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WIRELESS EQUIPMENT CERTIFICATION TEST&MEASUREMENT REPORT

On Model Name: IP Phone

Model Numbers: GXP2130

Brand Name: Grandstream

FCC ID: YZZGXP2130V2

Prepared for Grandstream Networks, Inc.

Test Specification: FCC 47 CFR Part 15, Subpart C

Test Report #: SHE-1408-11202-BT-FCC ID

Tested by: Andy Zhu MRT
Andy Zhu/Engineer Company Name

Reviewed by: Jawen Yin ECMG
Jawen Yin/Senior Engineer Company Name

QC Manager: Swall Zhang ECMG
Swall Zhang/QC Manager Company Name

Test Report Released by: Swall Zhang Sep.16th, 2014
Swall Zhang Date

List of Attached Files

<i>Exhibit Type</i>	<i>File Description</i>	<i>File Name</i>
<i>Test Report</i>	<i>Test Report</i>	YZZGXP2130V2 _FHSS Test report.pdf
<i>Operation Description</i>	<i>Technical Description</i>	YZZGXP2130V2 _Operation Description.pdf
<i>External Photos</i>	<i>External Photos</i>	YZZGXP2130V2 _External Photos.pdf
<i>Internal Photos</i>	<i>Internal Photos</i>	YZZGXP2130V2 _Internal Photos.pdf
<i>Block Diagram</i>	<i>Block Diagram</i>	YZZGXP2130V2 _Block Diagram.pdf
<i>Schematics</i>	<i>Circuit Diagram</i>	YZZGXP2130V2 _Schematics.pdf
<i>ID Label/Location</i>	<i>Label and Location</i>	YZZGXP2130V2 _Label & Location.pdf
<i>User Manual</i>	<i>User Manual</i>	YZZGXP2130V2 _User Manual.pdf
<i>Test Setup Photos</i>	<i>Test Setup Photos</i>	YZZGXP2130V2 _Test Setup Photos.pdf

Test Location

Tests performed in a Certified ANSI Semi-Anechoic Chamber and Shielded Room.

Test Site Location:

MRT Technology (Suzhou) co., Ltd.

D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Accreditation Bodies

The test facility was recognized, certified, or accredited by the following organizations:

- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**
- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (11384A-1).**
- **MRT facility is an IC registered (11384A-1) test laboratory with the site description on file at Industry Canada.**



List of Test and Measurement Instruments

The following test and measurement equipment was utilized for the tests documented in this report:

No.#	Test Equipment	Manufacturer	Type No.	Cal. Interval	Cal. Due Date
01	EMI Test Receiver	R&S	ESR7	1 year	2014/11/08
02	Two-Line V-Network	R&S	ENV216	1 year	2014/11/08
03	Temperature/ Meter Humidity	Anymetre	TH101B	1 year	2014/11/15
04	Spectrum Analyzer	Agilent	N9010A	1 year	2015/01/04
05	Preamplifier	MRT	AP01G18	1 year	2014/10/07
06	Loop Antenna	Schwarzbeck	FMZB1519	1 years	2014/11/24
07	TRILOG Antenna	Schwarzbeck	VULB9162	1 year	2014/11/24
08	Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	1 year	2014/11/24
09	Broadband Horn Antenna	Schwarzbeck	BBHA9170	1 year	2014/11/24
10	Bilog Period Antenna	Schwarzbeck	VULB 9162	1 year	2014/11/24
11	Power Sensor	Agilent	U2021XA	1 year	2014/12/14

Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EU T).Without the permission of ECMG Electronic Technical Testing Corp (Shenzhen). Test Lab this test report is not permitted to be duplicated in extracts.This test report does not entitle to carry any test mark on this or similar products.The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate.The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may resultin additional deviation.

Administrative Data

Test Sample : IP Phone
Model Number : GXP2130
Model Tested : GXP2130
Date Of Received : August 8th, 2014
Date Tested : August 15th to sep. 12th, 2014
Applicant : Grandstream Networks, Inc.
Address : 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Telephone : (86)-755-26014600
Fax : (86)-755-26014601
Manufacturer : Grandstream Networks, Inc.
Address : 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Telephone : (86)-755-26014600
Fax : (86)-755-26014601
Factory : Grandstream Networks, Inc.
Address : 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China
Telephone : (86)-755-26014600
Fax : (86)-755-26014601

EUT Description

Grandstream Networks, Inc. Tested model GXP2130 (referred to as the EUT in this report) is an IP Phone.

The EUT is an IP Phone which Complies with Bluetooth 2.1 + EDR Bluetooth Radio functionalityes. Technical specifications of the EUT are as belows:

Parameters		Ranges
Basic parameters	Rated voltage	DC +12V
	Rated Current	DC 0.5A
Specifications of Bluetooth	Operating band	2402-2480MHz
	Modulation Techniques	FHSS/ GFSK/ $\pi/4$ -DQPSK/8DPSK
	Number of Channels:	79 channels
	Data Rate	GFSK (1Mbps), $\pi/4$ -DQPSK (2Mbps), 8DPSK (3Mbps)
	RF Out power	<10dbm
	Type of modulation:	GFSK, DPSK,DQPSK
Antenna spec.	Antenna Type	PCB Antenna With Max.2dBi gain
	Frequency range	2.4GHz to 2.5GHz
	Impedance	50 Ohm Nominal
	Antenna Material	FR4
	V.S.W.R	<= 1.92
Power Adapter #1 (Mass power)	Input	100-240VAC 50/60Hz 0.15A
	Output	12VDC,0.5A
	Model	WCF1200050A1BA
	Brand name	Mass power

Continue on to next page...

<i>Power Adapter #2 (UE power)</i>	<i>Input</i>	<i>100-240VAC 50/60Hz 0.2A</i>
	<i>Output</i>	<i>12VDC,0.5A</i>
	<i>Model</i>	<i>UE06L8-120050SPAU</i>
	<i>Brand name</i>	<i>UE power</i>

Note 1: The EUT is a IP Phone, it contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth Module is $F(\text{MHz})=2402+1*n$ ($0 \leq n \leq 78$). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 39 (2441MHz) and 78 (2480MHz).

Note 2: Power adapter has two model, WCF1200050A1BA and UE06L8-120050SPAU, both of which were tested and only model WCF1200050A1BA was recorded in this report.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Working Frequency of Each Channel:

Channel	Frequency (MHz)						
0	2402	20	2422	40	2442	60	2480
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2441	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2402	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2441	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		---

Note: $F(\text{MHz})=2402+1*n$ ($0 \leq n \leq 78$)

15.247 REQUIREMENTS FOR BLUETOOTH DEVICE:

This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

- 1) *This system is hopping pseudorandomly.*
- 2) *Each frequency is used equally on the average by each transmitter.*
- 3) *The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters.*
- 4) *The receiver shifts frequencies in synchronization with the transmitted signals.*

15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.

15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

HOPPING SEQUENCE:

Example of a 79 hopping sequence in data mode:

43, 59, 27, 77, 45, 61, 29, 0, 47, 63, 31, 2, 49, 65, 33, 4, 51, 67, 35, 6, 53, 69, 37, 8, 55, 71, 39, 10, 57, 73, 41, 75, 16, 44, 12, 56, 24, 52, 20, 50, 18, 46, 14, 58, 26, 54, 22, 64, 32, 60, 28, 72, 40, 68, 36, 66, 34, 62, 30, 74, 42, 70, 38, 48

Test Summary

The Electromagnetic Compatibility requirements on tested model GXP2130 for this test is stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up. Tested model GXP2130 has been tested to conform to the following parts of the Part 15, Subpart C as detailed below:

FCC Rules	Requirement	Result	Remark
§15.247(c); §15.203	Antenna Requirement	Compliant	Attachment 1
§15.207	Conducted Emission	Compliant	Attachment 2
§15.205(a); §15.209(a)	Radiated Emission	Compliant	Attachment 3
§15.247(b)(1)	Maximum Peak Output Power	Compliant	Attachment 4
§15.247(a)(1)(ii) or (iii)	20 dB Bandwidth	Compliant	Attachment 5
Section 15.247 (a)(1)	Carrier Frequency Separation	Compliant	Attachment 6
Section 15.247 (a)(1)(iii)	Time of Occupancy	Compliant	Attachment 7
Section 15.247 (a)(1)(iii)	Number of Hopping Frequencies	Compliant	Attachment 8
Section 15.247(d)	Band Edges and Conducted Spurious Emissions Measurement	Compliant	Attachment 9
15.247(i)& KDB 447498 D01 v05r02	RF Exposure Compliance Requirement	Compliant	Attachment 10

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

Test Mode Applicability and Tested Channel Detail

The EUT has three orientations; therefore, X Y and Z orientations have been investigated, and the worst-case was found to be at X position.

Regards to the frequency band over 10MHz, the lowest, middle and highest frequency of channel were selected to perform the test, and then shown on this report.

So the there channel as follows:

Lowest channel: 2402MHz

Middle channel: 2441MHz

Highest channel: 2480 MHz

Description Of Available Antennas

The radio utilizes a PCB Antenna, with a maximum gain of 2.0 dBi in the 2.4 GHz band.

EUT Exercise Software

The test utility software used during testing was hcitool RF Test Tool.

Equipment Modification

Any modifications installed previous to testing by Grandstream Networks, Inc. will be incorporated in each production model sold or leased in United States.

There were no modifications for this EUT intended for grant.

Test System Details

EUT			
<i>Model Number:</i>	GXP2130		
<i>Description:</i>	IP Phone		
<i>Manufacturer:</i>	Grandstream Networks, Inc.		
<i>Input Voltage:</i>	DC 12V		
Support Equipment			
<i>Description</i>	<i>Model Number</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Notebook computer	X201	3626AM3	Lenovo

Cable Description					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
Power Adapter Cord of EUT	EUT	Plug	1.8	N	N
Power Adapter Cord of Notebook	EUT	Plug	1.8	N	Y

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

ATTACHMENT 1 - ANTENNA REQUIREMENT

§15.203 Requirements:

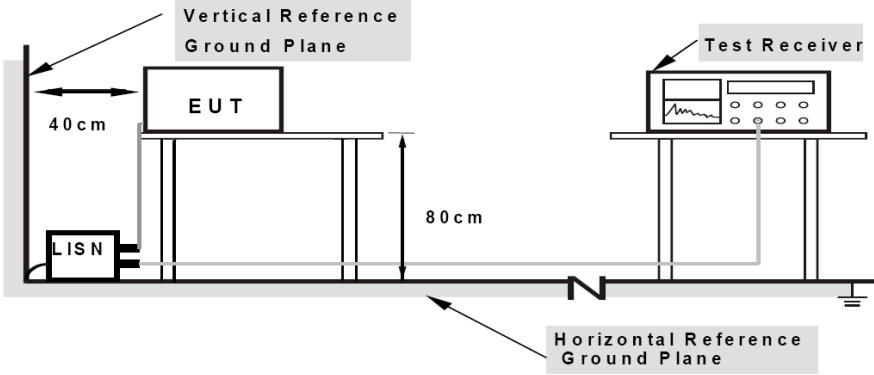
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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 connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 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 Section 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.

§15.247(c) (1)(i) Requirements:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

FCC Section	FCC Rules	Conclusion
§15.203& §15.207 (c) (1) (i)	<p><i>Described how the EUT complies with the requirements that either its antenna is permanently attached, or that it employ a unique antenna connector, for every antenna proposed for use with the EUT.</i></p> <p><i>The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:</i></p> <ol style="list-style-type: none"> 1. <i>The application (or intended use) of the EUT.</i> 2. <i>The installation requirements of the EUT.</i> 3. <i>The method by which the EUT will be marketed.</i> 	<p><i>The EUT utilizes an PCB Antenna, maximal gain of the antenna is 2.0 dBi and was permanently soldered on PCB. So the unit do meet requirement.</i></p>

ATTACHMENT 2 - CONDUCTED EMISSION TEST RESULTS

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	Section 15.207
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	August 25, 2014
TEST REFERENCE:	ANSI C63.4: 2009		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4:2009 for conducted emissions. The measurement was using an AMN on each line and an EMI receiver peak scan was made at the frequency measurement range. The six highest significant peaks were then marked, and these signals were then quasi-peaked and averaged.		
TEST SETUP:	 <p>Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>		
DESCRIPTIONS OF TEST MODE:	The EUT was conneted to the artifical main network, And test the EUT with actived in BT transmit mode.		
TESTED RANGE:	150kHz to 30MHz		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for conducted missions at AC input port. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

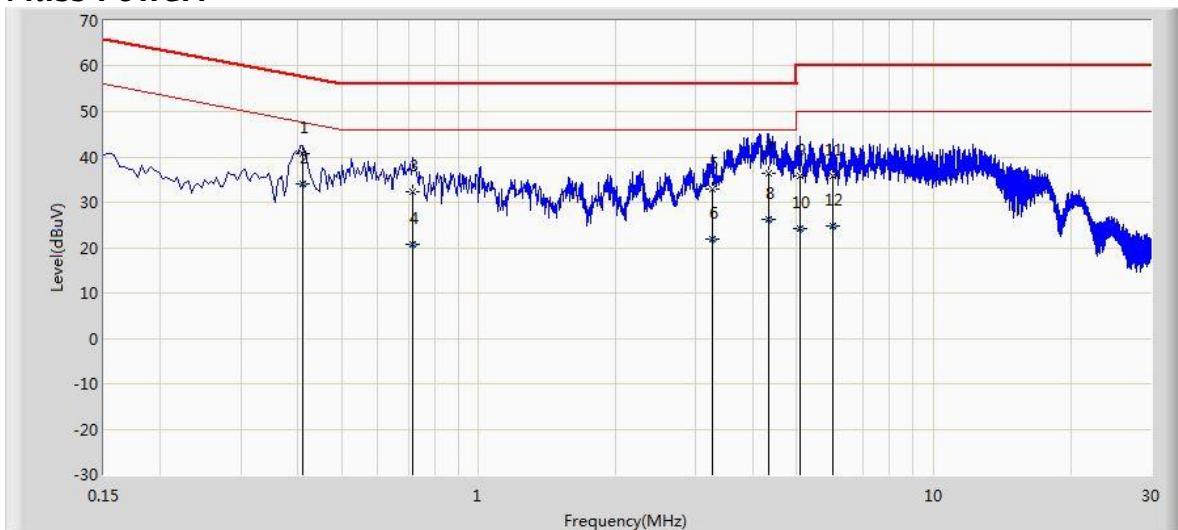
Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

