RADIO TEST REPORT

MIC Notice No.88 Appendix No.43

Product： AK28 Transmitter

Trade Mark： SIYI

Model Name： AK28

Family Model： N/A

Report No.： S20011304101003

Prepared for

SIYI Technology (Shenzhen) Co., Ltd

Room 608-610, Huaide-yinshan Mansion (besides national road 107), Fuwei Community, Fuyong Street, Baoan District, Shenzhen, China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... :	SIYI Technology (Shenzhen) Co., Ltd
Address ..... :	Room 608-610, Huaide-yinshan Mansion (besides national road 107), Fuwei Community, Fuyong Street, Baoan District, Shenzhen, China
Manufacturer's Name ..... :	SIYI Technology (Shenzhen) Co., Ltd.
Address ..... :	Room 608-610, Huaide-yinshan Mansion (beside national road 107), Fuwei Community, Fuyong Community, Baoan District, Shenzhen, China
Test specification:	
Standard ..... :	MIC Notice No.88 Appendix No.43
Test item description	
Product name ..... :	AK28 Transmitter
Model and/or type reference :	AK28
Rating(s) ..... :	DC 3.7V from battery or DC 5V from USB Port

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with MIC requirements. And it is applicable only to the tested sample identified in the report.

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Testing ..... :	
Date of receipt of test item ..... :	19 Sep. 2019
Date (s) of performance of tests ..... :	19 Sep. 2019~28 Oct. 2019
Date of Issue ..... :	19 Feb. 2020
Test Result ..... :	**Pass**

Note: All test data of this report are based on the original test report S19071000102003, dated by 2019-10-28.

Testing Engineer : Allen Liu
(Allen Liu)

Technical Manager : Jason Chen
(Jason Chen)

Authorized Signatory : Sam. Chen
(Sam Chen)

※ ※ Revision History ※ ※

REV.	REPORT NO.	Page Revised	ISSUED DATE	Contents
Original	S19071000102003	Rev.01	28 Oct. 2019	N/A
Update	S20011304101003	Rev.02	19 Feb. 2020	Update the Applicant, Trade Mark.

Table of Contents

Table of Contents

Table of Contents

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

MIC Notice No.88 Appendix No.43			
Standard Section	Test Item	Judgment	Remark
General provisions			
5	Frequency Error	PASS	
6	Occupied Bandwidth	PASS	
7	Spurious Emissions Intensity	PASS	
Transmitting equipment			
14	Antenna Power	PASS	
Transmitting antenna			
20	Type, Configuration, etc., of Transmitting Antenna	PASS	
22	Direction Pattern of Transmitting Antenna (Provided at Individual Antenna Report)	PASS	
Receiving antenna			
24	Limitation of Collateral Emission of Receiver	PASS	
26	Refer to All Articles for Transmitting Antenna	PASS	
Operating frequency 2400~2483.5MHz			
49.20(1);a	RF Shielding Method	PASS	
49.20(1);a	Communication Method	PASS	
49.20(1);b	Spread-spectrum Method	PASS	
49.20(1);c	Antenna Power	PASS	
49.20(1);d	Absolute Antenna Gain (Provided at Individual Antenna Report)	PASS	
49.20(1);e	Spread-Spectrum Bandwidth	PASS	
49.20(1);f	Spreading Factor	PASS	
49.20(1);g	Hopping Frequency Dwell Time (FH employed)	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd
Add. : 1/F, Building E, Fenda Science Park, Sanwei Community,Xixiang Street
Bao'an District, Shenzhen 518126 P.R. China
FCC Registration No.:463705; IC Registration No.:9270A-1
CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±3.2dB
2	Radiated Emission Test	±4.7dB
3	RF power,conducted	±0.16dB
4	Spurious emissions,conducted	±0.21dB
5	All emissions,radiated(<1G)	±4.68dB
6	All emissions,radiated(>1G)	±5.0dB
7	Radio Frequency	$\pm 1\times10^{-6}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	AK28 Transmitter
Model Name	AK28
Trade Mark	SIYI
Family Model	N/A
Model Difference	N/A
Product Description	The EUT is a AK28 Transmitter Operation Frequency: 2416~2476 MHz Modulation Type: FLRC Number Of Channel 40 CH Antenna Designation: Please see Note 3. Antenna Gain(Peak) 3 dBi
Channel List	Please refer to the Note 2.
Rating(s)	DC 3.7V from battery or DC 5V from USB Port
Adapter	N/A
Battery	DC 3.7V, 10800mAh
Hardware Version	V0.3.1
Software Version	V0.1.0
Firmware version	V0.1.0

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2416	21	2438
2	2417	22	2440
3	2418	23	2442
4	2419	24	2444
5	2420	25	2446
6	2421	26	2448
7	2422	27	2450
8	2423	28	2452
9	2424	29	2454
10	2425	30	2456
11	2426	31	2458
12	2427	32	2460
13	2428	33	2462
14	2429	34	2464
15	2430	35	2466
16	2431	36	2468
17	2432	37	2470
18	2433	38	2472
19	2434	39	2474
20	2436	40	2476

3.

Table for Filed Antenna

Antenna	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A(Main)	N/A	N/A	External antenna	N/A	3	2.4G Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	FLRC (CH01 CH25 CH40)

For Radiated Emission	
Final Test Mode	Description
Mode 1	FLRC (CH01 CH25 CH40)

2.3 TEST CONDITIONS

Voltage Fluctuation Test	Normal Voltage	High Voltage + 10% of Normal Voltage	Low Voltage - 10% of Normal Voltage
DC Power	DC 3.7V	DC 4.07V	DC 3.33V

NOTE:
Voltage Variation (%)
= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, + / - 10% of the external power change, will not affect the voltage of the RF, so only operated in normal voltage to test all regulations.

EUT test all voltages, but the report only record the worst data

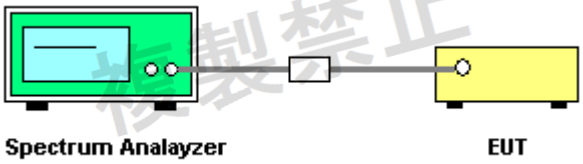
2.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	Test program: N/A		
Frequency	2416 MHz	2446 MHz	2476 MHz
Parameters	DEF	DEF	DEF

2.5 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Mode :



2.6 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	AK28 Transmitter	SIYI	AK28	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.7 EQUIPMENTS LIST FOR ALL TEST ITEMS

Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	SPECTRUM ANALYZER	AGLIENT	E4440A	MY41000130	2019.05.13	2020.05.12	1 year
2	SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2019.08.28	2020.08.27	1 year
3	TEST RECEIVER	R&S	ESPI7	101318	2019.05.13	2020.05.12	1 year
4	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200983705	2019.05.13	2020.05.12	1 year
5	HORN ANTENNA	EM	EM-AH-10180	2011071402	2019.04.15	2020.04.14	1 year
6	HORN ANT	SCHWARZBECK	BBHA 9170	9170-181	2019.05.13	2020.05.12	1 year
7	PRE-AMPLIFIER	EMC	EMC051835SE	980246	2019.08.06	2020.08.05	1 year
8	POWER METER	DARE	RPR3006W	15I00041SNO84	2019.08.06	2020.08.05	1 year
9	TEMPORARY ANTENNA CONNECTOR (NOTE)	NTS	R001	N/A	N/A	N/A	N/A

Note: All the equipments for Guangzhou Lisai Calibration.

