

FCC PART 15C TEST REPORT No. I16N00359-BLE

for

OnePlus Technology(Shenzhen) Co., Ltd.

Mobile Phone

Model Name: ONEPLUS A3000

With

Hardware Version: 16

Software Version: Qxygen OS 3.1.0

FCC ID: 2ABZ2-A3000

Issued Date: May 19th, 2016

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 CTTL.

Test Laboratory:

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REPORT HISTORY

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1. Test Laboratory

1.1. Testing Location

Location: CTTL(South Branch)

Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China 518000

1.2. Testing Environment

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

1.3. Project data

Testing Start Date:	2016-04-06
Testing End Date:	2016-05-19

1.4. Signature

(Prepared this test report)

Tang Weisheng (Reviewed this test report)

Zhang Bojun (Approvedthis test report)



2. Client Information

2.1. Applicant Information

Company Name:	OnePlus Technology(Shenzhen) Co., Ltd.
Address:	18/F, Tower C, Tai Ran Building,No.8 Tai Ran Road, Shenzhen, China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0755 61898696 EXT 7023
Fax:	/

2.2. Manufacturer Information

Company Name:	OnePlus Technology(Shenzhen) Co., Ltd.
Address:	18/F, Tower C, Tai Ran Building,No.8 Tai Ran Road, Shenzhen, China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0755 61898696 EXT 7023
Fax:	/



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

3.1. About EUT

Description	Mobile Phone
Model Name	ONEPLUS A3000
Market Name	/
Frequency Band	2402MHz~2480MHz
Type of Modulation	GFSK
Number of Channels	40
FCC ID	2ABZ2-A3000
*Note: Photographs of EUT are s	hown in ANNEX A of this test report.

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	860046030164299	16	Qxygen OS 3.1.0	2016-04-06
*EUT ID: is used to identify the test sample in the lab internally.				

3.3. Internal Identification of AE

AE ID*	Description	Туре	SN
AE1	Power Supply Unit	HK0504	/
*AE ID: is used to identify the test sample in the lab internally.			



4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. 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:	Nov,2015
	15.205 Restricted bands of operation;	
	15.209 Radiated emission limits, general requirements;	
	15.247 Operation within the bands 902–928MHz,	
	2400–2483.5 MHz, and 5725–5850 MHz.	
ANSI C63.10	American National Standard for Testing Unlicensed	Jun,2013
	Wireless Devices	0011,2013



5. Test Results

5.1. Summary of Test Results

No	Test cases	Standard Sub-clause	Verdict
0	Antenna Requirement	15.203	Р
1	Maximum Peak Output Power	15.247 (b)	Р
2	Peak Power Spectral Density	15.247 (e)	Р
3	Occupied 6dB Bandwidth	15.247 (a)	Р
4	Band Edges Compliance	15.247 (d)	Р
5	Transmitter Spurious Emission -	15.247 (d)	Р
5	Conducted	15.247 (u)	Г
6	Transmitter Spurious Emission -	15.247, 15.205, 15.209	Р
0	Radiated	15.247, 15.205, 15.209	F
7	AC Powerline Conducted Emission	15.107, 15.207	Р

See ANNEX B and ANNEX C for details.

5.2. Statements

CTTL has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.1 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2

5.3. Terms used in the result table

Terms used in Verdict column

Р	Pass
NA	Not Available
F	Fail

Abbreviations

AC	Alternating Current			
AFH	Adaptive Frequency Hopping			
BW	Band Width			
E.I.R.P.	equivalent isotropical radiated power			
ISM	Industrial, Scientific and Medical			
R&TTE	Radio and Telecommunications Terminal Equipment			
RF	Radio Frequency			
Тх	Transmitter			



5.4. Laboratory Environment

Semi-anechoic chamber	did not exceed following limits along the EMC testing
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	<u> </u>		
Temperature	Min. = 15 °C, Max. = 30 °C		
Relative humidity	Min. = 35 %, Max. = 60 %		
Shielding effectiveness	0.014MHz - 1MHz, >60dB;		
	1MHz - 1000MHz, >90dB.		
Electrical insulation	> 2 MΩ		
Ground system resistance	$< 4\Omega$		
Normalised site attenuation (NSA)	< ±4dB, 3m/10m distance,from 30 to 1000 MHz		
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz		
Shielded room did not exceed follow	ving limits along the EMC testing:		
Temperature	Min. = 15 °C, Max. = 30 °C		
Relative humidity	Min. = 35 %, Max. = 60 %		
Shielding effectiveness	0.014MHz - 1MHz, >60dB;		
	1MHz - 1000MHz, >90dB.		
Electrical insulation	> 2 MΩ		
Ground system resistance	< 4 Ω		

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB;
	1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Voltage Standing Wave Ratio	≤6dB, from 1 to 18 GHz,3m distance
(VSWR)	



6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2017-03-21	1 year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018-05-13	3 years
2	Test Receiver	ESCI	100701	Rohde & Schwarz	2016-08-10	1 year
3	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017-01-20	3 years
4	Horn Antenna	3117	00066585	ETS-Lindgren	2019-03-05	3 years
5	Spectrum Analyser	FSP40	100378	Rohde & Schwarz	2016-12-18	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2019-05-10	3 years
7	Test Receiver	ESCI	100702	Rohde & Schwarz	2016-05-30	1 year
8	LISN	ESH2-Z5	100196	Rohde & Schwarz	2017-01-12	1 year

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren.



