TEST REPORT

No. I17D00023-SRD02

For

Client : **Lenovo(Shanghai) Electronics Technology Co., Ltd**

Production : **Portable Tablet Computer**

Model Name : **Lenovo TB-8504F**

FCC ID: **O57TB8504F**

IC ID: **10407A-TB8504F**

Standard: **FCC Part 15 Subpart C §15.247/ RSS-247/ ANSI C63.10/RSS-GEN 6.2**

Hardware Version: **Lenovo Tablet TB-8504F**

Software Version: **TB-8504F_RF01_170208**

Issued date: **2017-04-27**

Note:

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

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

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

About EUT

EUT Description	Portable Tablet Computer
Model name	Lenovo TB-8504F
Bluetooth Frequency	2402MHz-2483.5MHz
BLE Frequency	2402MHz-2480MHz
WLAN Frequency	2.4G: 2412MHz-2462MHz;
GPS Frequency Band	1575.42MHz(L1)
Nominal Voltage	3.85V
Extreme High Voltage	4.4V
Extreme Low Voltage	3.65V

Revision Version

Report Number	Revision	Date	Memo
I17D00023-SRD02	00	2017-04-10	Initial creation of test report
I17D00023-SRD02	00	2017-04-27	Second creation of test report

CONTENTS

1. TEST LABORATORY 6
1.1. TESTING LOCATION 6
1.2. TESTING ENVIRONMENT 6
1.3. PROJECT DATA 6
1.4. SIGNATURE 6
2. CLIENT INFORMATION 7
2.1. APPLICANT INFORMATION 7
2.2. MANUFACTURER INFORMATION 7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 8
3.1. ABOUT EUT 8
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 8
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 9
3.4. THE DIFFERENCE BETWEEN TWO PROVIDE EUT 9
4. REFERENCE DOCUMENTS 11
4.1. REFERENCE DOCUMENTS FOR TESTING 11
5. SUMMARY OF TEST RESULTS 12
5.1. NOTES 13
5.2. STATEMENTS 13
6. TEST RESULT 14
6.1. PEAK OUTPUT POWER-CONDUCTED 14
6.2. PEAK POWER SPECTRAL DENSITY 16
6.3. 6DB BANDWIDTH 18
6.4. FREQUENCY BAND EDGES-CONDUCTED 20
6.5. CONDUCTED EMISSION 22
6.6. RADIATED EMISSION 25

6.7. AC POWERLINE CONDUCTED EMISSION 43

7. TEST EQUIPMENTS AND ANCILLARIES USED FOR TESTS 49

8. TEST ENVIRONMENT 50

ANNEX A. DEVIATIONS FROM PRESCRIBED TEST METHODS 51

ANNEX B. ACCREDITATION CERTIFICATE 52

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
IC OAT'S Test Site Registration Number	10766A-1

1.2. Testing Environment

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

1.3. Project data

Project Leader:	Xu Yuting
Testing Start Date:	2017-02-23
Testing End Date:	2017-04-04

1.4. Signature

Shi Hongqi
(Prepared this test report)

Ding Li
(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, 200131, CHINA
Telephone:	18116117205
Email:	Jiazz1@lenovo.com

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:	18116117205
Email:	Jiazz1@lenovo.com

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

3.1. About EUT

EUT Description	Portable Tablet Computer
Model name	Lenovo TB-8504F
BLE Frequency	2402MHz-2480Mhz
BLE Channel	Channel0-Channel39
BLE Modulation	GMSK;
Extreme Temperature	-10/+55 ℃
Nominal Voltage	3.85
Extreme High Voltage	4.4
Extreme Low Voltage	3.65

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
N03 (Main Supply 3+32G)	HGAD85M2	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-03-24
N13 (Main Supply 3+32G)	HGAD85JG	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-02-22
N19 (Main Supply 3+32G)	HGAD85JY	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-02-22
N47 (Main Supply 2+16G)	HGAD85C5	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-02-22
N32 (second Supply 3+32G)	HGAD85NP	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-02-22
N47 (second Supply 2+16G)	HGAD85JY	Lenovo Tablet TB-8504F	TB-8504F_RF01_170208	2017-02-22

*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 3+32G

Part Name	Model Name	supplier	Remark
LCD+TP	8“ WXGA On-cell +0.7mm sodalime cover glass,White	AUO	White
	8“ WXGA On-cell +0.7mm sodalime cover glass,Black	AUO	Black
Flash	KMRX1000BM-B614	SAMSUNG	
Speaker	QS171219AW00	KEYSOUND	
Front Camera	PC0KE0039A	Sunrise	
Back Camera	CCM F5695AV 5M OV5695 COB 30PIN BtoB	Qtech	
Battery	L16D1P34	Suwnoda	
USB Cable	DL1_MICRO5_1M2A_BLK_HL1	Saibao	
Earphone	N/A	N/A	
Charger	C-P56	Acbel	US
	C-P60	Huntkey	Argentina

Main Supply 2+16G

Part Name	Model Name	supplier	Remark
LCD+TP	8“ WXGA On-cell +0.7mm sodalime cover glass,White	AUO	White
	8“ WXGA On-cell +0.7mm sodalime cover glass,Black	AUO	Black
Flash	KMQE10013M-B318	Samsung	
Speaker	QS171219AW00	KEYSOUND	
Front Camera	PC0KE0039A	Sunrise	
Back Camera	CCM F5695AV 5M OV5695 COB 30PIN	Qtech	

	BtoB		
Battery	L16D1P34	Suwnoda	
USB Cable	DL1_MICRO5_1M2A_BLK_HL1	Saibao	
Charger	C-P56	Acbel	US
	C-P60	Huntkey	Argentina

Secondary Supply 3+32G

Part Name	Model Name	supplier	Remark
LCD+TP	8“ WXGA In-cell +0.7mm sodalime cover glass,White	INX	White
	8“ WXGA In-cell +0.7mm sodalime cover glass,Black	INX	Black
Flash	H9TQ26ADFTBCUR-KUM	Hynix	
Speaker	QS171219AW00	KEYSOUND	
Front Camera	H7P2-P3588FHQ	Kingcome	
Back Camera	CCM F5V08B 5M OV5695 COB 30PIN BtoB	Sunny	
Battery	L16D1P34	SCUD	
USB Cable	DL1_MICRO5_0.7M_BLK_HL1	Jieye	
Charger	C-P56	Huntkey	US

Secondary Supply2+16G

Part Name	Model Name	supplier	Remark
LCD+TP	8“ WXGA In-cell +0.7mm sodalime cover glass,White	INX	White
	8“ WXGA In-cell +0.7mm sodalime cover glass,Black	INX	Black
Flash	H9TQ17ABJTBCUR-KUM	Hynix	
Speaker	QS171219AW00	KEYSOUND	
Front Camera	H7P2-P3588FHQ	Kingcome	
Back Camera	CCM F5V08B 5M OV5695 COB 30PIN BtoB	Sunny	
Battery	L16D1P34	SCUD	
USB Cable	DL1_MICRO5_0.7M_BLK_HL1	Jieye	
Charger	C-P56	Huntkey	US

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
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(a)	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	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 RSS-247and 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

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℃
Voltage	Vnom	3.8V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

Note:

a. All the test data for each data were verified, but only the worst case was reported.

b.The GFSK, π/4 DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for π/4 DQPSK, 3-DH1 for 8DPSK.

c.The DC and low frequency voltages' measurement uncertainty is ±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 TB-8504F, supporting BT/BLE/WLAN/GPS/FM, 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	Sweeptime
Hopping OFF	3MHz	10MHz	6MHz	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)	-0.54	-0.44	-0.47	P
	Fig.1	Fig.2	Fig.3	

