



Full

TEST REPORT

No. I17D00060-BLE

For

Client : Mobiwire SAS

Production : 3G SmartPhone

Model Name : H5015 MobiWire Kayeta, ALTICE

STARNAUTE 4

FCC ID: QPN-KAYETA

Hardware Version: V02

Software Version: V01

Issued date: 2017-05-09

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



RF Test Report

Report No.: I17D00060-BLE

Revision Version

Report Number	Revision	Date	Memo
I17D00060-BLE	00	2017-04-28	Initial creation of test report
I17D00060-BLE-V1	01	2017-05-09	Initial 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

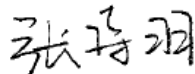
1.2. Testing Environment

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

1.3. Project data

Project Leader:	Zhou Yan
Testing Start Date:	2017-04-01
Testing End Date:	2017-04-17

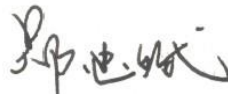
1.4. Signature



Zhang Shiyu
(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: Mobiwire SAS
Address: 79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX
 France.
Telephone: +33 1 78 14 09 31
Email: Di.Ai@mobiwire.com

2.2. Manufacturer Information

Company Name: MOBIWIRE MOBILES (NINGBO) CO.,LTD
Address: No.999,Dacheng East Road,Fenghua City,Zhejiang
Telephone: 0574 59555707
Email: Leander.xu@mobiwire.com.cn

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

3.1. About EUT

EUT Description	3G SmartPhone
Model name	H5015 MobiWire Kayeta, ALTICE STARNAUTE 4
GSM Frequency Band	GSM850/900/1800/1900
WLAN Frequency	2412MHz-2462MHz
WLAN Channel	Channel1-Channel11
WLAN type of modulation	802.11b:DSSS 802.11g/n: OFDM
Extreme Temperature	-10/+55°C
Nominal Voltage	3.8V
Extreme High Voltage	3.6V
Extreme Low Voltage	4.35V

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
N01	358109080000034	V02	V01	2017-03-28

*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.

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.	Jun,2016 Edition
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

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)	/	P
Peak Power Spectral Density	15.247(e)	/	P
6dB Occupied Bandwidth	15.247(a)	/	P
Band Edges Compliance	15.247(d)	/	P
Transmitter Spurious Emission-Conducted	15.247	/	P
Transmitter Spurious Emission-Radiated	15.247	/	P
AC Powerline Conducted Emission	15.107,15.207	/	P

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

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	3.7V
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, $\pi/4$ DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for $\pi/4$ DQPSK, 3-DH1 for 8DPSK.
- c. 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 H5015 MobiWire Kayeta, ALTICE STARNAUTE 4, supporting GSM/GPRS/WCDMA/HSDPA/HSUPA/HSPA+/WLAN/BT/BLE/GPS, manufactured by MOBIWIRE MOBILES (NINGBO) CO.,LTD 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	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.

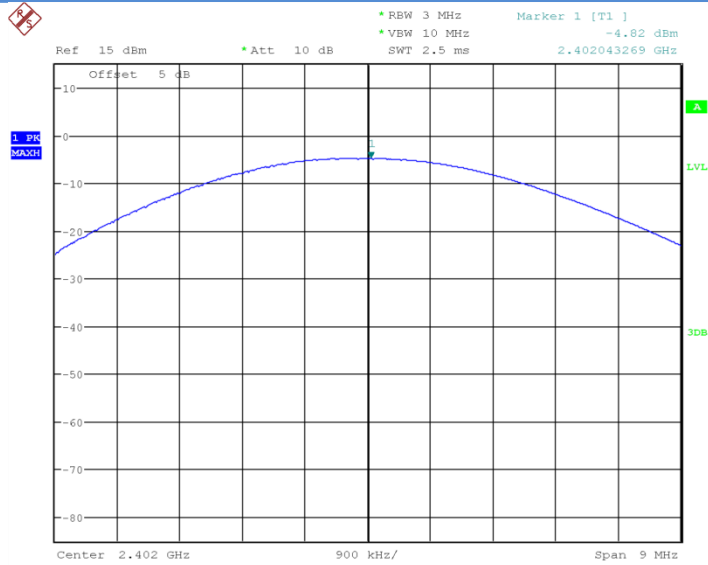
6.1.4 Measurement Results:

For GFSK

Channel	Ch0 2402 MHz	Ch19 2440 MHz	CH39 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	-4.823	-4.739	-5.052	P
	Fig.1	Fig.2	Fig.3	