ANNEX A: MEASUREMENT RESULTS FOR RECEIVER

A.0 Antenna requirement

Measurement Limit:

Standard	Requirement					
	An intentional radiator shall be designed to ensure that no antenna other than that					
	furnished by the responsible party shall be used with the device. The use of a					
	permanently attached antenna or of an antenna that uses a unique coupling to the					
	intentional radiator shall be considered sufficient to comply with the provisions of					
	this section. The manufacturer may design the unit so that a broken antenna can					
	be replaced by the user, but the use of a standard antenna jack or electrical					
FCC CRF Part	connector is prohibited. This requirement does not apply to carrier current devices					
15.203	or to devices operated under the provisions of §15.211, §15.213, §15.217,					
	§15.219, or §15.221. Further, this requirement does not apply to intentional					
	radiators that must be professionally installed, such as perimeter protection					
	systems and some field disturbance sensors, or to other intentional radiators					
	which, in accordance with §15.31(d), must be measured at the installation site.					
	However, the installer shall be responsible for ensuring that the proper antenna is					
	employed so that the limits in this part are not exceeded.					

Conclusion: The Directional gains of antenna used for transmitting is -3.5 dBi. The RF transmitter uses an integrate antenna without connector.



A.1 Maximum Average Output Power

Measurement Limit:

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

Measurement Results:

Mode	Channel	Maximum Peak Ou	Conclusion	
	0	-1.24	Fig.1	Р
GFSK	19	0.67	Fig.2	Р
	39	-1.12	Fig.3	Р

See ANNEX C for test graphs.

Conclusion: Pass

A.2 Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(d)	< 8 dBm/3 kHz

Measurement Results:

Mode	Channel	Peak Power	Conclusion	
	0	Fig.4	-16.61	Р
GFSK	19	Fig.5	-14.64	Р
	39	Fig.6	-16.31	Р

See ANNEX C for test graphs.

Conclusion: PASS



A.3 Occupied 6dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

Measurement Result:

Mode	Channel	Test Results (kHz)		conclusion
	0	Fig.7	672.9	Р
GFSK	19	Fig.8	680.2	Р
	39	Fig.9	680.2	Р

See ANNEX C for test graphs.

Conclusion: PASS

A.4 Band Edges Compliance

Measurement Limit:

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

Measurement Result:

Mode	Channel	Test Results	Conclusion
OFOK	0	Fig.10	Р
GFSK	39	Fig.11	Р

See ANNEX C for test graphs.

Conclusion: Pass



A.5 Transmitter Spurious Emission

A.5.1 Transmitter Spurious Emission - Conducted

Measurement Limit:

Standard	Limit	
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz	
	bandwidth	

Measurement Results:

MODE	Channel	Frequency Range Test Results		Conclusion
		2.402 GHz	Fig.12	Р
	0	30 MHz-3 GHz	Fig.13	Р
		3GHz-18GHz	Fig.14	Р
		2.440 GHz	Fig.15	Р
CERK	19	30 MHz-3 GHz	Fig.16	Р
Gran	GFSK	3GHz-18GHz	Fig.17	Р
		2.480 GHz	Fig.18	Р
	39	30 MHz-3 GHz	Fig.19	Р
		3GHz-18GHz	Fig.20	Р
	All channels	18GHz-26GHz	Fig.21	Р

See ANNEX C for test graphs.

Conclusion: Pass



A.5.2 Transmitter Spurious Emission - Radiated 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(µV/m)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition

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	RBW/VBW	Sweep Time(s)
(MHz)		
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note:

According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic.

The measurement results include the horizontal polarization and vertical polarization measurements.



Measurement Results:

	0	1 GHz ~18 GHz	Fig.22	Р
		9 kHz ~30 MHz	Fig.23	Р
	19	30 MHz ~1 GHz	Fig.24	Р
GFSK	15	1 GHz ~18 GHz	Fig.25	Р
	39	1 GHz ~18 GHz	Fig.26	Р
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.27	Р
	Power(CH39)	2.45 GHz ~ 2.5 GHz	Fig.28	Р
/	All channels	18 GHz~ 26.5 GHz	Fig.29	Р

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
2385.520	56.8	-38.8	27.7	67.9	Н	74
17937.000	58.8	-17.7	45.6	30.9	Н	74
17883.750	57.8	-18.5	45.6	30.7	Н	74
17967.000	57.8	-17.7	45.6	29.9	V	74
17988.750	57.8	-17.7	45.6	29.9	V	74
17906.250	57.5	-18.5	45.6	30.4	Н	74

Frequency (MHz)	Average (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
2390.000	44.2	-38.8	27.7	55.3	Н	54
17913.750	46.9	-18.5	45.6	19.8	V	54
17937.000	46.9	-17.7	45.6	19.0	Н	54
17996.250	46.8	-17.7	45.6	18.9	V	54
17911.500	46.8	-18.5	45.6	19.7	Н	54
17983.500	46.7	-17.7	45.6	18.8	V	54



GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
17713.500	53.1	-18.9	45.6	26.4	Н	74
17824.500	52.8	-18.5	45.6	25.7	Н	74
17931.000	52.3	-17.7	45.6	24.4	V	74
17782.500	52.1	-18.5	45.6	25.0	Н	74
17725.500	52.1	-18.9	45.6	25.4	Н	74
17881.500	52.0	-18.5	45.6	24.9	V	74

Frequency (MHz)	Average (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
17866.500	45.7	-18.5	45.6	18.6	V	54
17869.500	45.6	-18.5	45.6	18.5	V	54
17860.500	45.3	-18.5	45.6	18.2	V	54
17787.000	45.1	-18.5	45.6	18.0	V	54
17698.500	45.0	-18.9	45.6	18.3	Н	54
17054 500	44.0	10 5	45.0	17.0		54
17854.500	44.9	-18.5	45.6	17.8	Н	

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
2485.560	56.3	-38.9	27.7	67.5	V	74
17978.250	58.0	-17.7	45.6	30.1	Н	74
17912.250	57.7	-18.5	45.6	30.6	V	74
17856.000	57.5	-18.5	45.6	30.4	Н	74
17853.750	57.4	-18.5	45.6	30.3	Н	74
						74
17973.000	57.4	-17.7	45.6	29.5	V	



Frequency (MHz)	Average (dBµV/m)	Pathloss. (dB)	antenna factor	Receiver (dBm)	Polariz ation	Limit (dBµV/m)
2483.500	44.5	-38.9	27.7	55.7	V	54
17979.750	46.9	-17.7	45.6	19.0	Н	54
17976.750	46.7	-17.7	45.6	18.8	Н	54
17997.000	46.7	-17.7	45.6	18.8	Н	54
17993.250	46.7	-17.7	45.6	18.8	V	54
						54
17980.500	46.7	-17.7	45.6	18.8	Н	

See ANNEX C for test graphs.

Conclusion: Pass

Note:

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

 $\mathsf{P}_{\mathsf{Mea}}$ is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result= P_{Mea} + $A_{Rpl=}$ P_{Mea} +Cable Loss+Antenna Factor



A.6 AC Powerline Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

BLE (Quasi-peak Limit)-AE1

Frequency range	Quasi-peak	Result (dBµV)	Conclusion
(MHz)	Limit (dBµV)	Traffic	Conclusion
0.15 to 0.5	66 to 56		
0.5 to 5	56	Fig.30	Р
5 to 30	60		

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

BLE (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dBµV)	Result (dBµV) Traffic	Conclusion
0.15 to 0.5	56 to 46		
0.5 to 5	46	Fig.30	Р
5 to 30	50		
5 to 30	50		

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

BLE (Quasi-peak Limit)-AE1

Frequency range	Quasi-peak	Result (dBµV)	Conclusion
(MHz)	Limit (dBµV)	ldle	Conclusion
0.15 to 0.5	66 to 56		
0.5 to 5	56	Fig.31	Р
5 to 30	60		

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

BLE (Average Limit)-AE1

Frequency range	Average-peak	Result (dBµV)	Conclusion		
(MHz)	Limit (dBµV)	ldle	Conclusion		
0.15 to 0.5	56 to 46				
0.5 to 5	46	Fig.31	Р		
5 to 30	50				
NOTE: The limit de	NOTE: The limit decreases linearly with the logarithm of the frequency in the range				

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

Test Condition:

Voltage (V)	Frequency (Hz)
240	60



Measurement Result and limit:

BLE (Quasi-peak Limit)-AE1

Frequency range	Quasi-peak	Result (dBµV)	Conclusion
(MHz)	Limit (dBµV)	Traffic	
0.15 to 0.5	66 to 56		
0.5 to 5	56	Fig.32	Р
5 to 30	60		

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

BLE (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBµV) Traffic	Conclusion
0.15 to 0.5	56 to 46		
0.5 to 5	46	Fig.32	Р
5 to 30	50		

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

BLE (Quasi-peak Limit)-AE1

Frequency range	Quasi-peak	Result (dBµV)	Conclusion	
(MHz)	Limit (dBµV)	ldle	Conclusion	
0.15 to 0.5	66 to 56		Р	
0.5 to 5	56	Fig.33		
5 to 30	60			

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

BLE (Average Limit)-AE1

Frequency range	Average-peak	Result (dBµV)	Conclusion
(MHz)	Limit (dBµV)	ldle	Conclusion
0.15 to 0.5	56 to 46		
0.5 to 5	46	Fig.33	Р
5 to 30	50		
NOTE: The limit de	creases linearly	with the logarithm of the frequ	ency in the range

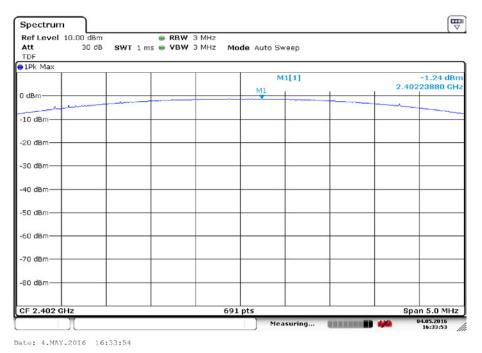
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note: The measurement results include the L1 and N measurements. **See ANNEX C for test graphs.**