Conclusion: PASS

Test graphs an below

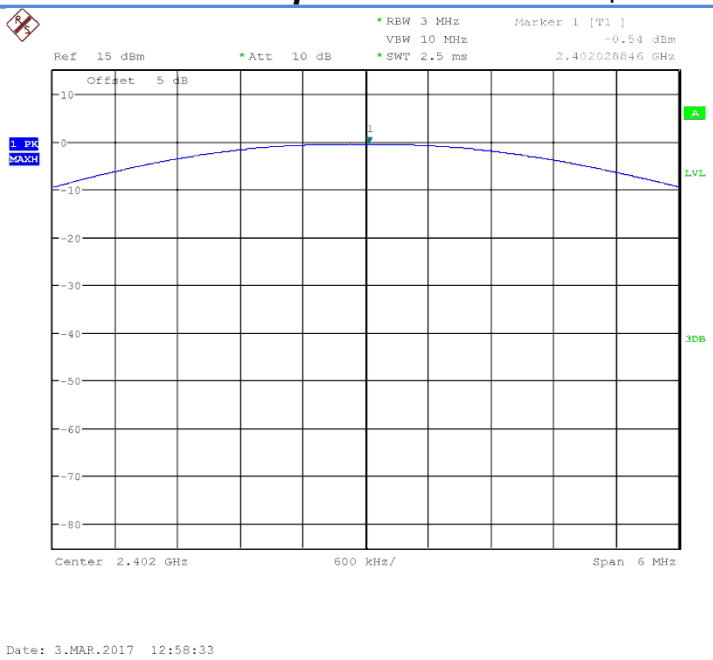

Fig.1 Peak Conducted Output Power CH0, DH1

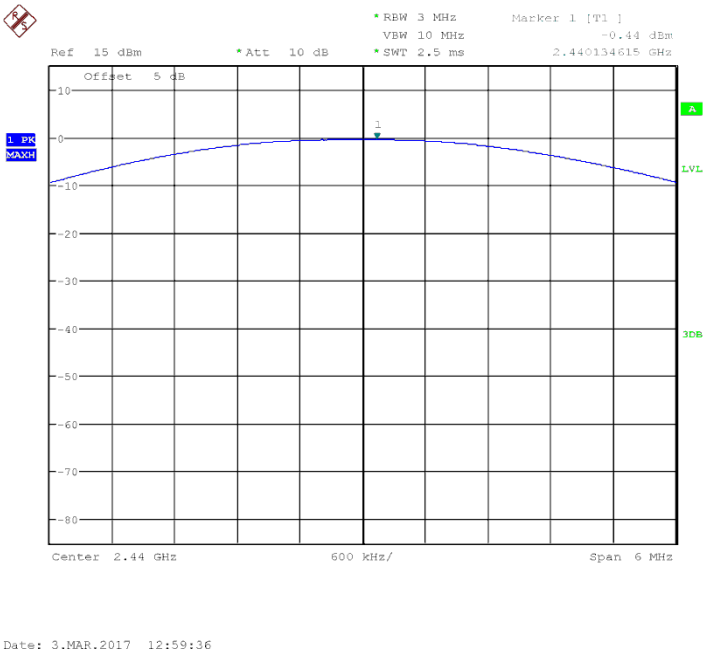

Fig.2 Peak Conducted Output Power CH19, DH1

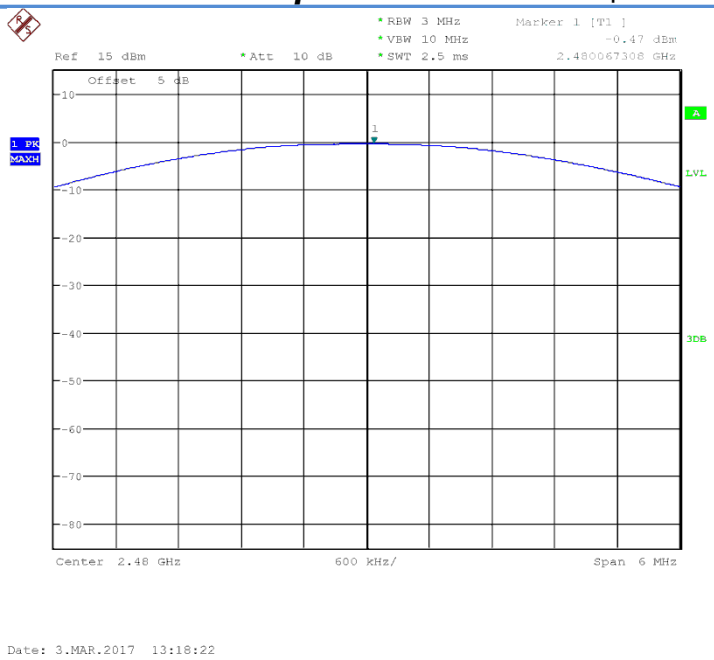

Fig.3 Peak Conducted Output Power CH39, DH1

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 kHz ⩽ RBW ⩽ 100 kHz.
6. Set the VBW ⩾ [3 × 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	±0.75dB

6.2.4 Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
BT4.0	00	Fig.4	-16.32	P
	19	Fig.5	-16.22	P
	39	Fig.6	-16.22	P

Test figure as below:

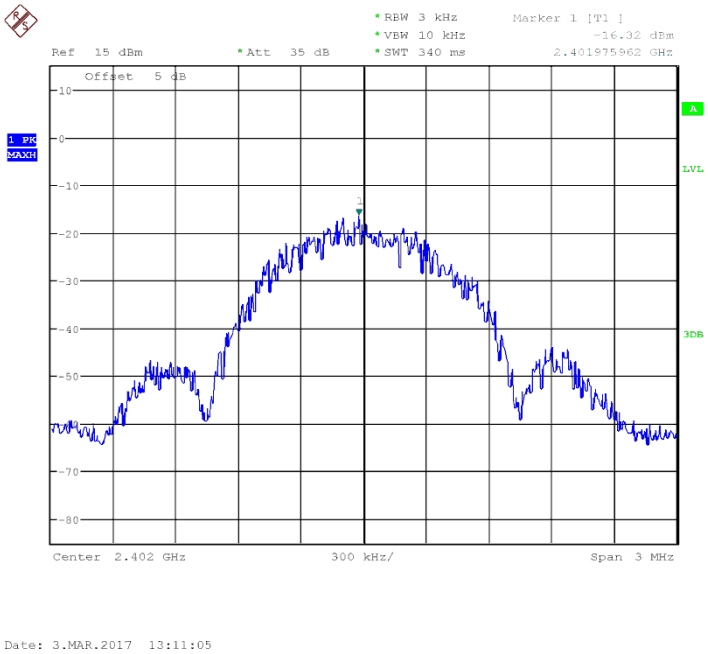

Fig.4 Power spectral density: CH0

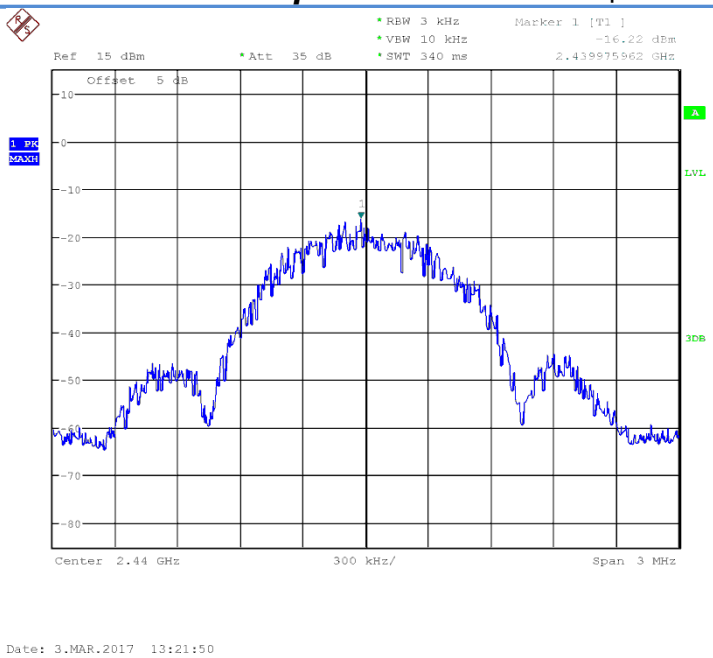

Fig.5 Power spectral density: CH19

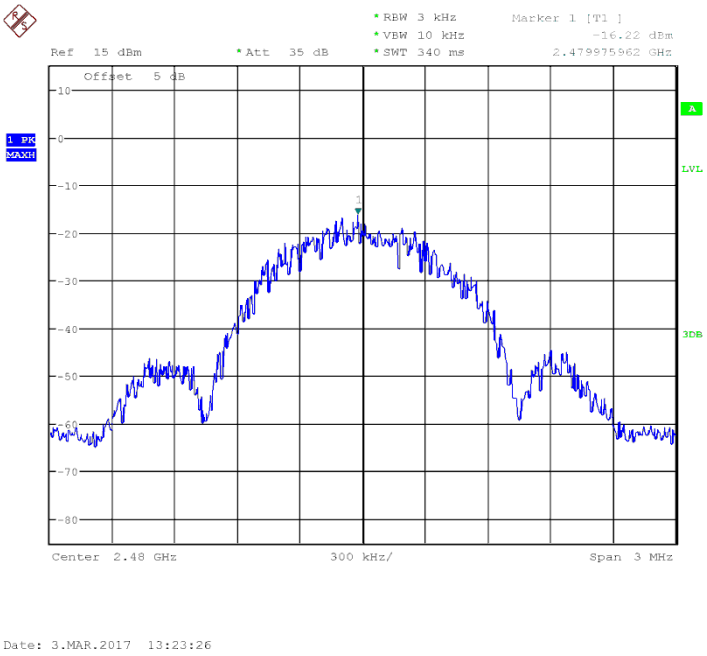

Fig.6 Power spectral density: CH39

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≥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	717.947	P
39	Fig.8	689.096	P
78	Fig.9	685.896	P

Conclusion: PASS

Test graphs as below:

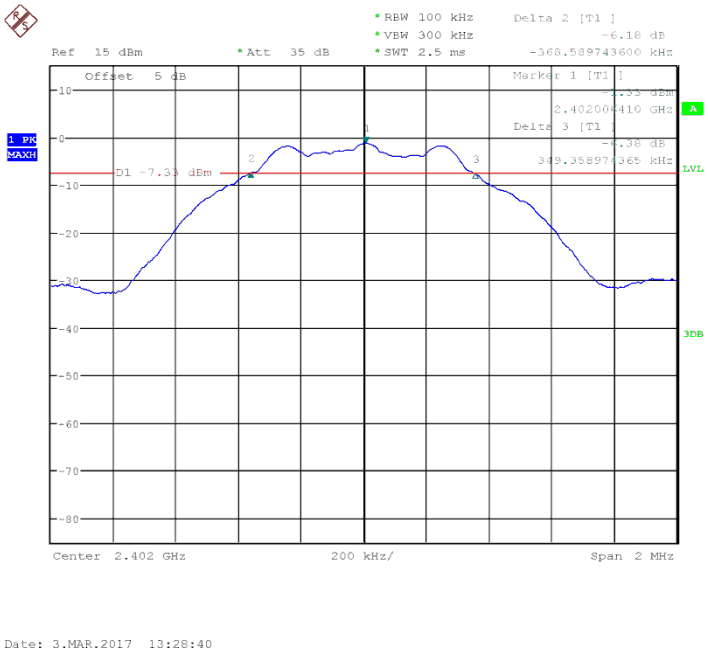

Fig.7 6dB Bandwidth: Ch0

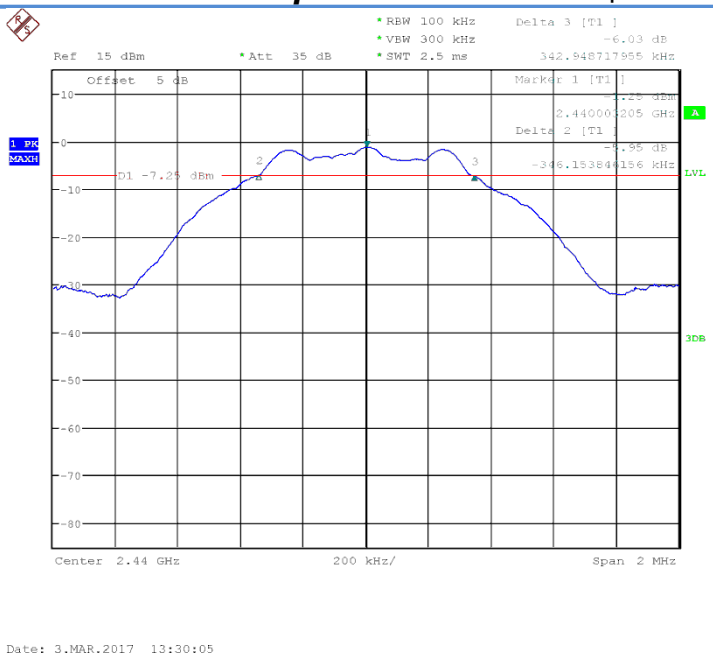

Fig.8 6dB Bandwidth: Ch19

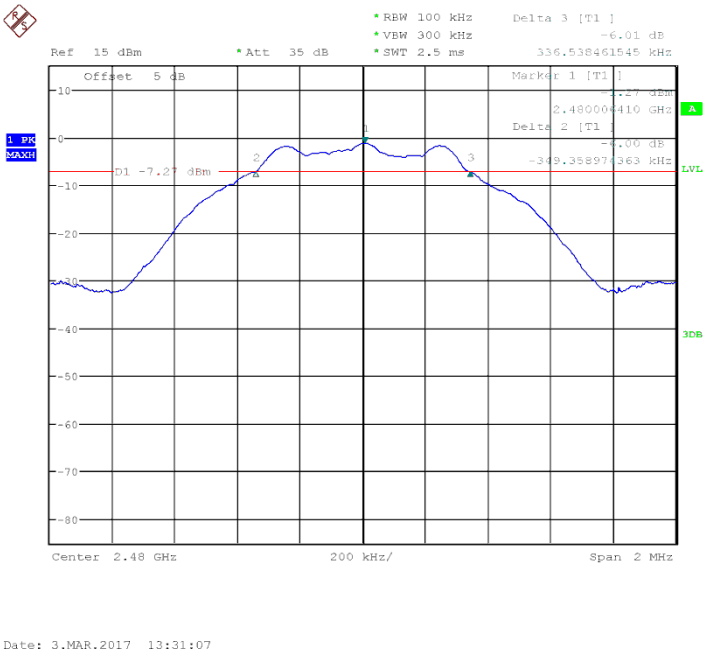

Fig.9 6dB Bandwidth: Ch39

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

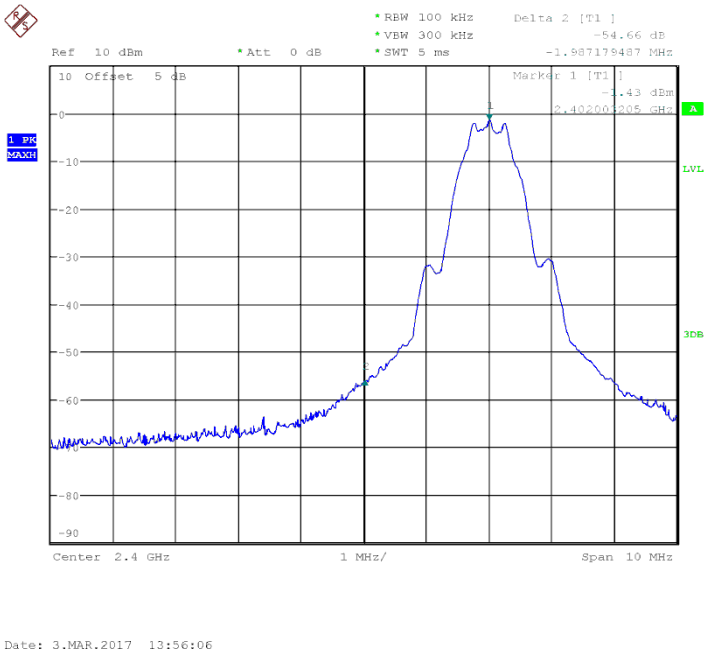

Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

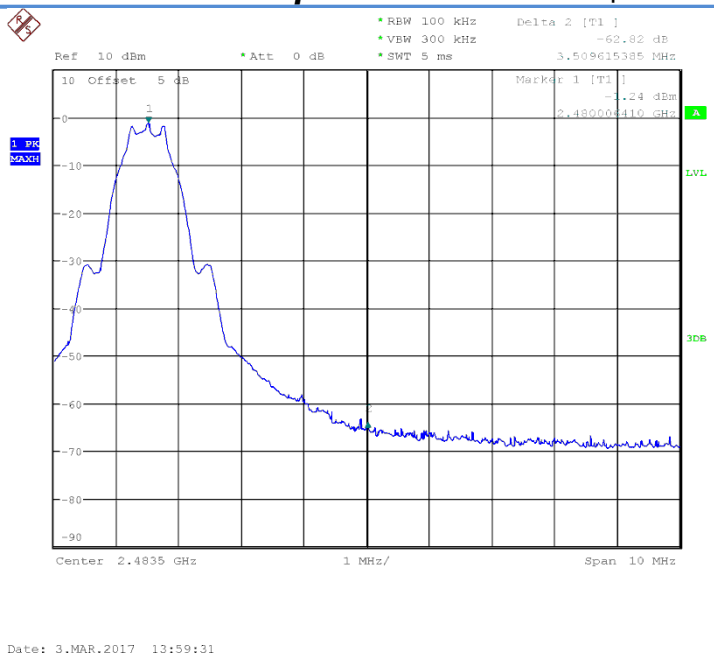

Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

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

Conclusion: PASS

Test graphs as below

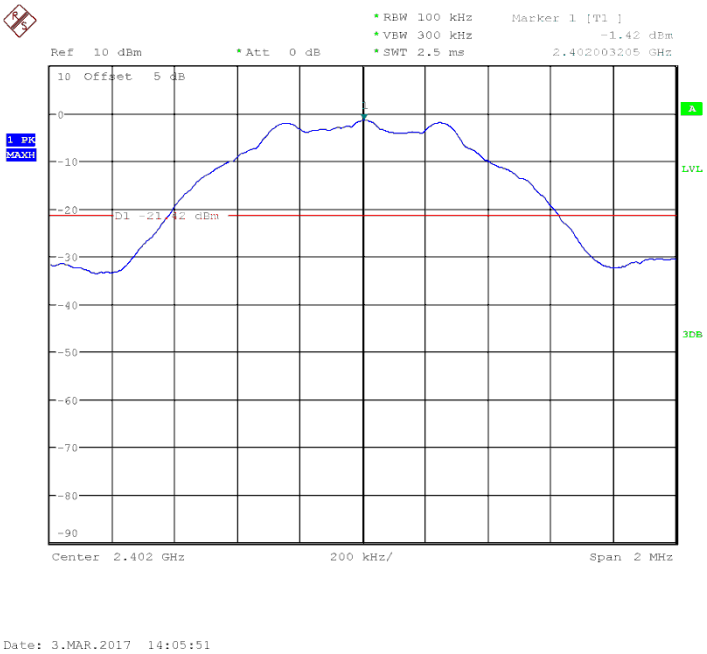

Fig.12 Conducted spurious emission: Ch0, 2402MHz

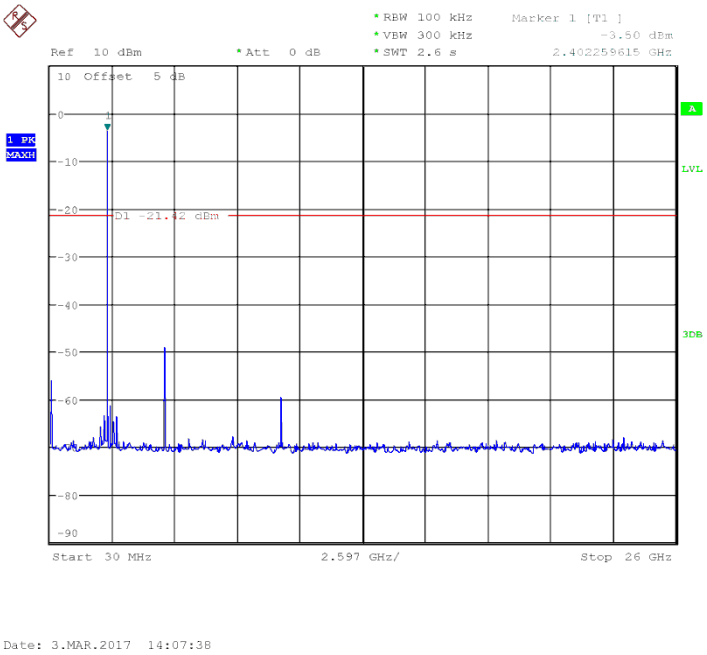

Fig.13 Conducted spurious emission: Ch0, 30MHz~26GHz

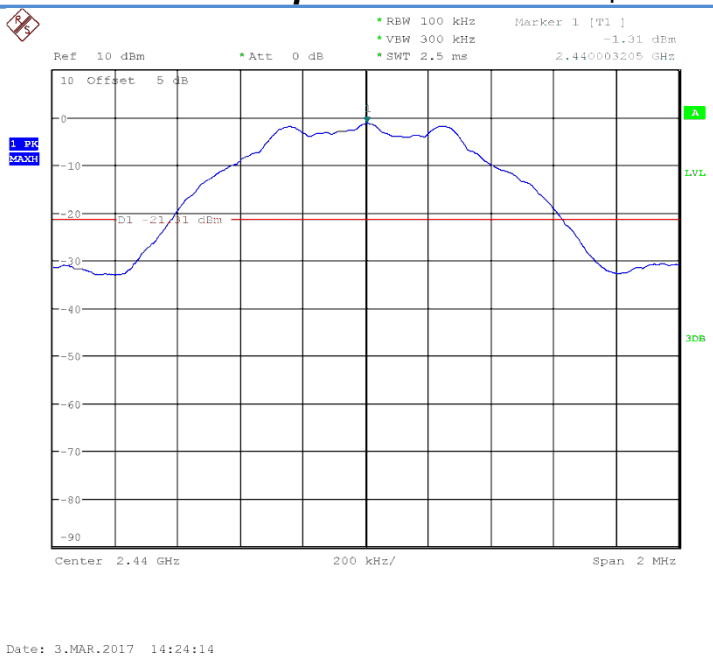

Fig.14 Conducted spurious emission: Ch19, 2441MHz

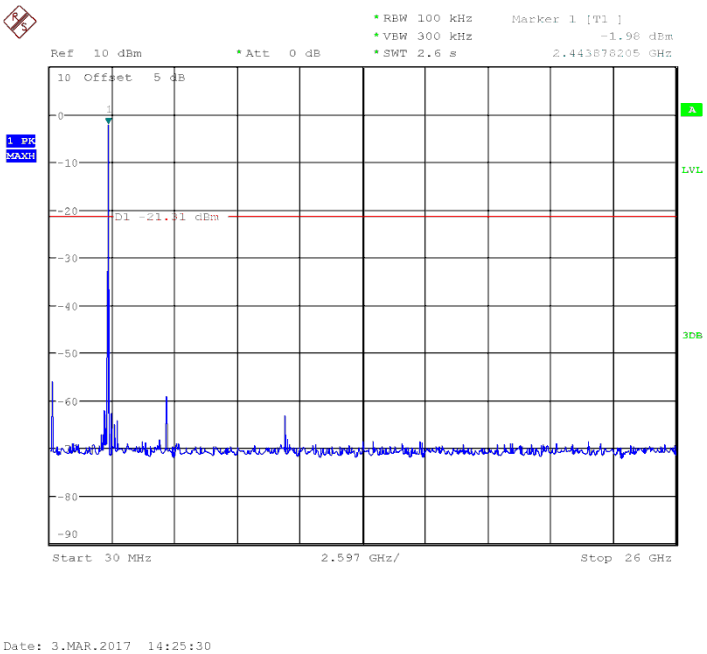

Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz

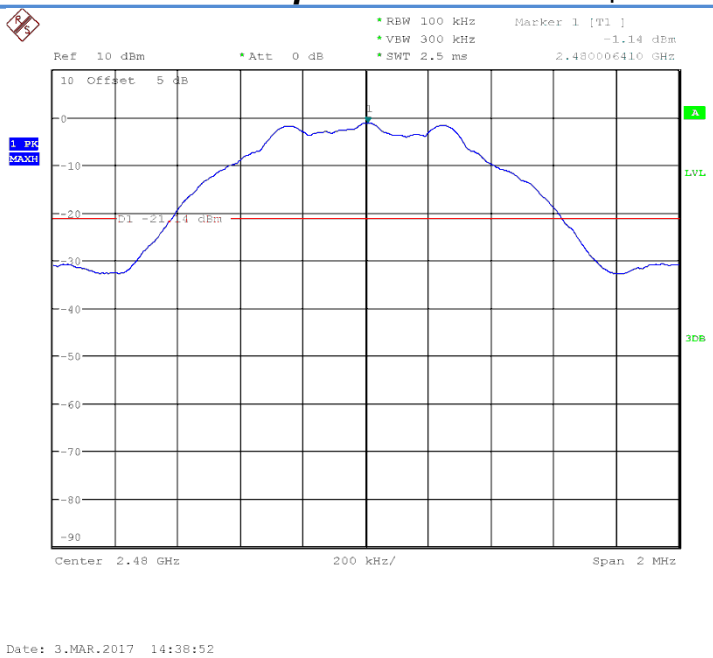

Fig.16 Conducted spurious emission: Ch39, 2480MHz

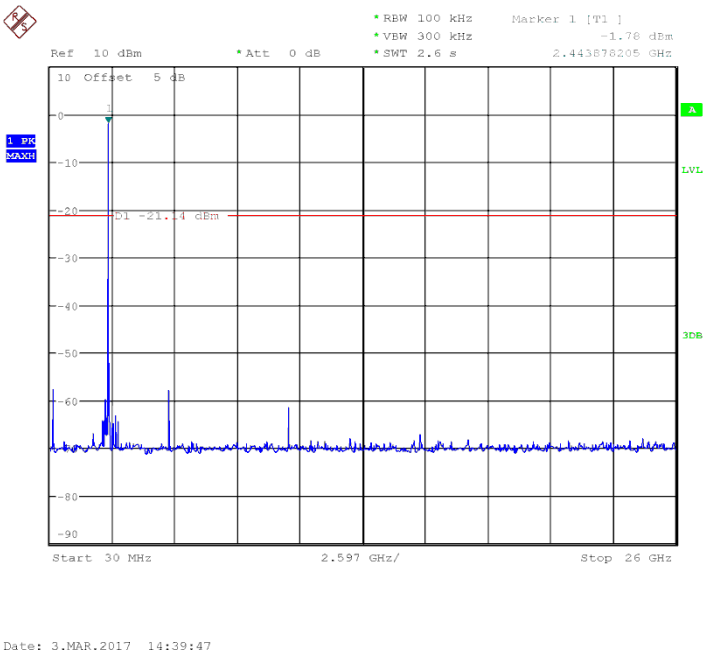

Fig.17 Conducted spurious emission: Ch39, 30MHz~26GHz

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} = Cable loss + Antenna Gain-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

Main Supply(3+32G)

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.18	P
	1GHz~3GHz	Fig.19	P
	3GHz~18GHz	Fig.20	P
Power	2.31GHz~2.5GHz	Fig.21	P

Channel	Frequency Range	Test Results	Conclusion
Ch0 2480MHz	30MH~1GHz	Fig.22	P
	1GHz~3GHz	Fig.23	P
	3GHz~18GHz	Fig.24	P
Power	2.31GHz~2.5GHz	Fig.25	P

Main Supply(2+16g)（worst-case）

Channel	Frequency Range	Test Results	Conclusion
Ch39 2480MHz	30MH~1GHz	Fig.26	P
	1GHz~3GHz	Fig.27	P
	3GHz~18GHz	Fig.28	P
Power	2.31GHz~2.5GHz	Fig.29	P

Second Supply(3+32g)（worst-case）

Channel	Frequency Range	Test Results	Conclusion
Ch39 2480MHz	30MH~1GHz	Fig.30	P
	1GHz~3GHz	Fig.31	P
	3GHz~18GHz	Fig.32	P
Power	2.31GHz~2.5GHz	Fig.33	P

Second Supply(2+16g)（worst-case）

Channel	Frequency Range	Test Results	Conclusion
Ch39 2480MHz	30MH~1GHz	Fig.34	P

	1GHz~3GHz	Fig.35	P
	3GHz~18GHz	Fig.36	P
Power	2.31GHz~2.5GHz	Fig.37	P
All Channel	18G-26G	Fig.38	P

Main Supply(3+32G)

Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.122528	13.43	-26.6	40.03	V
57.55696	8.74	-24.1	32.84	V
154.288136	2.29	-27.6	29.89	H
672.78128	15.85	-13.1	28.95	V
778.07014	17.54	-11.4	28.94	V
919.675212	20.24	-8.9	29.14	H

Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2550.529423	52.35	8.4	43.95	V
2682.305769	52.88	9.4	43.48	V
2750.834423	52.58	9.4	43.18	V
2802.590769	53.29	9.8	43.49	H
2880.330577	53.41	10.7	42.71	V
2939.059808	53.08	10.5	42.58	H

Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4804.409933	49.75	0.6	49.15	V
9607.9434	57.14	8.3	48.84	H
14326.53133	54.51	20.5	34.01	V

15408.9912	56.71	23.2	33.51	V
16290.855	57.78	25.2	32.58	H
17586.52253	62.29	29.5	32.79	V