3. FREQUENCY ERROR

3.1 LIMIT

Item	Limits
Frequency Error	±50ppm

3.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz/30KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3 TEST PROCEDURES

(1)In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.

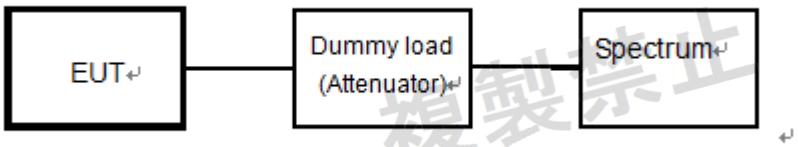
(2)In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

(3)In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.

(4)In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

3.4 TEST SETUP LAYOUT



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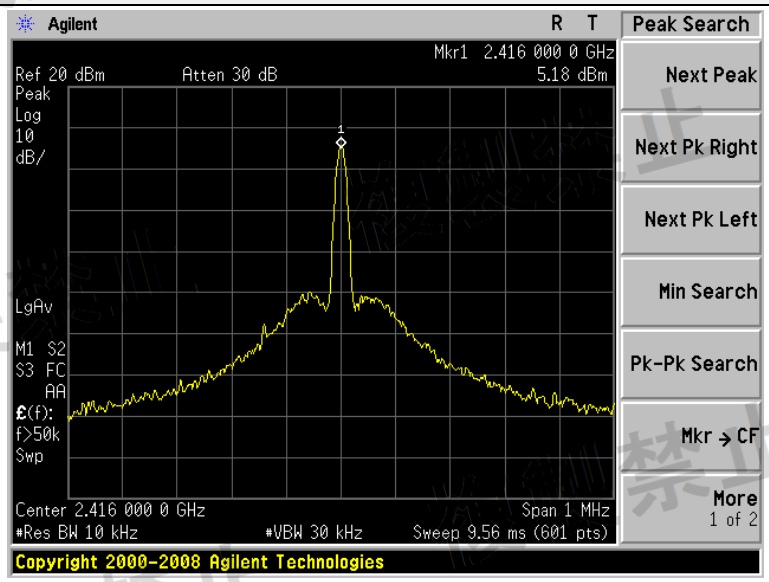
3.4.1 TEST RESULT

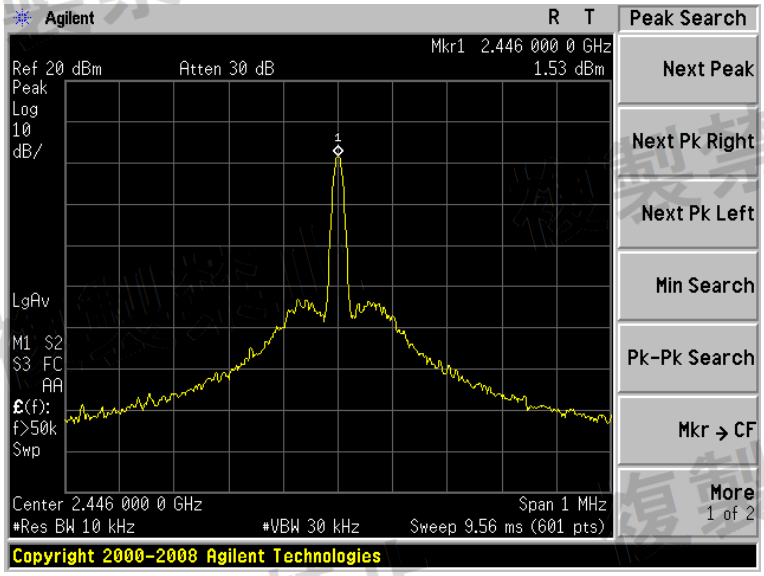
EUT：	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	TX CH 01/CH 25/CH 40		

Frequency	Reading	Tolerance	Limit	Remark
MHz	MHz	ppm	(ppm)	
2416	2416.00000	0.00	±50	Normal Voltage: DC 3.7V
2446	2446.00000	0.00	±50	
2476	2476.00000	0.00	±50	

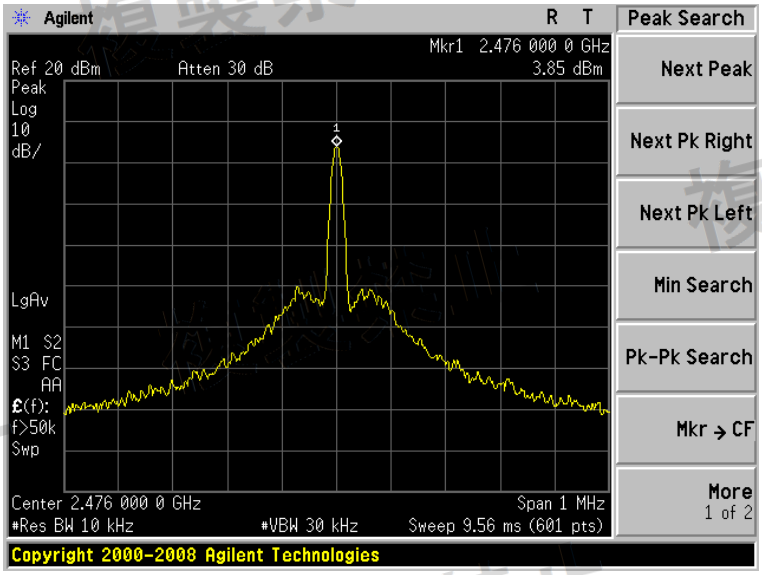
Test plot on channel 01



Test plot on channel 25



Test plot on channel 40



4. ANTENNA POWER

4.1 LIMIT

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional$_{Note1}$
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1$_{Note2}$	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH,FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

Note 1: The half-value angle of the beam directivity must be less than 360 ÷ A degrees. A shall be the rate at which the EIRP exceeds the upper limit of the omnidirectional EIRP.
Note 2: OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26 MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

4.2 TEST PROCEDURES

Attenuation of the attenuator shall be set to provide an optimum input level to the spectrum analyzer.