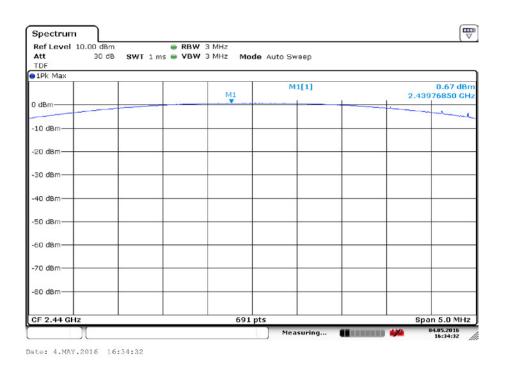
Conclusion: Pass



ANNEX B: TEST FIGURE LIST









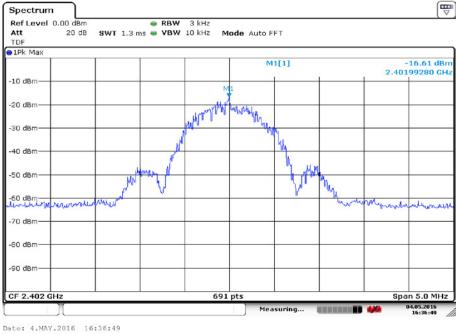
No. I16N00359-BLE Page 23 of 41



Att 30 dB SWT 1 ms TDF	RBW 3 MHz VBW 3 MHz Mode Auto Sweep	
1Pk Max	M1[1]	-1.12 dBn 2.48028220 GH
0 dBm		
-10 dBm		
-20 dBm		
-30 dBm		
-40 dBm		
50 dBm		
-60 dBm		
-70 dBm		
-80 dBm		
CF 2.48 GHz	691 pts	Span 5.0 MHz

Date: 4.MAY.2016 16:35:39

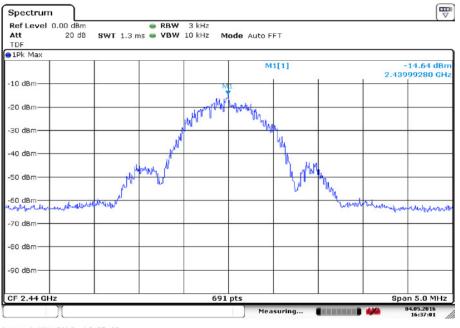




Power Spectral Density (Ch 0) Fig.4

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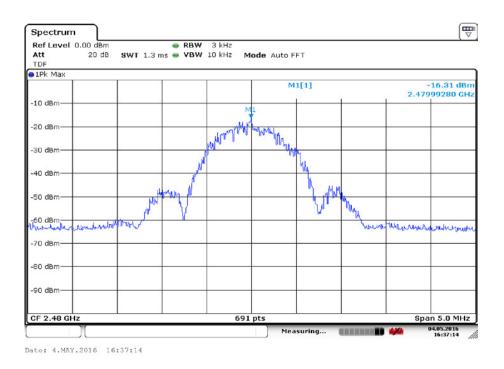


Fig.6 Power Spectral Density (Ch 39)

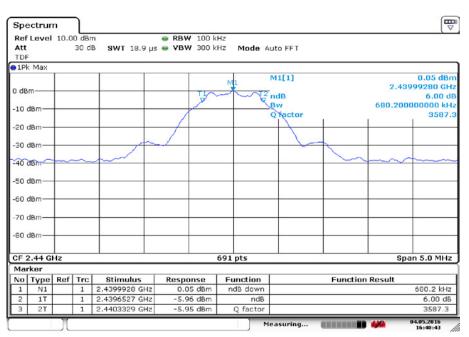
No. I16N00359-BLE Page 25 of 41



Ref	Level	10.0	0 dBn	n	RBW	100 kl	Hz				
Att			30 di	B SWT 18.9 µ	s 👄 VBW	300 ki	Hz Mode A	uto FFT			
TDF				1000							
) 1Pk	Max										
				1 1				M1[1]			-2.17 dBn
0 dB	m	<u> </u>		2 2		-	MI	10		2.40	200000 GH
				1 1		13		ndB Bw		672.000	6.00 dl 000000 kH
-10 0	iBm—	<u> </u>		-		-		Ofactor		672.900	3569.4
	-				1			address.	1	T	1
-20 0	1Bm—										
-30 (iBro										
-30 (
40 0	IBm-	~									
				1 1							
-50 0	iBm—	-		+				_			
-60 0	Bm—	-									
70	iBm—										
-70 0	iBm—										
-80 0	IBm-							100			
000				1 1							
CE 2	.402						691 pts			Sn	an 5.0 MHz
Mar	_	3112					051 pts			00	
	Type	Ref	Tro	Stimulus	Respon	se	Function		Function	n Result	
1	N1	1.61	1	2.402 GHz	-2.17		ndB down	17. 17	. and to	. ressare	672.9 kHz
2	11		1	2.4016599 GHz			ndB				6.00 dB
3	2T		1	2.4023329 GHz			Q factor				3569.4
	_	11						easuring		4.94	04.05.2016