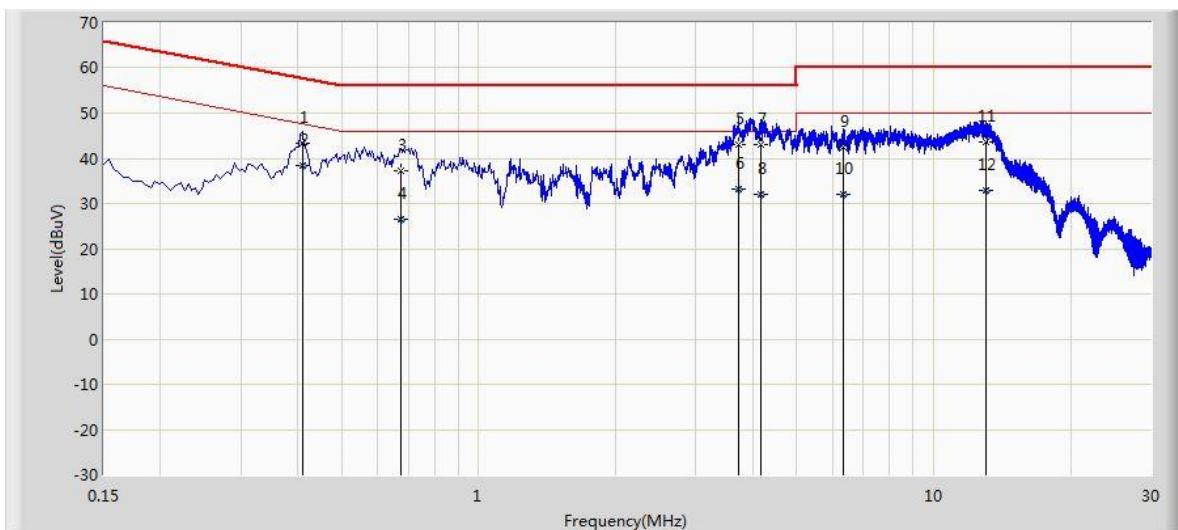
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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Mass Power:

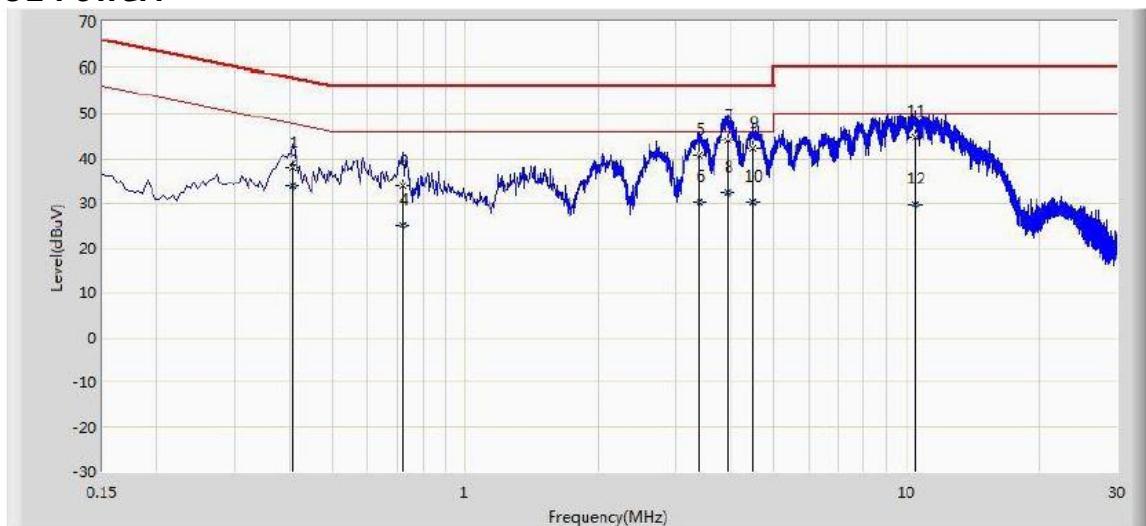


Line L Conducted Emission Graph

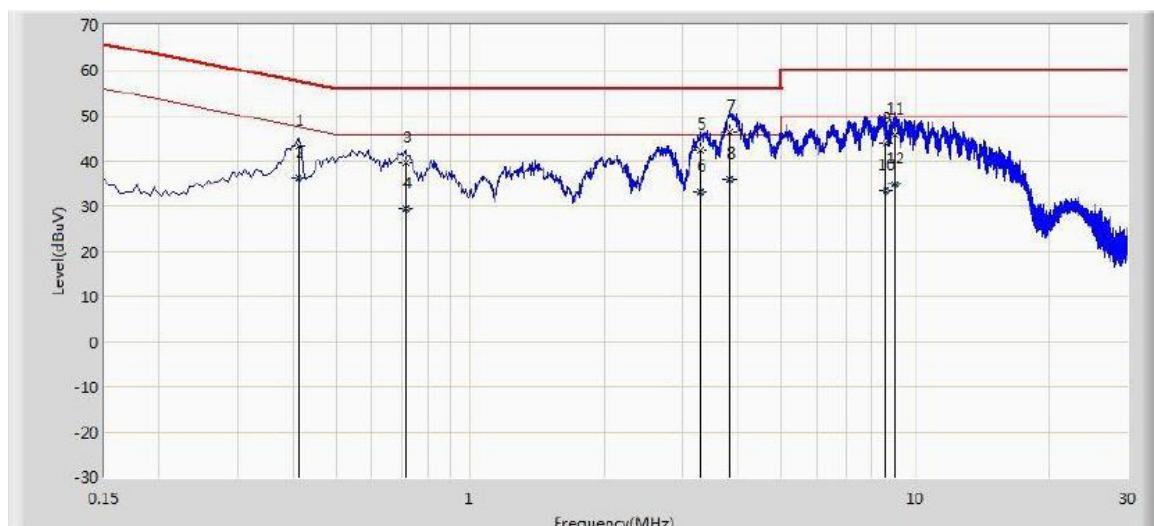


Line N Conducted Emission Graph

UE Power:



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:**Mass Power:**

Lines	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AV Level (dBuV)	Limits AV (dBuV)	Margin QP (dB)
<i>L</i>	0.410	40.8	57.6	-16.7	0.410	34.0	47.6	-13.6
<i>L</i>	0.718	32.3	56.0	-23.7	0.718	20.7	46.0	-25.3
<i>L</i>	3.254	32.9	56.0	-22.4	3.254	22.0	46.0	-24.0
<i>L</i>	/	/	/	/	/	/	/	/
<i>L</i>	/	/	/	/	/	/	/	/
<i>L</i>	/	/	/	/	/	/	/	/
<i>N</i>	0.410	43.4	57.6	-14.2	0.410	38.3	47.6	-9.3
<i>N</i>	0.674	37.2	56.0	-18.8	0.674	26.4	46.0	-19.6
<i>N</i>	3.730	43.0	56.0	-13.0	3.730	33.2	46.0	-12.8
<i>N</i>	/	/	/	/	/	/	/	/
<i>N</i>	/	/	/	/	/	/	/	/
<i>N</i>	/	/	/	/	/	/	/	/

Note :

- 1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not use.
- 2) "QP" means "Quasi-Peak" values, "AV" means "Average" values.
- 3) The symbol "/" means other emission readings are too low against official limits that are not be recorded.

UE Power:

Lines	Frequency (MHz)	Corrected QP Level (dBuV)	Limits QP (dBuV)	Margin QP (dB)	Frequency (MHz)	Corrected AV Level (dBuV)	Limits AV (dBuV)	Margin QP (dB)
L	0.406	37.8	57.7	-19.9	0.406	33.7	47.7	-14.0
L	0.718	32.3	56.0	-23.7	0.718	20.7	46.0	-25.3
L	3.254	32.9	56.0	-22.4	3.254	22.0	46.0	-24.0
L	/	/	/	/	/	/	/	/
L	/	/	/	/	/	/	/	/
L	/	/	/	/	/	/	/	/
N	0.410	43.4	57.6	-14.2	0.410	38.3	47.6	-9.3
N	0.674	37.2	56.0	-18.8	0.674	26.4	46.0	-19.6
N	3.730	43.0	56.0	-13.0	3.730	33.2	46.0	-12.8
N	/	/	/	/	/	/	/	/
N	/	/	/	/	/	/	/	/
N	/	/	/	/	/	/	/	/

Note :

- 1) All readings are using a bandwidth of 9 kHz, with a 500 ms sweep time. A video filter was not use.
- 2) "QP" means "Quasi-Peak" values, "AV" means "Average" values.
- 3) The symbol "/" means other emission readings are too low against official limits that are not be recorded.

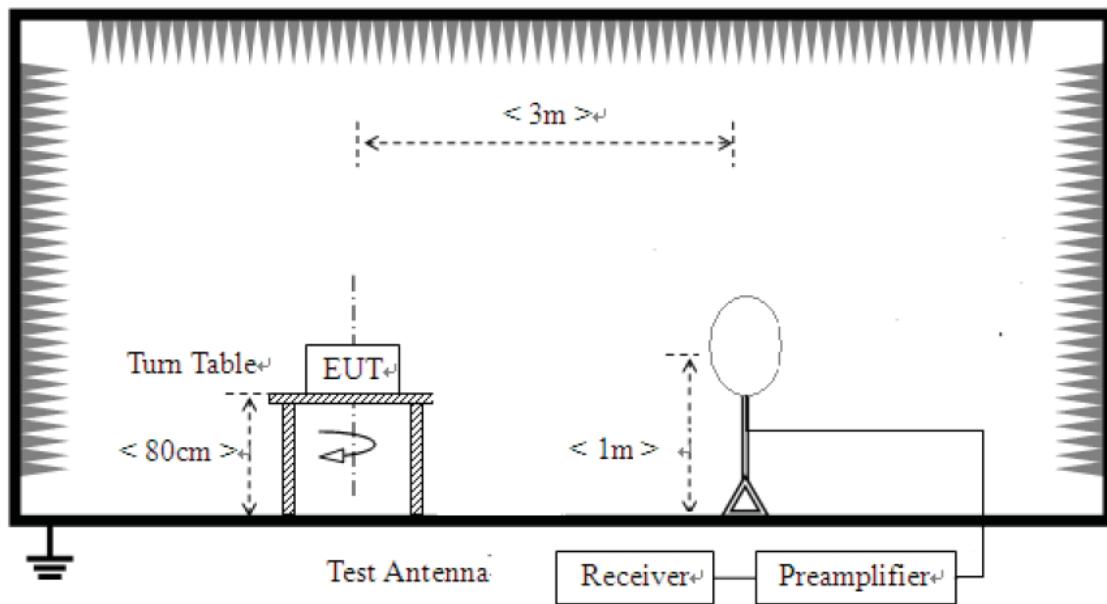
ATTACHMENT 3- RADIATED EMISSION TEST

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	Section 15.209(a), Section 15.205(a)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep. 11 th , 2014
TEST REFERENCE:	ANSI C63.4: 2009		
TEST PROCEDURE:	<p>The EUT was set up according to the guidelines of ANSI C63.4: 2009 for radiated emissions. An EMI receiver peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber. Test procedure as follow:</p> <ul style="list-style-type: none"> a) The EUT is placed on a turntable, which is 0.8 m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. b) The EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. c) Maximum procedure was performed on the six highest emissions to ensure EUT compliance. d) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. e) Repeat above procedures until the measurements for all frequencies are complete. <p>The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:</p> $FS = RA + AF + CL - AG$ <p>Where FS = Field Strength;</p> <p>AF = Antenna Factor;</p> <p>RA = Reading Amplitude;</p> <p>CL = Cable Attenuation Factor (Cable Loss);</p> <p>AG = Amplifier Gain.</p>		

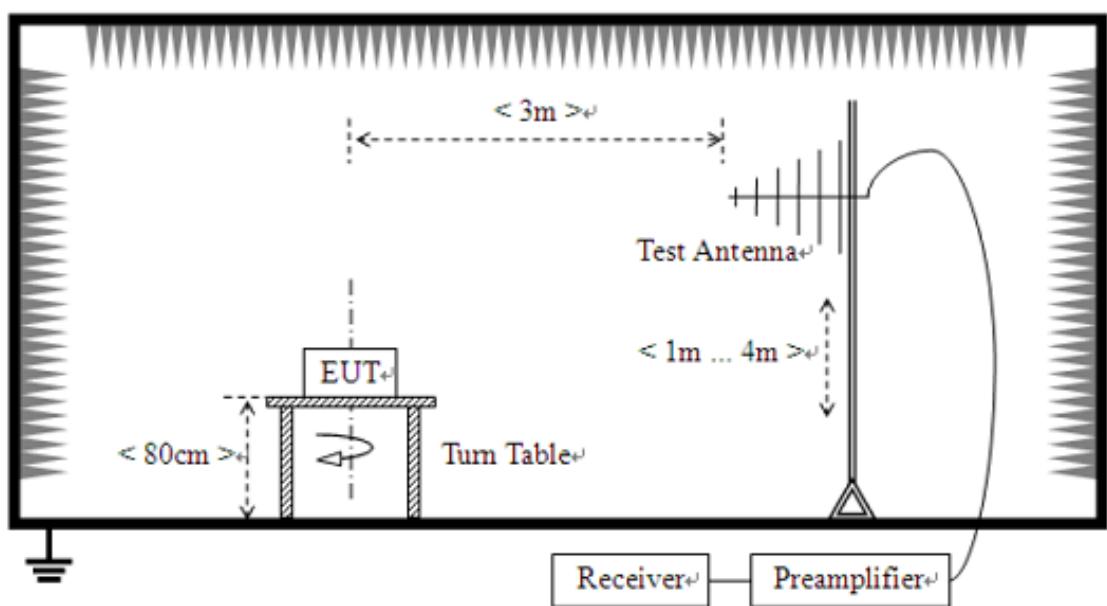
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TEST SET UP:

Frequency measured at 9KHz to 30MHz:

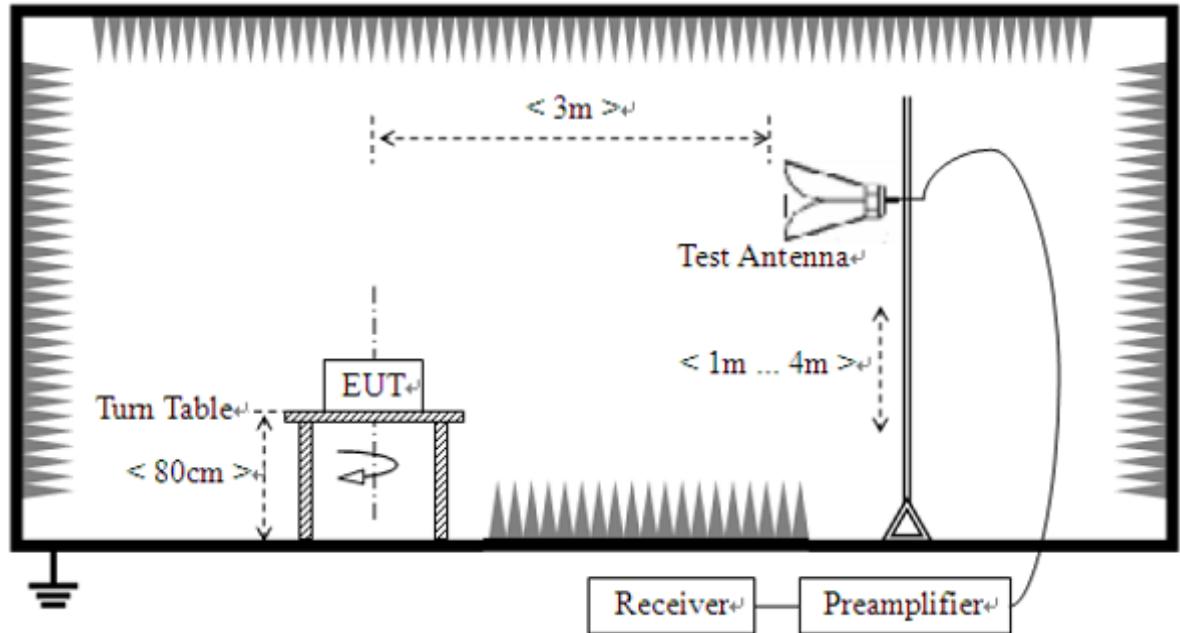


Frequency measured at 30MHz to 1000MHz:



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Frequency measured at Above 1GHz:



TESTED RANGE:	30MHz to 25GHz
TEST VOLTAGE:	120VAC/60Hz
RESULTS:	According to the data in the following, the EUT complied with the FCC Part 15.209 &15.205. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 3.6 dB

Radiated Emission From 9KHz to 30MHz:

Pre-scan the EUT in GFSK, $\pi/4$ -DQPSK and 8DPSK with transmitting and find out the worst case is GFSK mode in transmitting.

