TEST REPORT

No. I17D00247-SRD01

For

Client : Shanghai Sunmi Technology Co.,Ltd.

Production : POS System

Model Name : W1303

FCC ID: 2AH25W1301

Hardware Version: B3.2

Software Version: SUNMI_T1mini_GLOBAL_000009_170913

Issued date: 2018-01-09

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

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Revision Version

Report Number	Revision	Date	Memo
I17D00247-SRD01	00	2017-12-29	Initial creation of test report
I17D00247-SRD01	01	2018-01-09	Second creation of test report

CONTENTS

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:	Zhou Yan
Testing Start Date:	2017-12-26
Testing End Date:	2017-12-28

1.4. Signature

Wu Jiashen
(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:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Postcode:	200433
Telephone:	18721763396

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Postcode:	200433
Telephone:	18721763396

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

3.1. About EUT

EUT Description	POS System
Model name	W1303
BT Frequency	2402MHz-2480MHz
BT Channel	Channel0-Channel78
BT type of modulation	GFSK/ π /4 DQPSK/8DPSK
Extreme Temperature	-10/+55℃
Nominal Voltage	24V
Extreme High Voltage	25.2V
Extreme Low Voltage	22.8V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	N/A	B3.2	SUNMI_T1mini_GLOBAL_000009_170913	2017-11-26

*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	---

*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
Transmitter Spurious Emission-Radiated	15.247,15.209,	/	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℃
Voltage	Vnom	24V
Humidity	Hnom	48%
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.

5.2. Statements

The W1303, supporting WLAN/BT/BLE, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a variant product for testing.

In this report, only worst-case of RSE and AC Power line are tested from the original report. The other test cases please refer to the prototype report No: I17D00239-SRD01, which was prepared by East China Institute of Telecommunications.

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. Radiated Emission

6.1.1 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

6.1.2 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

6.1.3 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}

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig1	P
	1GHz~3GHz	Fig2	P
	3GHz~18GHz	Fig3	P
Power	2.38GHz~2.4GHz	Fig4	P
Power	2.45GHz~2.5GHz	Fig5	P

For π/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig6	P
	1GHz~3GHz	Fig7	P
	3GHz~18GHz	Fig8	P
Power	2.38GHz~2.4GHz	Fig9	P
Power	2.45GHz~2.5GHz	Fig10	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig11	P
	1GHz~3GHz	Fig12	P
	3GHz~18GHz	Fig13	P
Power	2.38GHz~2.4GHz	Fig14	P
Power	2.45GHz~2.5GHz	Fig15	P

GFSK Ch0 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.515428	15.39	-12	27.39	V
64.913076	17.04	-11.8	28.84	V
150.920644	20.95	-13.8	34.75	H
231.860548	22.91	-8.7	31.61	H
368.076636	23.34	-4.1	27.44	H
458.36858	29.29	-2.2	31.49	H

GFSK Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2351.9092	50.36	23.2	27.16	H
2518.593461	52.23	24	28.23	H
2587.127116	52.04	24.4	27.64	V
2656.840385	52.61	24.9	27.71	V
2714.556154	52.28	25.1	27.18	V
2749.668269	52.54	25.1	27.44	H

GFSK Ch0 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13779.85553	52.52	17.3	35.22	V
14316.34727	54.79	20	34.79	V
14846.88873	56.18	20.5	35.68	H
15805.2378	57.42	24	33.42	V
16571.8104	58.02	25.5	32.52	H
17471.54767	61.2	28.2	33	H

GFSK Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14316.34727	42.19	20	22.19	V
14846.88873	43.19	20.5	22.69	H
15805.2378	45.29	24	21.29	V
16571.8104	46.17	25.5	20.67	H
17471.54767	48.66	28.2	20.46	H

π/4 DQPSK Ch0 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.668296	14.6	-11.9	26.5	V
66.365264	18.01	-12.1	30.11	V
71.982604	20.78	-13.3	34.08	V
154.721192	21.62	-13.4	35.02	H
226.010572	21.31	-8.9	30.21	H
461.95544	30.33	-2.2	32.53	H

π/4 DQPSK Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2527.461154	51.21	23.9	27.31	H
2592.015769	52.01	24.4	27.61	H
2664.759807	51.98	25	26.98	V
2699.964039	51.91	25.1	26.81	V
2744.000193	52.36	25.1	27.26	V
2807.043654	52.37	25.5	26.87	H

π/4 DQPSK Ch0 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15363.33507	55.91	22.1	33.81	H

15749.1008	56.45	23.6	32.85	V
16433.0872	58.32	25.5	32.82	H
16805.0048	59.58	27	32.58	V
17160.7398	60.24	26.4	33.84	V
17548.95447	61.76	28.6	33.16	V

π/4 DQPSK Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15363.33507	43.42	22.1	21.32	H
15749.1008	44.92	23.6	21.32	V
16433.0872	45.89	25.5	20.39	H
16805.0048	47.25	27	20.25	V
17160.7398	47.12	26.4	20.72	V
17548.95447	49.23	28.6	20.63	V