Date: 4.MAY.2016 16:40:32





Date: 4.MAY.2016 16:40:44

Fig.8 Occupied 6dB Bandwidth (Ch 19)

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	ctrur Level				■ RBW 10	o La	-				
Att	Level	10.0	30 di					the FFT			
TDF			30 U	9 3MI 1919 ha	- • • B • 30	UK	12 Mode A				
	Max										
								M1[1]		1000	-1.68 dBn
0 dB	m	<u> </u>					M1			2.48	000000 GH:
					T1 9	~		ndB Bw		690.20	6.00 dl 0000000 kH
-10 0	dBm—	-				_		Q factor		080.20	3646.3
-20 0	10 m								1		
-20 0	10111-										
-30 0	dBm—	<u> </u>									
									~		
40 0	1Bm-	<u> </u>	~~~								
-50 0	dD en										
-50 (
-60 0	dBm—	<u> </u>					_			_	
-70 (iBm—	-		-					-	_	-
00.	iD en										
-80 (JBIII-										
05.7	2.48 G	<u> </u>					591 pts		_		an 5.0 MHz
Mar	_	12				<u> </u>	191 pt3				1011 0.0 MHz
	Type	Ref	Tre	Stimulus	Response	T	Function		Functio	on Result	
1	N1		1	2.48 GHz	-1.68 dB		ndB down		. andere		680.2 kHz
2	1T		1	2.4796454 GHz	-7.64 dB	m	ndB				6.00 dB
3	2T		1	2.4803256 GHz	-7.67 dB	m	Q factor				3646.1
_		11						easuring			04.05.2016

Date: 4.MAY.2016 16:41:07



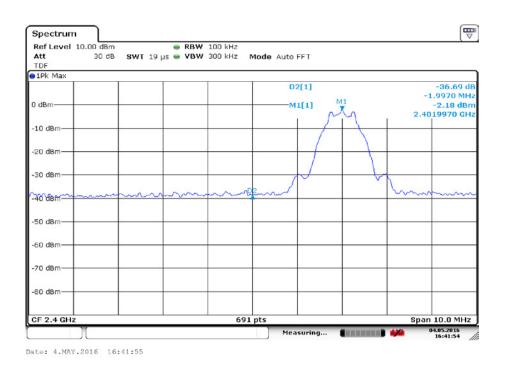
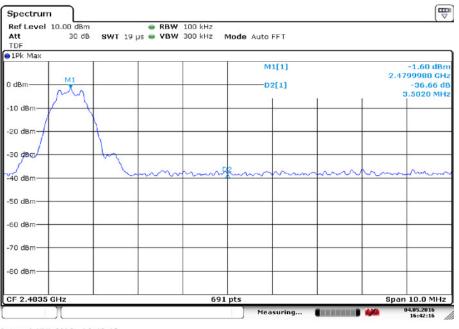


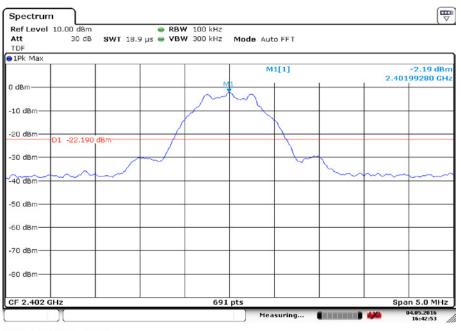
Fig.10 Band Edges (Ch 0)





Date: 4.MAY.2016 16:42:15





Date: 4.MAY.2016 16:42:54

Fig.12 Conducted Spurious Emission (Ch0, Center Frequency)

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Ref Level 1				₩ 100 kHz					
Att TDF	30 dB	SW1 29	.7 ms 👄 VB	W JUU KHZ	Mode Aut	to Sweep			
1Pk Max									
1					M	1[1]			-2.41 dBn 2.40200 GH
0 dBm			-			-	M	μ	2.40200 GH
								ĺ.	
-10 dBm									
-20 dBm	01 -22.190	dBm							
	-22.190								
-30 dBm									
	1.1.1	ور والدار من ال			and rates	Margaret	wellweinghen	valence	un and a start and a start
rfQ.dBarajon	and the design of the second	and and and	Color and Color	A CONTRACTOR OF A					
-50 dBm									
Jo dbiii									
-60 dBm									
-70 dBm		-							
-80 dBm									
Start 30.0 M	4Hz			691	pts				Stop 3.0 GHz
	T					suring		444	04.05.2016 16:43:03



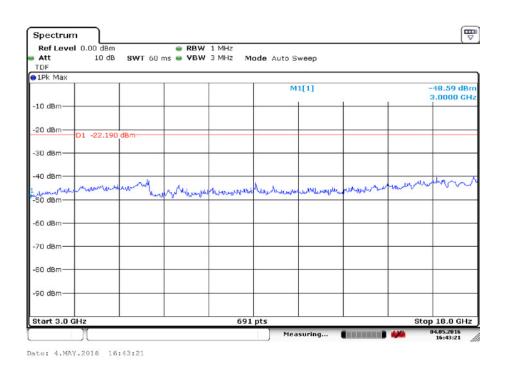
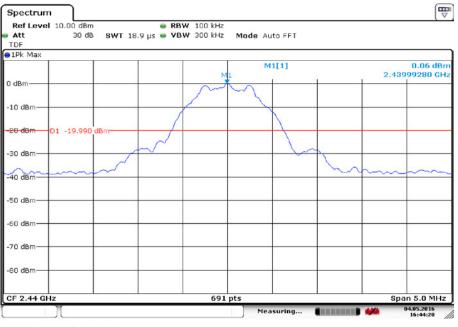