Test No. #:	Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB)	Reading Level QP (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Mass power							
1	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/
UE power							
1	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/

Note:

1. The field strength is calculated by adding the antenna factor, cable factor. The basic equation with a sample calculation is as follows:
Emission Level = Reading Level + Antenna Factor + Cable Loss.
2. The limits shown are based on quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. the bandwidth of Test Receiver was set at 200Hz in frequency range of 9KHz to 150KHz, 9kHz in the frequency range of 150KHz to 30MHz.
3. All emission levels in the frequency range of 9KHz to 30MHz are 20dB below the official limits that are not reported.

Radiated Emission from 30MHz to 1GHz:

Pre-scan the EUT in GFSK,π/4-DQPSK and 8DPSK with transmittting and find out the worst case is GFSK mode in transmitting.

Mass Power:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	QP Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
36.130	H	7.90	20.70	28.60	40	-11.40	Pass
38.000	H	5.70	18.70	24.40	40	-15.60	Pass
240.000	H	13.70	12.20	25.90	46	-20.10	Pass
322.880	H	10.40	14.90	25.30	46	-20.70	Pass
400.000	H	9.00	16.20	25.20	46	-20.80	Pass
957.200	H	-3.10	24.20	21.10	46	-24.90	Pass
31.210	V	18.90	13.20	32.10	40	-7.90	Pass
36.480	V	10.60	16.70	27.30	40	-12.70	Pass
100.400	V	13.90	8.40	22.30	43.5	-21.20	Pass
413.920	V	11.50	16.80	28.30	46	-17.70	Pass
616.720	V	4.60	19.90	24.50	46	-21.50	Pass
800.000	V	4.10	22.60	26.70	46	-19.30	Pass

Note:

1. The field strength is calculated by adding the Antenna Factor, Cable Loss& Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss -Preamplifier Factor.
2. Other emission levels are too low against official limits that are not recorded.

UE Power:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/ Amp. CF	Emission Level (dBuV/m)	QP Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
36.130	H	7.30	20.70	28.00	40	-12.00	Pass
38.000	H	4.90	18.70	23.60	40	-16.4	Pass
240.000	H	13.70	12.20	26.10	46	-19.90	Pass
322.880	H	10.40	13.90	25.30	46	-20.70	Pass
400.000	H	11.28	16.20	27.48	46	-18.52	Pass
957.200	H	-1.00	24.20	23.20	46	-22.80	Pass
31.210	V	18.10	13.20	31.30	40	-8.70	Pass
36.480	V	9.60	16.70	26.30	40	-13.70	Pass
100.400	V	14.90	8.40	23.30	43.5	-22.20	Pass
413.920	V	11.50	16.80	28.30	46	-15.20	Pass
616.720	V	4.60	19.90	24.50	46	-21.50	Pass
800.000	V	4.20	22.60	26.80	46	-19.20	Pass

Note:

1. The field strength is calculated by adding the Antenna Factor, Cable Loss & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level = Reading Level + Antenna Factor + Cable Loss - Preamplifier Factor.
2. Other emission levels are too low against official limits that are not recorded.

Radiated Emission from 1GHz to 25GHz:

Pre-scan the EUT in GFSK,Π/4-DQPSK and 8DPSK with transmittting and find out the worst case is GFSK mode(Mass Power) in transmitting.

Transmitting mode (GFSK mode Lowest channel=2402MHz)

Peak measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4808.000	H	53.019	6.369	59.388	74	-14.612	Pass
7205.000	H	43.110	13.633	56.743	74	-17.257	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4808.000	V	50.488	6.369	56.857	74	-17.143	Pass
7205.000	V	44.676	13.633	58.309	74	-15.691	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Average Measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4803.975	H	46.627	6.356	52.983	54	-1.1017	Pass
7295.900	H	35.950	13.639	49.589	54	-4.411	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4803.975	H	44.187	6.356	50.543	54	-3.457	Pass
7209.900	H	37.242	13.661	50.903	54	-3.097	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Transmitting mode (GFSK mode Middle channel=2441MHz)

Peak Measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4884.500	H	53.136	6.651	59.786	74	-14.214	Pass
7324.000	H	42.548	14.016	56.564	74	-17.436	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4884.500	V	49.975	6.651	56.625	74	-17.375	Pass
7324.000	V	42.923	14.016	56.939	74	-17.061	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Average Measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4882.025	H	46.252	6.641	52.893	54	-1.107	Pass
7323.625	H	36.527	14.015	50.543	54	-3.547	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4803.975	V	43.173	6.356	49.818	54	-4.182	Pass
7209.900	V	35.816	13.661	49.830	54	-4.170	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Transmitting mode (GFSK mode Highest channel=2480MHz)

Peak Measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4961.000	H	52.223	6.790	59.013	74	-14.987	Pass
7443.000	H	41.174	14.168	55.342	74	-18.658	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4961.000	V	50.636	6.790	57.426	74	-16.574	Pass
7443.000	V	42.792	14.168	56.960	74	-17.040	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Average Measurement:

Frequency (MHz)	Antenna Polarity	Reading Level (dBuV/m)	Ant./CL/Amp. CF	Emission Level (dBuV/m)	PK Limit (dBuV/m)	Over Limit(dB)	Pass/Fail
4960.250	H	45.127	6.787	51.914	54	-2.086	Pass
7440.500	H	34.256	14.168	48.424	54	-5.576	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
4960.250	V	44.169	6.787	50.957	54	-3.043	Pass
7440.500	V	35.026	14.168	49.194	54	-4.806	Pass
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Note:

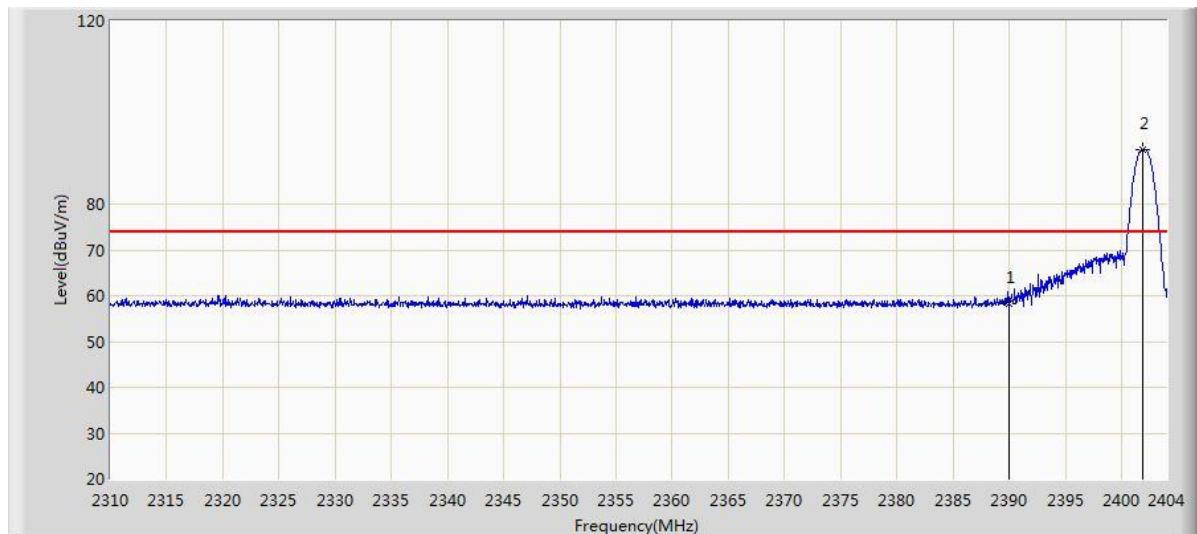
1. *The field strength is calculated by adding the Antenna Factor, Cable Loss & Preamplifier. The basic equation with a sample calculation is as follows: Emission Level =Reading Level + Antenna Factor + Cable Loss -Preamplifier Factor.*
2. *According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.Hence there no other emissions have been reported.*
3. *As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.*
4. *The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.*

Band Edge and Restricted band (Radiated measurement):

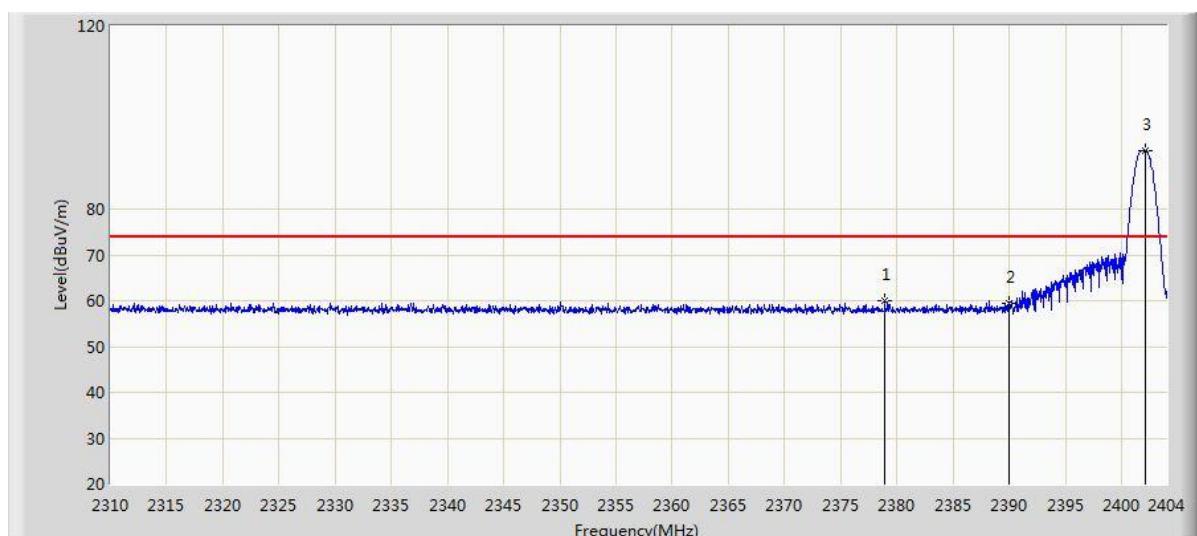
Pre-scan the EUT in GFSK, $\pi/4$ -DQPSK and 8DPSK with transmitting mode and find out the worst case is GFSK mode in transmitting.

Transmitting with GFSK mode (Lowest channel=2402MHz)

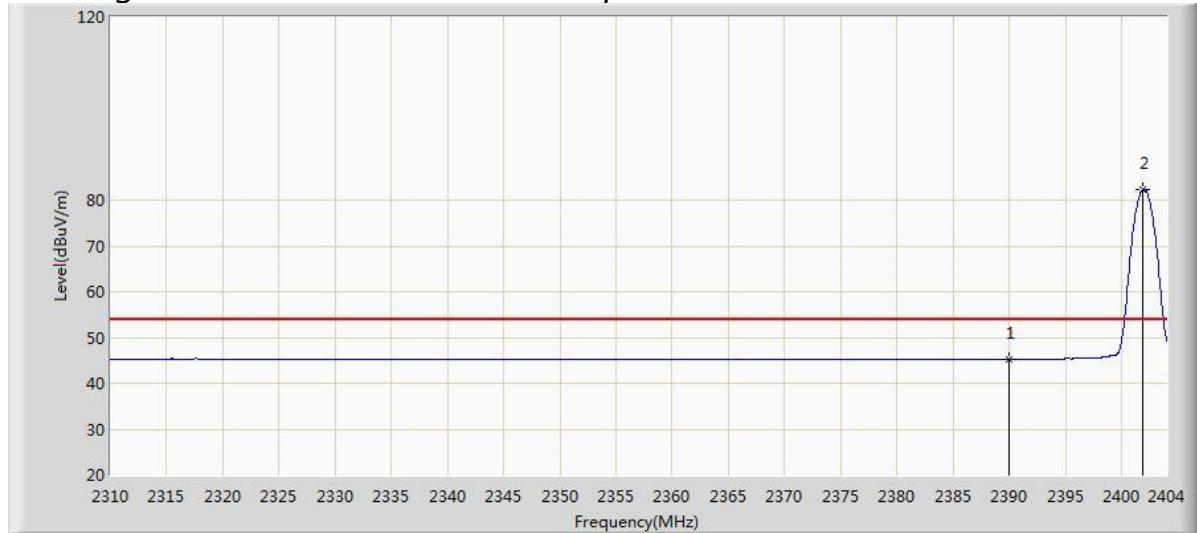
Peak Measurement in Horizontal polarization:



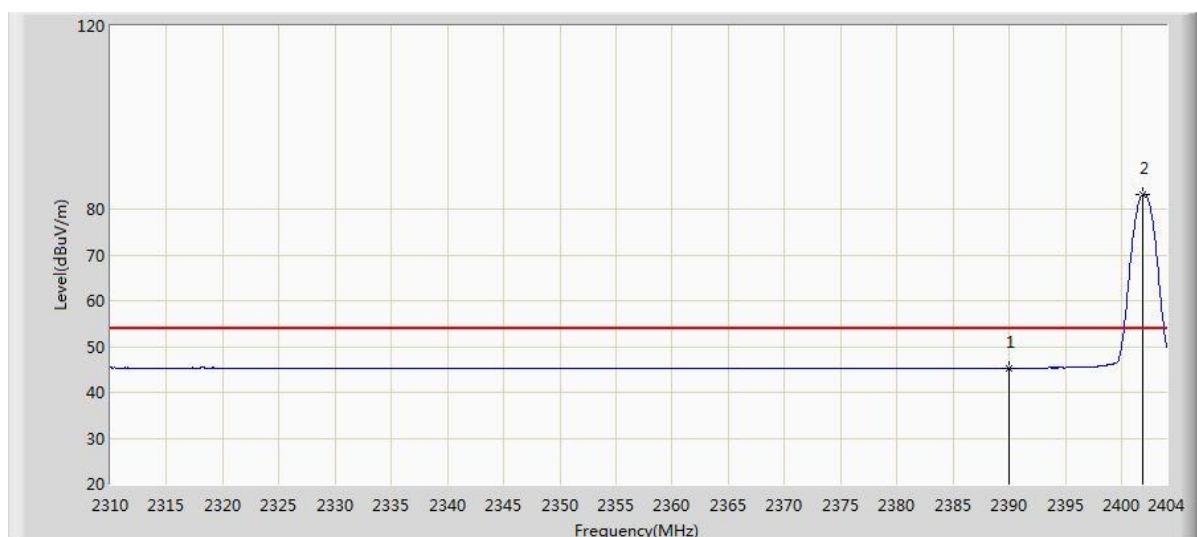
Peak Measurement in Vertical polarization



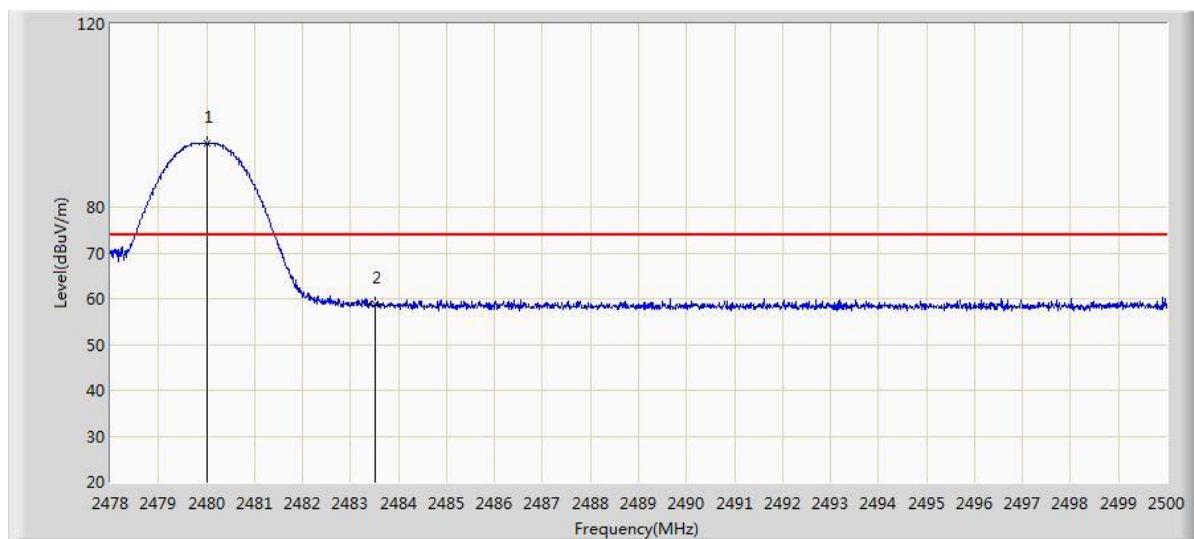
Average Measurement in Horizontal polarization:



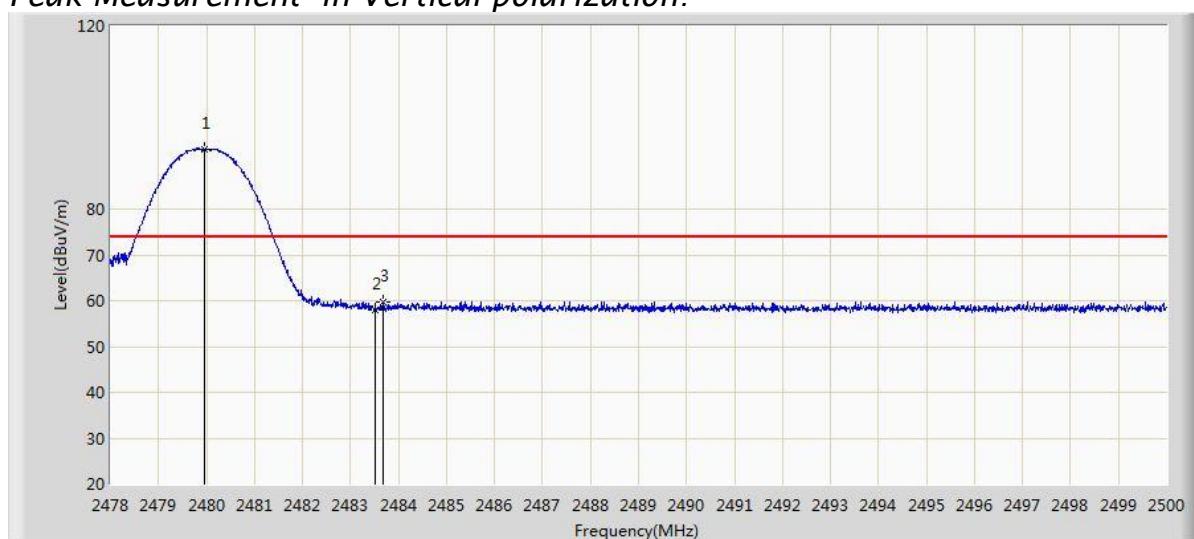
Average Measurement in Vertical polarization:



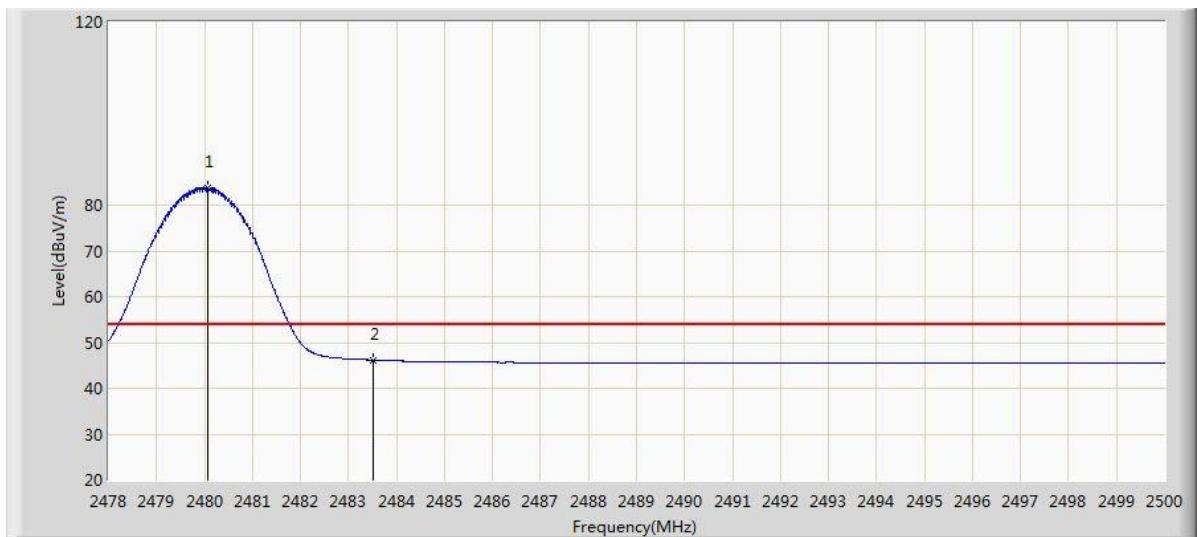
*Transmitting with GFSK mode (Highest channel=2480MHz)
Peak Measurement in Horizontal polarization:*



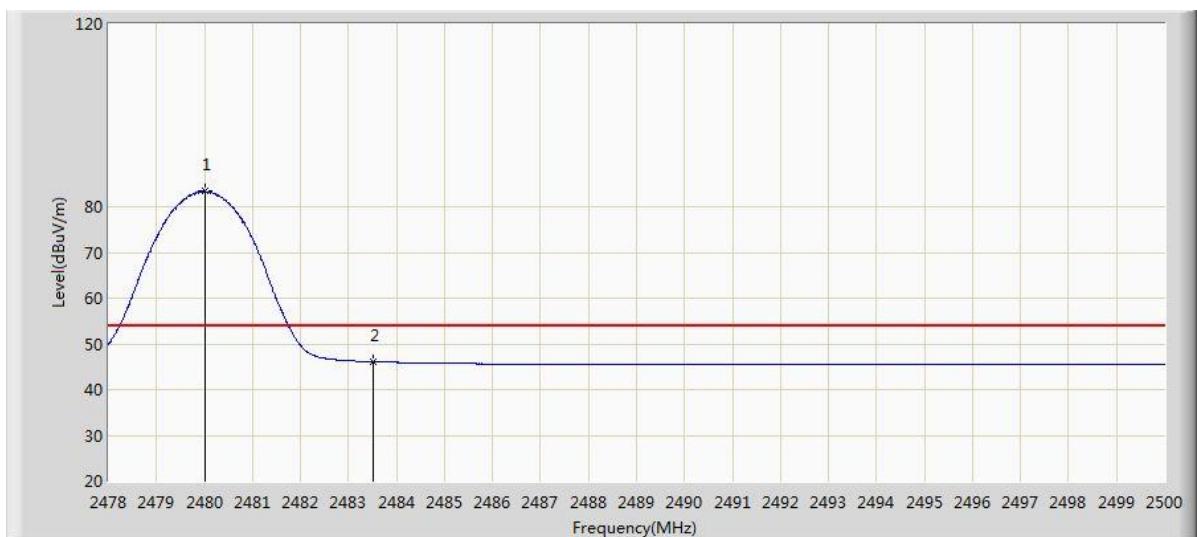
Peak Measurement in Vertical polarization:



Average Measurement in Horizontal polarization:



Average Measurement in Vertical polarization:



Remark 1:

No any other emissions level which are attenuated less than 20dB below the limit According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

Remark 2:

- 1). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 2). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.
- 3) Pre-Scan has been conducted to determine the worst-case mode from all possible Combinations between available modulations, data rates and antenna ports, and found the EUT worse case mode: 8DPSK modulation mode.
- 4) For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the 4th harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4th harmonic.

Remark 3:

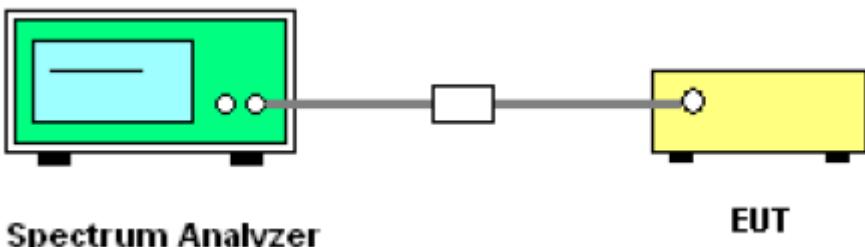
Section 15.205(a) Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
1.0495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

Conclusions:

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209.

ATTACHMENT 4 - MAXIMUM PEAK OUTPUT POWER

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	Section 15.247(b)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep. 10 th , 2014
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.		
DESCRIPTIONS OF TEST MODE:	Bluetooth in transmit mode without hopping.		
EQUIPMENT SETUP:	RBW=3 MHz, VBW=10 MHz (Peak detector)		
LIMITS:	Regulation 15.247 (b) The Limit of Maximum Peak Output Power Measurement is 30dBm.		
TEST SETUP:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
TEST VOLTAGE:	Pretest the EUT with voltage $120 \pm 15\%$ Vac,60Hz;and found out at 120Vac,60Hz is the worst case.		
RESULTS:	The EUT meet the requirements of test reference for occupied bandwidth.The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	$\text{Freq.} \pm 2 \times 10^{-7} \times \text{Center Freq.}$, $\text{Amp} \pm 1.5 \text{ dB}$		

Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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Test Data:

For EUT communicating with GFSK Mode:

Channel Frequency (MHz)	Peak output Power (dBm)	Cable Loss (dB)	Power Level (dBm)	Limit (dBm)	Over Limit(dB)
2402	0.424	/	0.424	30	-29.576
2441	0.421	/	0.421	30	-29.579
2480	0.821	/	0.821	30	-29.179

For EUT communicating with $\Pi/4$ -DQPSK Mode:

Channel Frequency (MHz)	Peak output Power (dBm)	Cable Loss (dB)	Power Level (dBm)	Limit (dBm)	Over Limit(dB)
2402	1.179	/	1.179	30	-28.821
2441	1.201	/	1.201	30	-28.799
2480	1.633	/	1.633	30	-28.367

For EUT communicating with 8DPSK Mode:

Channel Frequency (MHz)	Peak output Power (dBm)	Cable Loss (dB)	Power Level (dBm)	Limit (dBm)	Over Limit(dB)
2402	1.105	/	1.105	30	-28.895
2441	1.127	/	1.127	30	-28.873
2480	1.542	/	1.542	30	-28.458

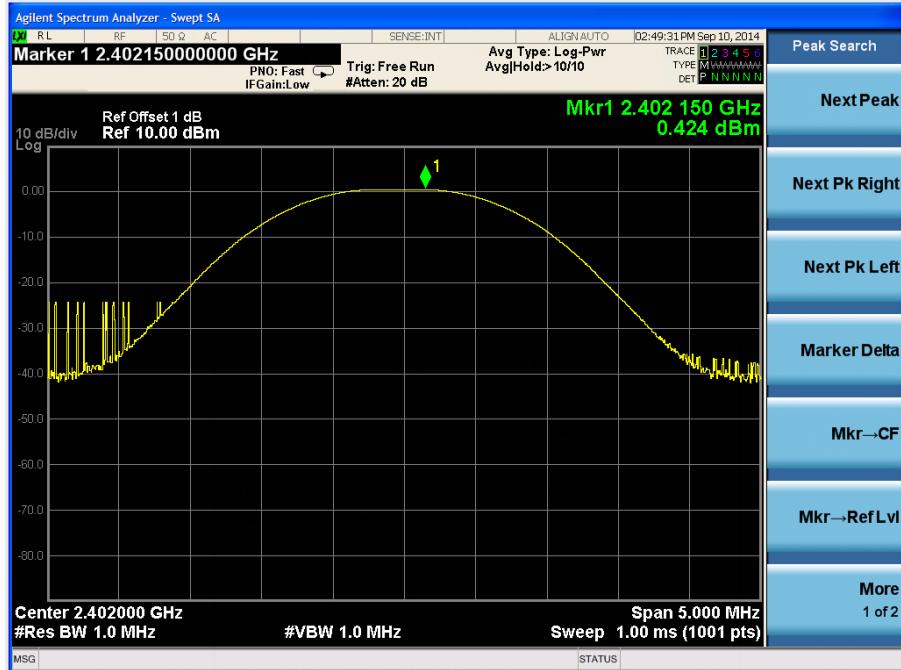
Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