1, Set the spectrum analyzer as follows for searching the frequency that outputs the maximum antenna power:

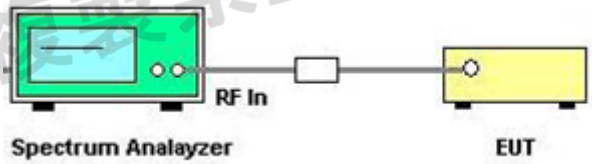
Center frequency:	Test frequency
Frequency sweep width:	Twice of the occupied bandwidth
Resolution bandwidth:	1MHz
Video bandwidth:	Approximately three times of the resolution bandwidth
Sweep time:	Minimum time to ensure the measuring accuracy (In the case of burst wave, one burst shall be included per data point.)
Trigger condition:	Free run
Data points:	400 points or more
Sweep mode:	Continuous sweep
Detection mode:	Positive peak
Display mode:	Maximum hold

2. Set the spectrum analyzer as follows for measuring antenna power.

Center frequency:	Frequency giving the peak mark value (searched frequency)
span:	0Hz
Resolution bandwidth:	1MHz
Video bandwidth:	Approximately the same as the resolution bandwidth
Sweep time:	60s
Detection mode:	RMS

3. Antenna Power Error is definition that actual measure antenna power tolerance between + 20% to - 80% power range that base on manufacturer declare the conducted power density.

4.3 TEST SETUP LAYOUT



4.4 EST DEVIATION

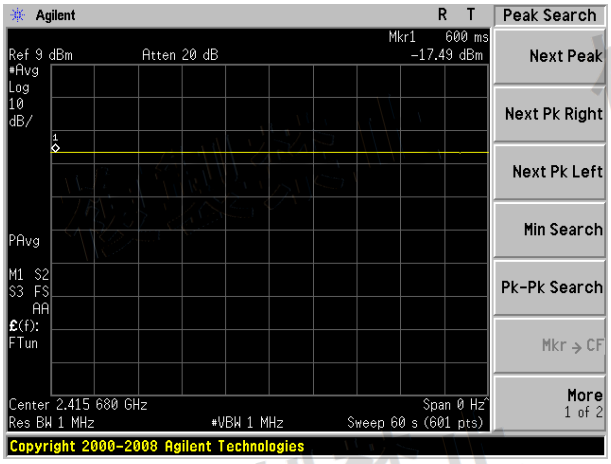
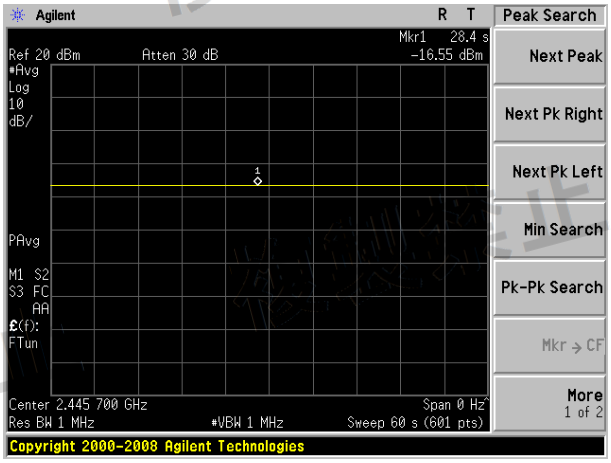
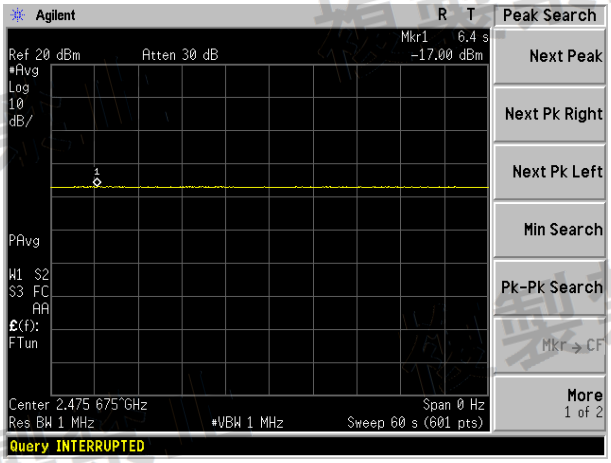
There is no deviation with the original standard.

4.5 TEST RESULT

EUT :	AK28 Transmitter	Model:	AK28
Temperature:	25°C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	FLRC TX CH 01/CH 25/CH 40		

Test Mode	Frequency	Conducted RF output power density		Rated power density (mW/MHz)	Antenna Power Error (%)
		(dBm/MHz)	(mW/MHz)		
FLRC	2416 MHz	-17.49	0.0178	0.03	-40.59%
	2446 MHz	-16.55	0.0221	0.03	-26.23%
	2476 MHz	-17.00	0.0200	0.03	-33.49%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)					

Test Plot

Mode (FLRC)	
CH 01	
	
CH 25	
	
CH 40	
	

5. OCCUPIED BANDWITH (99%)

5.1 LIMIT

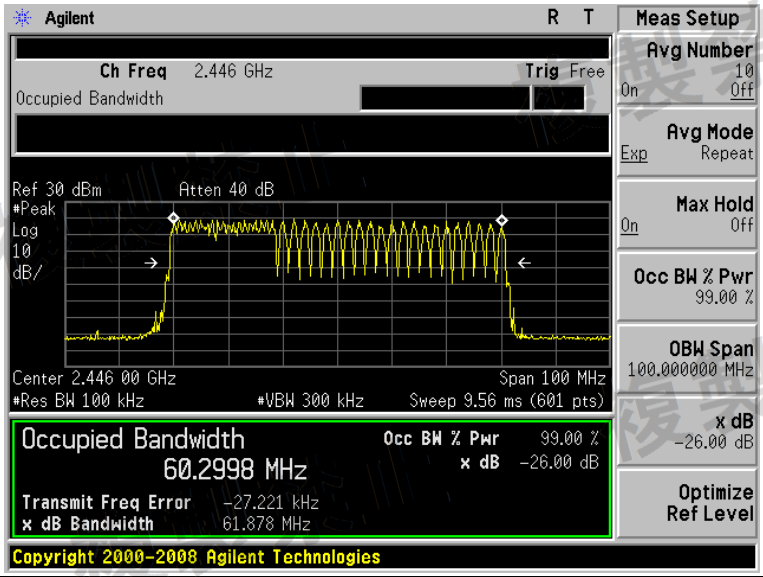
Item	Limits
Occupied Band Width:	FH≦83.5MHz; OFDM1,DS ≦26MHz; OFDM2(802.11n40)≦38MHz； Others≦ 26MHz
Spreading Bandwidth:	≧500 kHz (FH, DS)

5.2 TEST RESULT

Test Voltage:DC 3.7V

Mode	Hopping Mode(Occupied bandwidth) MHz
FLRC	60.2998

Test plot on GFSK Mode



6. UNWANTED EMISSION INTENSITY MEASUREMENT

6.1 LIMIT

Item	Limits
TX Spurious Emission	≦0.25 μW (30MHz≦f≦1000MHz)
	≦2.5 μW (1000MHz<f≦2387MHz)
	≦25 μW (2387MHz<f≦2400MHz)
	≦25 μW (2483.5MHz≦f<2496.5MHz)
	≦2.5 μW (2496.5MHz≦f<12500MHz)

6.2. MEASURING INSTRUMENTS AND SETTING

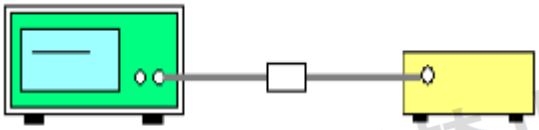
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3. TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
   Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
   Sweep Mode: Continuous sweep / Detect mode: Positive peak
   Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Meaured_ Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

6.4. TEST SETUP LAYOUT



6.5. TEST DEVIATION

There is no deviation with the original standard.