Fig.14 Conducted Spurious Emission (Ch0, 3 GHz-18 GHz)

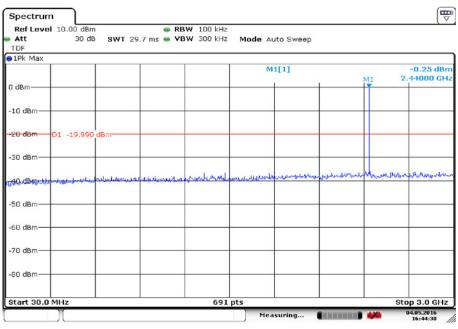
No. I16N00359-BLE Page 29 of 41











Date: 4.MAY.2016 16:44:30

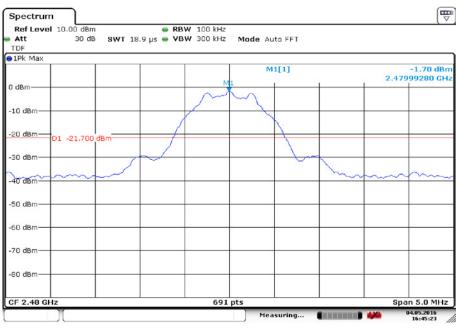
Fig.16 Conducted Spurious Emission (Ch19, 30 MHz-3 GHz)

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Ref Level 0.00 dBm	RBW	1 MHz				
	60 ms 👄 VBW	3 MHz Mode	Auto Sweep			
TDF						
1Pk Max						
				1 1		
10 dBm						
1				1 1		
0 dBm D1 -19.990 dBm						
30 dBm						
				1 1		
40 dBm						
	•		and the manufacture	1 mar energy	annon	ontophane
phillipping presente in the all	and a martial	mal market the	An Marian An	mel- man	12	
60 dBm						
				1 1		
70 dBm						
				1 1		
80 dBm				4		
				1 1		
90 dBm						
				1 1		
tart 3.0 GHz		691 pt:	1			18.0 GHz
Л			Measuring		4 /4 0	4.05.2016 16:44:49





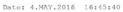
Date: 4.MAY.2016 16:45:23

Fig.18 Conducted Spurious Emission (Ch39, Center Frequency)

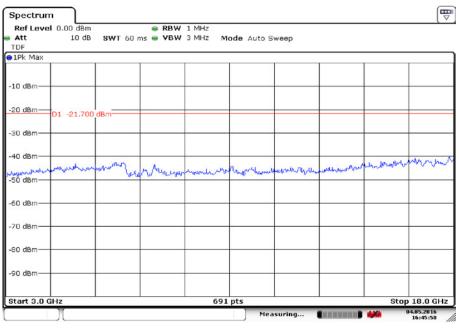
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Ref Level 10.00 dBm	RBW 100 kHz	
	WBW 300 kHz Mode Auto Sweep	
TDF	ä.	
1Pk Max		
	M1[1]	-1.96 dBm 2.48000 GH
0 dBm		M1 2.48000 GH2
-10 dBm		
-20 dBmD1 -21.700 dBm		
D1 -21.700 dBm		
-30 dBm		
40. derauger with also and in the and a second and a second and a second a	dependent of the second of the	and a second and a second s
-50 dBm		
-60 dBm		
-70 dBm		
-80 dBm		







Date: 4.MAY.2016 16:45:58





Spectrum Ref Level 0.00 dBm	BBW 1 MHz			
	2 ms - VBW 3 MHz	Mode Auto Sweep		
TDF				
1Pk Max				
-10 dBm				
10 ubin				
20 dBm				
D1 -21.700 dBm				
30 dBm				
So dBill				
40 dBtown have been and the				
Hand and march and my themas	why we we readoughter a	where and post of a start of the	Whindowellow marker	mounderally
50 dBm				
So dom				
-60 dBm				
-70 dBm				
-80 dBm				
-1. To 1. To 2. 1. 1. 1.				
-90 dBm				
Start 18.0 GHz		01 ====		Stop 26.0 GHz
start 18.0 GHz	6	91 pts		04.05.2016
Л		Measuring		16:46:13



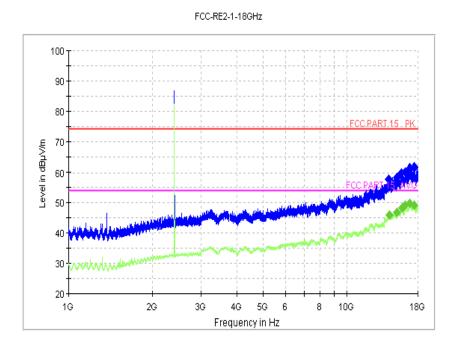
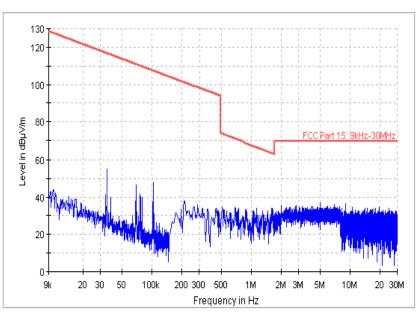