Test Result Plot As Follows:

The EUT communicating with GFSK Mode

Lowest channel=2402MHz:



Middle channel=2441MHz



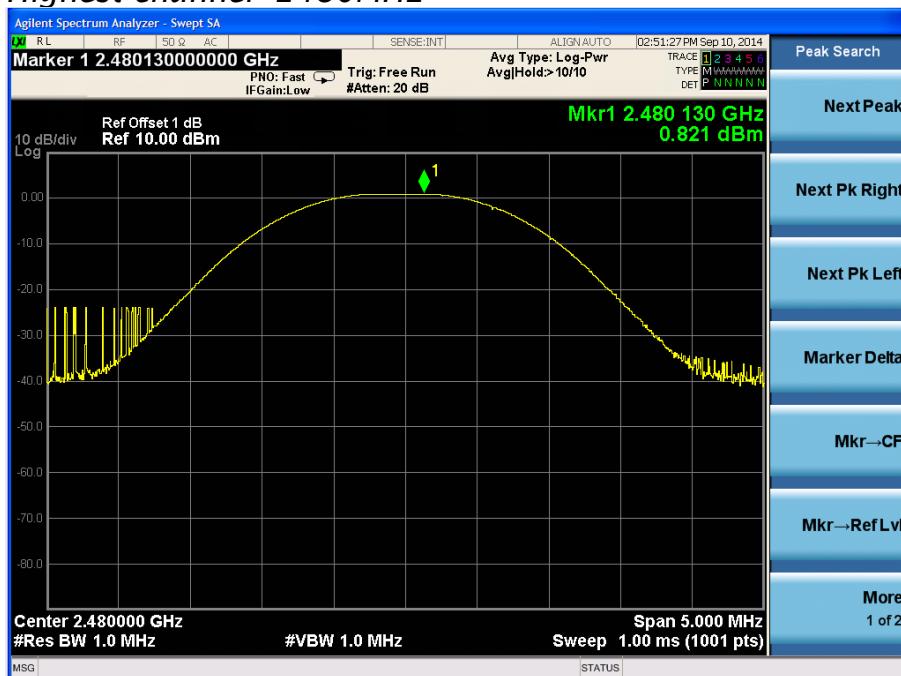
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Highest channel=2480MHz



The EUT communicating with $\pi/4$ -DQPSK Mode

Lowest channel=2402MHz:



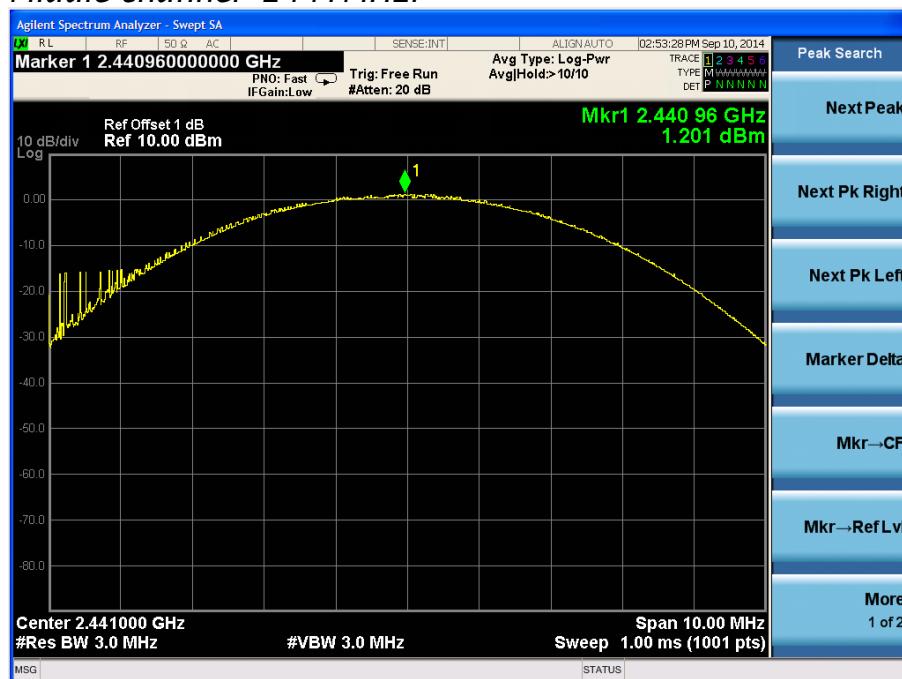
Test Report #: SHE-1408-11202-BT-FCC ID

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Middle channel=2441MHz:



Highest channel=2480MHz:



The EUT communicating with 8DPSK Mode

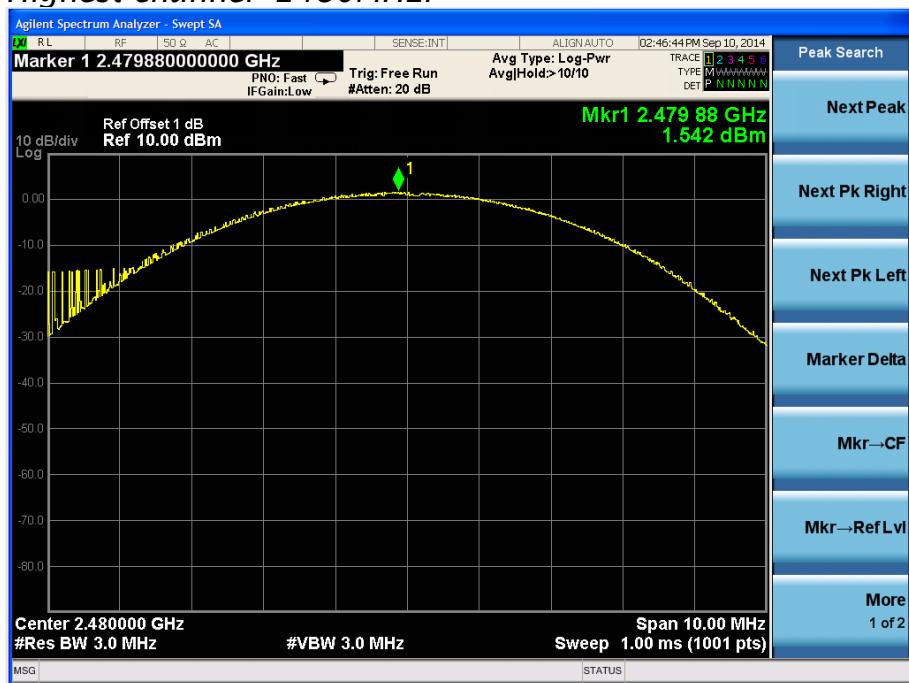
Lowest channel=2402MHz:



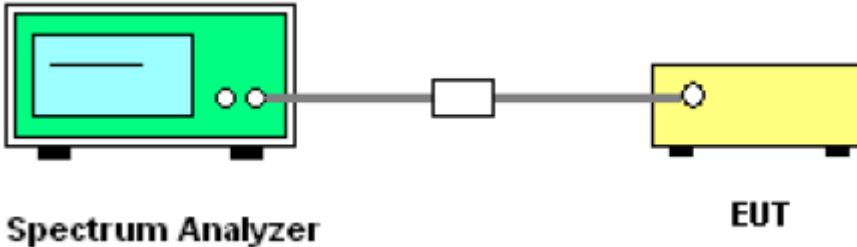
Middle channel=2441MHz



Highest channel=2480MHz:



ATTACHMENT 5 – 20dB BANDWIDTH TEST

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	Section 15.247(b)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep. 10 th , 2014
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.		
DESCRIPTIONS OF TEST MODE:	Bluetooth in transmit mode without hopping.		
EQUIPMENT SETUP:	RBW=30kHz, VBW=100kHz (Peak detector)		
LIMITS:	Reporting only		
TEST SETUP:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for occupied bandwidth. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	±5 %		

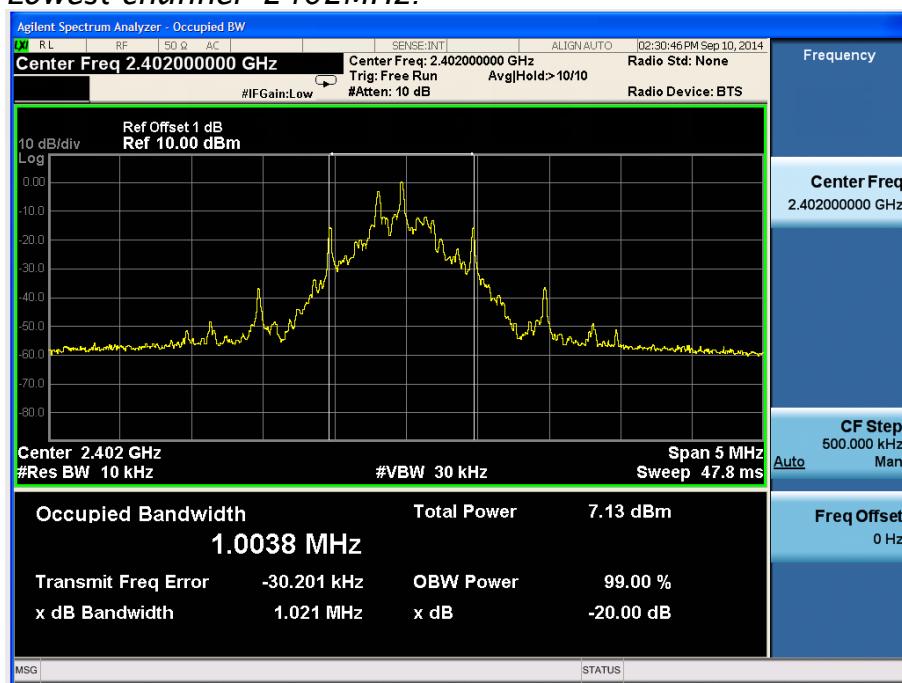
Test Data:

Chanel Frequency (GHz)	20 dB Bandwidth(MHz)		
	GFSK	$\pi/4$ -DQPSK	8DPSK
2.402	1.021	1.211	1.150
2.441	1.020	1.211	1.150
2.480	1.021	1.211	1.150

Test result: The unit does meet the requirements.

The EUT communicating with GFSK Mode:

Lowest channel=2402MHz:



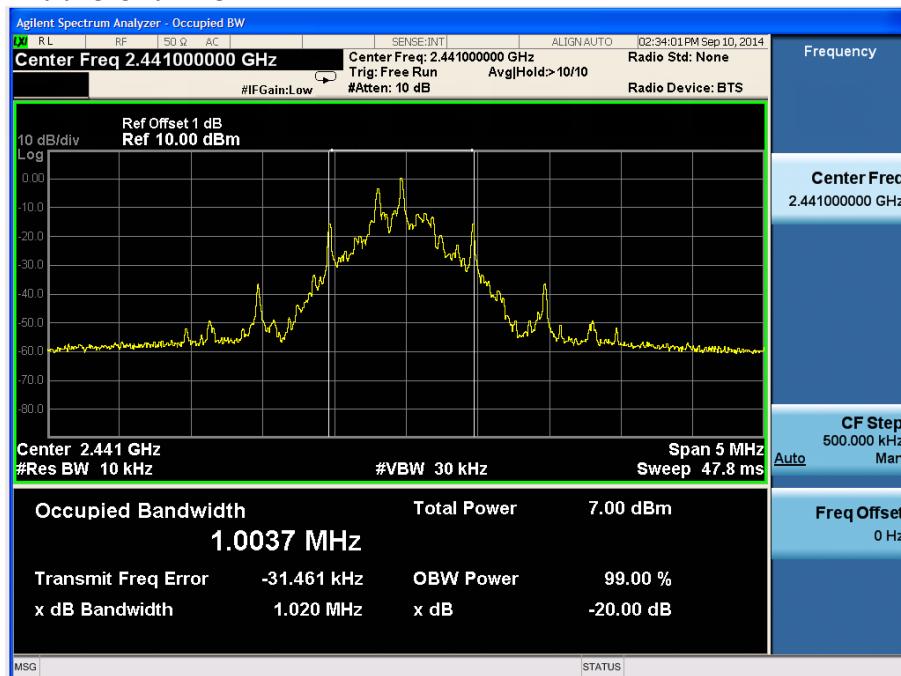
Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

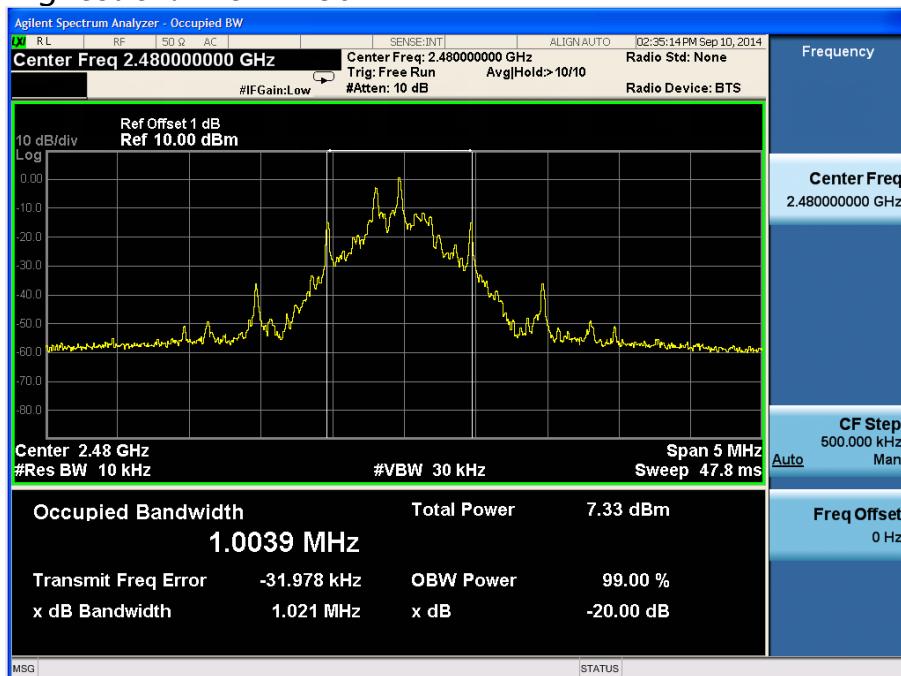
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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Middle channel=2441MHz

