main supply(N06)

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.18	P
	1GHz~3GHz	Fig.19	P
	3GHz~18GHz	Fig.20	P
Power	2.38GHz~2.4GHz	Fig.21	P
Power	2.45GHz~2.5GHz	Fig.22	P

Channel	Frequency Range	Test Results	Conclusion
Ch0 2480MHz	30MH~1GHz	Fig.23	P
	1GHz~3GHz	Fig.24	P
	3GHz~18GHz	Fig.25	P
All channels	18GHz~26GHz	Fig.26	P

## Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.392112	9.35	-25.9	35.25	V
46.885968	11.35	-24.9	36.25	V
50.529028	6.59	-24.9	31.49	V
81.641044	3.54	-27.7	31.24	V
109.158464	7.29	-23.6	30.89	H
665.744284	16.93	-11.8	28.73	V

## Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2615.457116	52.54	9.5	43.04	H
2663.519423	52.99	10	42.99	V
2753.4525	53.19	10.1	43.09	V

2794.342692	54.13	10.4	43.73	V
2895.251731	54.21	11.3	42.91	H
2956.846731	53.91	11.3	42.61	V

**Ch0 3GHz-18GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
12816.08133	52.2	16.7	35.5	V
13780.94327	53.12	17.9	35.22	V
15013.93033	55.58	21.5	34.08	H
16216.03127	58.87	25.6	33.27	V
16998.0978	60.15	27.1	33.05	V
17546.41667	62.34	29.3	33.04	H

**Ch39 30MHz-1GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.517528	7.9	-25.9	33.8	V
46.793508	12.3	-24.9	37.2	V
52.903636	10.75	-25	35.75	V
56.880264	8.37	-25	33.37	V
116.980776	4.94	-24.9	29.84	H
182.632224	5.11	-25.2	30.31	H

**Ch39 1GHz-3GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2607.695193	52.13	9.4	42.73	V
2675.161346	52.77	10	42.77	H
2709.844615	52.99	10.1	42.89	H
2806.622692	53.85	10.5	43.35	V
2908.648846	53.2	11.3	41.9	H

2952.68	54.23	11.3	42.93	V
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## Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14287.43993	55.28	20.6	34.68	V
14936.725	56.33	22	34.33	H
15801.22327	58.29	24.7	33.59	H
16460.66773	59.5	26.4	33.1	V
17538.55127	61.66	29.3	32.36	H
17868.2832	62.13	29.3	32.83	V

## All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97	42.03	V
20684.980000	47.7	6.97	40.73	H
22119.789000	45.3	3.05	42.05	V
23627.899000	43.8	3.05	40.75	H
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	H