Fig. 22 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz)









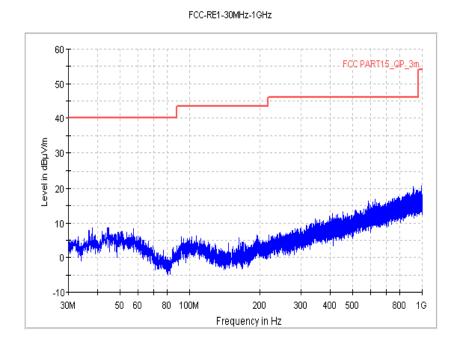
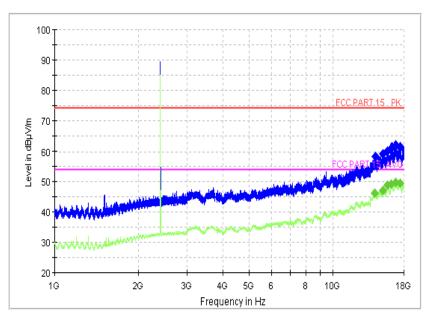


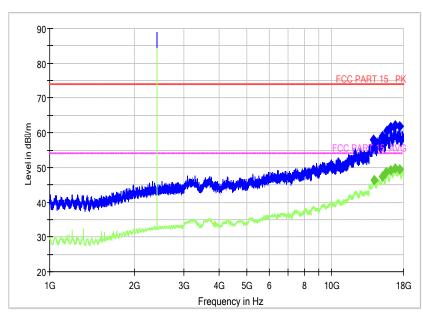
Fig.24 Radiated Spurious Emission (Ch19, 30 MHz-1 GHz)



FCC-RE2-1-18GHz





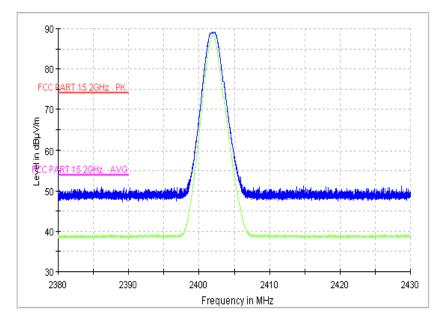


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FCC-RE2-1-18GHz
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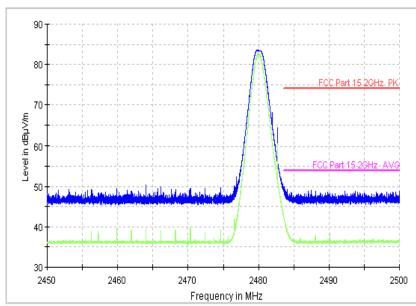
Fig.26 Radiated Spurious Emission (Ch39, 1 GHz-18 GHz)

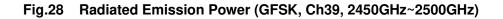


FCC-RE2-Power-2.38GHz-2.43GHz









FCC-RE2-Power-2.45GHz-2.50GHz



FCC-RE4-18-26.5GHz

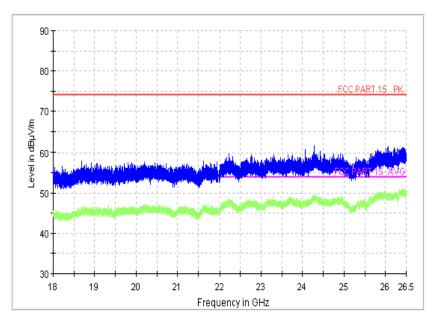
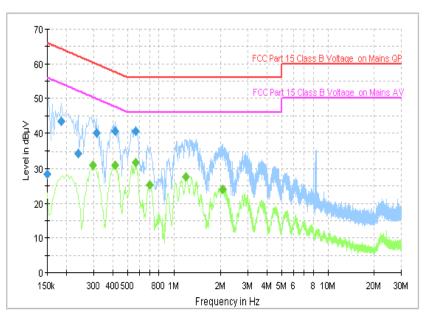
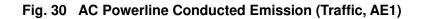


Fig.29 Radiated emission: 18 GHz – 26.5 GHz



ESH2-Z5 Scan-FCC





MEASUREMENT RESULT: " QuasiPeak "

Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBµV)			(dB)	(dB)	(dBµV)
0.150000	28.3	GND	N	10.1	37.7	66.0
0.186000	43.3	GND	Ν	10.1	20.9	64.2
0.238000	34.5	GND	Ν	10.0	27.7	62.2
0.314000	40.0	GND	Ν	10.1	19.9	59.9
0.414000	40.5	GND	L1	10.0	17.1	57.6
0.566000	40.6	GND	L1	10.1	15.4	56.0

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.298000	30.9	GND	L1	10.0	19.4	50.3
0.414000	30.9	GND	L1	10.0	16.7	47.6
0.566000	31.8	GND	L1	10.1	14.2	46.0
0.698000	25.4	GND	L1	10.0	20.6	46.0
1.206000	27.7	GND	L1	10.1	18.3	46.0
2.066000	24.1	GND	L1	10.1	21.9	46.0