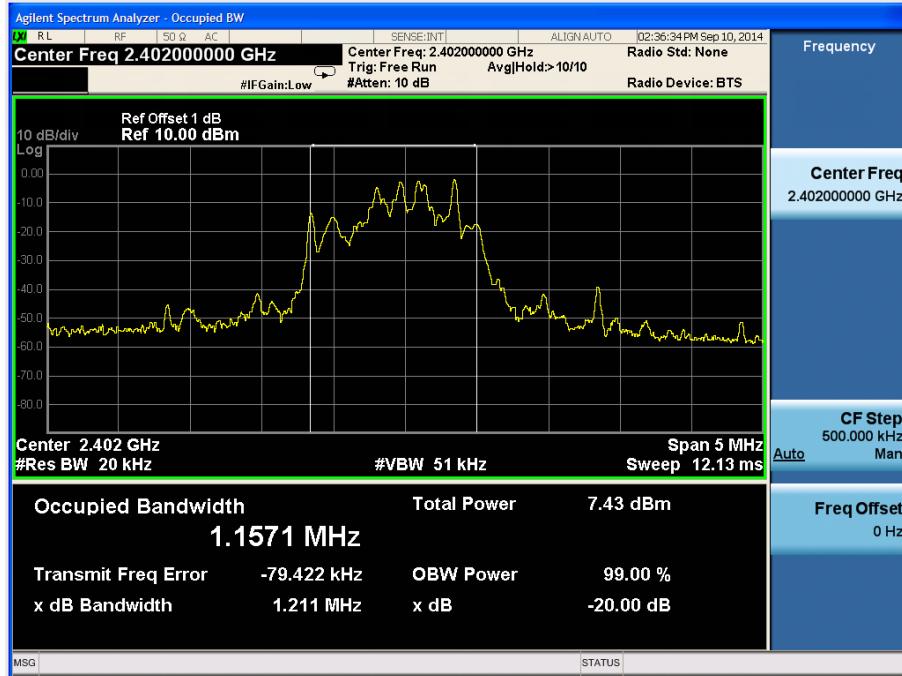


Highest channel=2480MHz

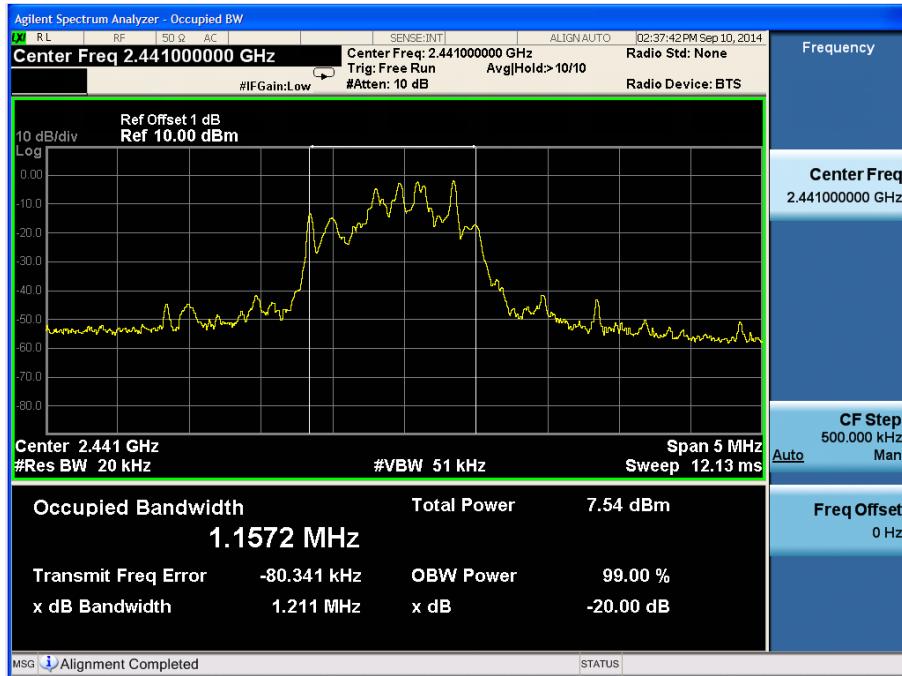


The EUT communicating with $\Pi/4$ -DQPSK Mode:

Lowest channel=2402MHz



Middle channel=2441MHz



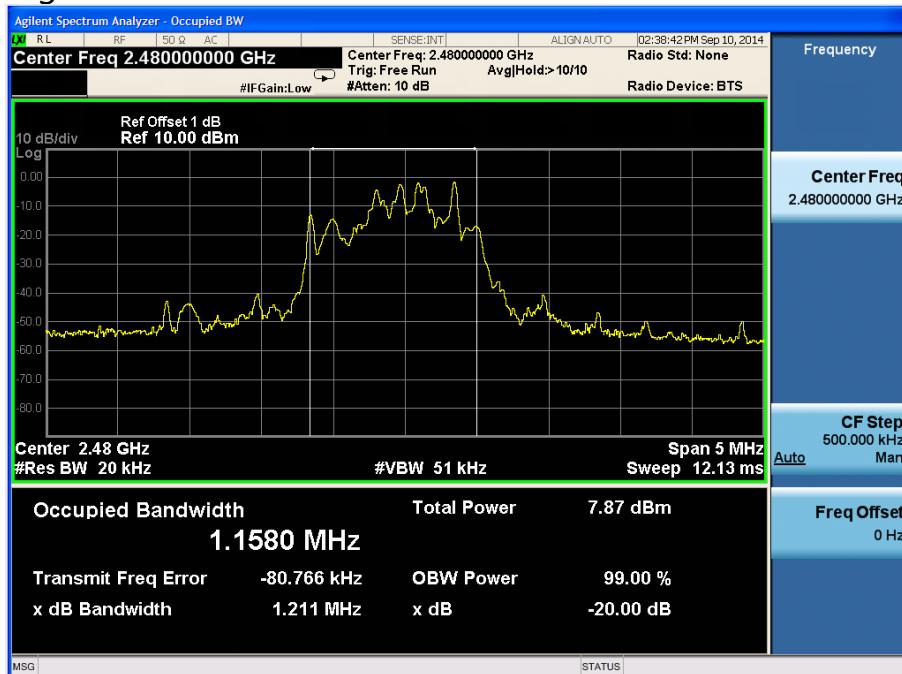
Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

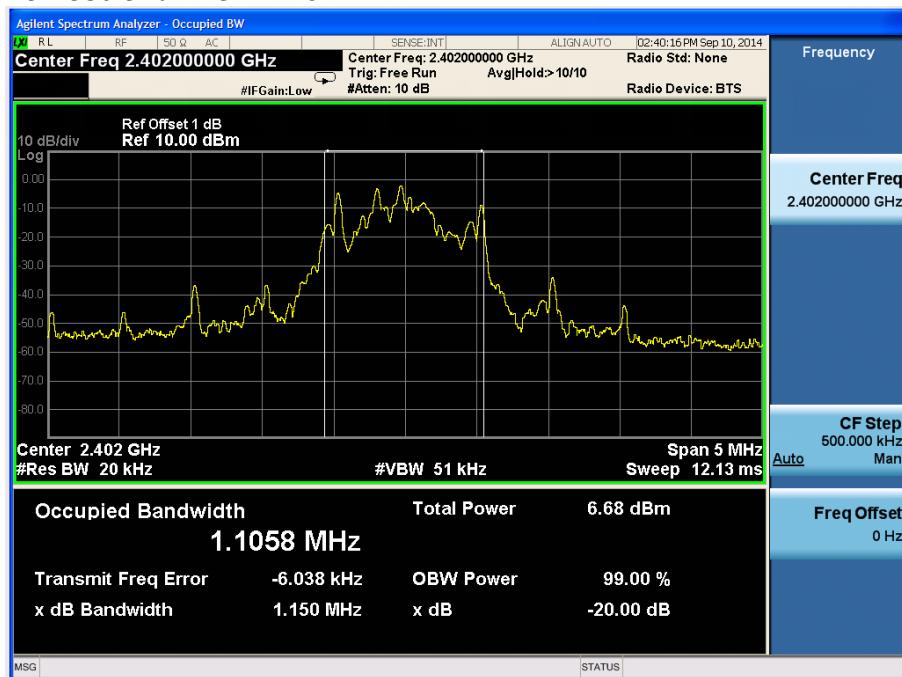
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Highest channel=2480MHz



The EUT communicating with 8DPSK Mode:

Lowest channel=2402MHz



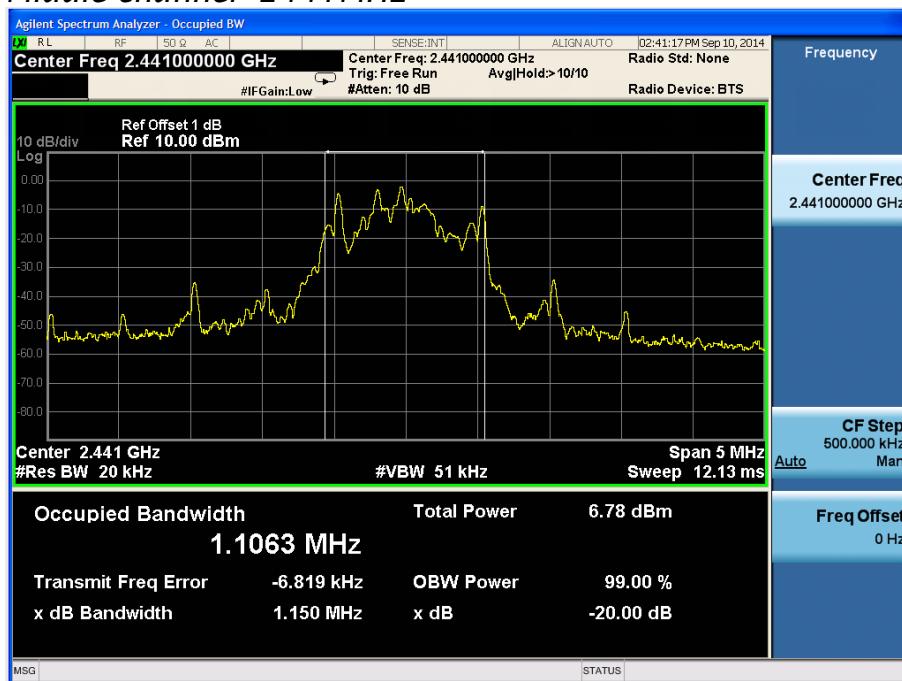
Test Report #: SHE-1408-11202-BT-FCC ID

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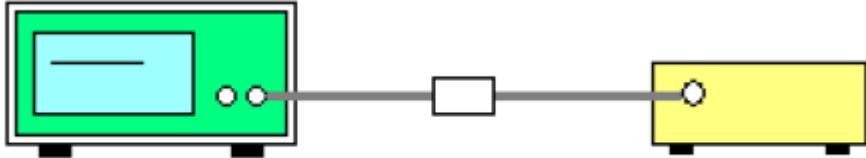
Middle channel=2441MHz



Highest channel=2480MHz



ATTACHMENT 6 – CARRIER FREQUENCY SEPARATION

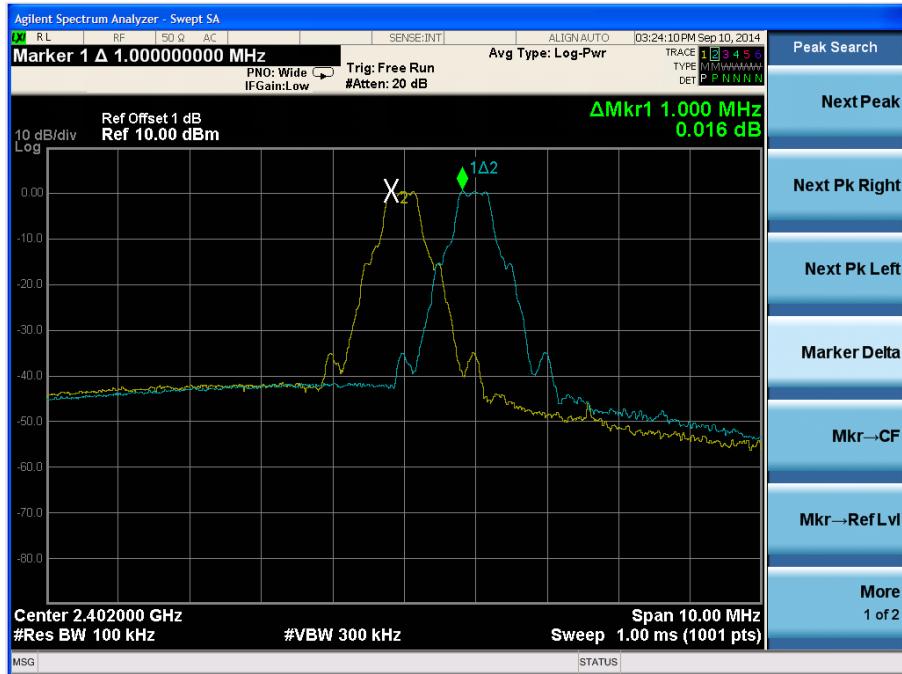
CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	FCC 15.247(a)(1)												
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone												
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter												
TEMPERATURE:	23 °C	HUMIDITY:	47%RH												
ATM PRESSURE:	101.0kPa	GROUNDING:	None												
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep 10 th , 2014												
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705														
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.														
DESCRIPTIONS OF TEST MODE:	Bluetooth transmit with hopping mode														
EQUIPMENT SETUP:	RBW=100kHz,VBW=300 KHz (Peak detector)														
TEST SET UP:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>														
LIMITS:	<p>≥0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater).</p> <p>According to 20dB bandwidth test result:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">Mode</th> <th style="text-align: center; padding: 5px;">20dB bandwidth (MHz) (worse case)</th> <th style="text-align: center; padding: 5px;">Limit(MHz) (Carrier Frequencies Separation)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">GFSK</td> <td style="text-align: center; padding: 5px;">1.021</td> <td style="text-align: center; padding: 5px;">0.684</td> </tr> <tr> <td style="text-align: center; padding: 5px;">Π/4-DQPSK</td> <td style="text-align: center; padding: 5px;">1.211</td> <td style="text-align: center; padding: 5px;">0.811</td> </tr> <tr> <td style="text-align: center; padding: 5px;">8DPSK</td> <td style="text-align: center; padding: 5px;">1.150</td> <td style="text-align: center; padding: 5px;">0.770</td> </tr> </tbody> </table> <p>So the limit is 0.811MHz.</p>			Mode	20dB bandwidth (MHz) (worse case)	Limit(MHz) (Carrier Frequencies Separation)	GFSK	1.021	0.684	Π/4-DQPSK	1.211	0.811	8DPSK	1.150	0.770
Mode	20dB bandwidth (MHz) (worse case)	Limit(MHz) (Carrier Frequencies Separation)													
GFSK	1.021	0.684													
Π/4-DQPSK	1.211	0.811													
8DPSK	1.150	0.770													

Continue on to next page...