**Note:** all the test data shown was peak detected.

**Conclusion:** PASS

**Test graphs as below:**

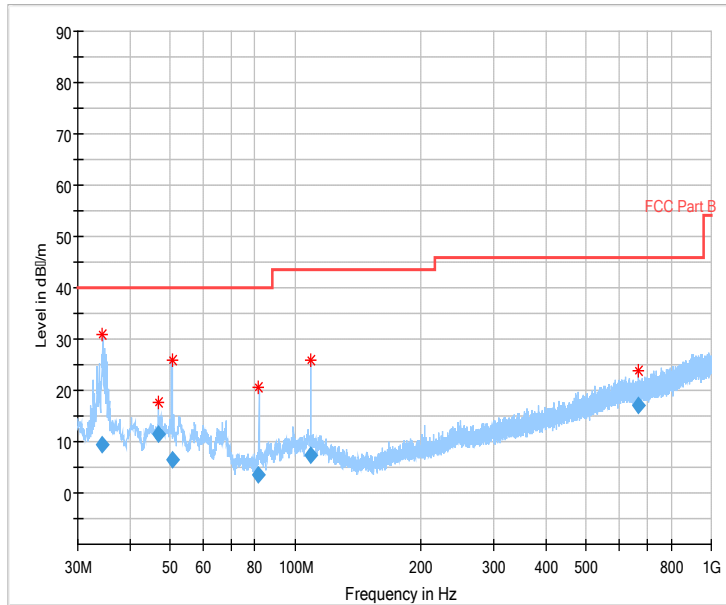


Fig.18 Radiated emission: Ch0, 30MHz~1GHz

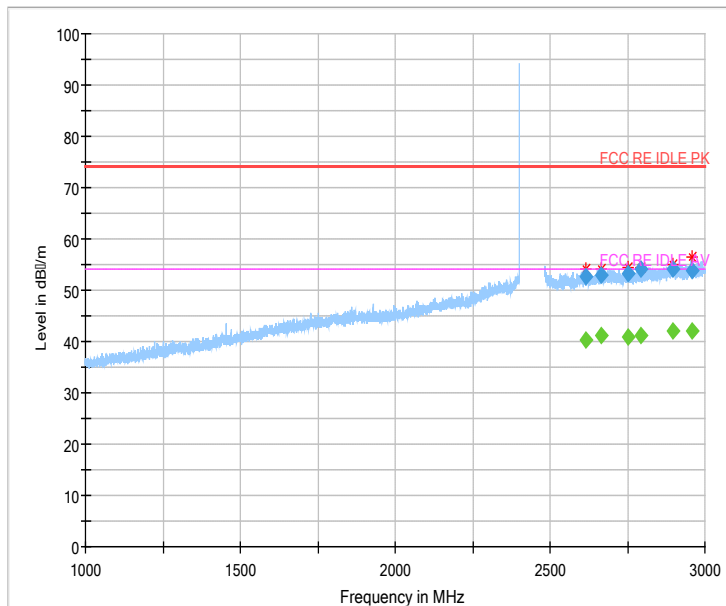