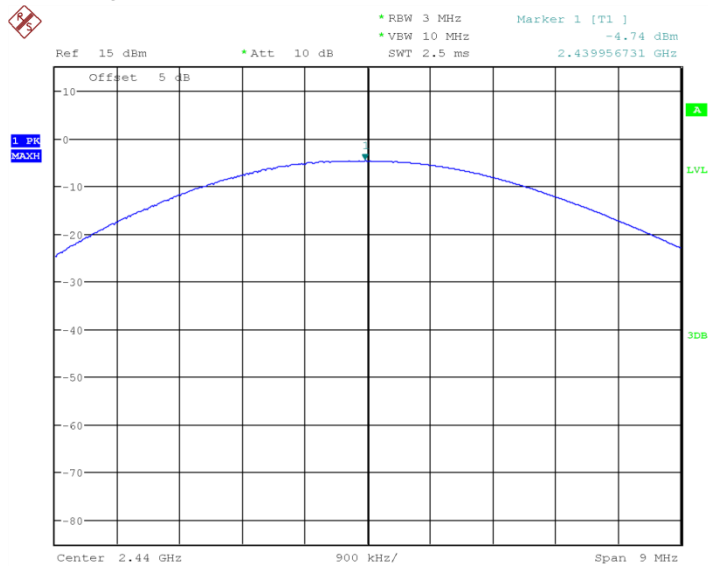
Conclusion: PASS

Test graphs an below



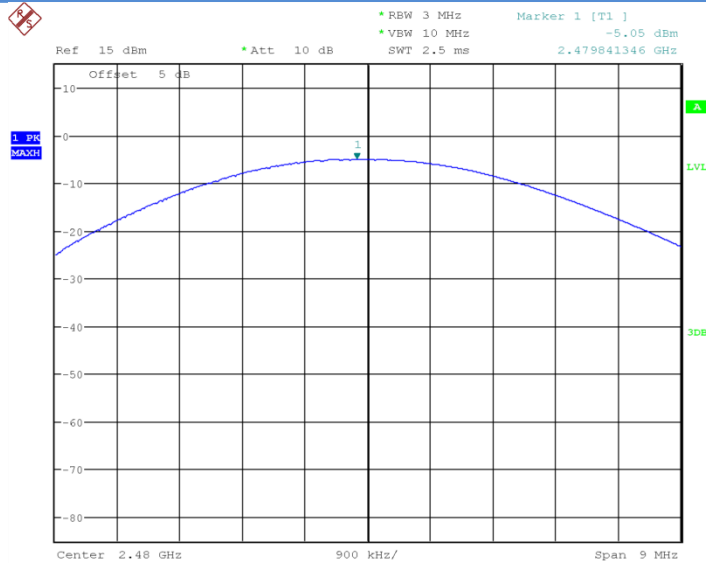
Date: 7.APR.2017 12:41:55

Fig.1 Peak Conducted Output Power CH0, DH1



Date: 7.APR.2017 12:43:03

Fig.2 Peak Conducted Output Power CH19, DH1



Date: 7.APR.2017 12:43:23

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:

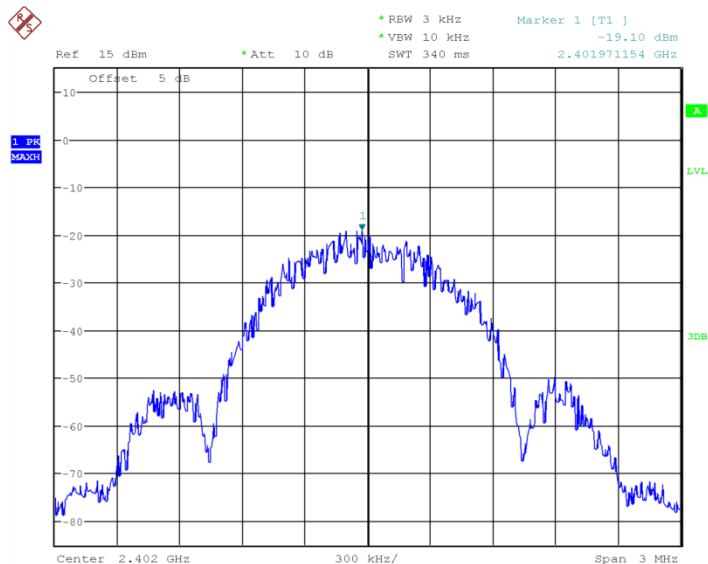
Measurement Uncertainty	0.75dB
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6.2.4 Measurement Results:

802.11b/g mode

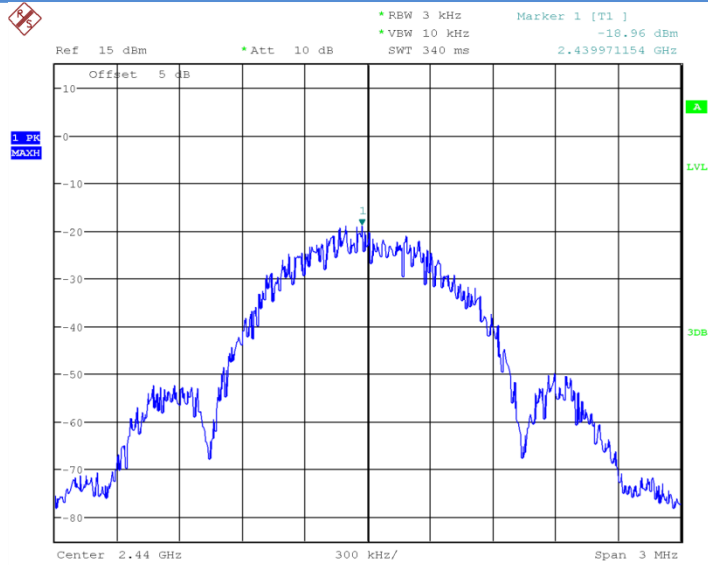
Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
BT-LE	00	Fig.4	-19.103	P
	19	Fig.5	-18.961	P
	39	Fig.6	-19.464	P

Test figure as below:



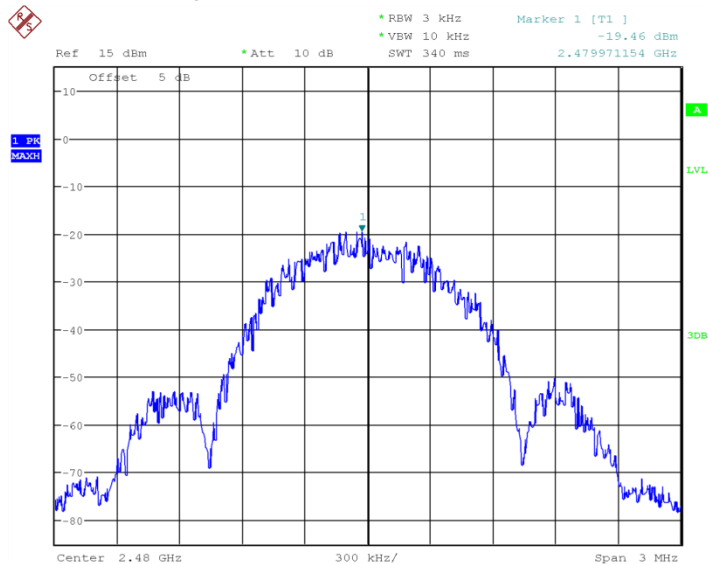
Date: 13.APR.2017 08:40:33

Fig.4 Power spectral density: CH0



Date: 13.APR.2017 08:42:43

Fig.5 Power spectral density: CH19



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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)	$\geq 500k$

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 DTS channel center frequency.
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=6dB.
7. Record the results.

