



TEST REPORT

No. I17D00262-SRD02

For

Client : Shanghai Sunmi Technology Co.,Ltd.

Production : POS System

Model Name : W5920

FCC ID: 2AH25V1SNFC

Hardware Version: 2.0

Software Version: 1.1.0

Issued date: 2018-01-12

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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RF Test Report

Report No.: I17D00262-SRD02

Revision Version

Report Number	Revision	Date	Memo
I17D00262-SRD02	00	2018-01-12	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

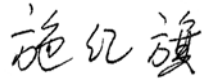
1.2. Testing Environment

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

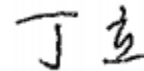
1.3. Project data

Project Leader:	Zhou Yan
Testing Start Date:	2017-12-14
Testing End Date:	2018-01-05

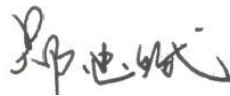
1.4. Signature



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: 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	Wireless data POS System
Model name	W5920
Bluetooth Frequency	2402MHz-2480MHz
Bluetooth Channel	Channel0-Channel39
Bluetooth Modulation	GFSK;
Extreme Temperature	-10/+55°C
Nominal Voltage	3.6 V
Extreme High Voltage	4.2 V
Extreme Low Voltage	3.5 V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N02	865150030317082	2.0	1.1.0	2017-11-24

*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°C
Voltage	Vnom	3.6V
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 was set in DH1.
- 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.

5.2. Statements

The W5920, supporting GSM /WCDMA /BT/BLE/WIFI/GPS/NFC, manufactured by Shanghai Sunmi Technology Co.,Ltd.. is a variant product for testing.

We only test worst-case of RSE and AC Power line , The other test cases please refer to the prototype report No: CCISE170603502, which was prepared by Shenzhen Zhongjian Nanfang Testing Co.,Ltd

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

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig1	P
	1GHz~3GHz	Fig2	P
	3GHz~18GHz	Fig3	P

Ch0 30MHz-1GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
33.32972	11.54	-22	33.54	V
35.098652	14.66	-21.9	36.56	V
36.44262	14.75	-21.6	36.35	V
156.317264	5.71	-27.4	33.11	H
652.896656	19.4	-13.6	33	V
811.853272	21.98	-10.8	32.78	V

Ch0 1GHz-3GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2517.271923	53.99	7	46.99	V
2576.484038	55.2	7.2	48	H
2622.296154	54.25	7.5	46.75	V
2680.867116	54.76	7.8	46.96	V
2709.199231	54.97	7.9	47.07	H
2750.643846	54.49	7.7	46.79	V

Ch0 1GHz-3GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2576.484038	42.01	7.2	34.81	H
2622.296154	42.21	7.5	34.71	V
2680.867116	42.67	7.8	34.87	V
2709.199231	42.62	7.9	34.72	H
2750.643846	42.54	7.7	34.84	V

Ch0 3GHz-18GHz (Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
13494.29553	53.82	18	35.82	H
14332.87907	53.61	19.8	33.81	H
14958.7754	56.18	21.4	34.78	H
15762.19387	58.94	23.7	35.24	V
16541.0518	59.08	25.9	33.18	V
17605.81013	61.29	28.7	32.59	H

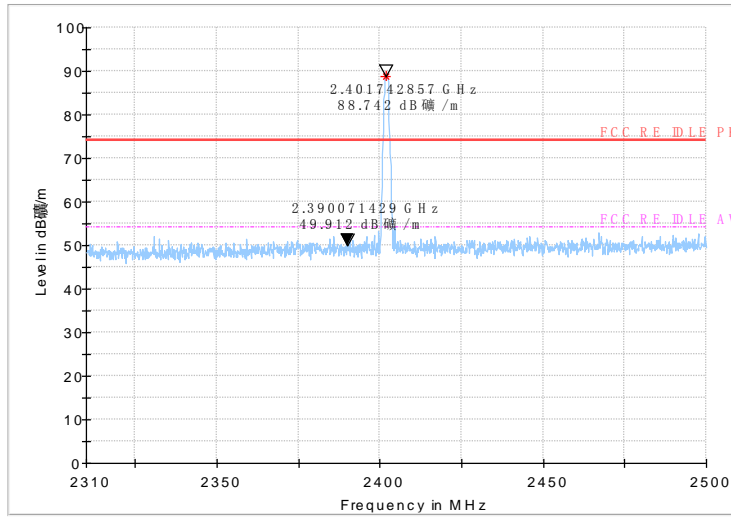
Ch39 3GHz-18GHz (Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
14958.7754	43.49	21.4	22.09	H
15762.19387	45.07	23.7	21.37	V
16541.0518	46.75	25.9	20.85	V
17605.81013	49.26	28.7	20.56	H