Fig.19 Radiated emission: Ch0, 1GHz~3GHz

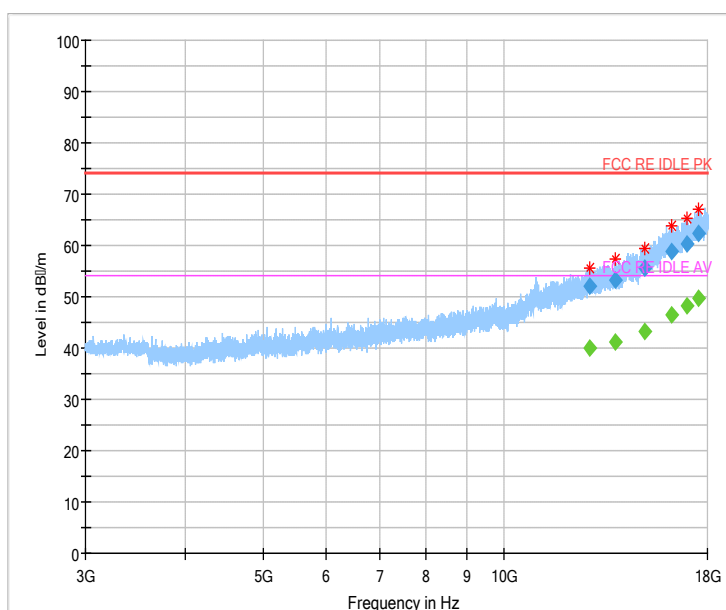


Fig.20 Radiated emission: Ch0, 3GHz~18GHz

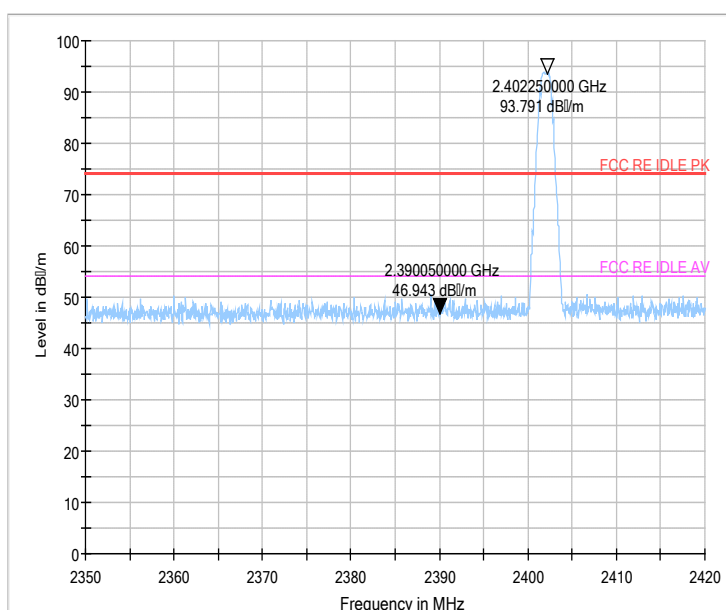
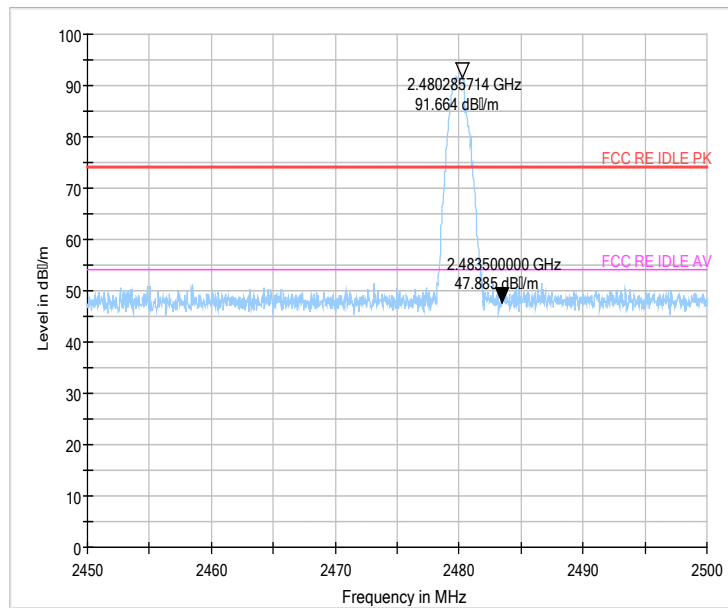