8DPSK Ch0 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
35.017848	13.51	-11.9	25.41	V
66.3676	17.97	-12.1	30.07	V
71.989064	20.55	-13.3	33.85	V
150.20558	22.46	-13.9	36.36	H
229.459852	21.73	-8.8	30.53	H
462.59788	29.45	-2.1	31.55	H

8DPSK Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2319.4236	50.72	22.4	28.32	H
2510.230577	52.45	24.2	28.25	H
2556.592115	59.2	24.2	35	H

2603.846538	51.89	24.5	27.39	V
2626.418462	51.71	24.7	27.01	V
2666.733462	52.36	25	27.36	V

8DPSK Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2319.4236	39.51	24.2	15.31	H

8DPSK Ch0 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14447.66313	53.86	19.1	34.76	V
14892.1118	55.85	21.6	34.25	H
15747.3652	56.86	23.6	33.26	V
16150.13427	58.53	24.6	33.93	V
16532.4792	58.87	26	32.87	H
17013.1144	61.21	26.8	34.41	H

8DPSK Ch0 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14892.1118	43.74	21.6	22.14	H
15747.3652	45.07	23.6	21.47	V
16150.13427	46.13	24.6	21.53	V
16532.4792	46.76	26	20.76	H
17013.1144	47.99	26.8	21.19	H

Note: Only the worst case is written in the report.

Conclusion: PASS

Test graphs as below:

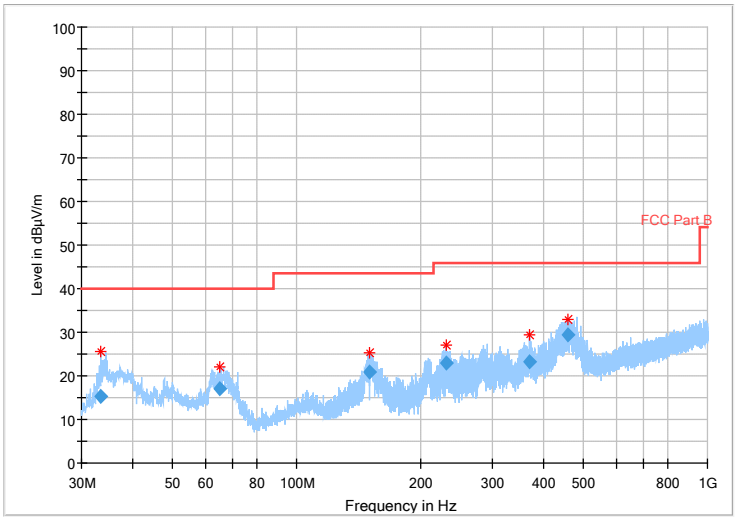


Fig 1 Radiated emission: GFSK, Ch0, 30MHz~1GHz

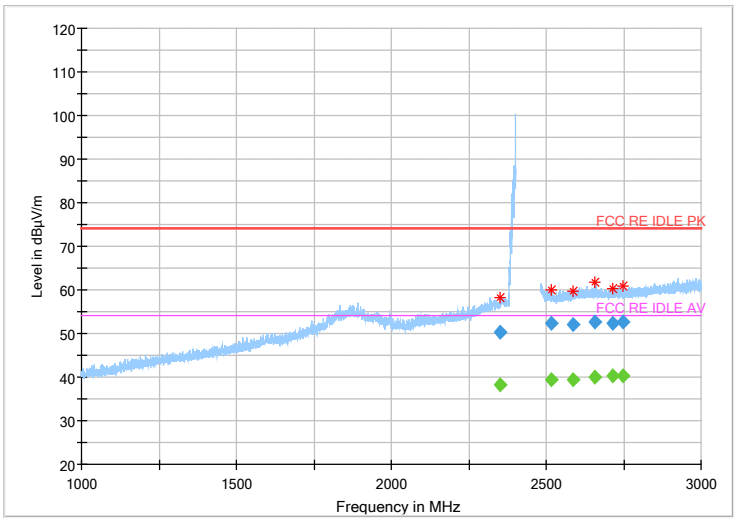


Fig 2 Radiated emission: GFSK, Ch0, 1GHz~3GHz

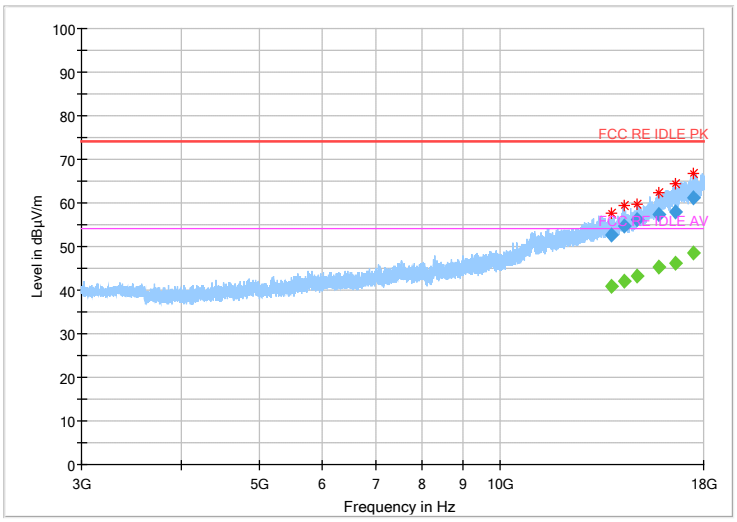
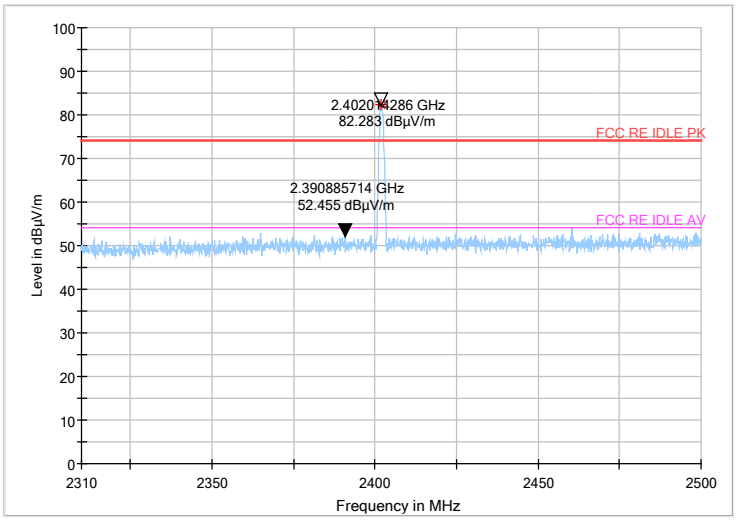
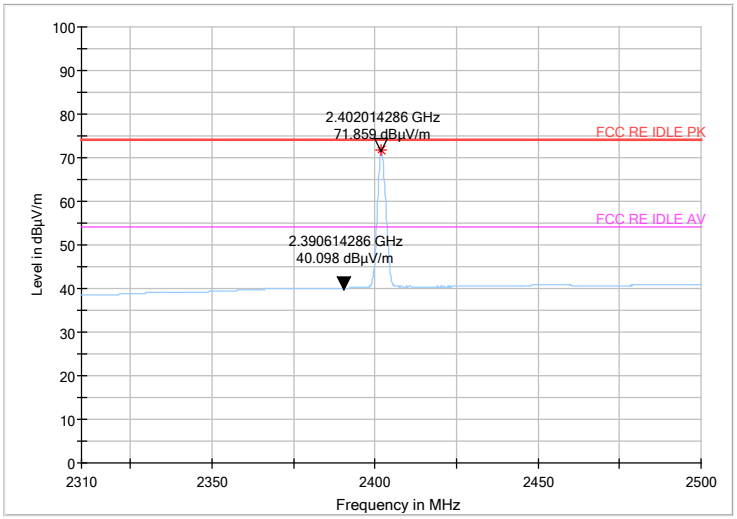