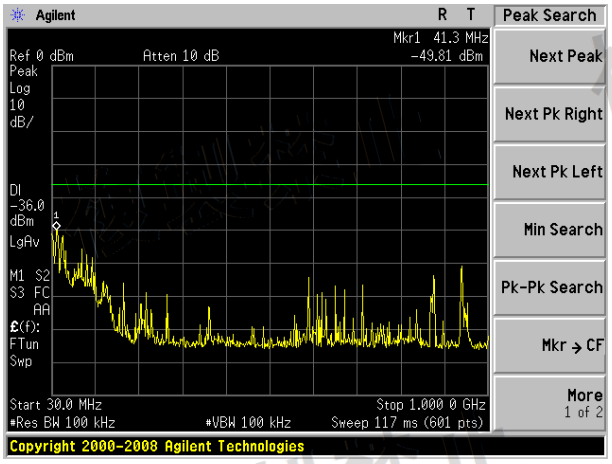
6.6. TEST RESULT

EUT :	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	TX for FLRC; Normal Voltage		

Test Plot

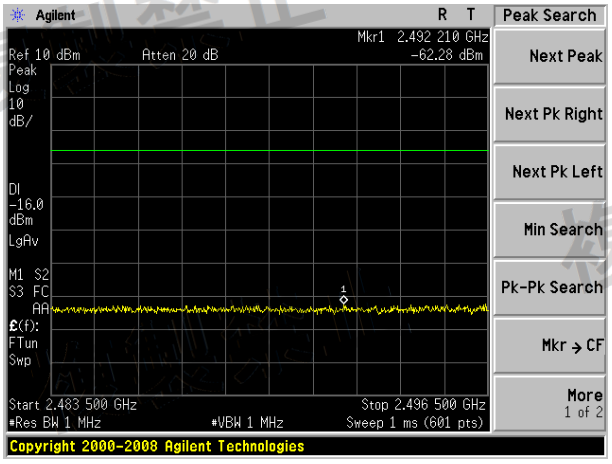
Mode (FLRC)

CH 01 (30 MHz ≦ f ≦ 1000 MHz)

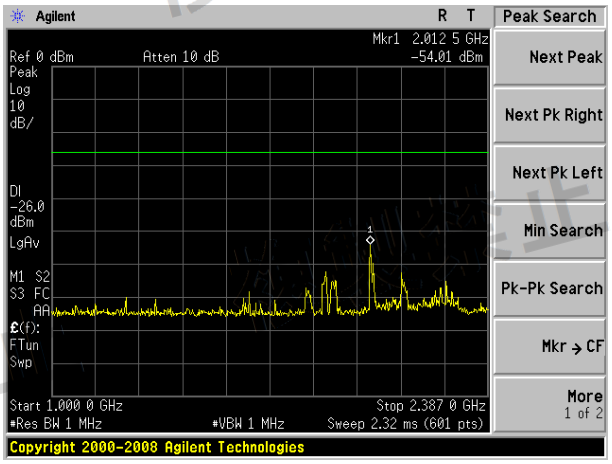


Mode (FLRC)

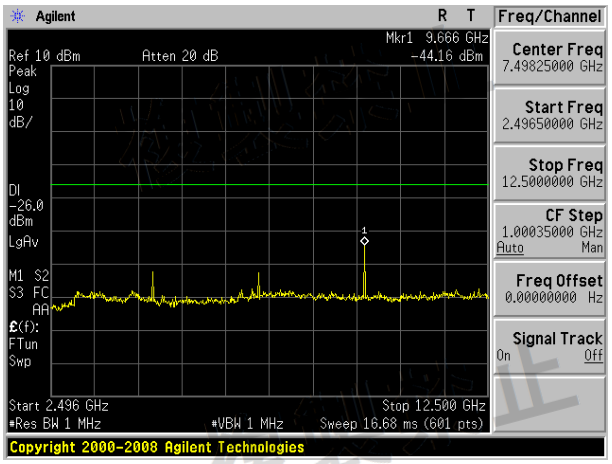
CH 01 (2483.5 MHz < f ≦ 2496.5 MHz)



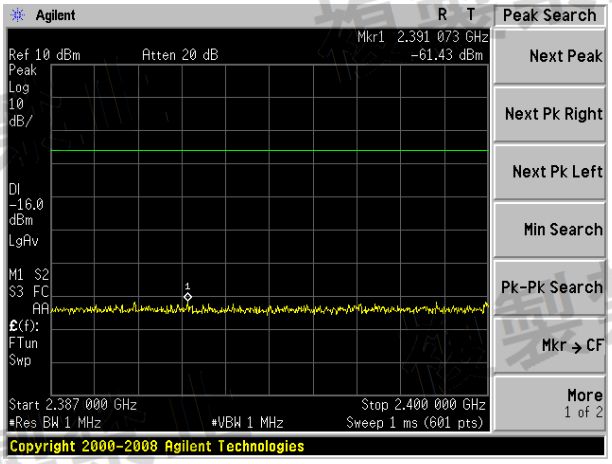
CH 01 (1000 MHz < f ≦ 2387 MHz)