Fig.21 Radiated emission (Power): low channel



(peak)

Fig.22 Radiated emission (Power): high channel

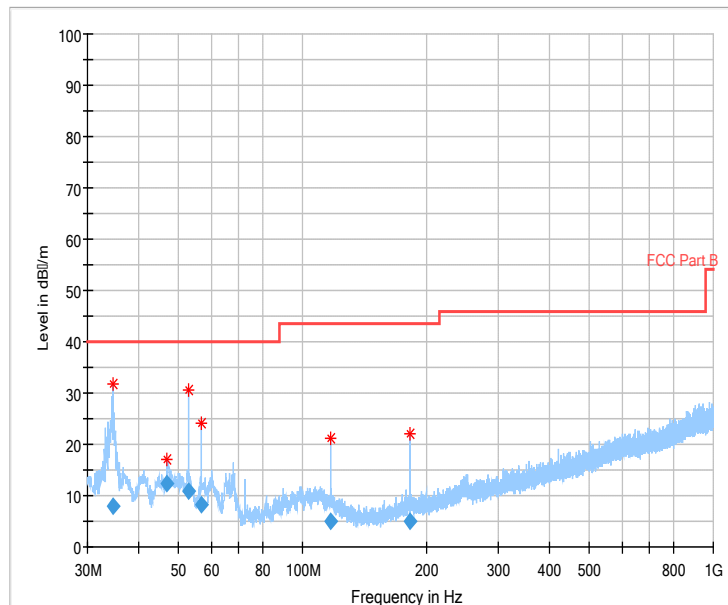


Fig.23 Radiated emission: Ch39, 30MHz~1GHz

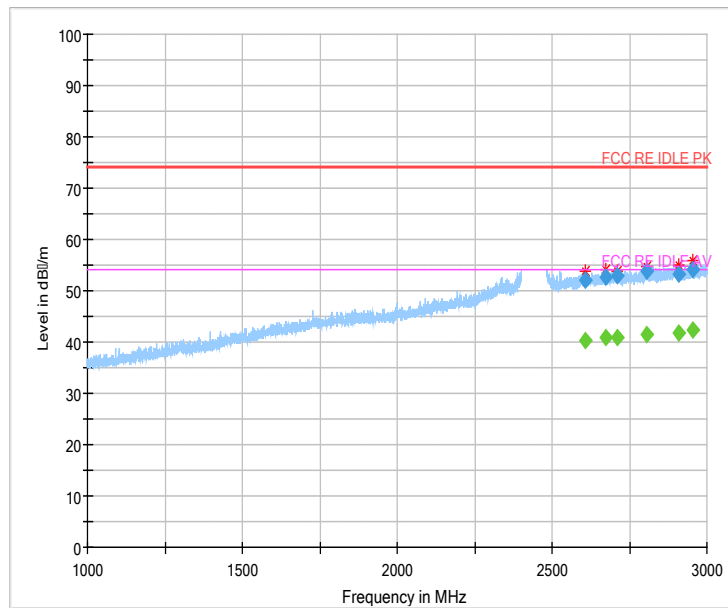


Fig.24 Radiated emission: Ch39, 1GHz~3GHz

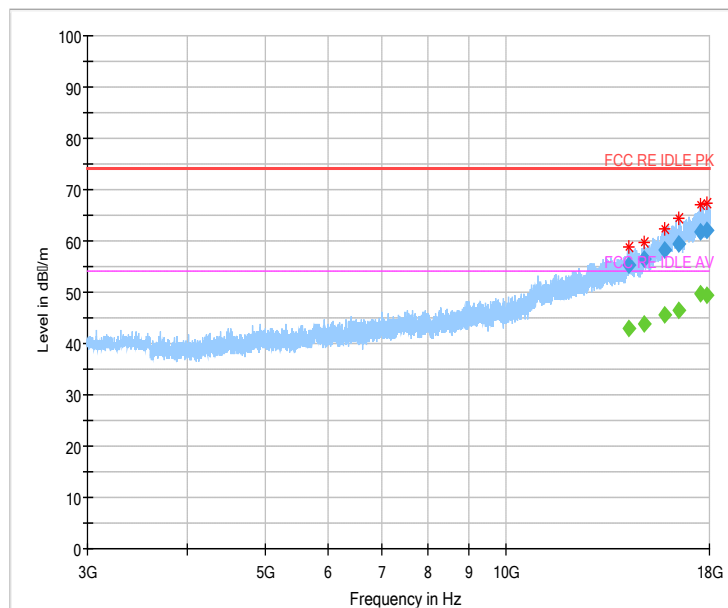


Fig.25 Radiated emission: Ch39, 3GHz~18GHz

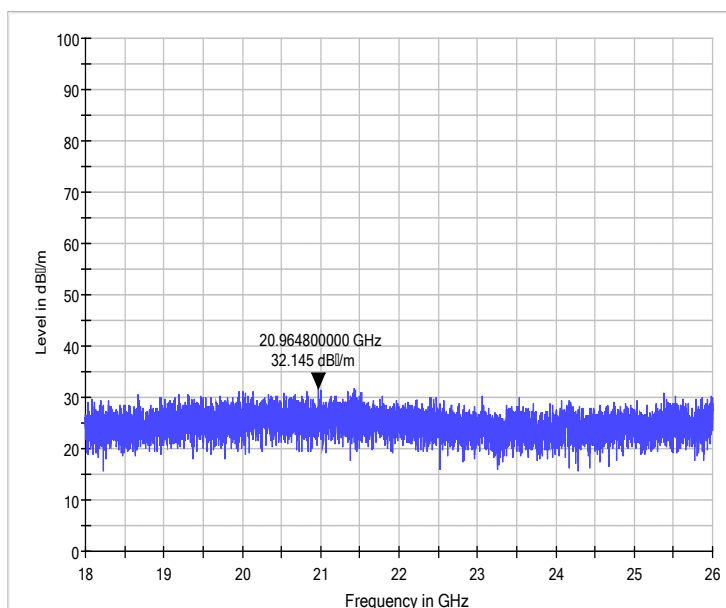


Fig.26 Radiated emission: 18 GHz - 26 GHz

## Secondary supply(N16)

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.27	P
	1GHz~3GHz	Fig.28	P
	3GHz~18GHz	Fig.29	P
Power	2.38GHz~2.4GHz	Fig.30	P
Power	2.45GHz~2.5GHz	Fig.31	P

Channel	Frequency Range	Test Results	Conclusion
Ch0 2480MHz	30MH~1GHz	Fig.32	P
	1GHz~3GHz	Fig.33	P
	3GHz~18GHz	Fig.34	P
All channels	18GHz~26GHz	Fig.35	P

## Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.969064	12.67	-25.9	38.57	V

47.221116	14.04	-24.9	38.94	V
52.713184	9.75	-25	34.75	V
81.75656	5.52	-27.7	33.22	V
111.864908	6.95	-24	30.95	V
561.074972	15.94	-13.1	29.04	V

**Ch0 1GHz-3GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2560.871539	52.06	9	43.06	H
2748.659808	53.19	10.1	43.09	H
2880.416923	55.32	11.2	44.12	H
2899.874808	55.04	11.3	43.74	V
2949.208654	54.13	11.2	42.93	H
2992.039615	54.38	11.7	42.68	H