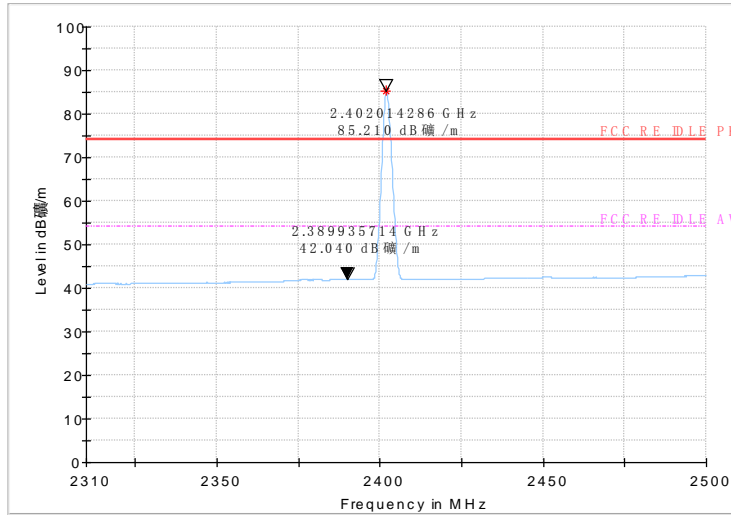
Note: Only the worst case is written in the report.

Conclusion: PASS

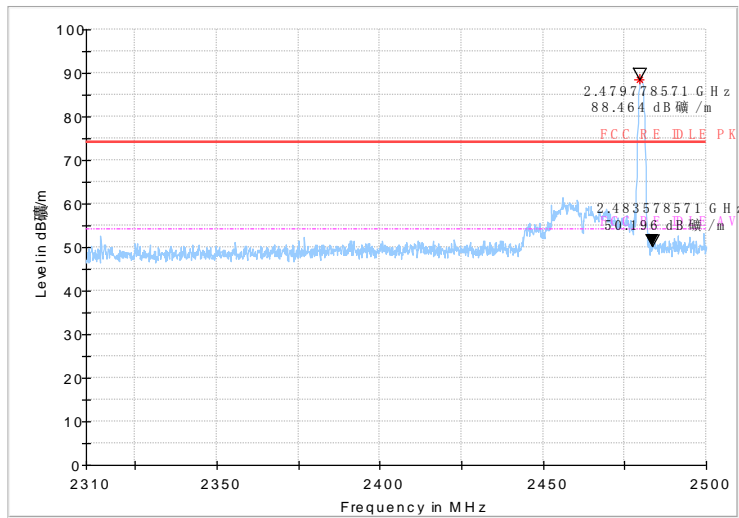
Test graphs as below:



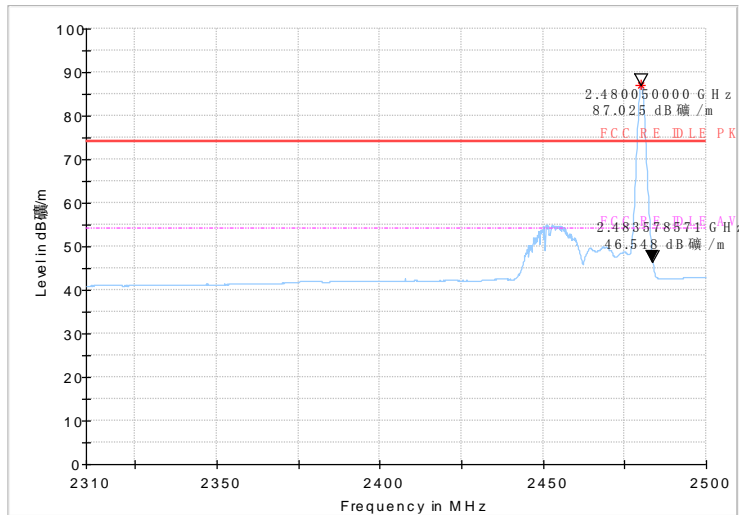
Peak Detector



Average Detector
Bandedge:Ch0



Peak Detector



Average Detector
Bandedge:Ch39

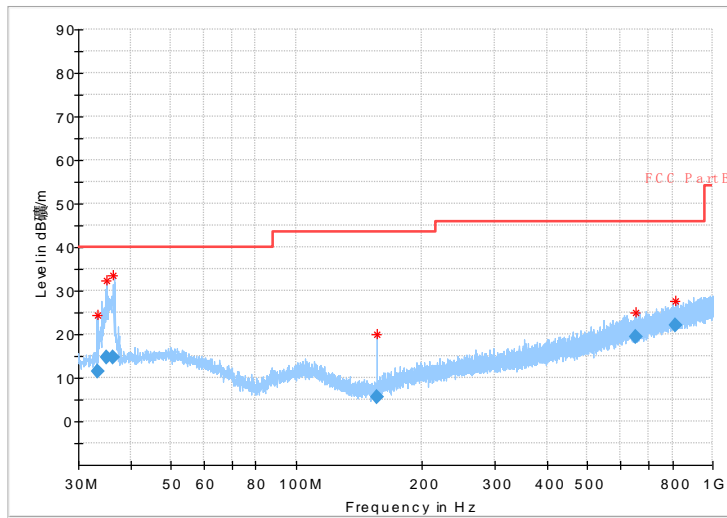


Fig.1 Radiated emission: Ch0, 30MHz~1GHz

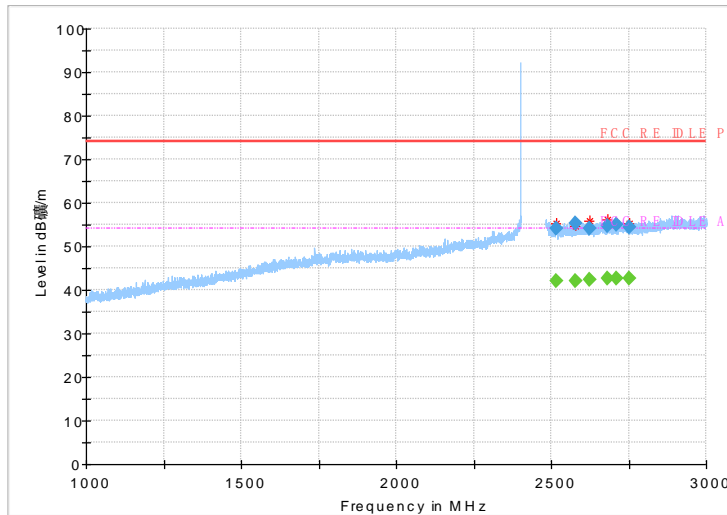


Fig.2 Radiated emission: Ch0, 1GHz~3GHz

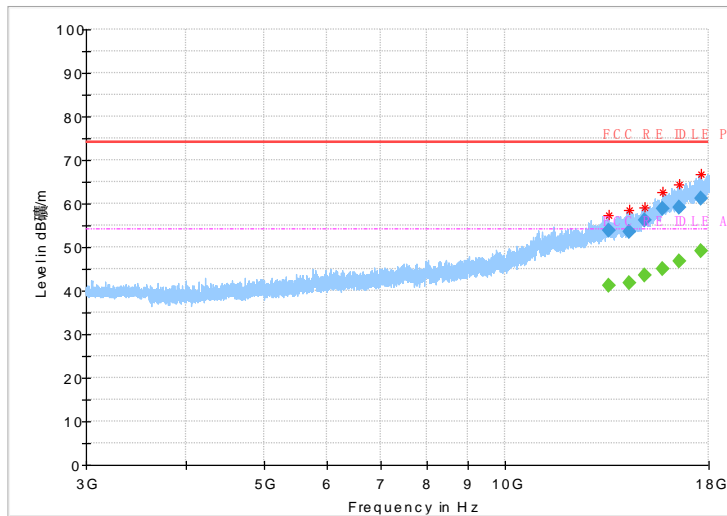
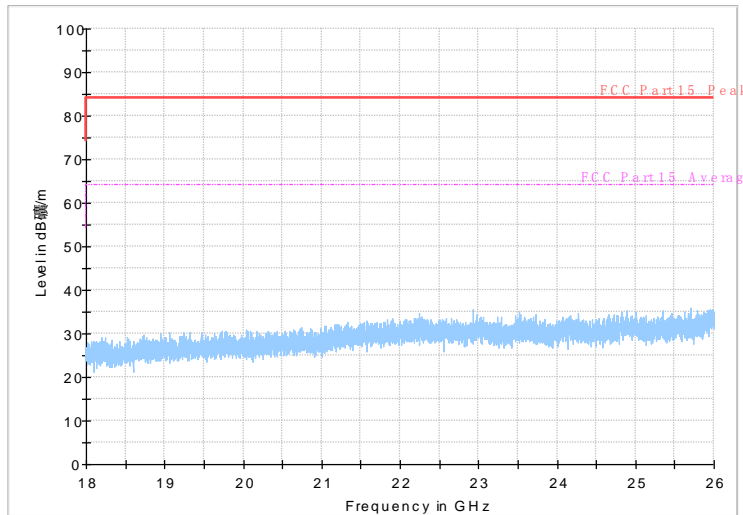