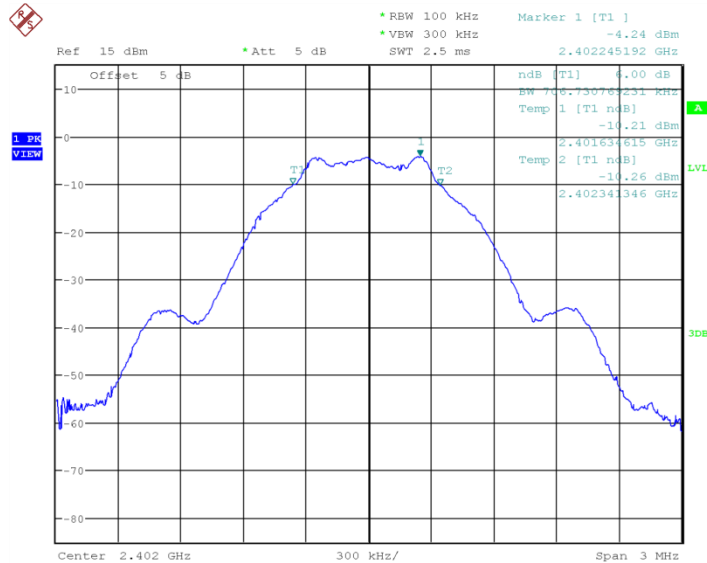
Measurement Result:

For GFSK

Channel	6dB Bandwidth (KHz)		Conclusion
0	Fig.7	706.731	P
39	Fig.8	706.731	P
78	Fig.9	711.538	P

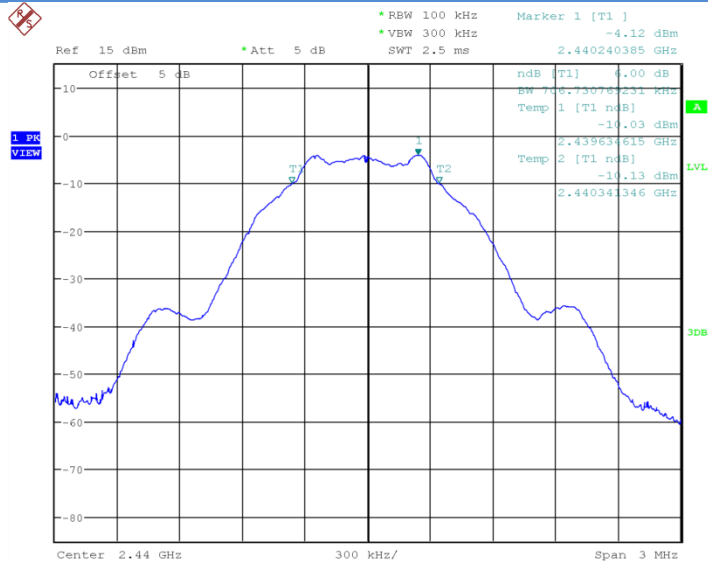
Conclusion: PASS

Test graphs as below:



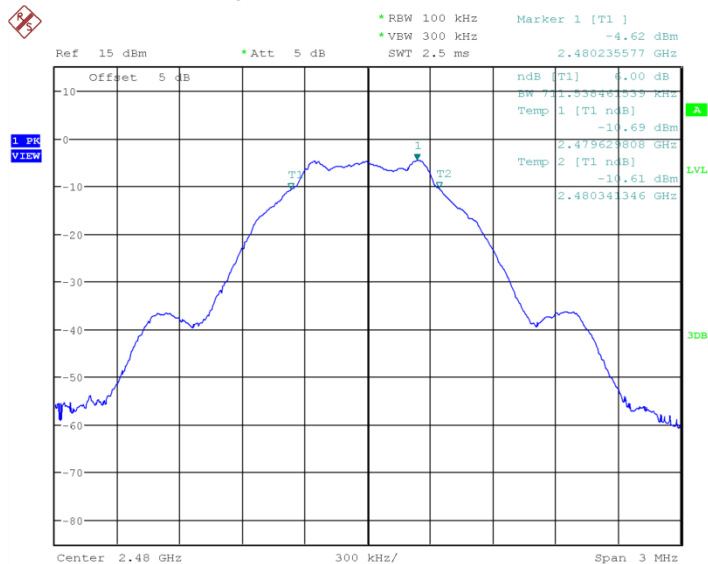
Date: 13.APR.2017 08:39:05

Fig.7 6dB Bandwidth: Ch0



Date: 13.APR.2017 08:39:26

Fig.8 6dB Bandwidth: Ch19



Date: 13.APR.2017 08:39:46

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.