Fig 3 Radiated emission: GFSK, Ch0, 3GHz~18GHz

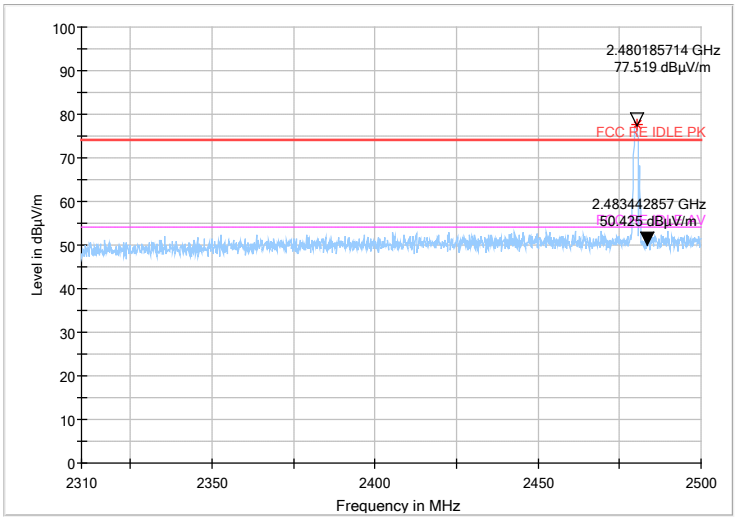


Peak Detector

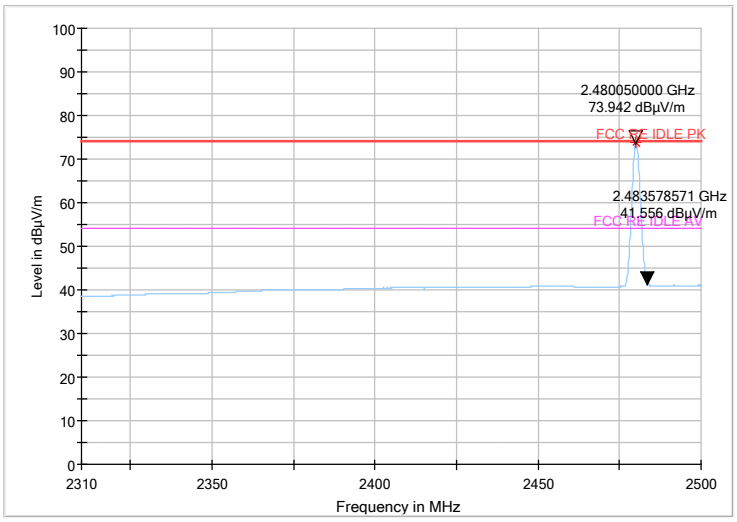


Average Detector

Fig 4 Radiated emission (Power): GFSK, low channel



Peak Detector



Average Detector

Fig 5 Radiated emission (Power): GFSK, high channel