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ESH2-Z5 Scan-FCC

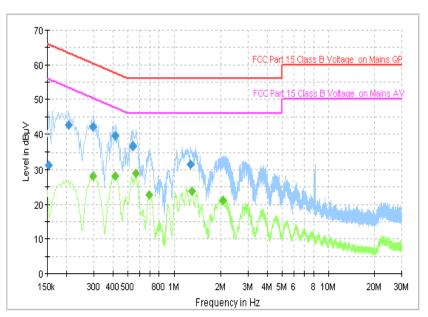


Fig. 31	AC Power line	Conducted	Emission	(Idle, AE1)
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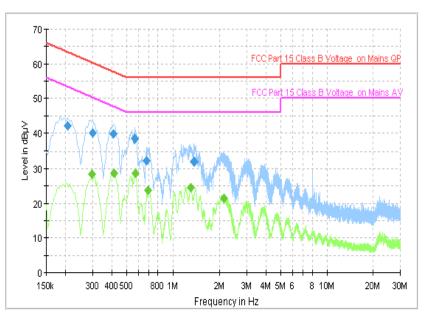
MEASUREMENT RESULT: " QuasiPeak "

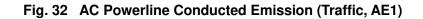
Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.154000	31.2	GND	L1	10.0	34.5	65.8
0.206000	42.5	GND	L1	10.0	20.9	63.4
0.298000	42.1	GND	Ν	10.1	18.2	60.3
0.414000	39.6	GND	Ν	10.1	18.0	57.6
0.542000	36.8	GND	Ν	10.1	19.2	56.0
1.286000	31.6	GND	L1	10.1	24.4	56.0

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.298000	28.0	GND	L1	10.0	22.3	50.3
0.414000	28.2	GND	L1	10.0	19.3	47.6
0.566000	29.0	GND	L1	10.1	17.0	46.0
0.690000	22.8	GND	L1	10.0	23.2	46.0
1.306000	23.9	GND	L1	10.1	22.1	46.0
2.054000	21.1	GND	L1	10.1	24.9	46.0



ESH2-Z5 Scan-FCC





MEASUREMENT RESULT: " QuasiPeak "

Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBµV)			(dB)	(dB)	(dBµV)
0.206000	42.0	GND	L1	10.0	21.3	63.4
0.302000	40.2	GND	Ν	10.1	20.0	60.2
0.410000	39.7	GND	Ν	10.1	17.9	57.6
0.566000	38.6	GND	L1	10.1	17.4	56.0
0.678000	32.2	GND	L1	10.0	23.8	56.0
1.378000	32.1	GND	L1	10.1	23.9	56.0

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.298000	28.4	GND	L1	10.0	21.9	50.3
0.414000	28.6	GND	L1	10.0	19.0	47.6
0.574000	28.7	GND	L1	10.1	17.3	46.0
0.690000	23.9	GND	L1	10.0	22.1	46.0
1.314000	24.5	GND	L1	10.1	21.5	46.0
2.142000	21.3	GND	L1	10.1	24.7	46.0

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ESH2-Z5 Scan-FCC

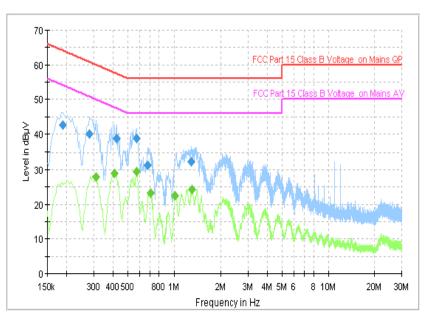


Fig. 33	AC Power line	Conducted	Emission	(Idle, AE1)
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MEASUREMENT RESULT: " QuasiPeak "

Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.190000	42.6	GND	Ν	10.1	21.4	64.0
0.282000	40.1	GND	Ν	10.1	20.6	60.8
0.426000	38.7	GND	Ν	10.1	18.6	57.3
0.570000	38.6	GND	L1	10.1	17.4	56.0
0.678000	31.2	GND	Ν	10.0	24.8	56.0
1.294000	32.2	GND	L1	10.1	23.8	56.0

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.310000	27.8	GND	L1	10.0	22.2	50.0
0.410000	28.9	GND	L1	10.0	18.7	47.6
0.570000	29.4	GND	L1	10.1	16.6	46.0
0.702000	23.3	GND	L1	10.0	22.7	46.0
1.022000	22.5	GND	L1	10.0	23.5	46.0
1.310000	24.4	GND	L1	10.1	21.6	46.0



ANNEX C: Persons involved in this testing

Test Name	Tester
Maximum Peak Output Power	Xu Ye, Tang Weisheng
Peak Power Spectral Density	Xu Ye, Tang Weisheng
Occupied 6dB Bandwidth	Xu Ye, Tang Weisheng
Band Edges Compliance	Xu Ye, Tang Weisheng
Transmitter Spurious Emission - Conducted	Xu Ye, Tang Weisheng
Transmitter Spurious Emission - Radiated	Xu Ye, Tang Weisheng
AC Powerline Conducted Emission	Xu Ye, Tang Weisheng

END OF REPORT