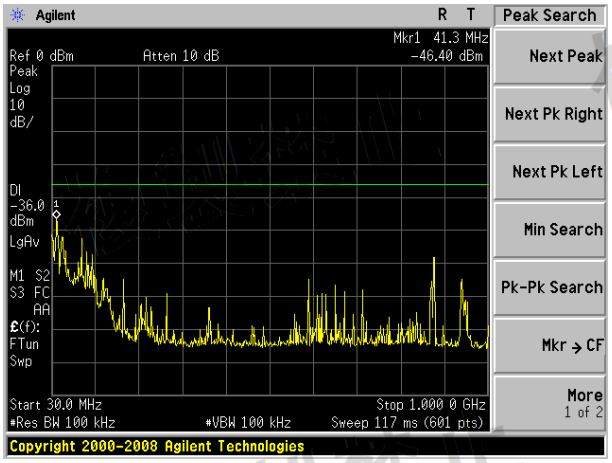
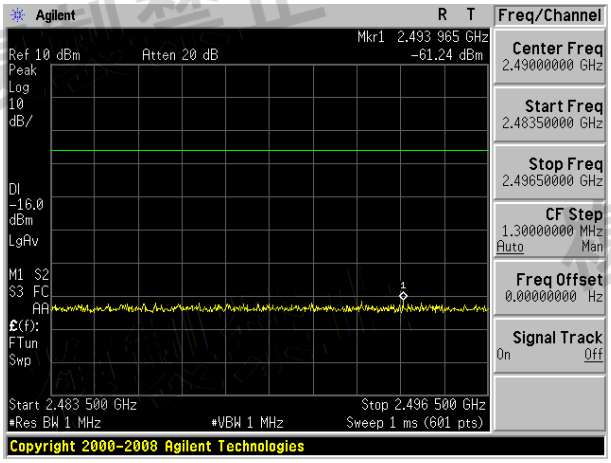
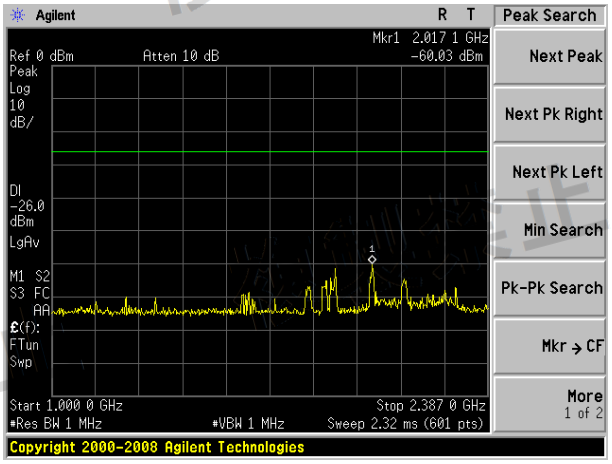
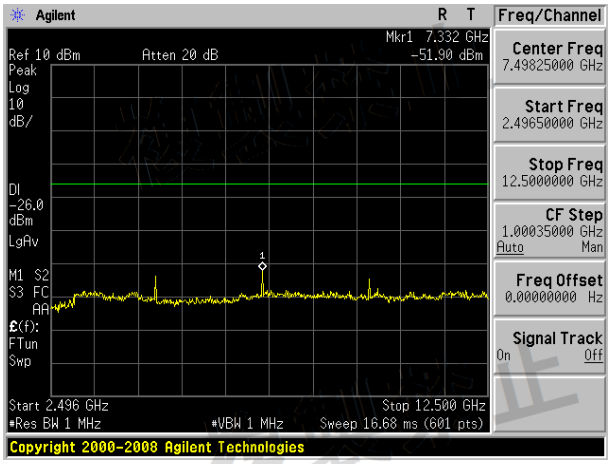
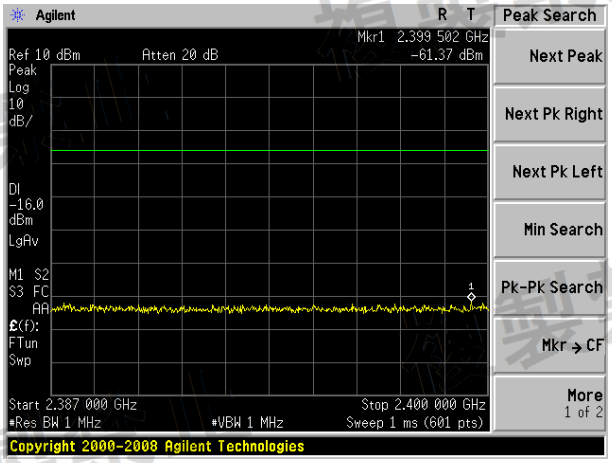
CH 01 (2496.5 MHz < f ≦ 12.5GHz)



CH 01 (2387 MHz < f ≦ 2400 MHz)



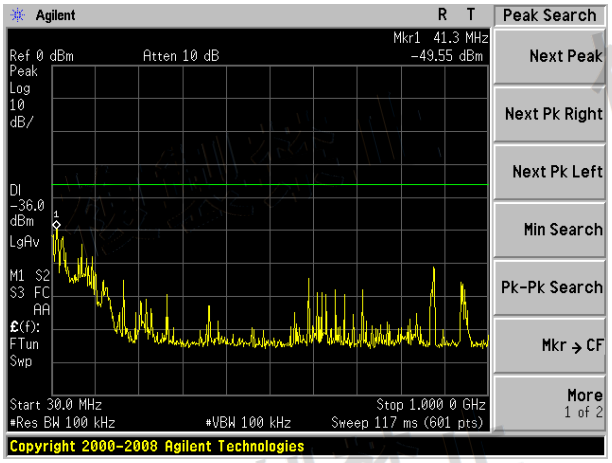
Test Plot

Mode (FLRC)	Mode (FLRC)
CH 25 (30 MHz ≦ f ≦ 1000 MHz)	CH 25 (2483.5 MHz < f ≦ 2496.5 MHz)
	
CH 25 (1000 MHz < f ≦ 2387 MHz)	CH 25 (2496.5 MHz < f ≦ 12.5GHz)
	
CH 25 (2387 MHz < f ≦ 2400 MHz)	
	

Test Plot

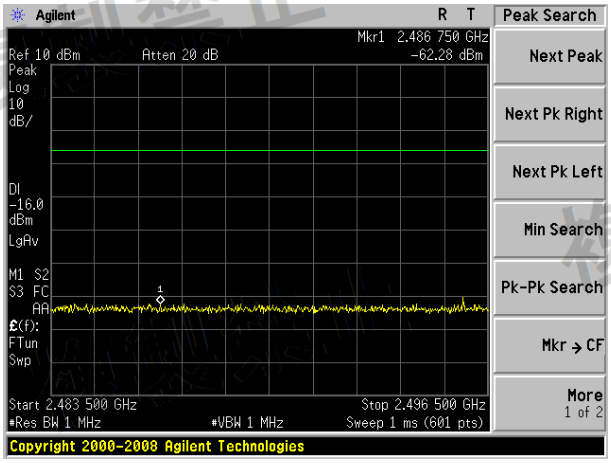
Mode (FLRC)

CH 40 (30 MHz ≦ f ≦ 1000 MHz)

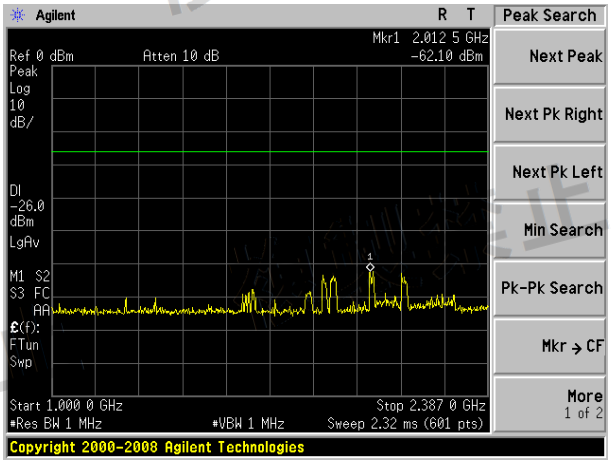


Mode (FLRC)

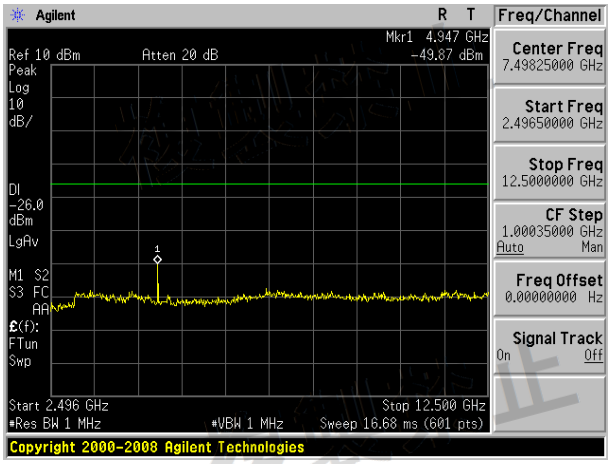
CH 40 (2483.5 MHz < f ≦ 2496.5 MHz)