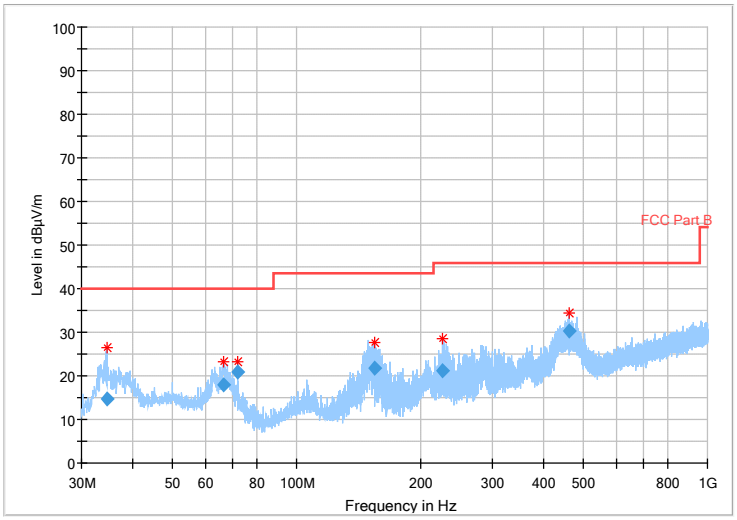


Fig 6 Radiated emission: π/4 DQPSK, Ch0, 30MHz~1GHz

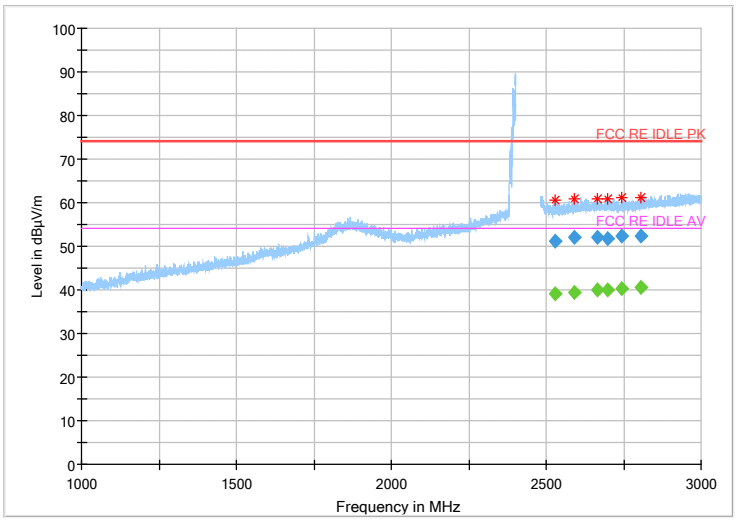


Fig 7 Radiated emission: π/4 DQPSK, Ch0, 1GHz~3GHz

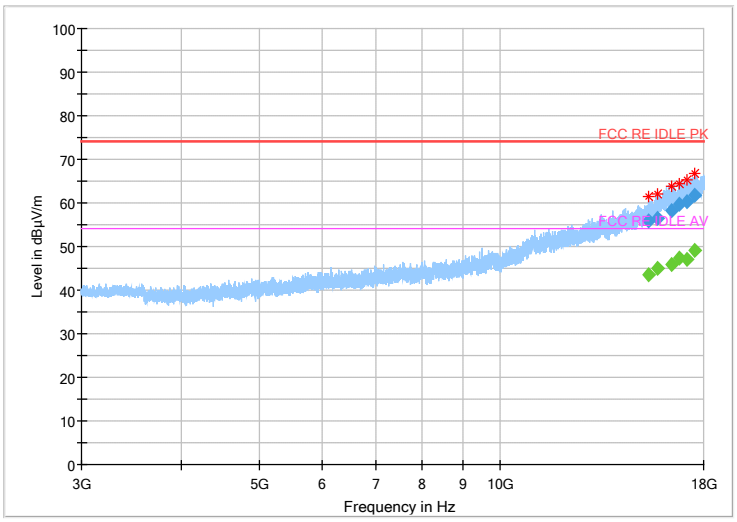
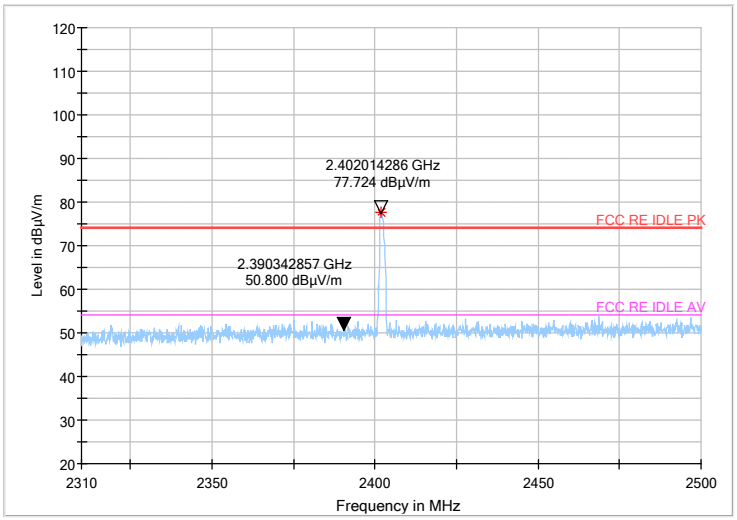
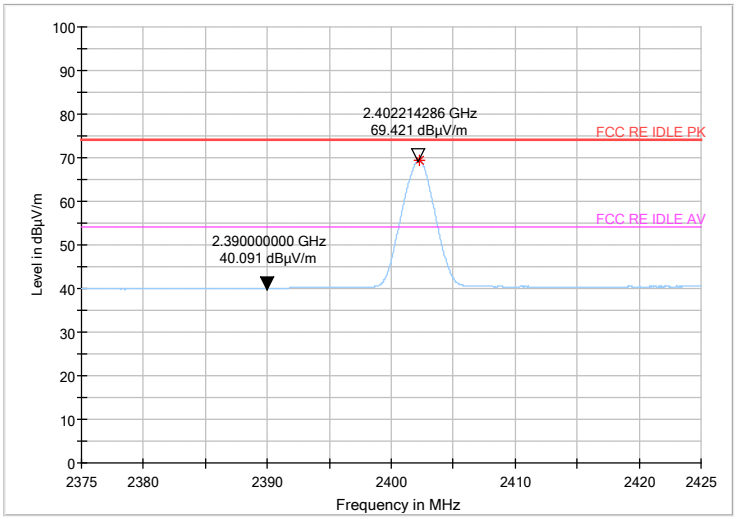