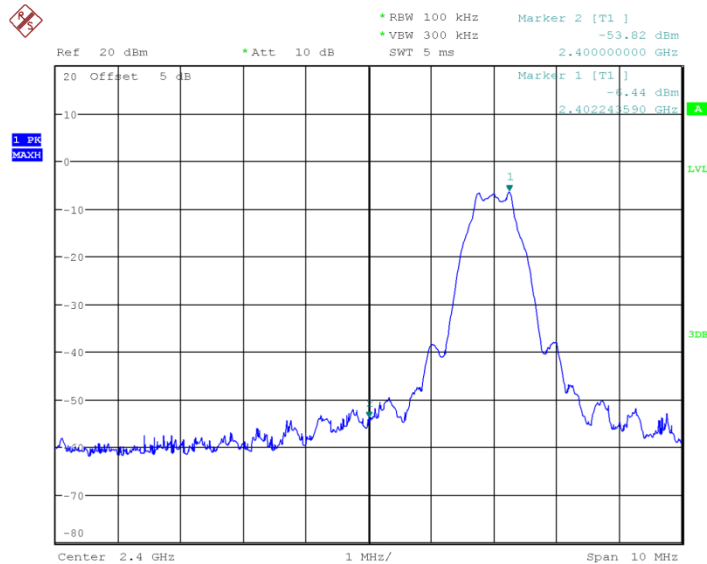
6.4.3 Measurement results

For GFSK

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

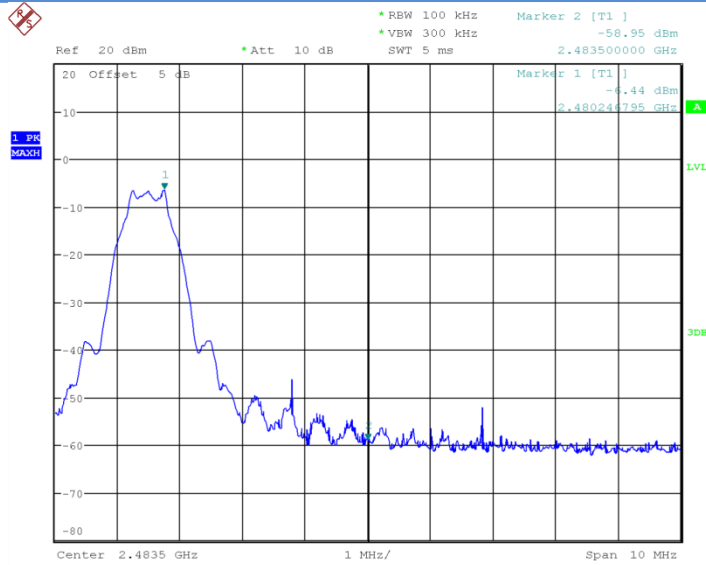
Conclusion: PASS

Test graphs an below



Date: 7.APR.2017 12:35:29

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



Date: 7.APR.2017 12:36:36

Fig.11 Frequency Band Edge: GFSK, Ch39, Hopping OFF

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.

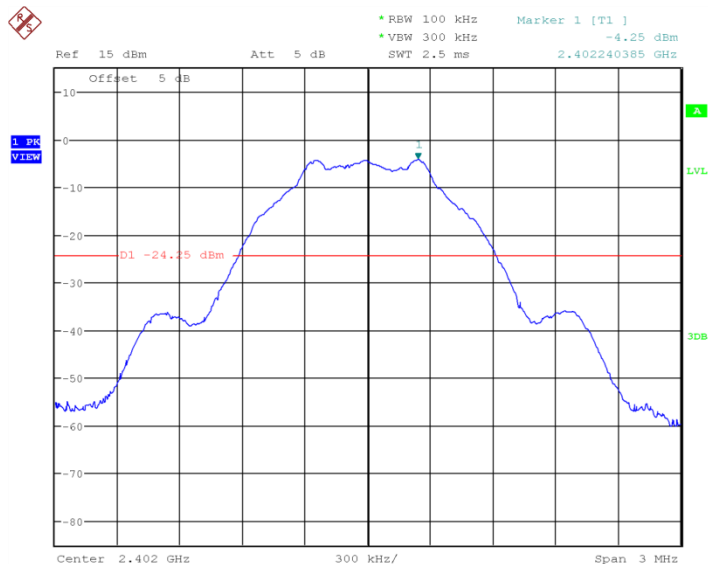
6.5.3 Measurement Results:

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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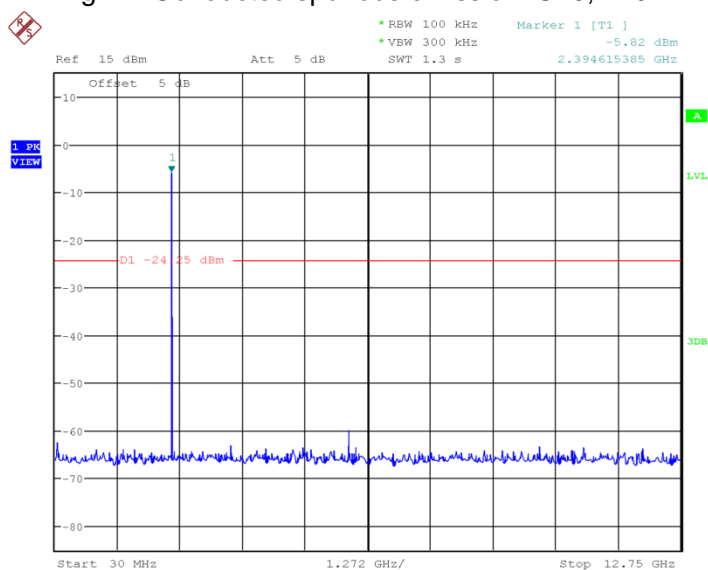
Conclusion: PASS