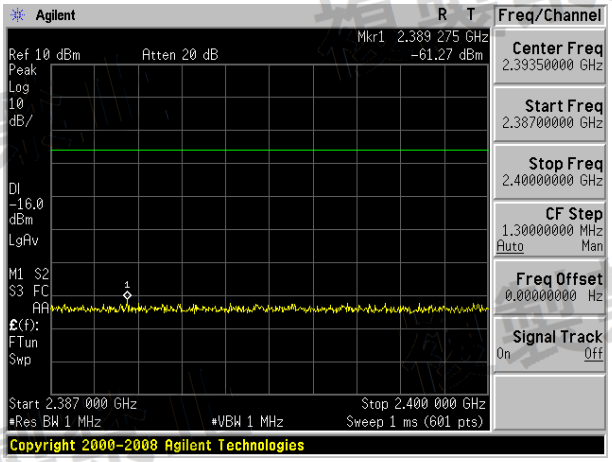
CH 40 (1000 MHz < f ≦ 2387 MHz)



CH 40 (2496.5 MHz < f ≦ 12.5GHz)



CH 40 (2387 MHz < f ≦ 2400 MHz)



7. DWELL TIME

7.1 LIMIT

Item	Limits
Hopping Freq. Dwell Time	≦ 0.4 sec (In 0.4 sec × spreading rate)

7.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep	Continuous

7.3 TEST PROCEDURES

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. Dwell time = [spreading rate/79] x duty-cycle x 0.4 seconds. (to be determined for each mode, DH1, DH3, DH5)

7.4 TEST SETUP LAYOUT

7.5 TEST RESULT

EUT :	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Test Mode:	FLRC		

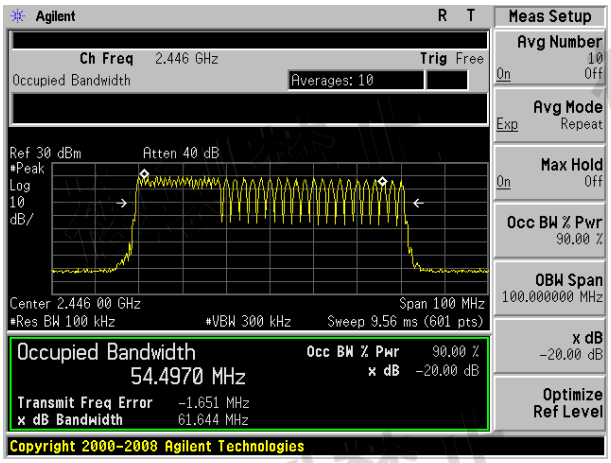
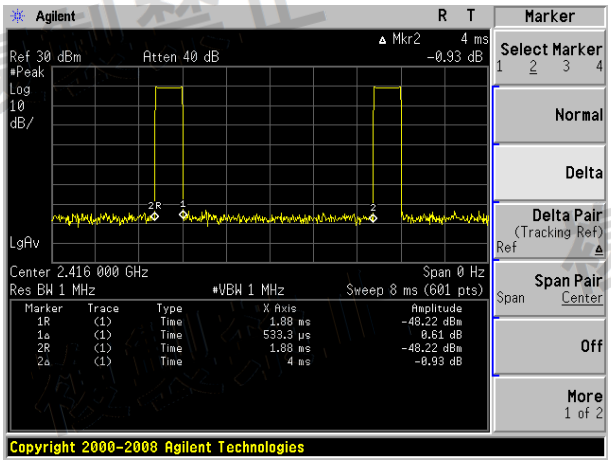
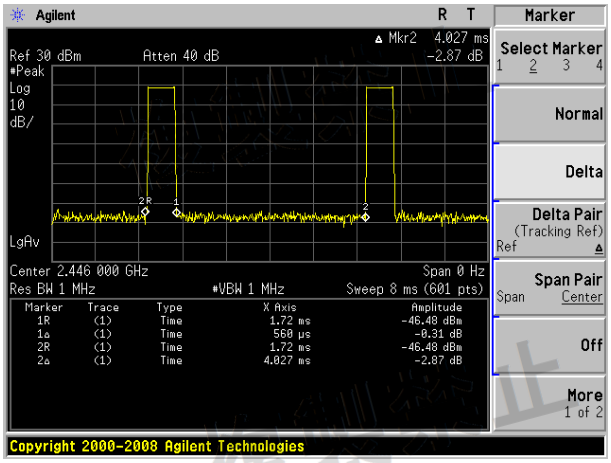
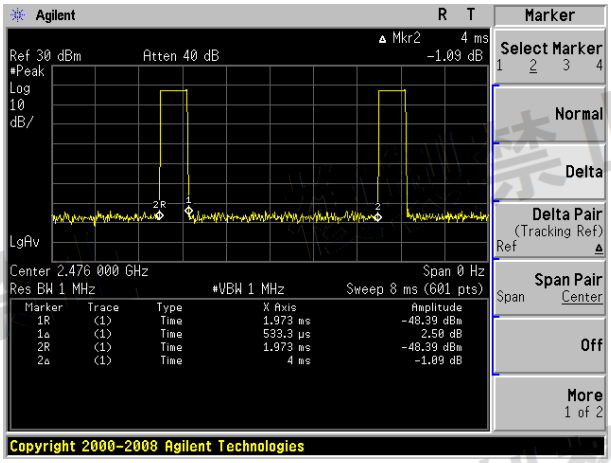
Test Mode	Spread BW	On time	Total time	Duty cycle	Dwell Time	Limits
	(MHz)	(ms)	(ms)	(%)	(s)	(s)
FLRC	54.497	0.533	1.880	0.284	0.078	0.400

Test Mode	Channel	Center Frequency(MHz)	Bandwidth(MHz)	Spreading factor
FLRC	40	2446	54.497	54.497

Spreading Factor =Spreading Bandwidth/ Frequency equal to Transmitting Data speed

Note: Duty-cycle = [on time/total time] x 100%
Dwell time = [spreading rate/79] x duty-cycle x 0.4 seconds

Test Plot

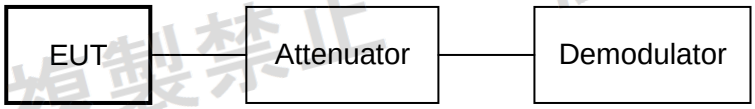
90% Spread BW	Dwell Time
CH 25	CH 01
	
	CH 25
	
	CH 40
	

8. CARRIER SENSE

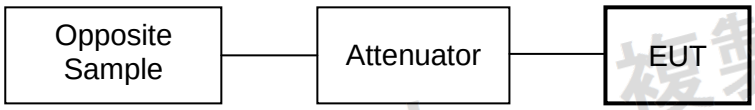
Not applicable, Since the EUT belong to Bluetooth

9. INTERFERENCE PREVENTION FUNCTION

10.1 IN CASE IDENTIFICATION CODE IS TRANSMITTED



10.2 IN CASE IDENTIFICATION CODE IS RECEIVED



10.3 MEASURING EQUIPMENT CONDITIONS

a. The Demodulator shall demodulate the TX-signal transmitted by the EUT and be able to display the contents of the identification code.
b. The opposite sample shall be able to transmit TX-signal equivalent to the TX-signal transmitted by the EUT.