Fig 8 Radiated emission: π/4 DQPSK, Ch0, 3GHz~18GHz

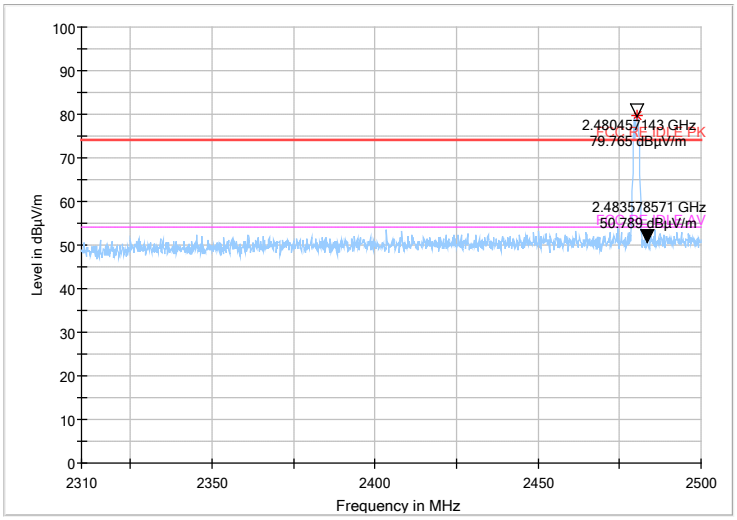


Peak Detector

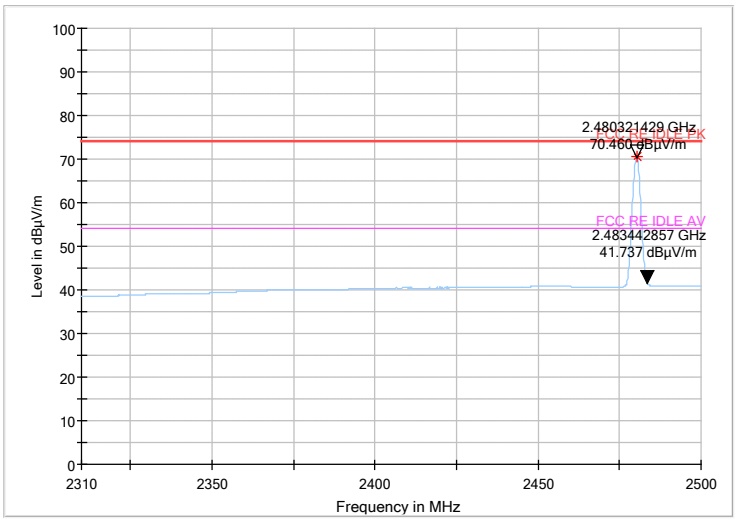


Average Detector

Fig 9 Radiated emission (Power): π/4 DQPSK, low channel



Peak Detector



Average Detector

Fig 10 Radiated emission (Power): π/4 DQPSK, high channel