Test graphs as below



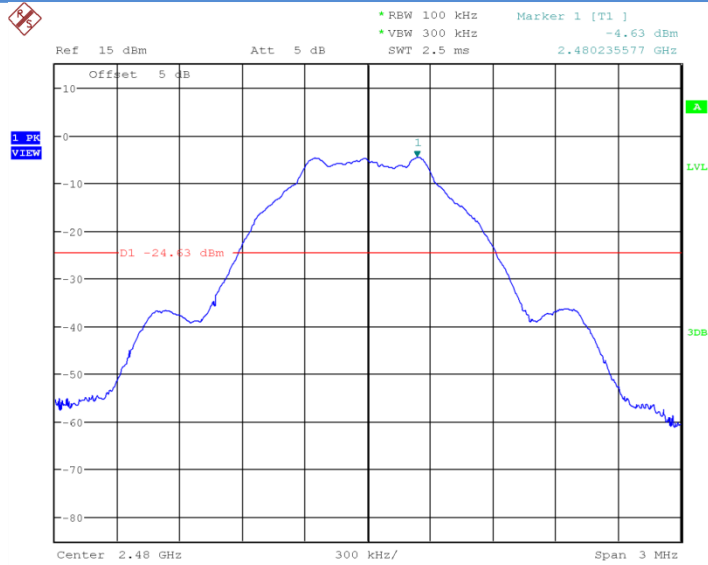
Date: 13.APR.2017 08:46:39

Fig.12 Conducted spurious emission: Ch0, 2402MHz



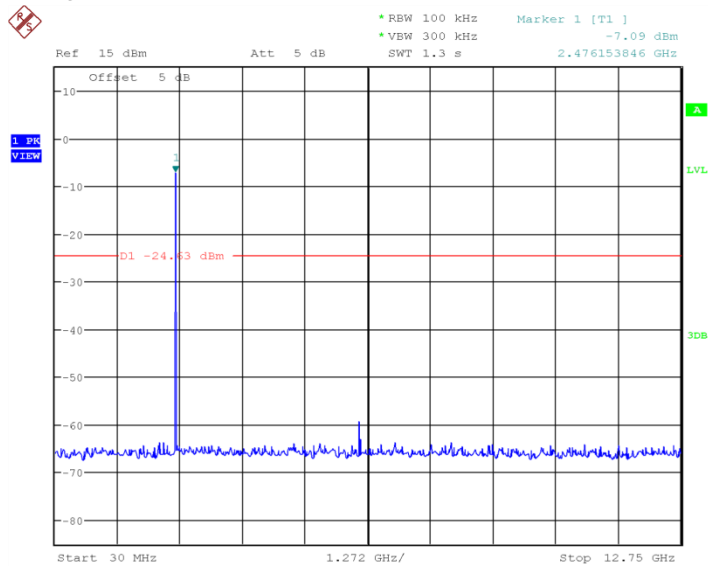
Date: 13.APR.2017 08:47:00

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



Date: 13.APR.2017 08:49:42

Fig.16 Conducted spurious emission: Ch39, 2480MHz



Date: 13.APR.2017 08:50:03

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 C63.10-2013 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 $A_{R_{pi}}$ 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:

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

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

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

Channel	Frequency Range	Test Results	Conclusion
Ch0 2480MHz	30MH~1GHz	Fig.21	P
	1GHz~3GHz	Fig.22	P
	3GHz~18GHz	Fig.23	P

Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpi (dB)	PMea(dBuV/m)	Polarity
30.29	16.4	-26.7	43.1	V
43.59	20.5	-24.1	44.6	V
58.37	17.3	-25	42.3	V
60.566	15.1	-25.4	40.5	V
84.135	14.3	-28.5	42.8	H
936.444	19	-10.8	29.8	V

Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpi (dB)	PMea(dBuV/m)	Polarity
2500.6	46.8	2.7	44.1	V
2585	46.8	2.9	43.9	V
2659	46.9	3.2	43.7	V
2758.4	47.4	3.7	43.7	V
2846.8	48.1	3.9	44.2	V
2925	47.8	4.3	43.5	H

Ch0 3GHz-18GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
7056.65	46.8	3.1	43.7	H
8111.075	47.2	4.1	43.1	H
13884.2	53	12.8	40.2	V
14815.55	54.4	13.7	40.7	H
16877.8	59.5	19.7	39.8	V
17807.575	63	22	41	V

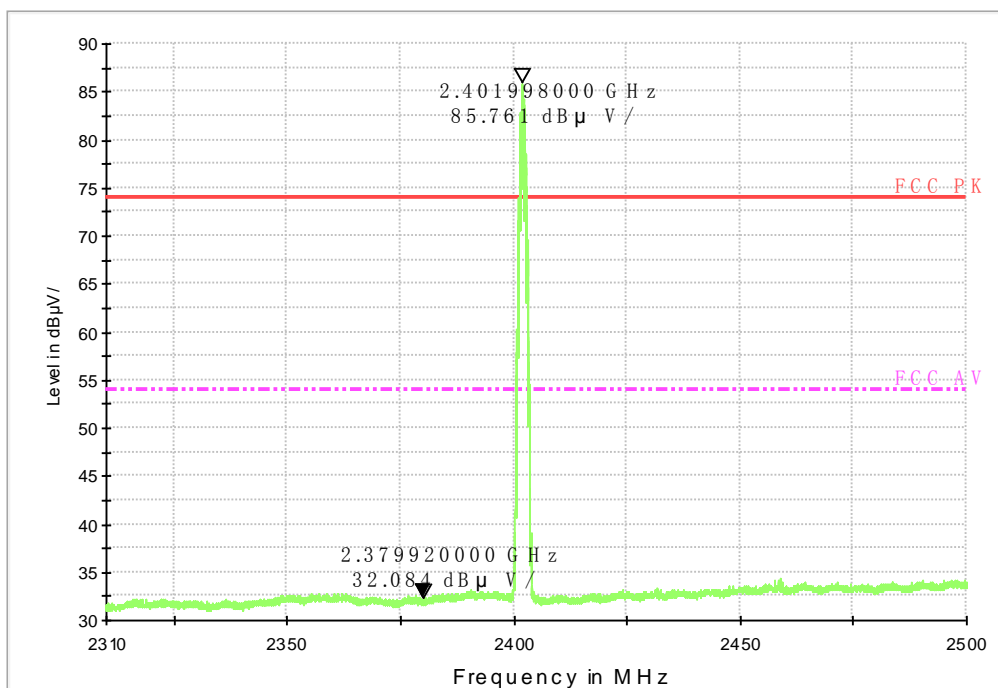
Ch0 3GHz-18GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2772.8	34.4	3.6	30.8	V
2845.8	34.6	3.9	30.7	H
2940.6	35	4.4	30.6	H