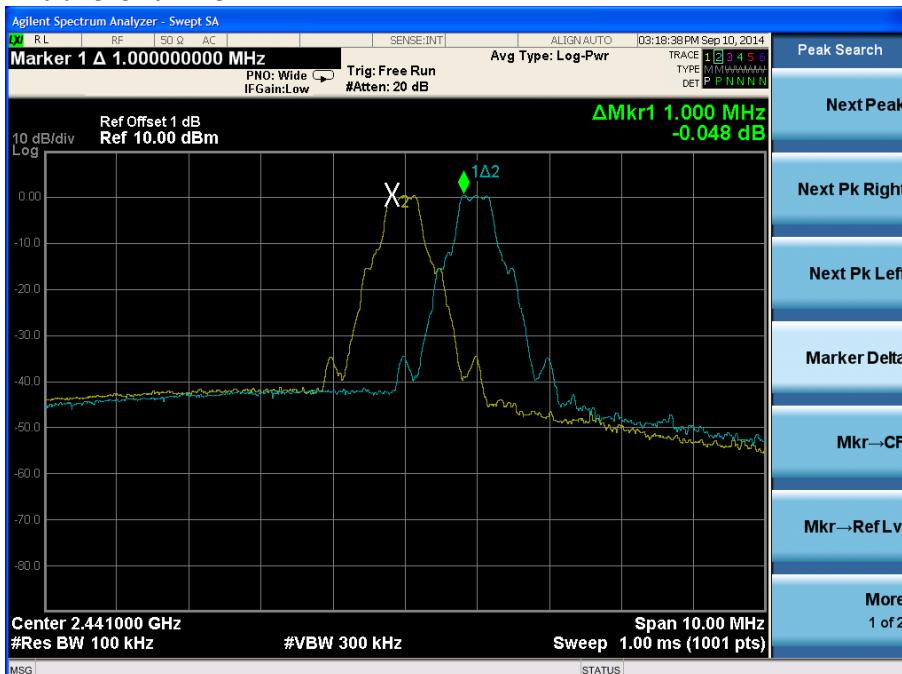
TEST VOLTAGE:	120VAC/60Hz
RESULTS:	The EUT meet the requirements of test reference for carrier frequency separation.The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.
M. UNCERTAINTY:	n/a

Test Data:
The EUT communicating with GFSK Mode:

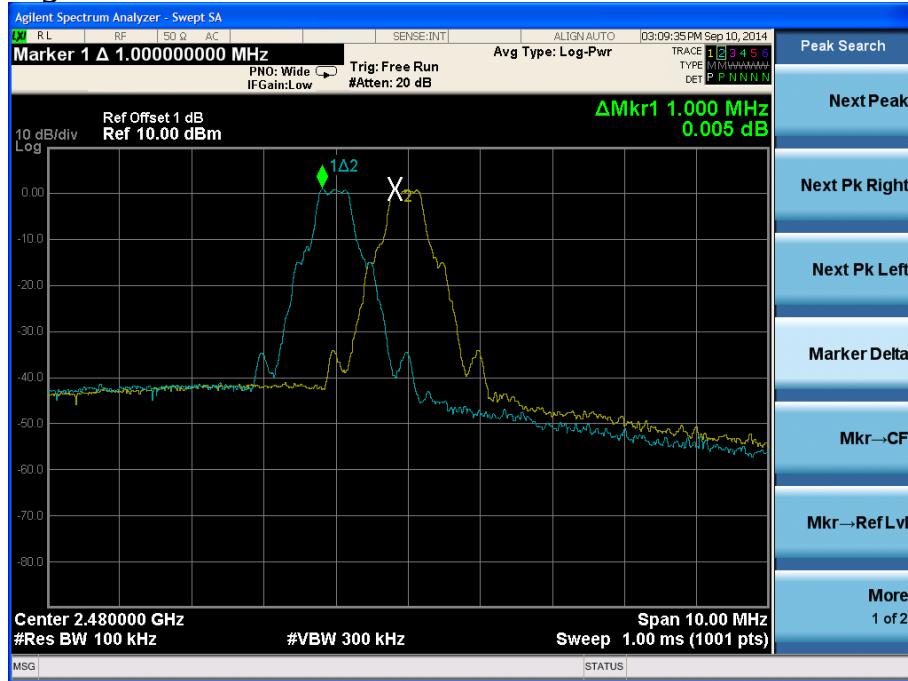
Lowest channel=2402MHz:



Middle channel=2441MHz:

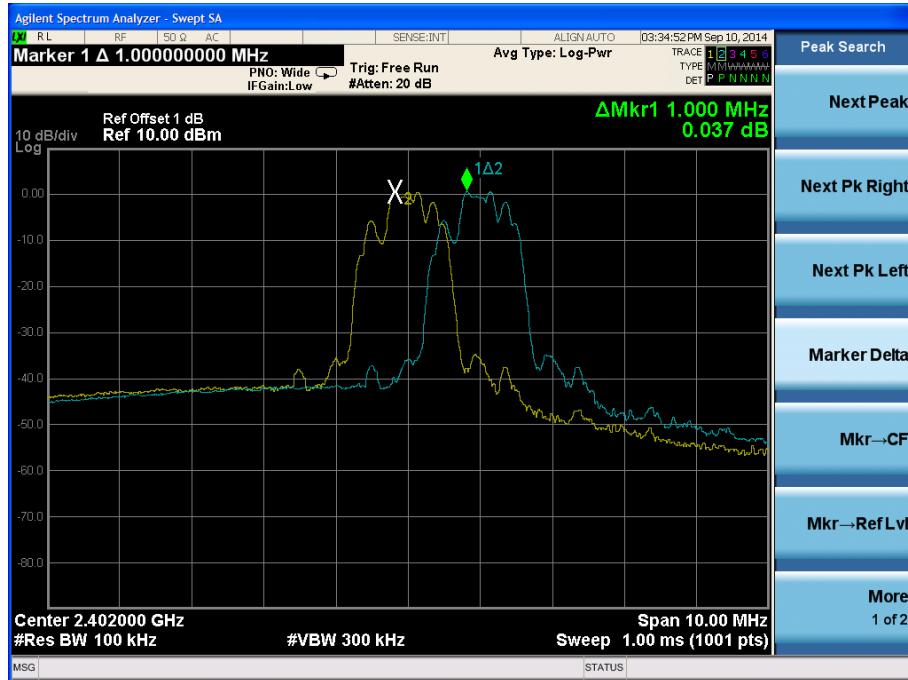


Highest channel=2480MHz:



The EUT communicating with $\Pi/4$ -DQPSK Mode:

Lowest channel=2402MHz



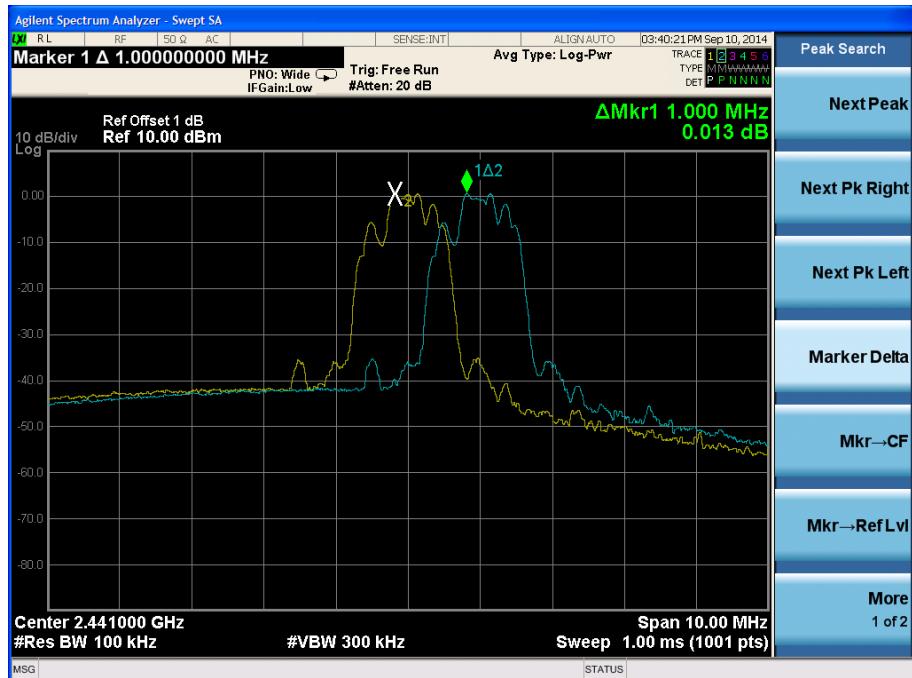
Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

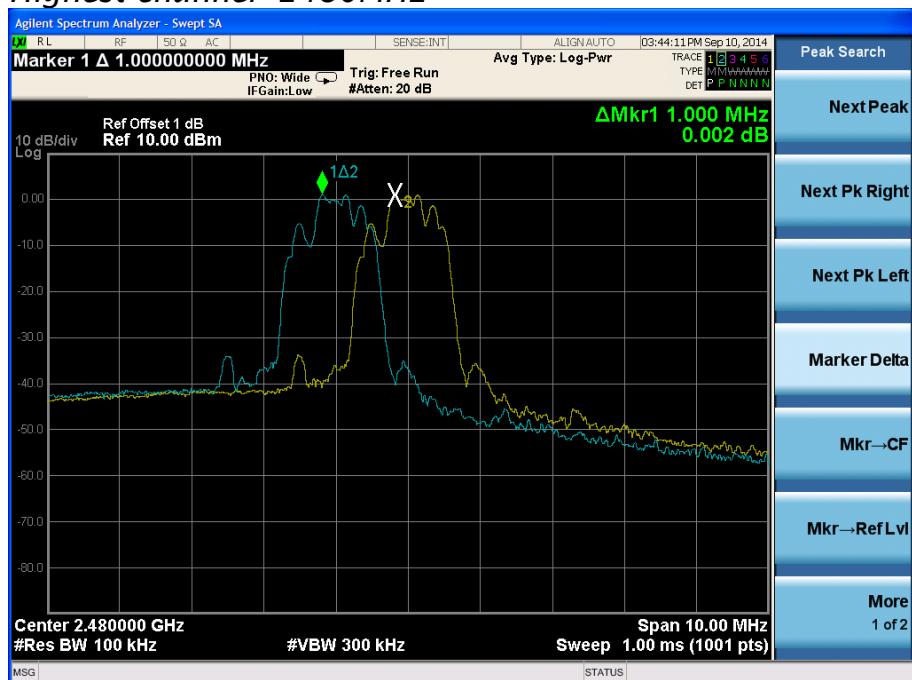
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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Middle channel=2441MHz



Highest channel=2480MHz



Test Report #: SHE-1408-11202-BT-FCC ID

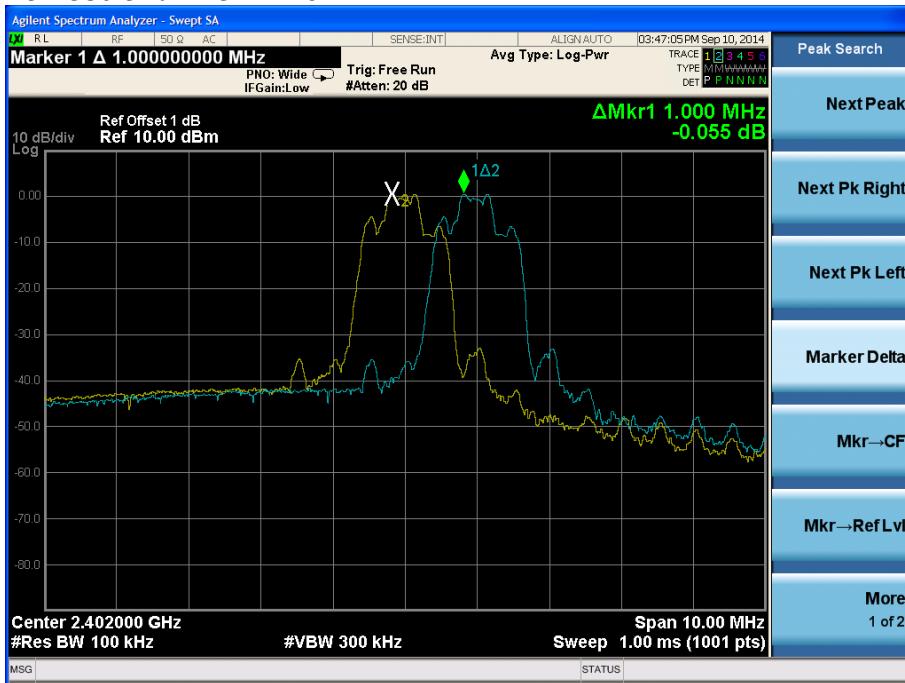
Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

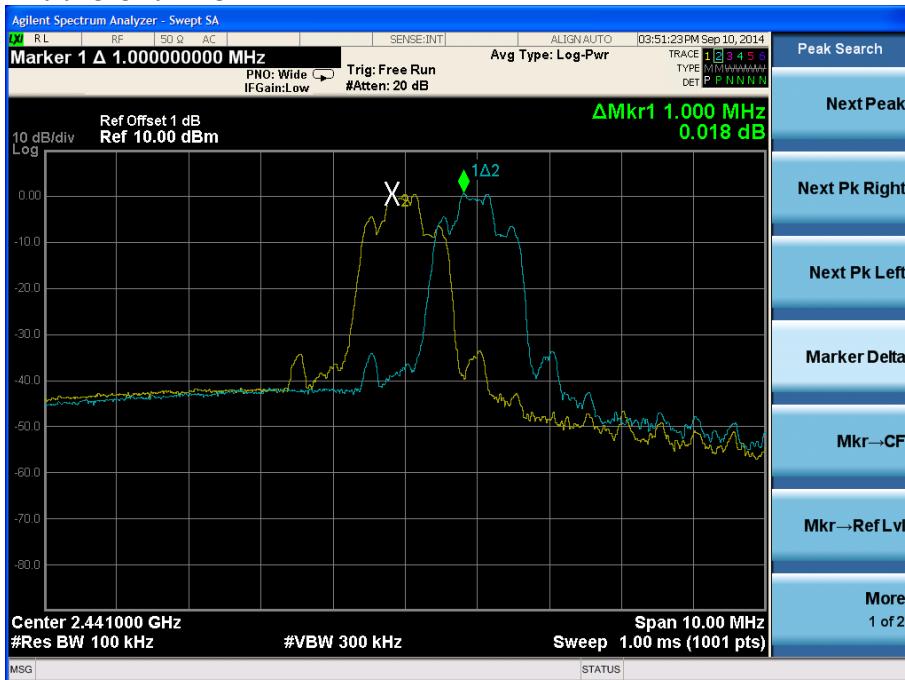
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The EUT communicating with 8DPSK Mode:

Lowest channel=2402MHz



Middle channel=2441MHz



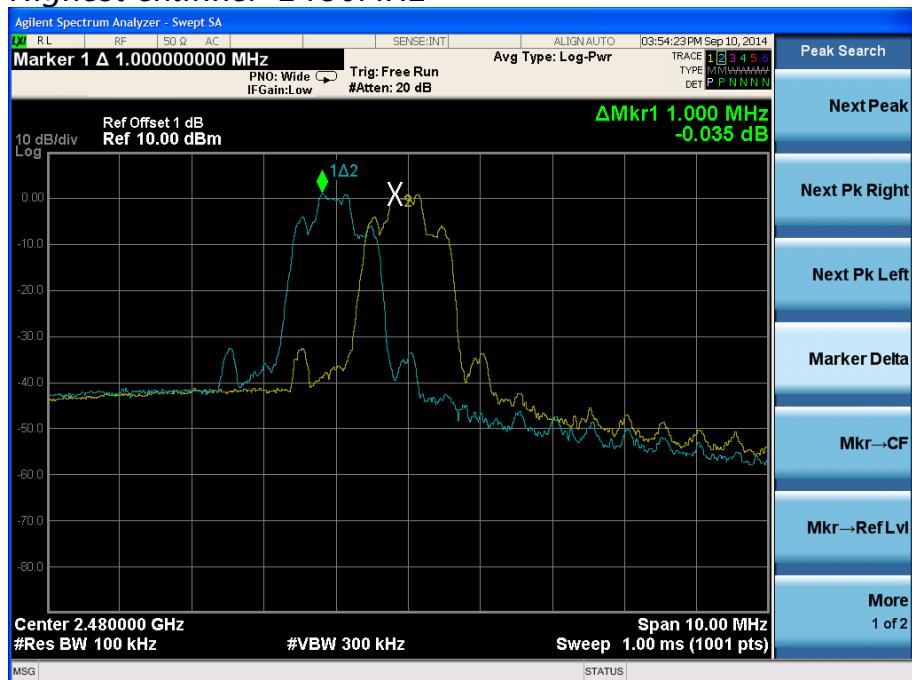
Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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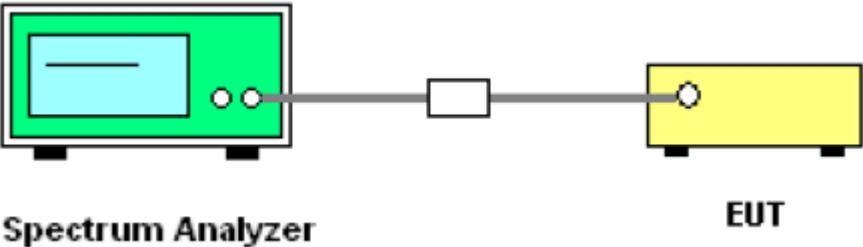
Highest channel=2480MHz



The minimum value of Carrier Frequencies Separation test is 1.000MHz > 0.811MHz

Test result: The unit does meet the requirements.