**Ch0 3GHz-18GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13302.18627	53.28	17.2	36.08	V
14296.41213	55.02	20.7	34.32	V
14885.30087	55.84	21.9	33.94	V
15709.0226	57.41	23.9	33.51	H
16800.77113	59.7	27.4	32.3	H
17312.69987	61	28.4	32.6	H

**Ch39 30MHz-1GHz**

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.71394	8.81	-25.9	34.71	V
48.713696	8.61	-24.9	33.51	V
52.01962	8.06	-25	33.06	V

84.30024	2.64	-26.9	29.54	V
125.053584	4.38	-26.3	30.68	H
598.031284	16.58	-12.4	28.98	H

## Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2545.90827	51.57	8.9	42.67	V
2610.82173	52.64	9.4	43.24	V
2694.909807	54.13	10.1	44.03	V
2726.838462	52.97	10.1	42.87	V
2913.210769	55.54	11.3	44.24	H
2956.610384	54.92	11.3	43.62	H

## Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4850.812	42.64	0.9	41.74	V
6149.946467	43.06	3.6	39.46	H
9734.9532	46.33	9.3	37.03	H
13565.45713	53.51	18.3	35.21	V
15974.10093	58.64	25.2	33.44	H
17634.96667	61.83	29.2	32.63	V

## All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97	42.03	V
20684.980000	47.7	6.97	40.73	H
22119.789000	45.3	3.05	42.05	V
23627.899000	43.8	3.05	40.75	H
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	H

**Note: all the test data shown was peak detected.**

Conclusion: PASS

Test graphs as below:

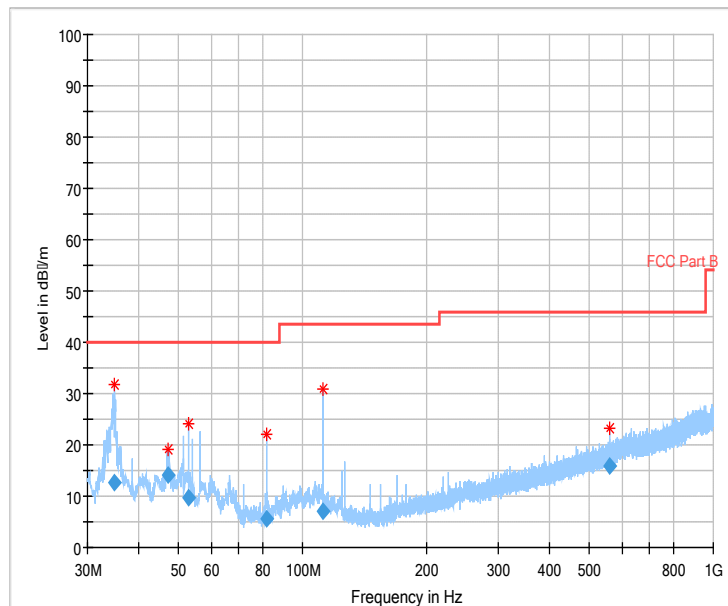


Fig.27 Radiated emission: Ch0, 30MHz~1GHz

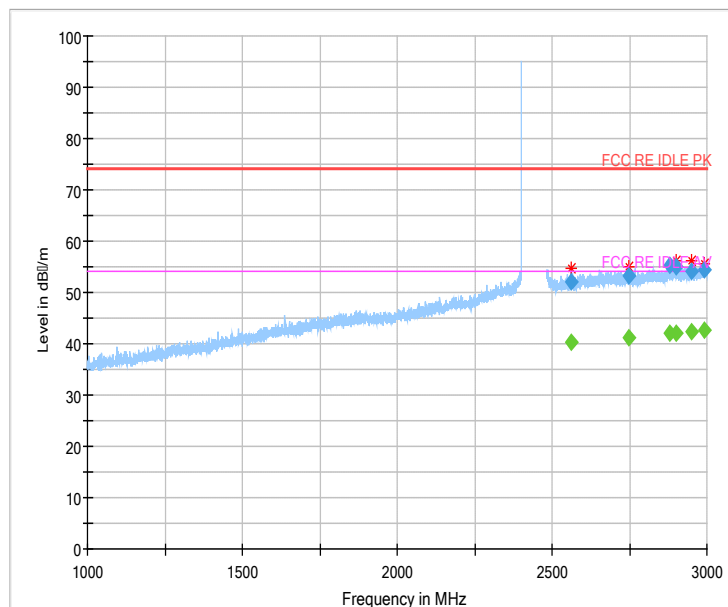


Fig.28 Radiated emission: Ch0, 1GHz~3GHz

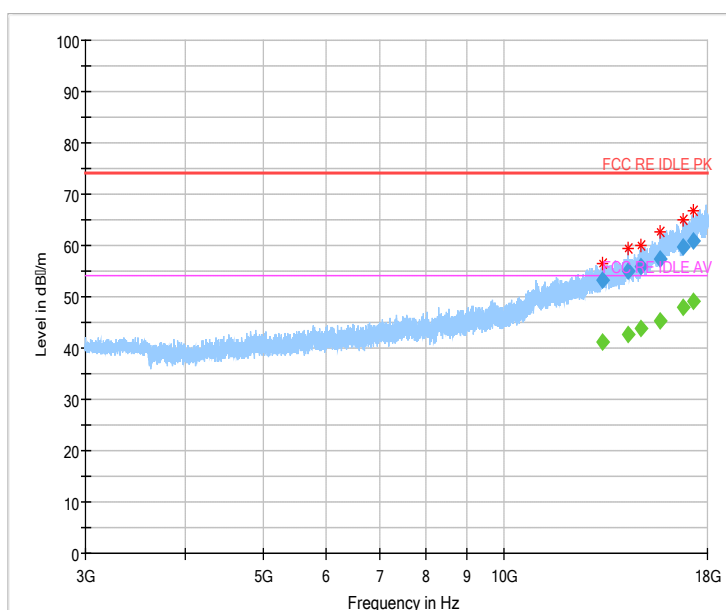


Fig.29 Radiated emission: Ch0, 3GHz~18GHz

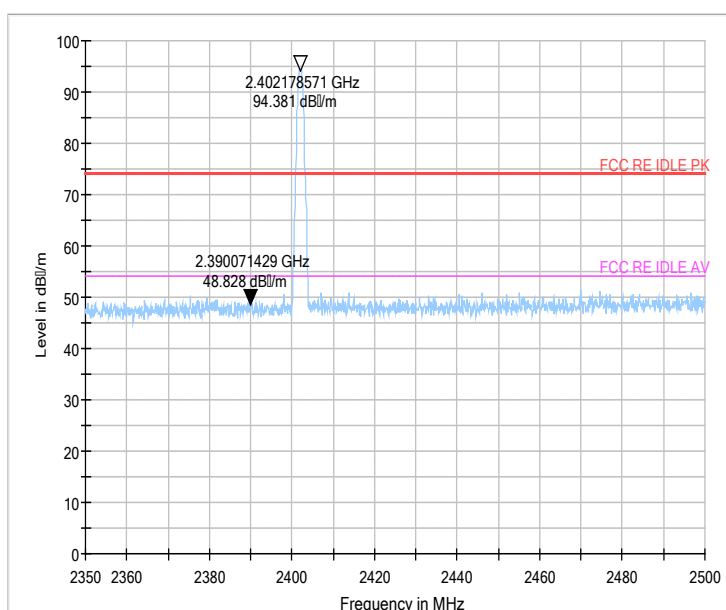
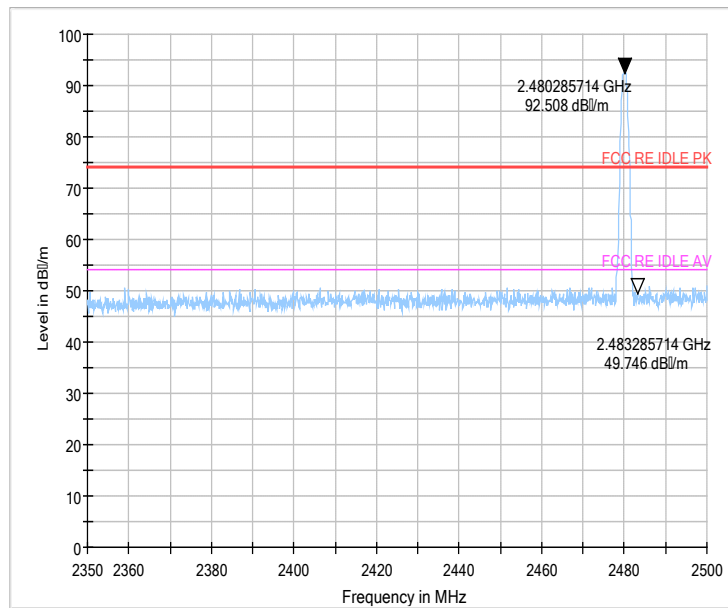


Fig.30 Radiated emission (Power): low channel



(peak)