10.4 CONDITIONS OF EUT

The EUT is set on the usual operating mode.

10.5 MEASUREMENT PROCEDURE

(1) In case the EUT possesses function to transmit identification code automatically
a Predetermined identification code is transmitted by the EUT.
b Verify the transmitted identification code.
(2) In case the EUT possesses function to receive identification code automatically
a Predetermined identification code is transmitted by the opposite sample.
b Verify the working of the normal communication.
c Other code than the predetermined identification code is transmitted by the opposite sample.
d Verify the EUT to stop transmitting or to display that the ID code is different.

Radio interface prevention function

	Normal voltage	Low voltage	High voltage
Result	OK	OK	OK

Mac address: 001158C5452SR
Result: OK

10. IMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

10.1 LIMIT

Item	Limits
RX Spurious Emission:	≦4nW (f<1GHz)
	≦20nW (1GHz≦f)

10.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

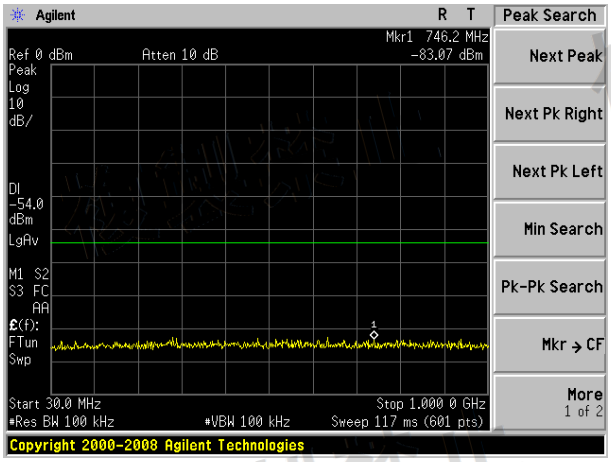
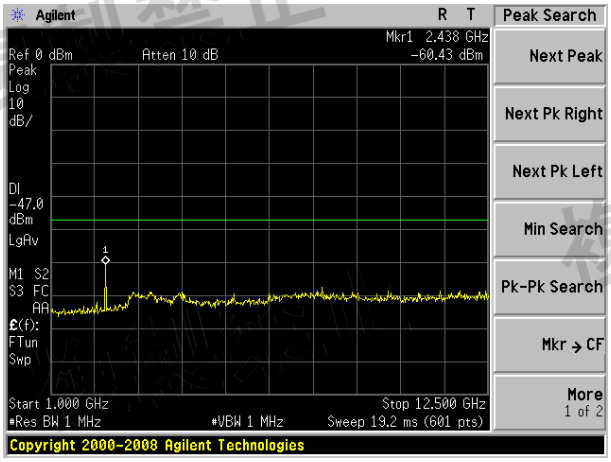
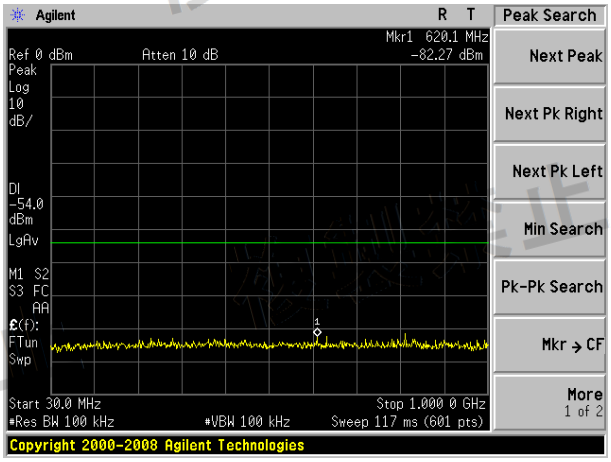
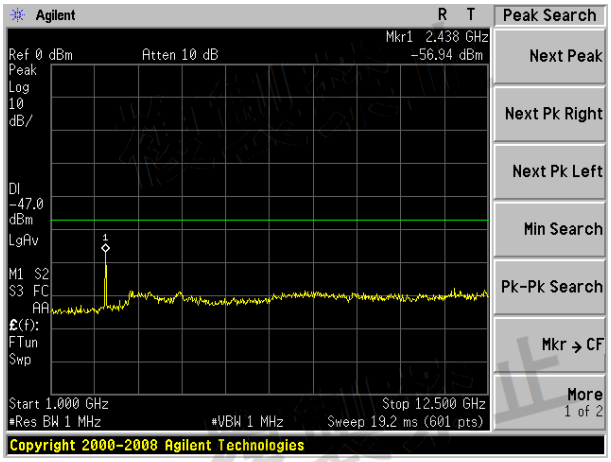
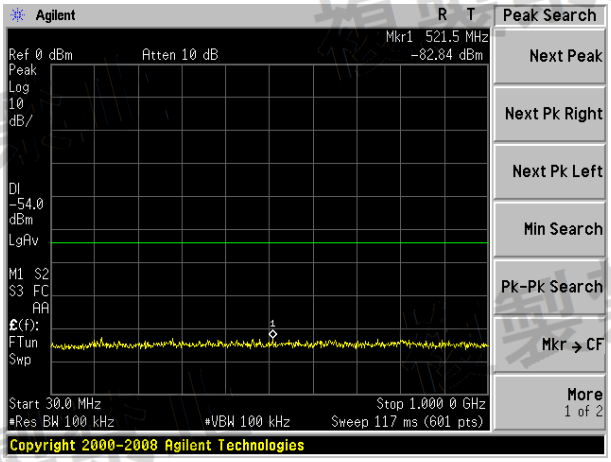
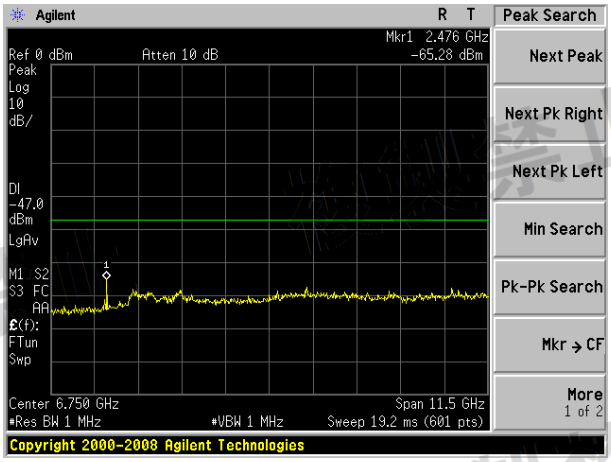
10.3 TEST PROCEDURES

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
   AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

10.4 TEST RESULT

EUT：	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	FLRC		

Test Plot

30 MHz ≦ f ≦ 1000 MHz	1000 MHz ≦ f < 12500 MHz
FLRC Mode-CH14	FLRC Mode-CH14
	
FLRC Mode-CH44	FLRC Mode-CH44
	
FLRC Mode-CH74	FLRC Mode-CH74
	

11. EIRP ANTENNA POWER MEASUREMENT

11.1 LIMIT

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional$_{Note1}$
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1$_{Note2}$	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH,FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

Note 1: The half-value angle of the beam directivity must be less than 360 ÷ A degrees. A shall be the rate at which the EIRP exceeds the upper limit of the omnidirectional EIRP.