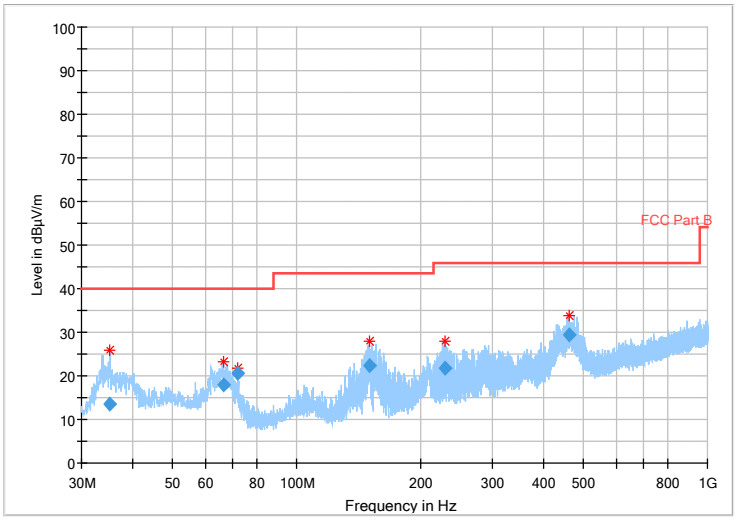


Fig 11 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

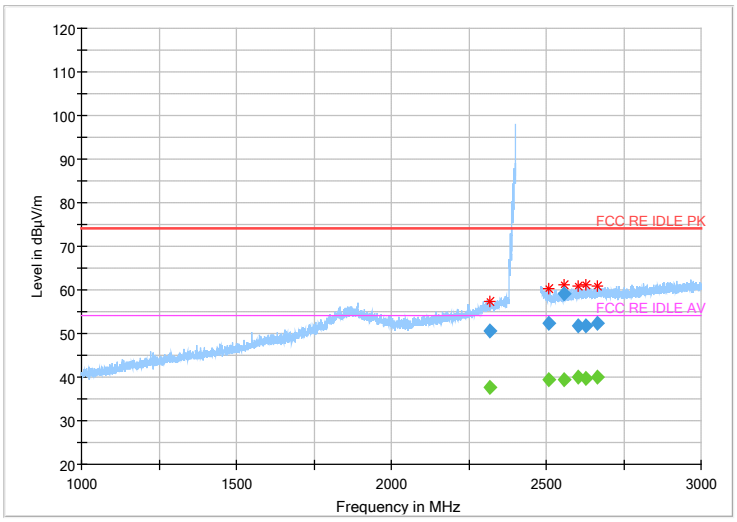


Fig 12 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

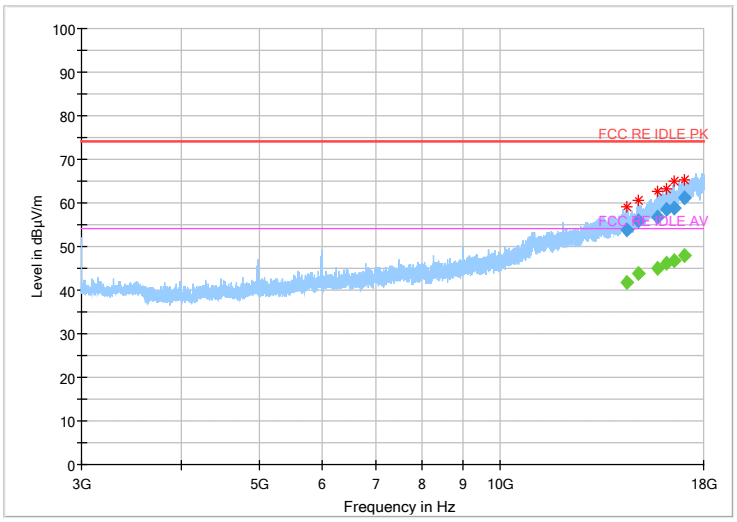
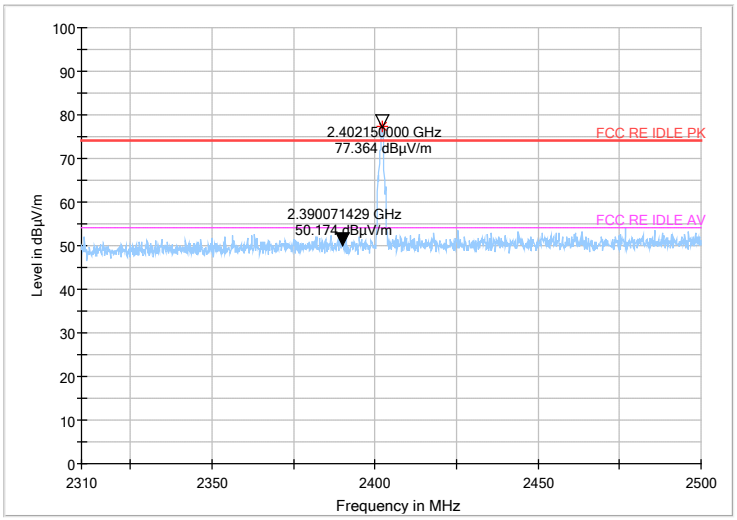
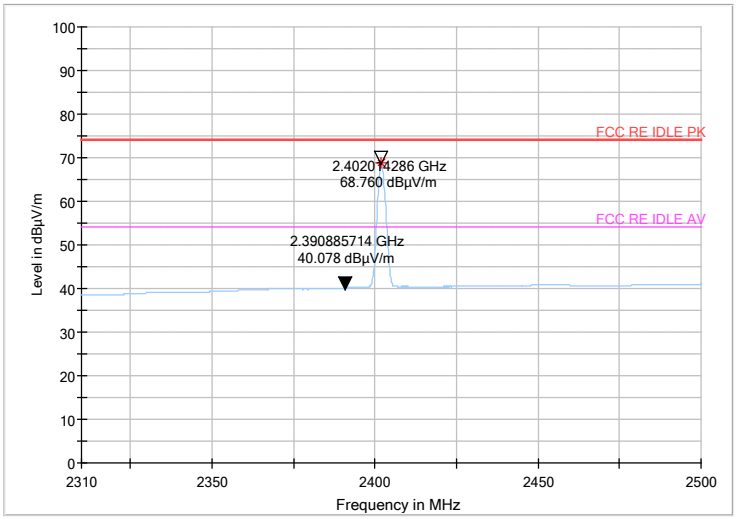