Fig.31 Radiated emission (Power): high channel

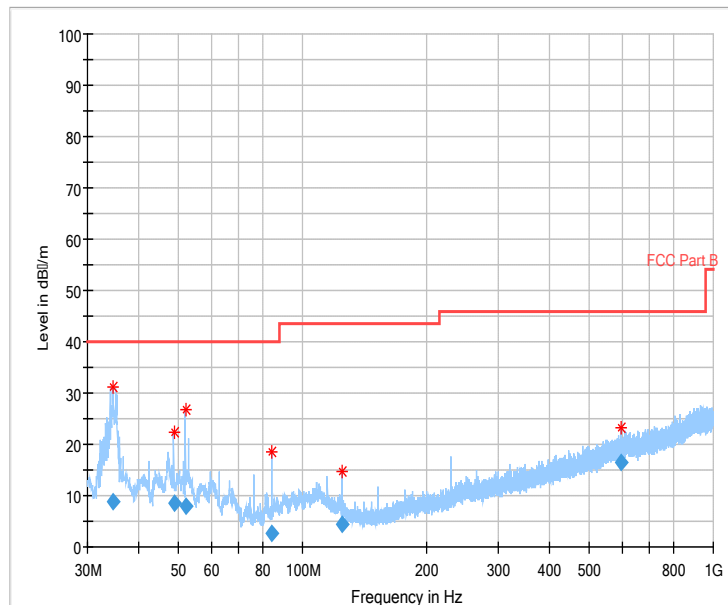


Fig.32 Radiated emission: Ch39, 30MHz~1GHz

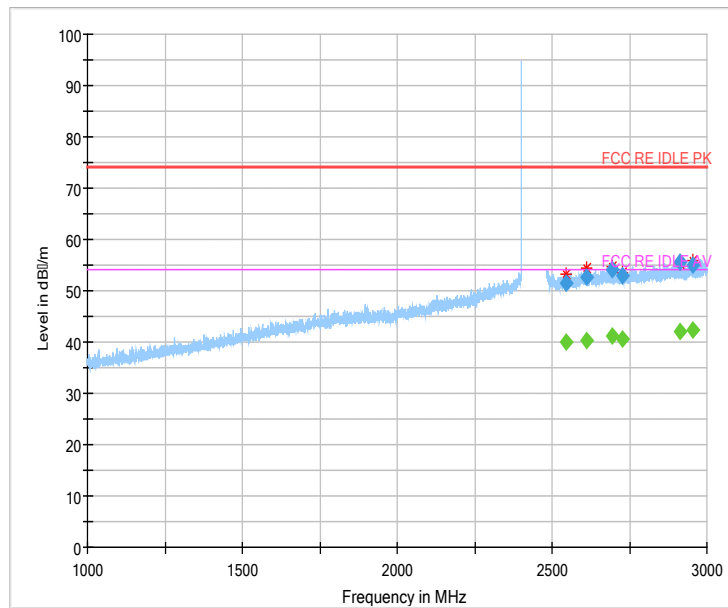


Fig.33 Radiated emission: Ch39, 1GHz~3GHz

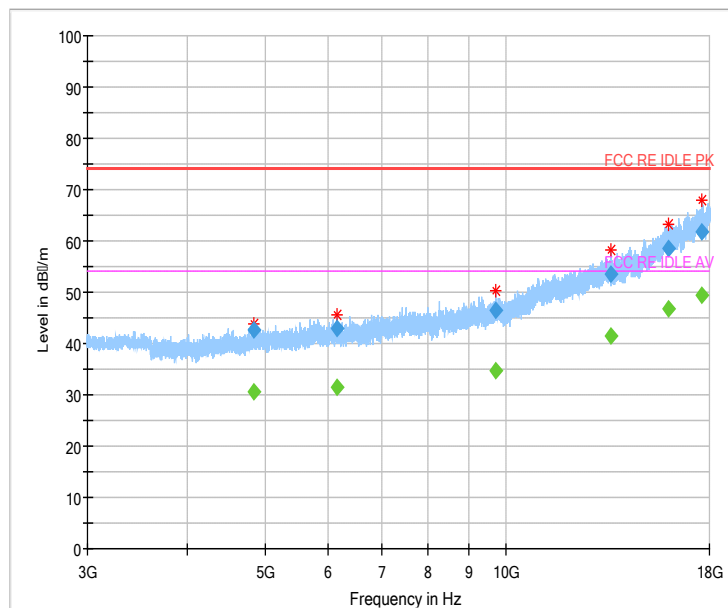


Fig.34 Radiated emission: Ch39, 3GHz~18GHz

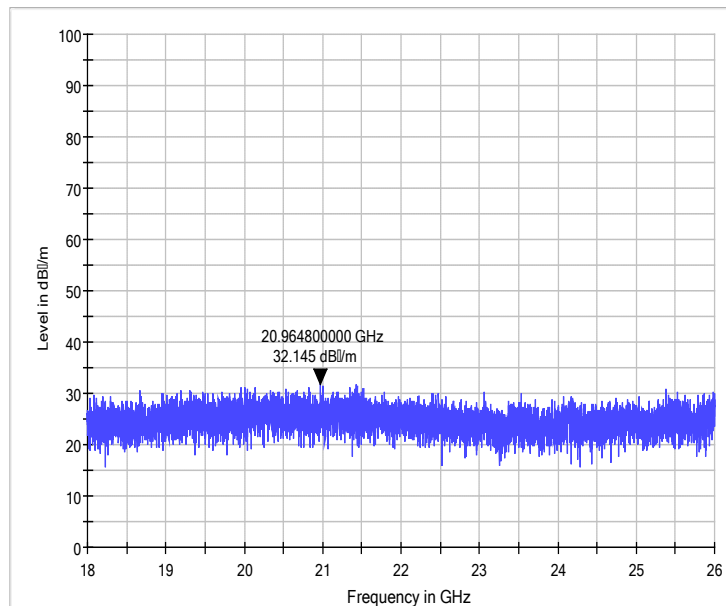


Fig.35 Radiated emission: 18 GHz - 26 GHz

## 6.6.4 The Result of AC Conducted Emission

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)    Conducted limit (dB $\mu$ V)

Quasi-peak    Average

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000  $\mu$ V within the frequency band 535-1705 kHz, as measured using a 50  $\mu$ H/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

## Main supply(N06)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)
0.217162	48.11	9.6	38.51
0.474619	42.89	9.6	33.29
0.773119	36.96	9.6	27.36
1.153706	41.41	9.7	31.71
4.907344	40.36	9.7	30.66
5.056594	40.37	9.7	30.67

## Secondary supply(N016)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)
0.17985	28.64	9.6	19.04
0.489544	40.62	9.6	31.02
1.1649	39.53	9.6	29.93
2.802919	29.42	9.7	19.72
3.989456	28.81	9.7	19.11
23.6121	33.95	9.7	24.25