Conclusion: PASS

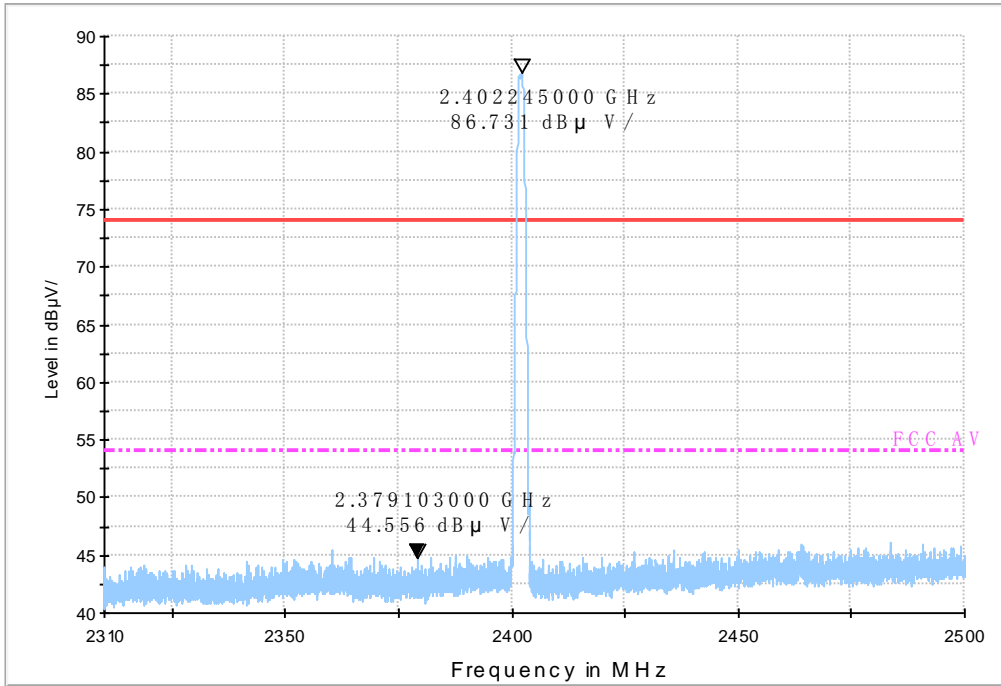
Test graphs as below:

RE 1GHz-3GHz



Bandedge:ch0,AV

RE 1GHz-3GHz



Bandedge:ch0,PK

RE 30MHz-1GHz

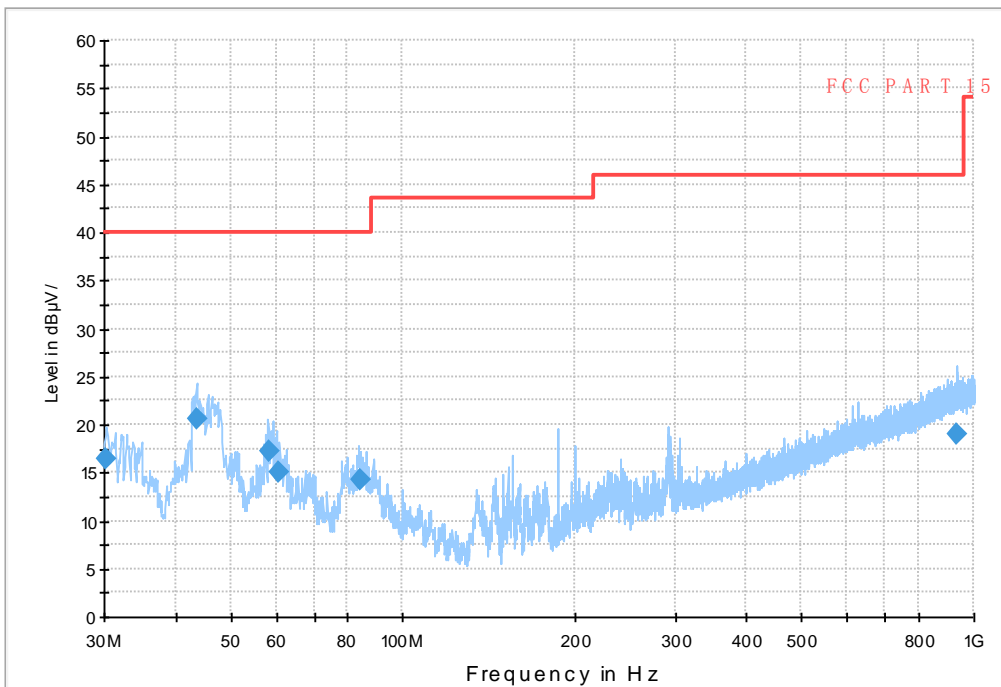


Fig.18 Radiated emission: Ch0, 30MHz~1GHz

RE 1GHz-3GHz

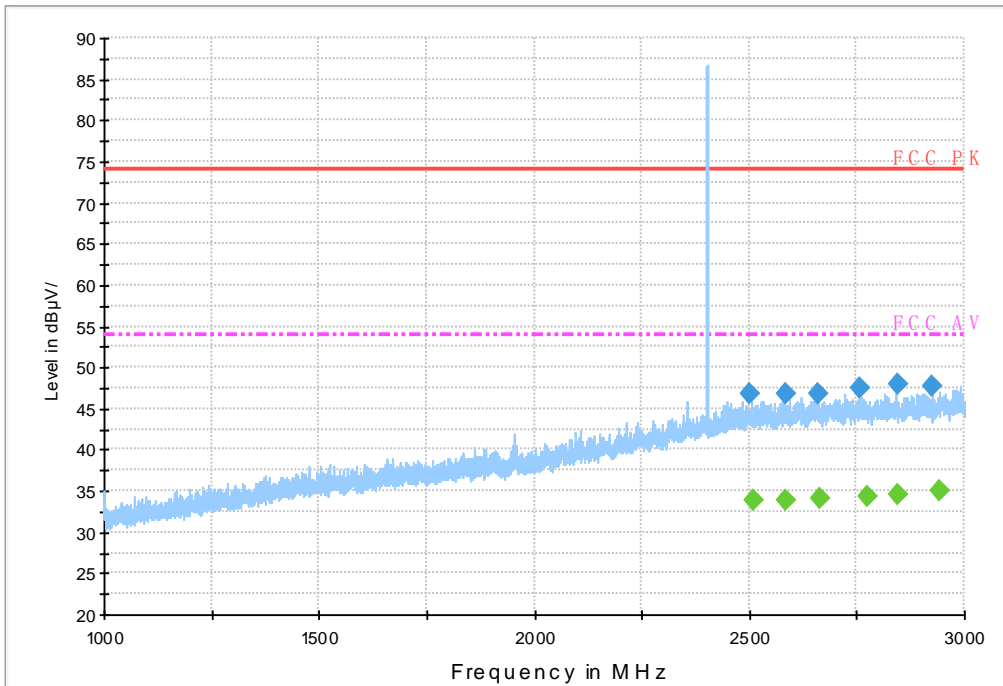


Fig.19 Radiated emission: Ch0, 1GHz~3GHz

RE 3GHz-18GHz

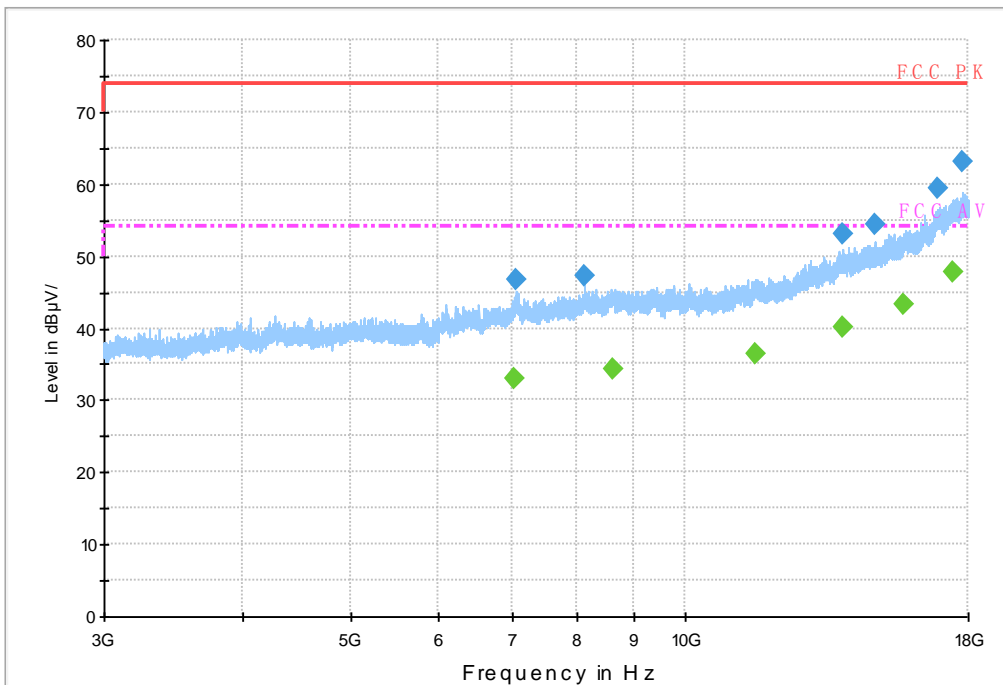
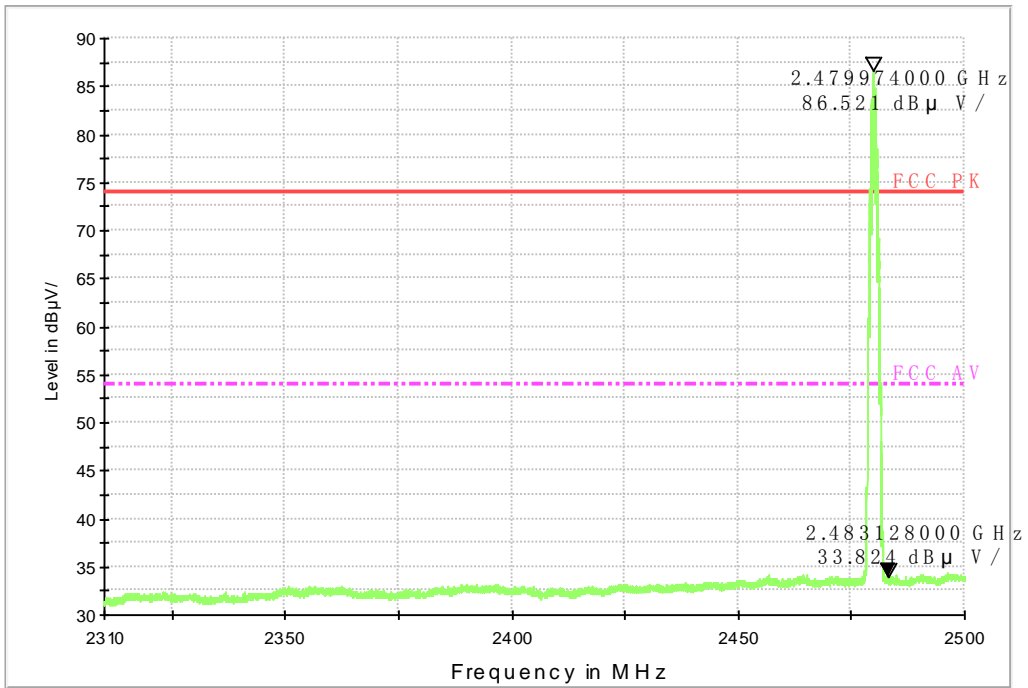