Note 2: OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26 MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

Note 3: This test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

11.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

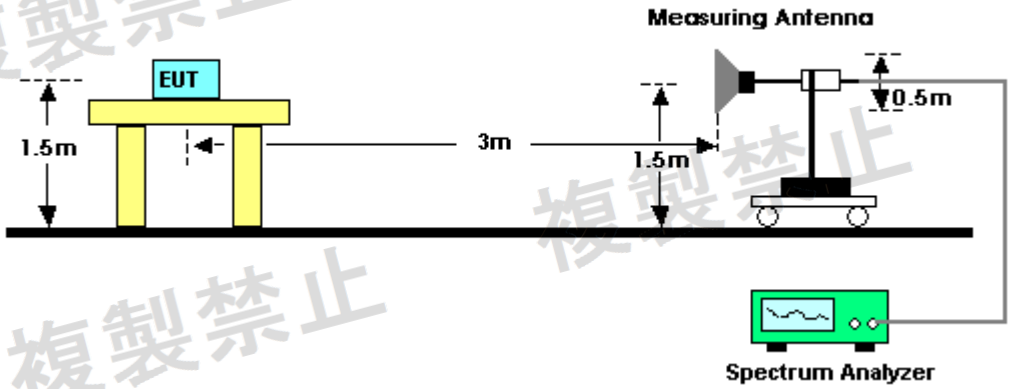
11.3 TEST PROCEDURES

1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.

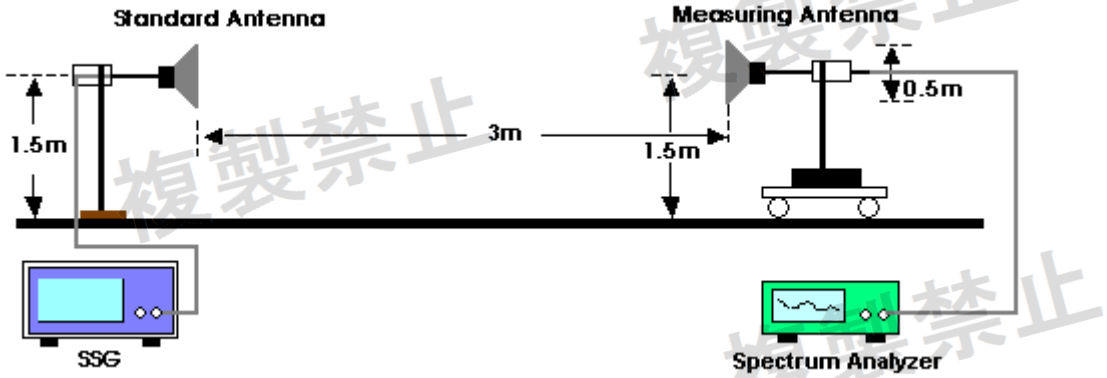
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.
   Gt: gain of replacing antenna (dBi)
   L: feeder loss between SSG and replacing antenna
   Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

11.4 TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



11.5 TEST DEVIATION

There is no deviation with the original standard.

11.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

11.7 RESULTS OF TRANSMISSION ANTENNA GAIN

EUT：	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	FLRC		

Polar (H/V)	Frequency(MHz)	EIRP ANTENNA POWER (dBm/MHz)	Limits (dBm/MHz)	Remark
V	2416	-14.49	12.14	Pass
V	2446	-13.55	12.14	Pass
V	2476	-14.00	12.14	Pass
H	2416	-14.15	12.14	Pass
H	2446	-13.33	12.14	Pass
H	2476	-14.08	12.14	Pass

12. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

12.1 LIMIT

Item	Limits
3dB antenna beam width	360/A (If A<1; then A=1) A = {EIRP Power [mW] / 16.36 for DS, OFDM} or A = {EIRP Power [mW] / 4.9 for FH}
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

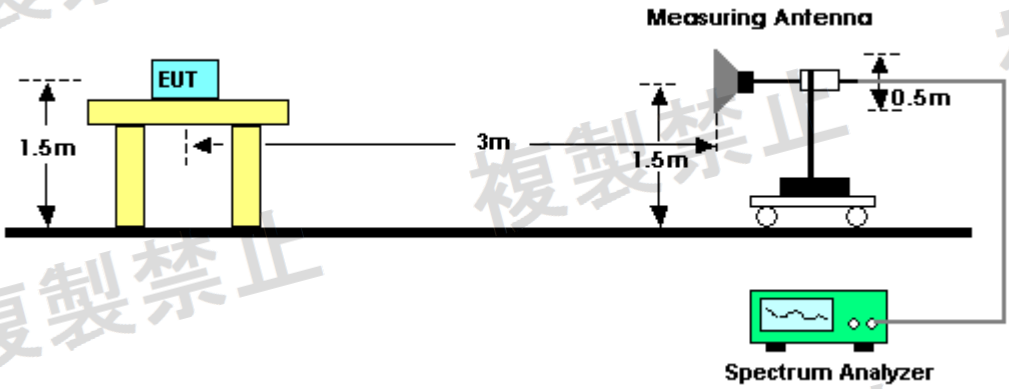
12.2 MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

12.3 TEST PROCEDURES

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).
   A = {EIRP Power [mW] / 16.36 for DS, OFDM} or
   A = {EIRP Power [mW] / 4.9 for FH}

12.4 TEST SETUP LAYOUT



12.5 TEST DEVIATION

There is no deviation with the original standard.

12.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

12.7 TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

EUT：	AK28 Transmitter	Model:	AK28
Temperature:	25^{0}C	Tested by:	Allen Liu
Humidity:	55 % RH	Test Voltage	DC 3.7V
Operation Mode:	FLRC		

Polar (H/V)	Frequency(MHz)	EIRP ANTENNA POWER(dBm)	EIRP ANTENNA POWER(mW)	A (See Note1)
V	2416	-14.49	0.036	0.007
V	2446	-13.55	0.044	0.009
V	2476	-14.00	0.040	0.008
H	2416	-14.15	0.038	0.008
H	2446	-13.33	0.046	0.009
H	2476	-14.08	0.039	0.008

3dB BEAMWIDTH test Result is 360.
Note1: A = {EIRP Power [mW] / 4.9 for DS, OFDM}
Note2: All the modes had been tested, but only the worst data recorded in the report.

END OF REPORT