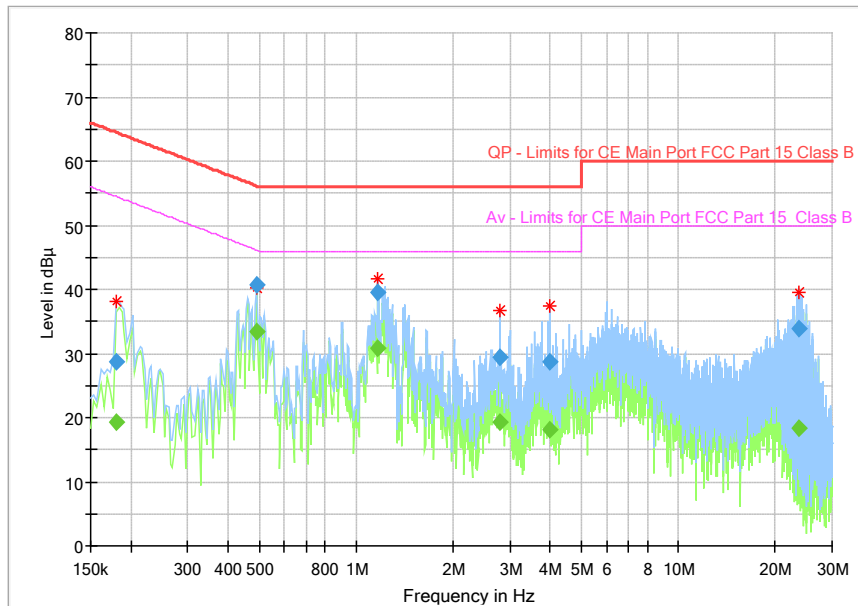


Fig.36 AC Conducted Emission

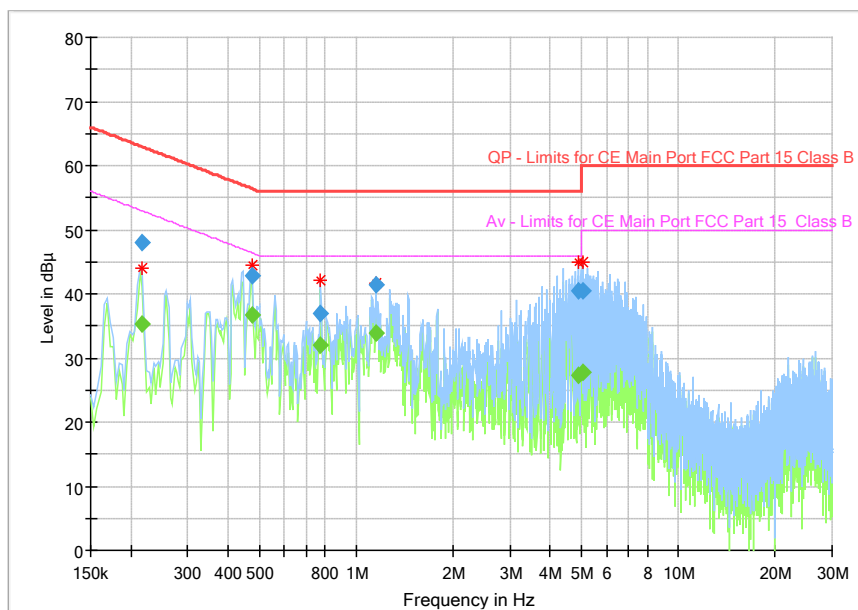


Fig.37 AC Conducted Emission

## 7. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.intervall
1	Vector Signal Analyser	FSQ26	101096	Rohde&Schwarz	2015-05-13	1
2	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2015-05-13	1
3	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2015-05-13	1
4	Power Meter	NRP2	101804	Rohde&Schwarz	2015-08-31 3	1
5	Wideband Power	Z81	100241	Rohde&Schwarz	2015-05-04	1

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.intervall
1	Universal Radio Communicati	CMU200	123126	R&S	2015-05-1 3	1
2	Test Receiver	ESU40	100307	R&S	2015-05-1 3	1
3	Trilog Antenna	VULB916 3	VULB9163-51 5	Schwarzbeck	2014-11-0 5	3
4	Double Ridged Guide Antenna	ETS-311 7	00135885	ETS	2014-05-0 6	3

5	2-Line V-Network	ENV216	101380	R&S	2015-05-1 3	1
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### Anechoic chamber

Fully anechoic chamber by Frankonia German.

## 8. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

**Control room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber1** (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz
------------------------------	--

**Fully-anechoic chamber2** (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to 40000MHz

## **ANNEX A. Deviations from Prescribed Test Methods**

No deviation from Prescribed Test Methods.

**ANNEX B. Accreditation Certificate****Accredited Laboratory**

A2LA has accredited

**EAST CHINA INSTITUTE OF TELECOMMUNICATIONS***Shanghai, People's Republic of China*

for technical competence in the field of

**Electrical Testing**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of any additional program requirements in the field of Electrical. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 10<sup>th</sup> day of December 2014.

President & CEO  
For the Accreditation Council  
Certificate Number 3682.01  
Valid to February 28, 2017

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.***\*\*\*\*\*End The Report\*\*\*\*\***