Fig 13 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz

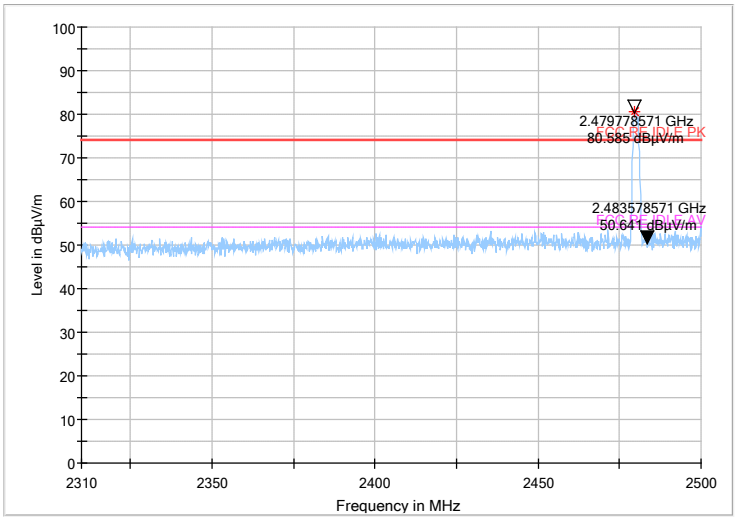


Peak Detector

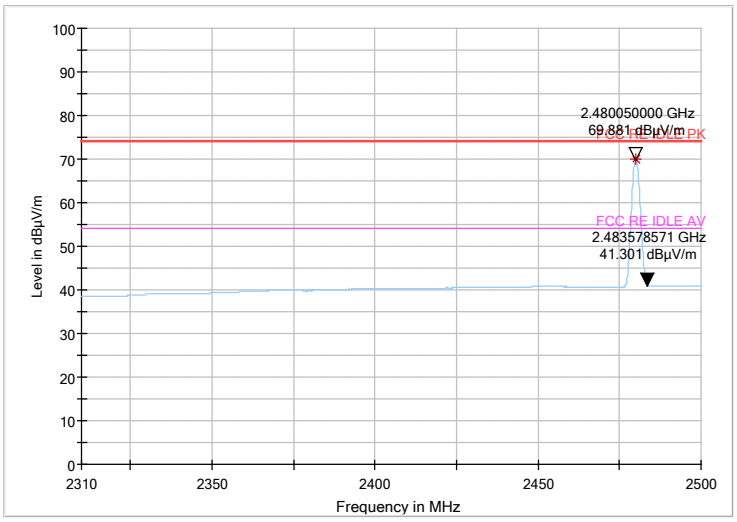


Average Detector

Fig 14 Radiated emission (Power): 8DPSK, low channel

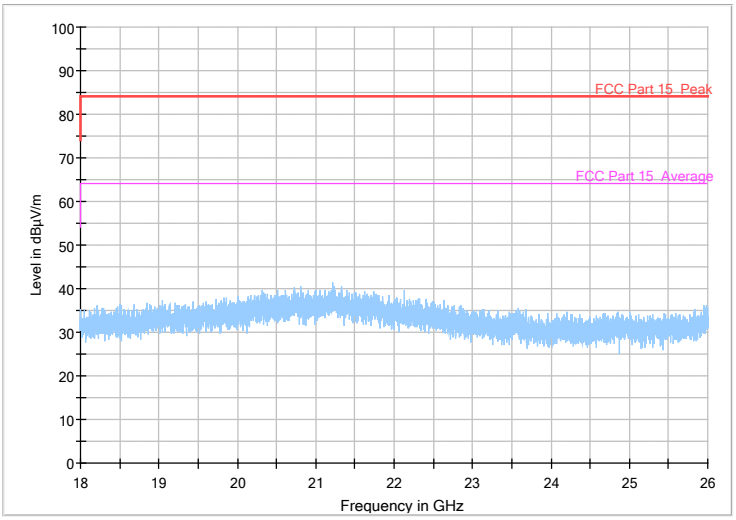


Peak Detector



Average Detector

Fig 15 Radiated emission (Power): 8DPSK, high channel



ALL Channel 18GHz~26GHz

6.2. 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	Conclusion
0.15 to 0.5	66 to 56	56 to 46	Fig.16	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

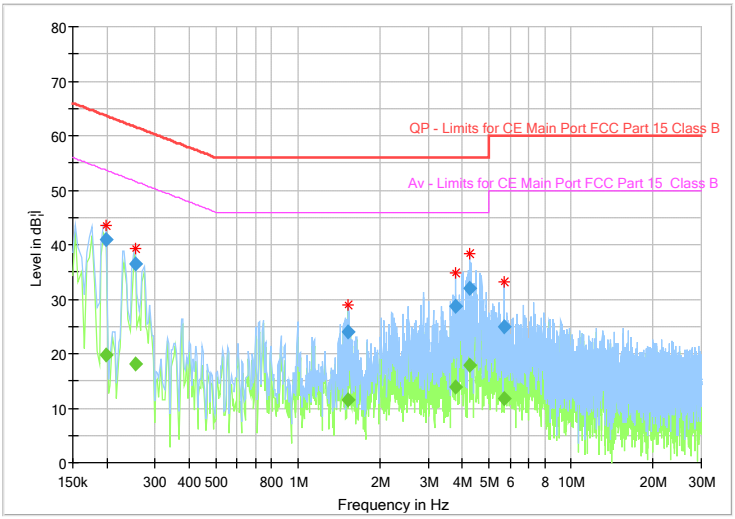


Fig 16 AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.198506	---	19.65	53.67	34.02	1000.0	9.000	L1	ON	9.6
0.198506	40.94	---	63.67	22.73	1000.0	9.000	L1	ON	9.6
0.254475	---	18.03	51.61	33.58	1000.0	9.000	L1	ON	9.6
0.254475	36.54	---	61.61	25.07	1000.0	9.000	L1	ON	9.6
1.534294	---	11.48	46.00	34.52	1000.0	9.000	L1	ON	9.7
1.534294	24.09	---	56.00	31.91	1000.0	9.000	L1	ON	9.7
3.776775	---	13.99	46.00	32.01	1000.0	9.000	N	ON	9.7
3.776775	28.71	---	56.00	27.29	1000.0	9.000	N	ON	9.7
4.254375	---	17.79	46.00	28.21	1000.0	9.000	N	ON	9.7
4.254375	31.94	---	56.00	24.06	1000.0	9.000	N	ON	9.7
5.668519	---	11.75	50.00	38.25	1000.0	9.000	N	ON	9.7
5.668519	25.05	---	60.00	34.95	1000.0	9.000	N	ON	9.7

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	2017-05-11	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006	TDL-Lambda	2017-05-11	1 Year
3	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2017-05-11	1 Year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2017-05-11	1 Year
2	EMI Test Receiver	ESU40	100307	R&S	2017-05-11	1 Year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	2017-01-11	3 Year
5	2-Line V-Network	ENV216	101380	R&S	2017-05-11	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. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω

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

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
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.

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 OF REPORT************