Average:

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4804.409933	38.72	0.6	38.12	V
9607.9434	47.19	8.3	38.89	H
14326.53133	42.39	20.5	21.89	V
15408.9912	44.61	23.2	21.41	V
16290.855	45.86	25.2	20.66	H
17586.52253	40.84	29.5	11.34	V

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.806116	14.62	-26.6	41.22	V
72.005236	26.75	-27.6	54.35	V
240.022096	25.49	-23	48.49	V
399.838456	15.75	-18.2	33.95	H
508.010384	19.64	-15.9	35.54	H
910.563944	19.87	-9	28.87	H

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1993.568	54.18	1.1	53.08	H
2599.47327	53	8.7	44.3	H
2716.018847	51.97	9.4	42.57	H
2826.261346	52.94	10.3	42.64	V
2915.012115	53.12	10.6	42.52	H
2987.720961	53.02	11	43.02	H

Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
9920.047533	57.43	8.7	48.73	H
14308.73567	54.56	20.7	33.86	H
15252.94	55.55	21.7	33.85	V
15769.11053	57.83	24.4	33.43	V
16501.43893	59.32	26.9	32.42	V
17569.91593	62.06	29.4	32.66	V

Average:

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
9920.047533	48.70	8.7	40	H
14308.73567	42.66	20.7	21.96	H
15252.94	43.23	21.7	21.53	V
15769.11053	45.61	24.4	21.21	V
16501.43893	47.28	26.9	20.38	V
17569.91593	49.91	29.4	20.51	V

Main Supply(2+16g)

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.307448	11.25	-26.7	37.95	V
43.009396	7.55	-23.5	31.05	V
101.88716	6.83	-23.8	30.63	V
235.633592	6.9	-23.2	30.1	V
804.79	18	-10.8	28.8	V
907.564	19.67	-9.1	28.77	H

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1196.0908	43.52	-5.7	49.22	H

1995.7936	55.17	1.2	53.97	H
2596.161539	51.35	8.7	42.65	H
2822.107115	53.36	10.2	43.16	H
2861.838654	53.14	10.7	42.44	V
2905.378269	52.97	10.6	42.37	H

Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13787.31027	53.4	17.9	35.5	V
14896.81167	56.06	22.2	33.86	V
15853.92447	58.08	24.7	33.38	V
16208.92433	58.54	25.7	32.84	V
16983.83893	60.38	27.1	33.28	V
17619.7526	61.18	29.4	31.78	V

Average:

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13787.31027	41.70	17.9	23.8	V
14896.81167	43.03	22.2	20.83	V
15853.92447	44.50	24.7	19.8	V
16208.92433	47.09	25.7	21.39	V
16983.83893	47.49	27.1	20.39	V
17619.7526	49.96	29.4	20.56	V

Second Supply(3+32g)

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.452684	20.59	-25.9	46.49	V
51.590684	29.95	-25	54.95	V
65.488968	31.76	-26.9	58.66	V

75.157408	34.79	-28.2	62.99	V
479.3724	25.9	-15.3	41.2	H
559.860908	37.78	-13.1	50.88	H

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2193.0412	49.34	5	44.34	H
2662.080384	56.45	10	46.45	H
2740.048654	53.03	10.1	42.93	V
2802.678269	53.21	10.4	42.81	H
2901.711346	53.31	11.3	42.01	H
2998.158654	52.12	11.8	41.32	H

Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15831.54567	57.85	24.7	33.15	H
16213.46507	59.03	25.6	33.43	V
16794.5614	59.83	27.3	32.53	H
17329.54413	61.43	28.4	33.03	V
17660.29567	62.02	28.9	33.12	H
17972.67233	63.04	30	33.04	H

Average:

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15831.54567	50.20	24.7	25.5	H
16213.46507	40.51	25.6	14.91	V
16794.5614	42.17	27.3	14.87	H
17329.54413	44.24	28.4	15.84	V
17660.29567	47.06	28.9	18.16	H
17972.67233	48.86	30	18.86	H

Second Supply(2+16g)

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.01364	10.16	-26.6	36.76	V
48.060664	9.18	-23.4	32.58	V
56.109408	7.81	-23.9	31.71	V
100.699664	5.91	-23.7	29.61	H
321.376056	8.97	-20.3	29.27	V
931.107016	20.45	-8.6	29.05	V

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2357.9624	50.51	8	42.51	V
2584.995962	52.1	8.6	43.5	H
2671.631923	52.32	9.4	42.92	V
2752.527885	52.53	9.4	43.13	V
2880.7525	53.6	10.7	42.9	H
2954.231923	53.16	10.6	42.56	V

Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
9608.122533	57.3	8.3	49	V
13249.76907	53.07	17.2	35.87	V
14289.91693	55.64	20.6	35.04	V
15784.0742	57.93	24.6	33.33	H
16463.3912	58.65	26.4	32.25	H
17520.2268	61.85	29.2	32.65	H

Average:

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
9608.122533	41.70	8.3	33.4	V

13249.76907	42.03	17.2	24.83	V
14289.91693	44.50	20.6	23.9	V
15784.0742	47.09	24.6	22.49	H
16463.3912	47.49	26.4	21.09	H
17520.2268	49.96	29.2	20.76	H

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

Main Supply(3+32G)

Test graphs as below:

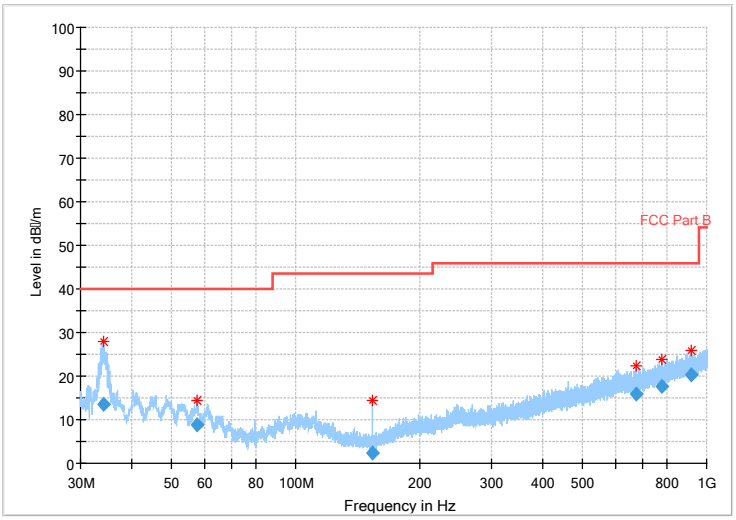

Fig.18 Radiated emission: Ch0, 30MHz~1GHz

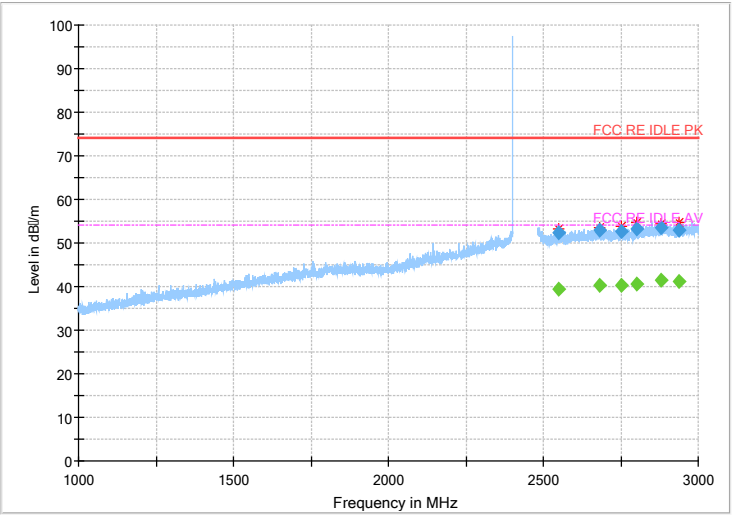

Fig.19 Radiated emission: Ch0, 1GHz~3GHz

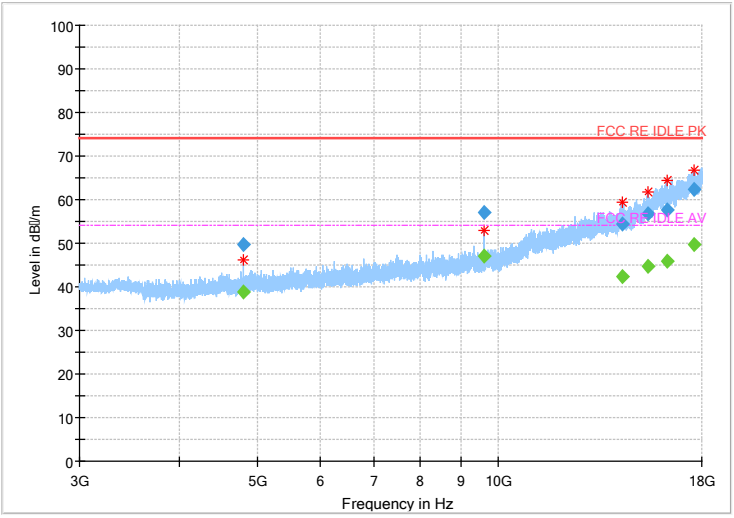

Fig.20 Radiated emission: Ch0, 3GHz~18GHz

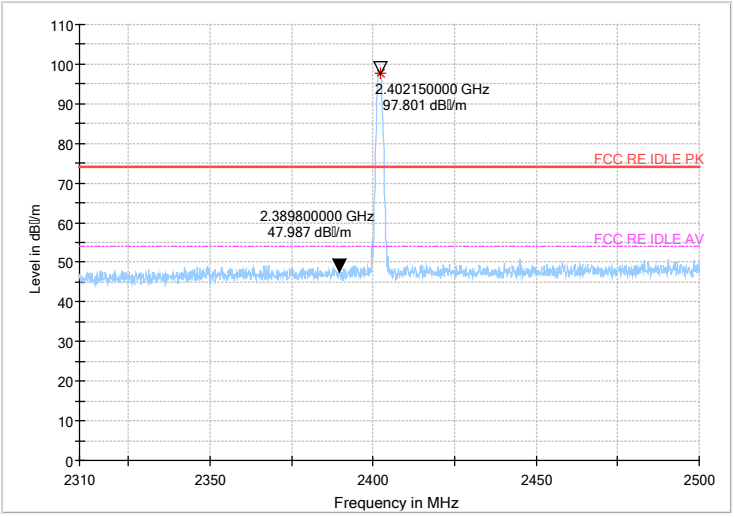

Fig.21 Radiated emission (Power): low channel

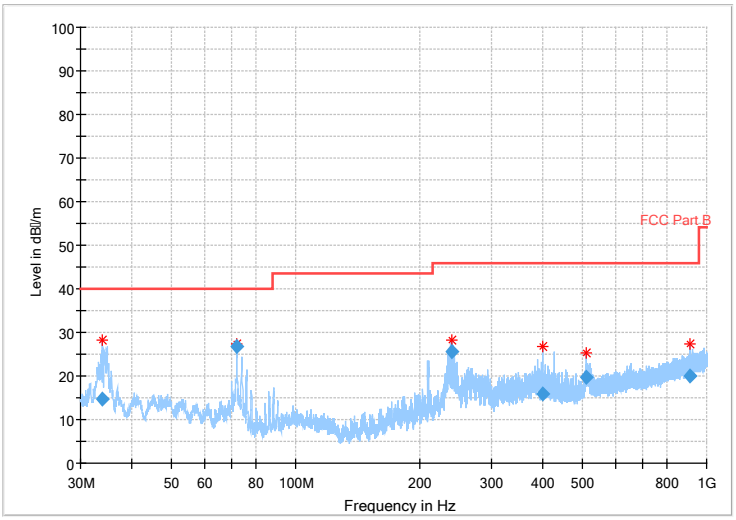

Fig.22 Radiated emission: Ch39, 30MHz~1GHz

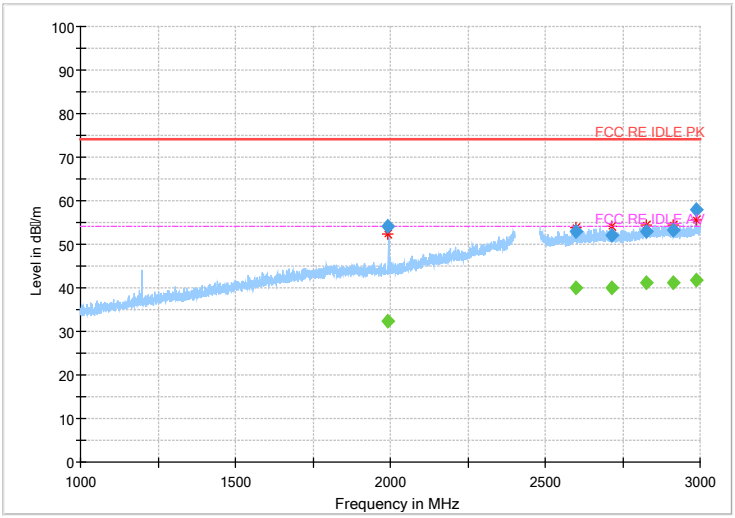

Fig.23 Radiated emission: Ch39, 1GHz~3GHz

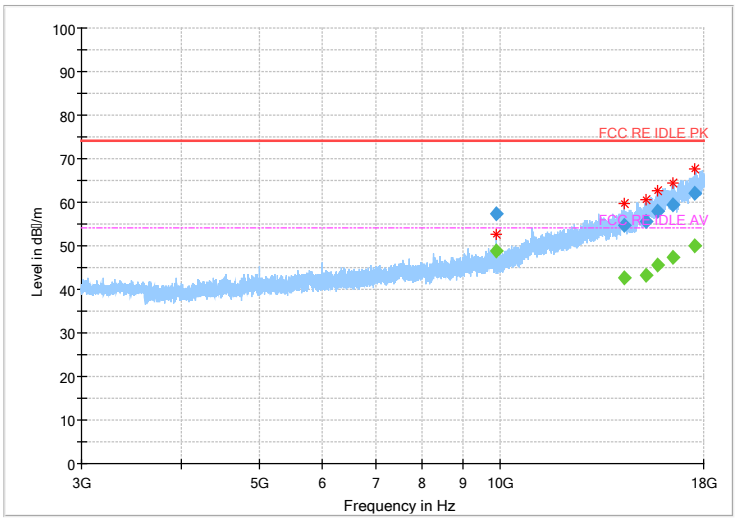

Fig.24 Radiated emission: Ch39, 3GHz~18GHz

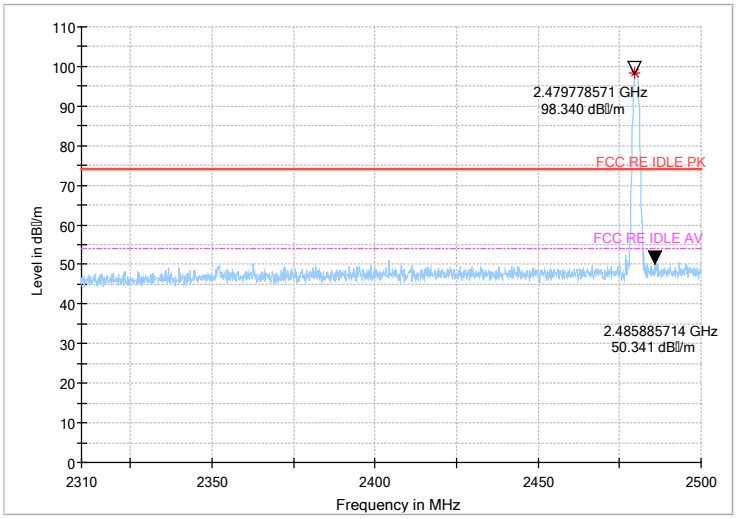

Fig.25 Radiated emission (Power): high channel

Main Supply(2+16G)

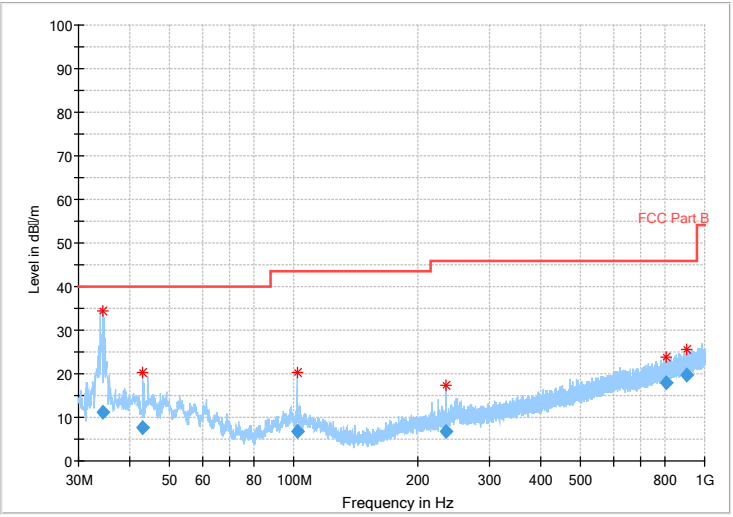

Fig.26 Radiated emission: Ch39, 30MHz~1GHz

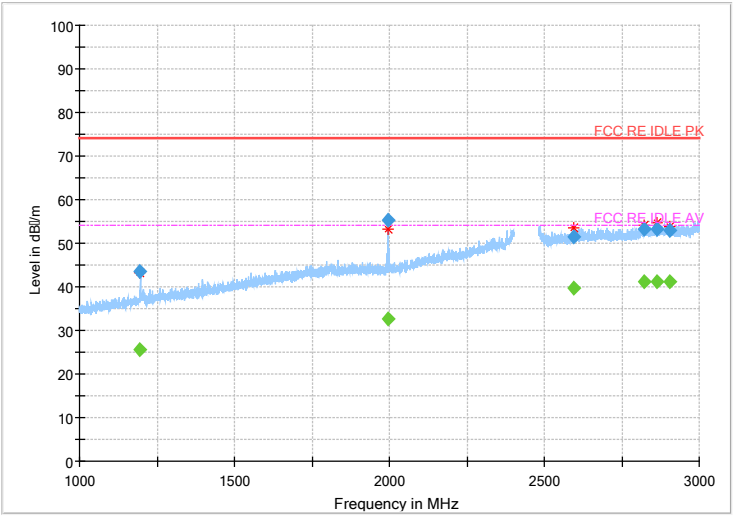

Fig.27 Radiated emission: Ch39, 1GHz~3GHz

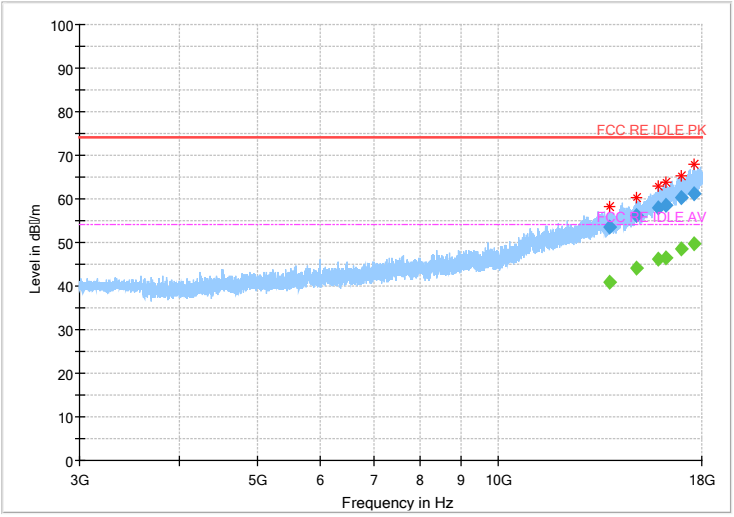

Fig.28 Radiated emission: Ch39, 3GHz~18GHz

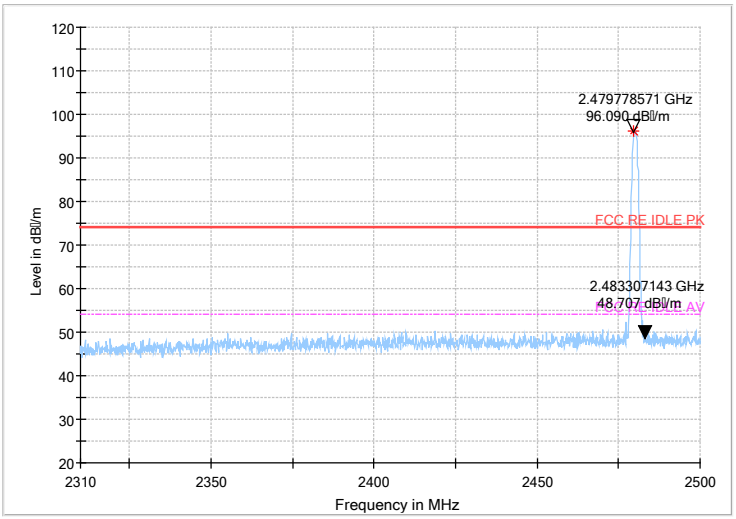

Fig.29 Radiated emission (Power): high channel

Second Supply(3+32g)