Fig.3 Radiated emission: Ch0, 3GHz~18GHz



ALL Channel 18GHz~26GHz

6.2. 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.4	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

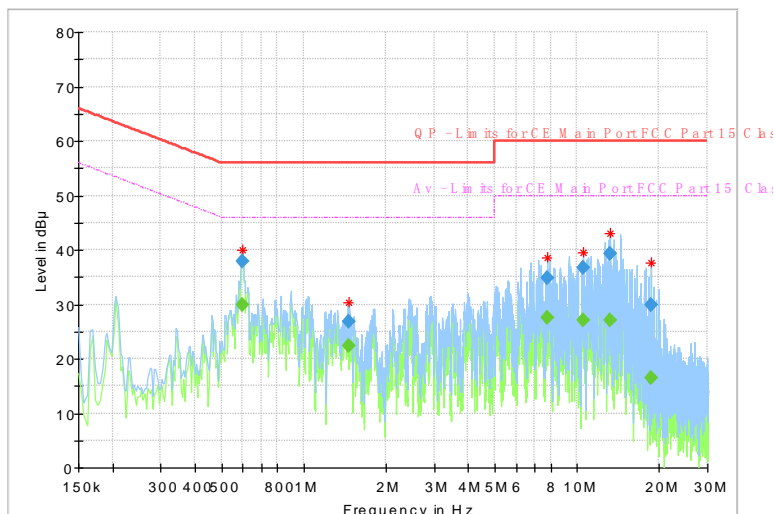


Fig.4 AC Power line Conducted Emission

Frequency (MHz)	QuasiPeak (dB µV)	Average (dB µV)	Limit (dB µ)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.597750	---	29.89	46.00	16.11	1000.0	9.000	L1	ON	9.6
0.597750	37.95	---	56.00	18.05	1000.0	9.000	L1	ON	9.6
1.467131	---	22.40	46.00	23.60	1000.0	9.000	L1	ON	9.7
1.467131	26.73	---	56.00	29.27	1000.0	9.000	L1	ON	9.7
7.810256	---	27.63	50.00	22.37	1000.0	9.000	L1	ON	9.8
7.810256	34.92	---	60.00	25.08	1000.0	9.000	L1	ON	9.8
10.485562	---	26.97	50.00	23.03	1000.0	9.000	L1	ON	9.8
10.485562	36.65	---	60.00	23.35	1000.0	9.000	L1	ON	9.8
13.265344	---	26.96	50.00	23.04	1000.0	9.000	N	ON	9.8
13.265344	39.21	---	60.00	20.79	1000.0	9.000	N	ON	9.8
18.657000	---	16.52	50.00	33.48	1000.0	9.000	N	ON	10.0
18.657000	29.77	---	60.00	30.23	1000.0	9.000	N	ON	10.0

7. Test Equipment and Ancillaries Used For Tests

The test equipment and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Vector Signal Analyzer	FSQ26	101096	Rohde&Schwarz	2017-05-11	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	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 °C, Max. = 35 °C
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 °C, Max. = 35 °C
Relative humidity	Min. =25 %, Max. = 75 %
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 °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 OF REPORT*****