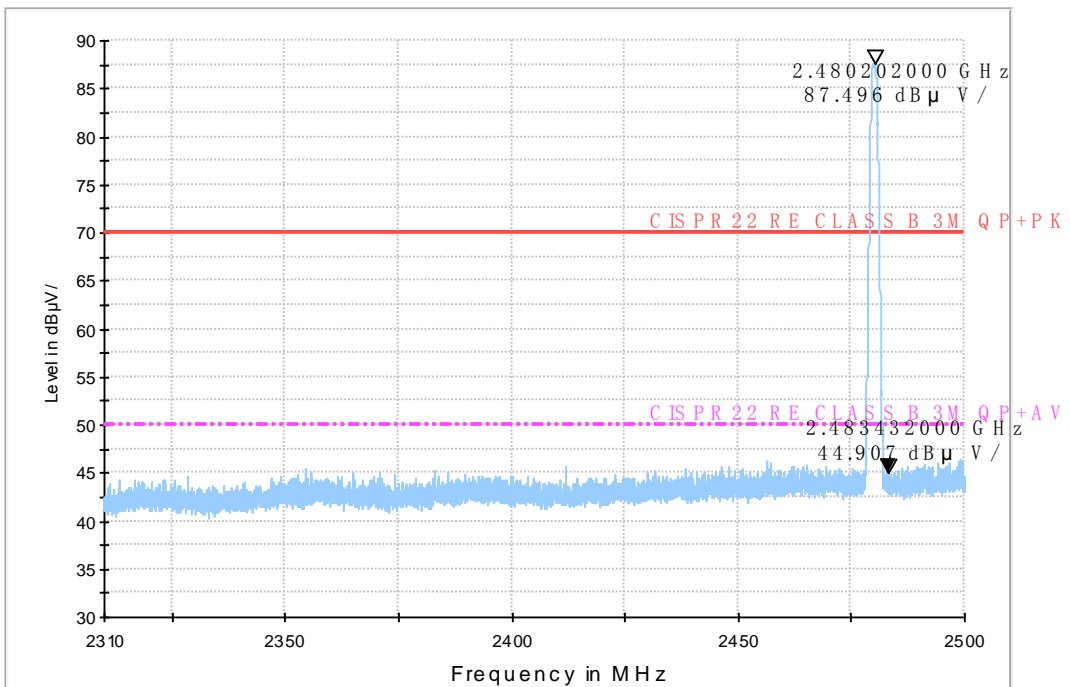
Fig.20 Radiated emission: Ch0, 3GHz~18GHz

RE 1GHz-3GHz



Bandedge:ch39,AV

RE 1GHz-3GHz



Bandedge:ch39,PK

6.7. AC Powerline 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)	Conclusion
			With charger	
			BLE	
0.15 to 0.5	66 to 56	56 to 46	Fig.91	P
0.5 to 5	56	46		

5 to 30	60	50	
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NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Conclusion: Pass

CISPR L Voltage 150k to 30MHz-Class B

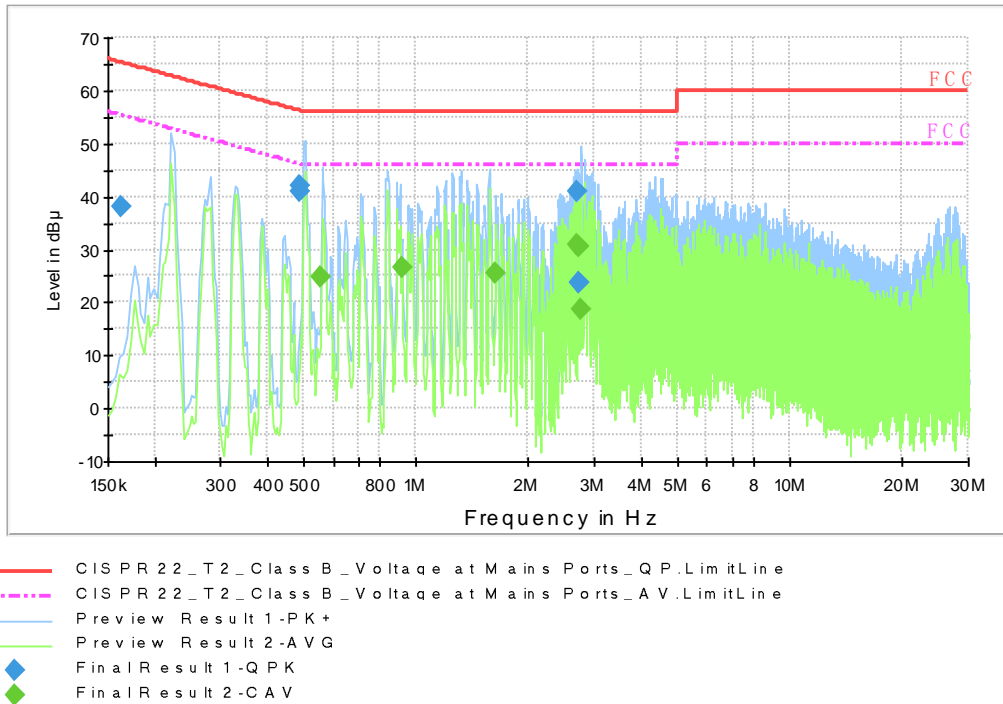


Fig.91 AC Powerline Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dB µV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB)
0.162000	38.0	1000.0	9.000	On	L1	9.6	27.4	65.4
0.486438	41.9	1000.0	9.000	On	L1	9.6	14.3	56.2
0.486469	40.8	1000.0	9.000	On	L1	9.6	15.5	56.2
2.691606	41.0	1000.0	9.000	On	L1	9.7	15.0	56.0
2.739575	23.9	1000.0	9.000	On	L1	9.7	32.1	56.0
2.743638	23.9	1000.0	9.000	On	L1	9.7	32.1	56.0

Final Result 2

Frequency (MHz)	CAverage (dB µV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB µ)
0.554469	24.9	1000.0	9.000	On	L1	9.6	21.1	46.0
0.918281	26.7	1000.0	9.000	On	L1	9.7	19.3	46.0
1.625875	25.7	1000.0	9.000	On	L1	9.7	20.3	46.0
2.711606	30.9	1000.0	9.000	On	L1	9.7	15.1	46.0
2.719669	30.4	1000.0	9.000	On	L1	9.7	15.6	46.0
2.755306	18.8	1000.0	9.000	On	L1	9.7	27.2	46.0

7. Test Equipment 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	FSQ26	101096	Rohde&Schwarz	2016-05-12	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006	TDL-Lambda	2016-05-12	1 Year
3	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2016-05-12	1 Year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Universal Radio Communication Tester	CMU200	123101	R&S	2016-05-12	1 Year
3	Test Receiver	ESU40	100307	R&S	2016-05-12	1 Year
4	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2014-11-05	3 Year
5	Double Ridged Guide Antenna	ETS-3117	135885	ETS	2014-05-06	3 Year
8	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 metersx3.0 metersx2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =25 %, Max. = 75 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 metersx10.9 metersx5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

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