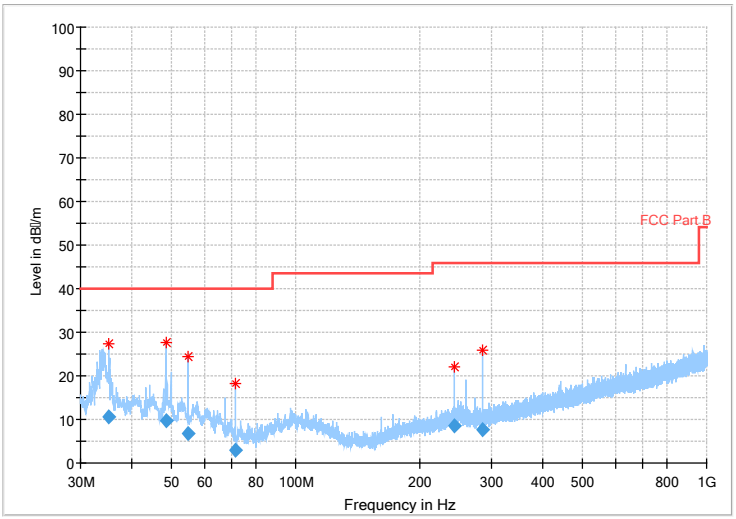

Fig.30 Radiated emission: Ch39, 30MHz~1GHz

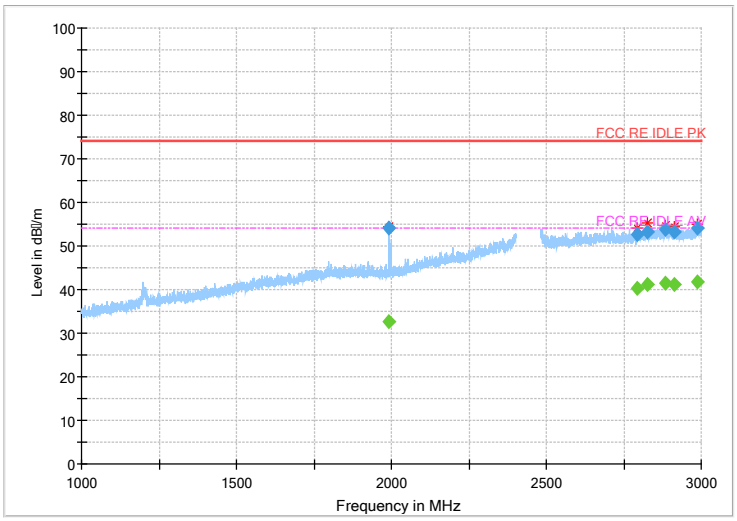

Fig.31 Radiated emission: Ch39, 1GHz~3GHz

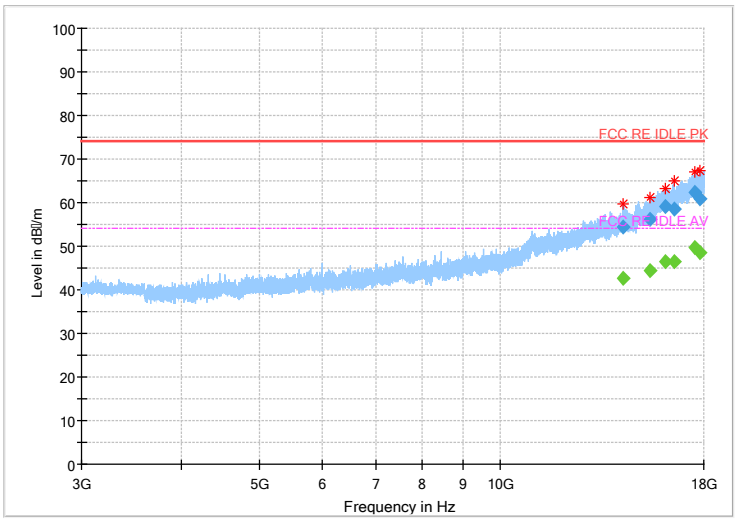

Fig.32 Radiated emission: Ch39, 3GHz~18GHz

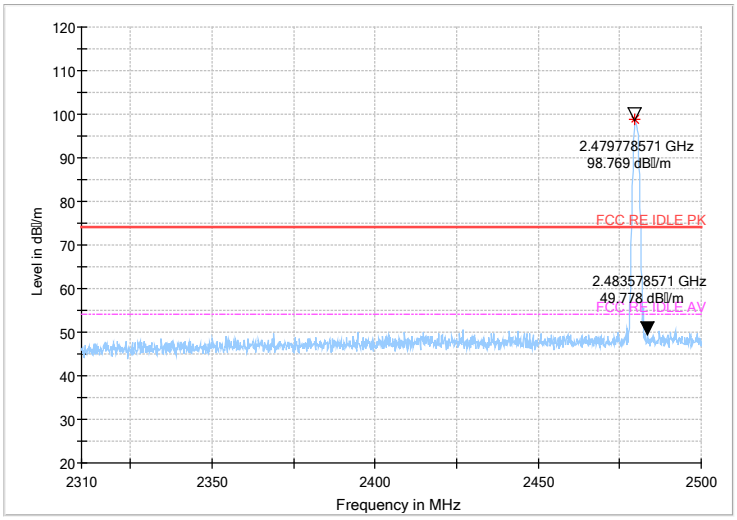

Fig.33 Radiated emission (Power): high channel

Second Supply(2+16G)

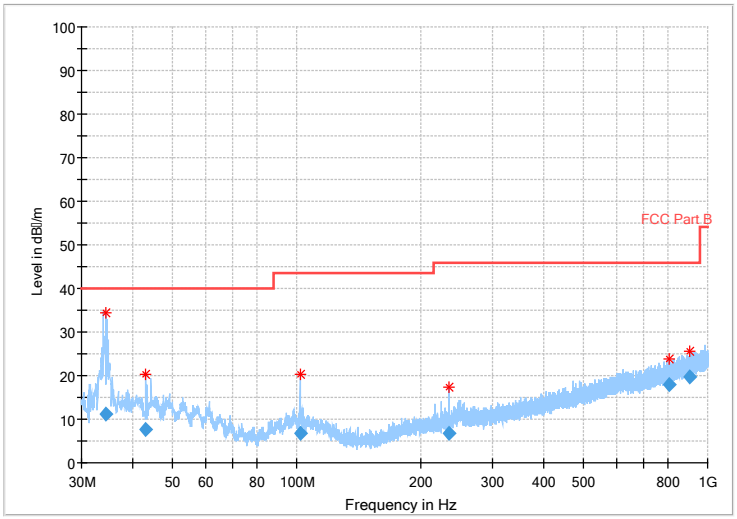

Fig.34 Radiated emission: Ch39, 30MHz~1GHz

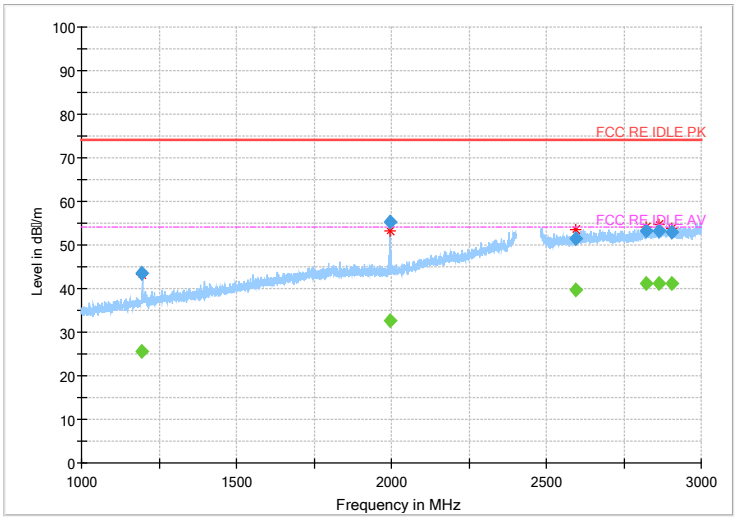

Fig.35 Radiated emission: Ch39, 1GHz~3GHz

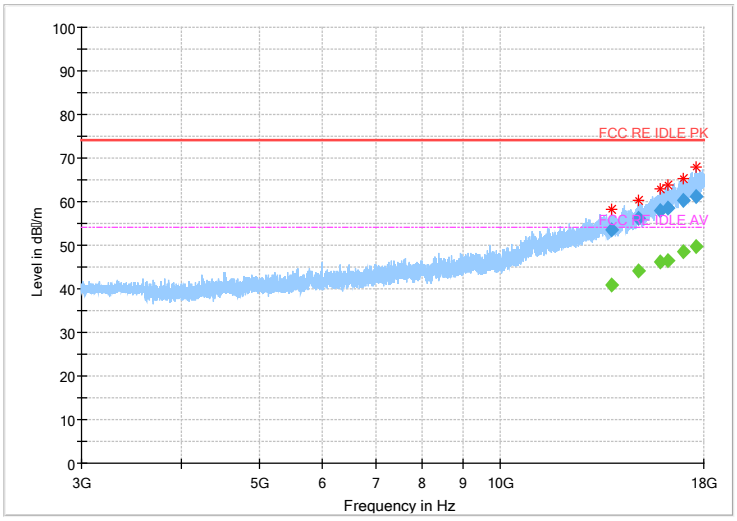

Fig.36 Radiated emission: Ch39, 3GHz~18GHz

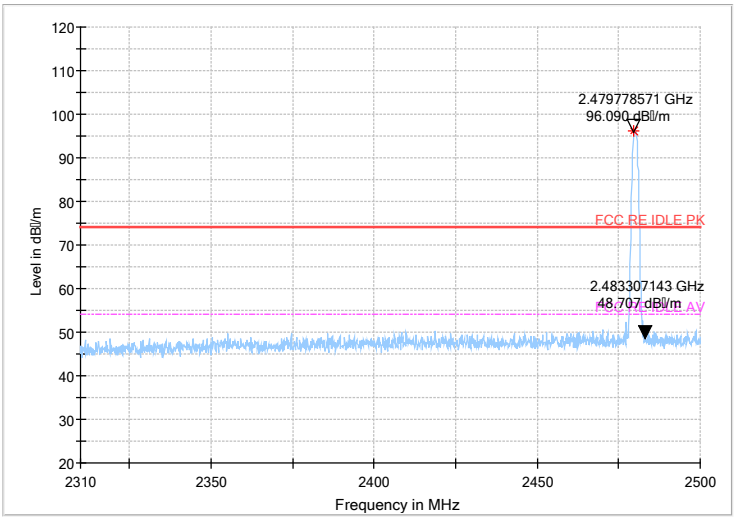

Fig.37 Radiated emission (Power): high channel

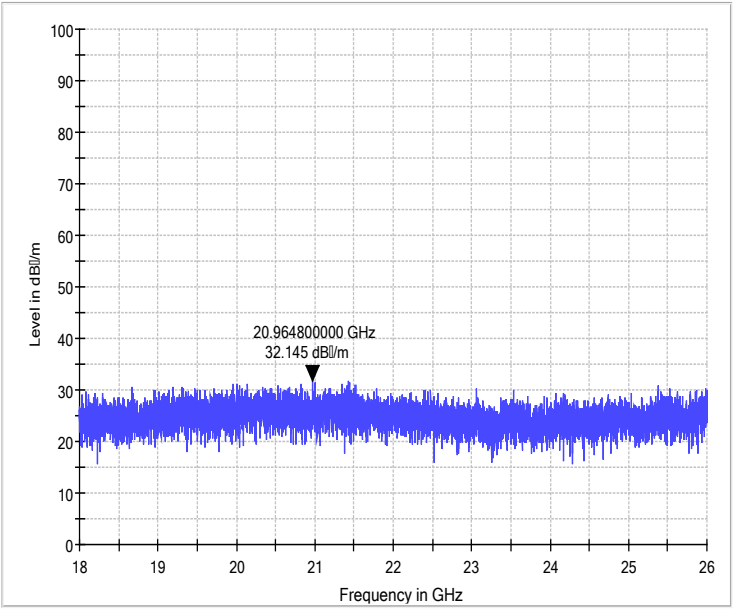

Fig.38 Radiated emission: 18 GHz - 26 GHz

6.7. AC Power line Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Result (dBμV) With charger BT.4.0	Conclusion
0.15 to 0.5	66 to 56	56 to 46	Fig.39	P
0.5 to 5	56	46		
5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

Main Supply(3+32G)

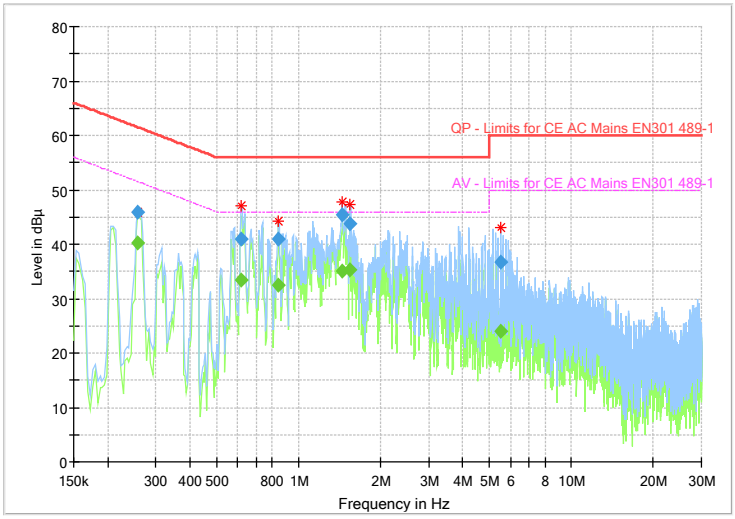

Fig.62 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.258206	45.77	---	61.49	15.72	1000.0	9.000	N	ON	9.7
0.258206	---	40.25	51.49	11.24	1000.0	9.000	N	ON	9.7
0.616406	---	33.33	46.00	12.67	1000.0	9.000	N	ON	9.7
0.616406	40.83	---	56.00	15.17	1000.0	9.000	N	ON	9.7
0.844012	---	32.52	46.00	13.48	1000.0	9.000	L1	ON	9.7
0.844012	41.04	---	56.00	14.96	1000.0	9.000	L1	ON	9.7
1.448475	45.44	---	56.00	10.56	1000.0	9.000	L1	ON	9.7
1.448475	---	34.95	46.00	11.05	1000.0	9.000	L1	ON	9.7
1.549219	---	35.24	46.00	10.76	1000.0	9.000	L1	ON	9.7
1.549219	43.78	---	56.00	12.22	1000.0	9.000	L1	ON	9.7
5.504344	---	24.02	50.00	25.98	1000.0	9.000	L1	ON	9.7
5.504344	36.80	---	60.00	23.20	1000.0	9.000	L1	ON	9.7

Main Supply(2+16G)

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Average Limit (dBµV)	Result (dBµV) With charger BT4.0	Conclusion
0.15 to 0.5	67 to 56	56 to 46	Fig.63	P
0.5 to 5	56	46		
5 to 30	60	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: Pass

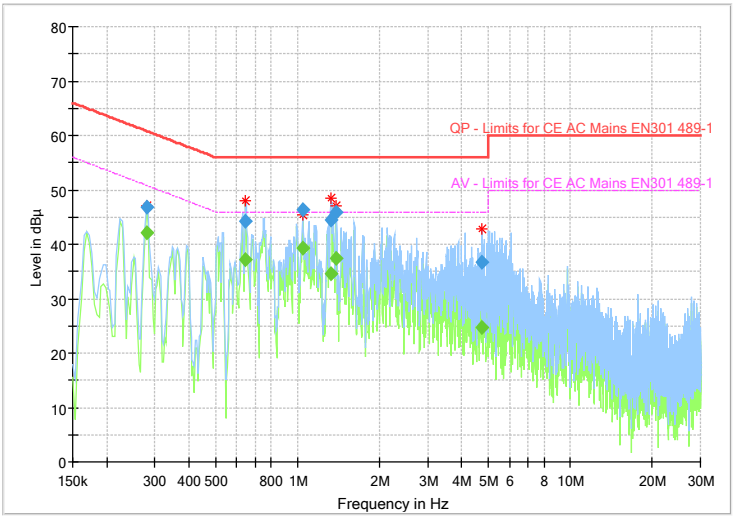

Fig.63 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.280594	---	42.10	50.80	8.70	1000.0	9.000	N	ON	9.7
0.280594	46.76	---	60.80	14.04	1000.0	9.000	N	ON	9.7
0.646256	---	37.10	46.00	8.90	1000.0	9.000	N	ON	9.7
0.646256	44.26	---	56.00	11.74	1000.0	9.000	N	ON	9.7
1.045500	46.25	---	56.00	9.75	1000.0	9.000	N	ON	9.7
1.045500	---	39.26	46.00	6.74	1000.0	9.000	N	ON	9.7
1.325344	---	34.58	46.00	11.42	1000.0	9.000	L1	ON	9.7
1.325344	44.55	---	56.00	11.45	1000.0	9.000	L1	ON	9.7
1.388775	---	37.33	46.00	8.67	1000.0	9.000	L1	ON	9.7
1.388775	45.80	---	56.00	10.20	1000.0	9.000	L1	ON	9.7
4.724512	36.71	---	56.00	19.29	1000.0	9.000	L1	ON	9.7
4.724512	---	24.76	46.00	21.24	1000.0	9.000	L1	ON	9.7

Second Supply (3+32G)

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Average Limit (dBµV)	Result (dBµV) With charger BT4.0	Conclusion
0.15 to 0.5	68 to 56	56 to 46	Fig.63	P
0.5 to 5	56	46		
5 to 30	60	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: Pass

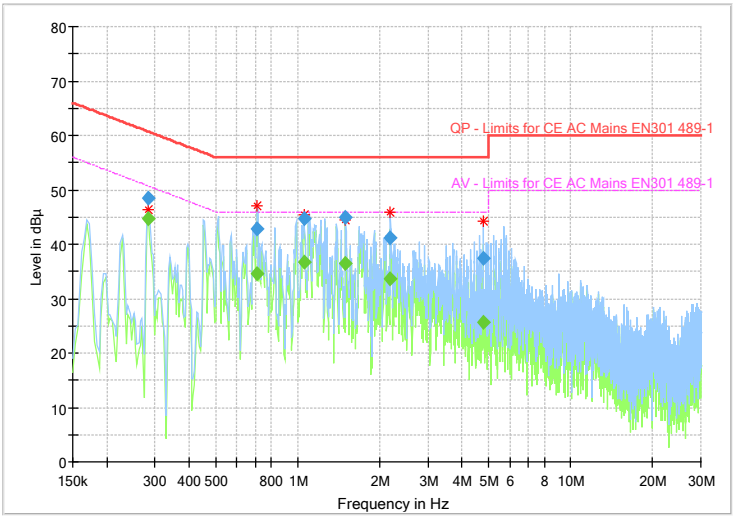

Fig.63 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.284325	48.39	---	60.69	12.30	1000.0	9.000	N	ON	9.7
0.284325	---	44.78	50.69	5.91	1000.0	9.000	N	ON	9.7
0.709688	42.93	---	56.00	13.07	1000.0	9.000	L1	ON	9.7
0.709688	---	34.65	46.00	11.35	1000.0	9.000	L1	ON	9.7
1.056694	44.66	---	56.00	11.34	1000.0	9.000	N	ON	9.7
1.056694	---	36.63	46.00	9.37	1000.0	9.000	N	ON	9.7
1.500712	44.91	---	56.00	11.09	1000.0	9.000	L1	ON	9.7
1.500712	---	36.43	46.00	9.57	1000.0	9.000	L1	ON	9.7
2.190994	---	33.66	46.00	12.34	1000.0	9.000	L1	ON	9.7
2.190994	41.13	---	56.00	14.87	1000.0	9.000	L1	ON	9.7
4.784212	---	25.56	46.00	20.44	1000.0	9.000	L1	ON	9.7
4.784212	37.43	---	56.00	18.57	1000.0	9.000	L1	ON	9.7

Second Supply (2+16G)

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Average Limit (dBµV)	Result (dBµV) With charger BT4.0	Conclusion
0.15 to 0.5	69 to 56	56 to 46	Fig.63	P
0.5 to 5	56	46		
5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

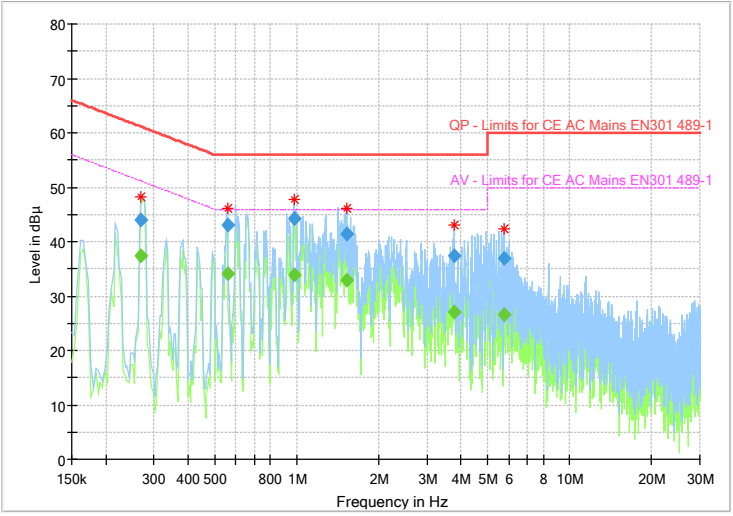

Fig.63 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.269400	44.10	---	61.14	17.04	1000.0	9.000	N	ON	9.7
0.269400	---	37.45	51.14	13.69	1000.0	9.000	N	ON	9.7
0.556706	43.03	---	56.00	12.97	1000.0	9.000	L1	ON	9.6
0.556706	---	34.11	46.00	11.89	1000.0	9.000	L1	ON	9.6
0.978338	44.32	---	56.00	11.68	1000.0	9.000	L1	ON	9.7
0.978338	---	33.88	46.00	12.12	1000.0	9.000	L1	ON	9.7
1.519369	---	32.88	46.00	13.12	1000.0	9.000	L1	ON	9.7
1.519369	41.36	---	56.00	14.64	1000.0	9.000	L1	ON	9.7
3.776775	37.47	---	56.00	18.53	1000.0	9.000	L1	ON	9.7
3.776775	---	27.00	46.00	19.00	1000.0	9.000	L1	ON	9.7
5.754338	---	26.49	50.00	23.51	1000.0	9.000	N	ON	9.7
5.754338	36.94	---	60.00	23.06	1000.0	9.000	N	ON	9.7

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.interval
1	Vector Signal Analyser	FSQ26	101096	Rohde&Schwarz	2016-05-12	1 Year
2	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2016-05-12	1 Year
3	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2016-05-12	1 Year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.interval
1	Universal Radio Communicati	CMU200	123126	R&S	2016-05-12	1 Year
2	Test Receiver	ESU40	100307	R&S	2016-05-12	1 Year
3	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2014-11-05	3 Year
4	Double Ridged Guide Antenna	ETS-3117	00135885	ETS	2014-05-06	3 Year
5	2-Line V-Network	ENV216	101380	R&S	2016-05-12	1 Year

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 ℃, Max. = 30 ℃
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 ℃, Max. = 35 ℃
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 ℃, Max. = 30 ℃
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 ℃, Max. = 30 ℃

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 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 15th day of March 2017.

President and CEO
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

************End The Report************