ATTACHMENT 7 - NUMBER OF HOPPING FREQUENCIES

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	FCC 15.247(b)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep. 10 th , 2014
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.		
DESCRIPTIONS OF TEST MODE:	Bluetooth transmit with hopping mode		
EQUIPMENT SETUP:	RBW=100kHz, VBW=300kHz (Peak detector)		
TEST SETUP:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
LIMITS:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for Number Of Hopping Frequencies .The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	n/a		

Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

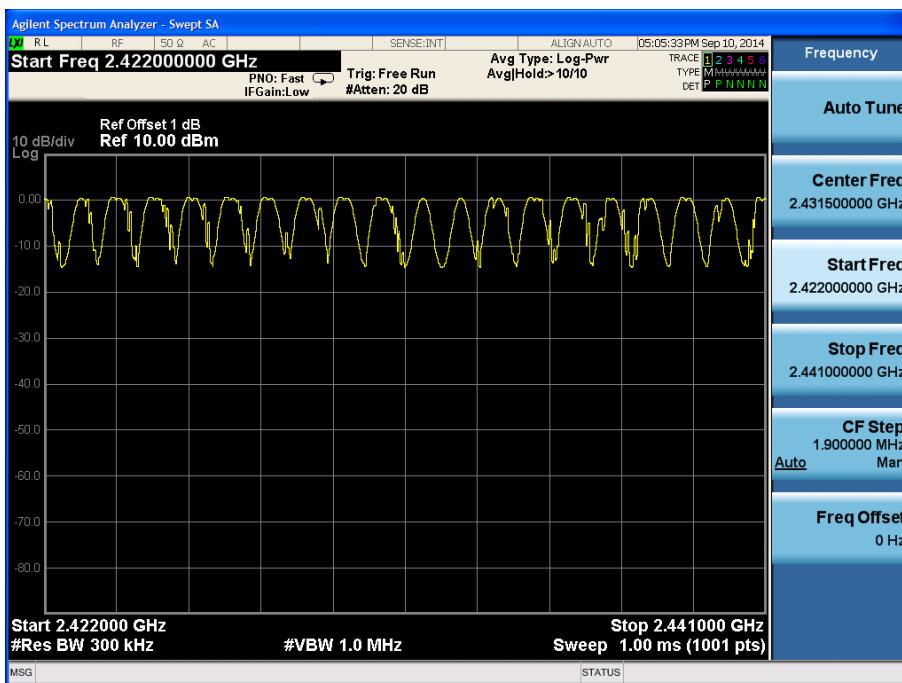
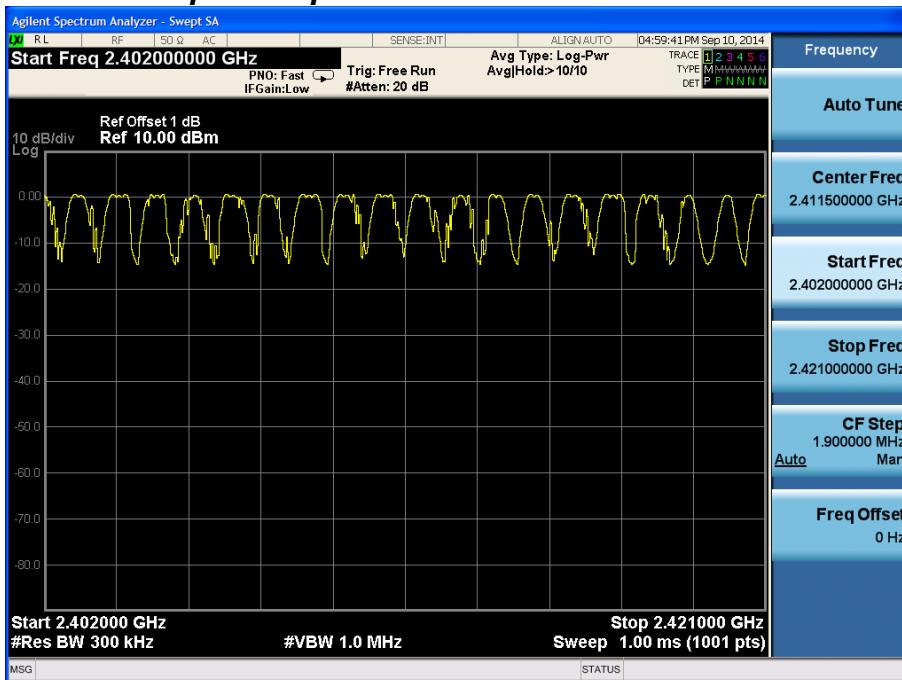
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Test Data:

<i>Numbers Of Hopping channels(Channel)</i>	<i>Minimum Limit</i>	<i>Pass/Fail</i>
79	15	pass

Test result: The unit does meet the requirements.

Test result plot as follows:

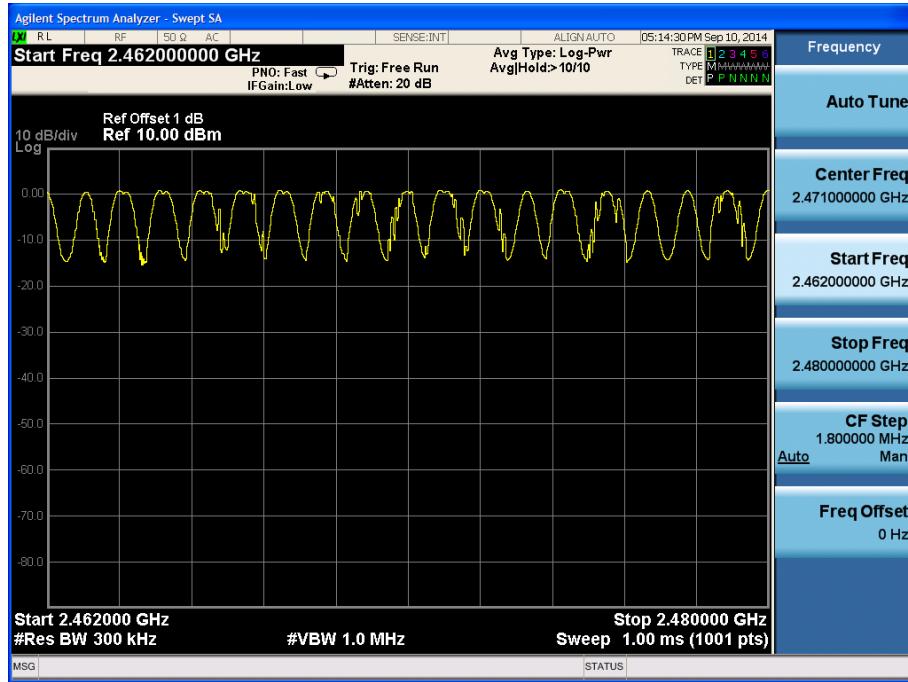
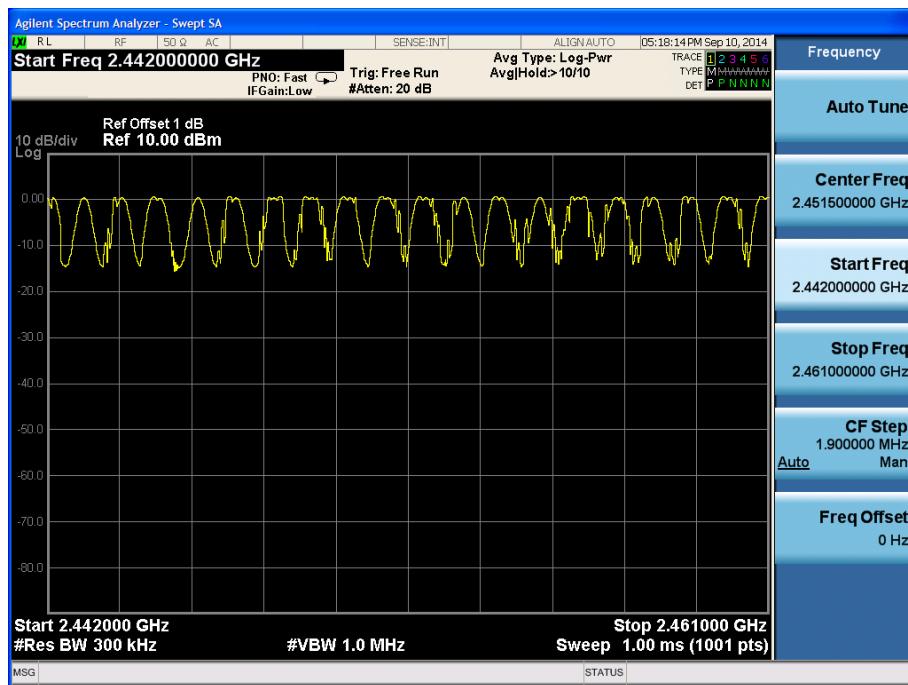


Test Report #: SHE-1408-11202-BT-FCC ID

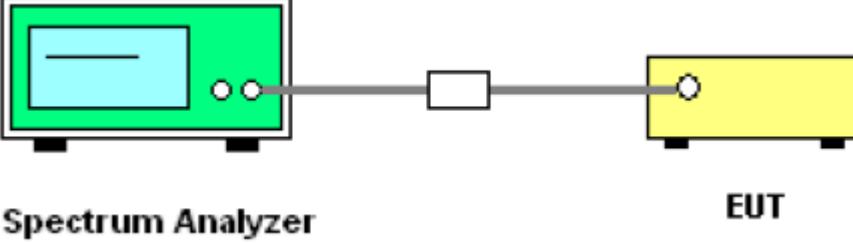
Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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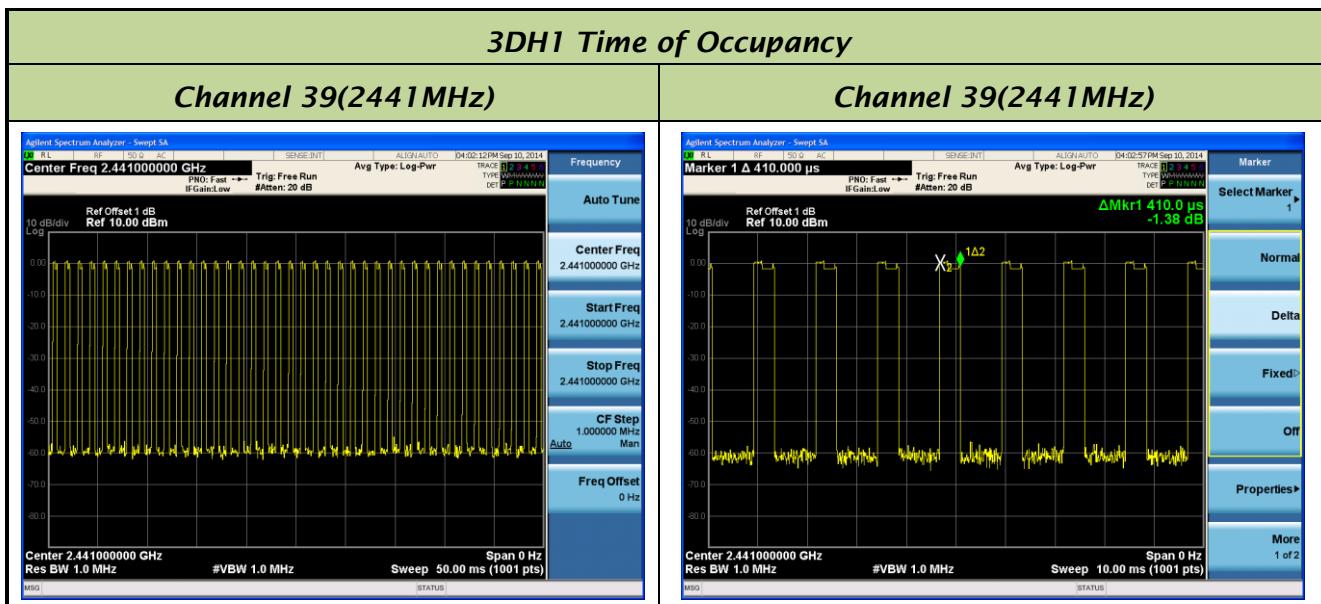
ATTACHMENT 8 - TIME OF OCCUPY(DWELL TIME)

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	FCC 15.247(a)(1)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep.10 th , 2014
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.		
DESCRIPTIONS OF TEST MODE:	Bluetooth transmit with hopping mode		
EQUIPMENT SETUP:	RBW=1MHz,VBW=3MHz (Peak detector); Span=0		
TEST SETUP:	 <p style="text-align: center;">Spectrum Analyzer</p> <p style="text-align: right;">EUT</p>		
LIMITS:	≤ 0.4Second		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for Time of Occupy.The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	n/a		

Test Data:

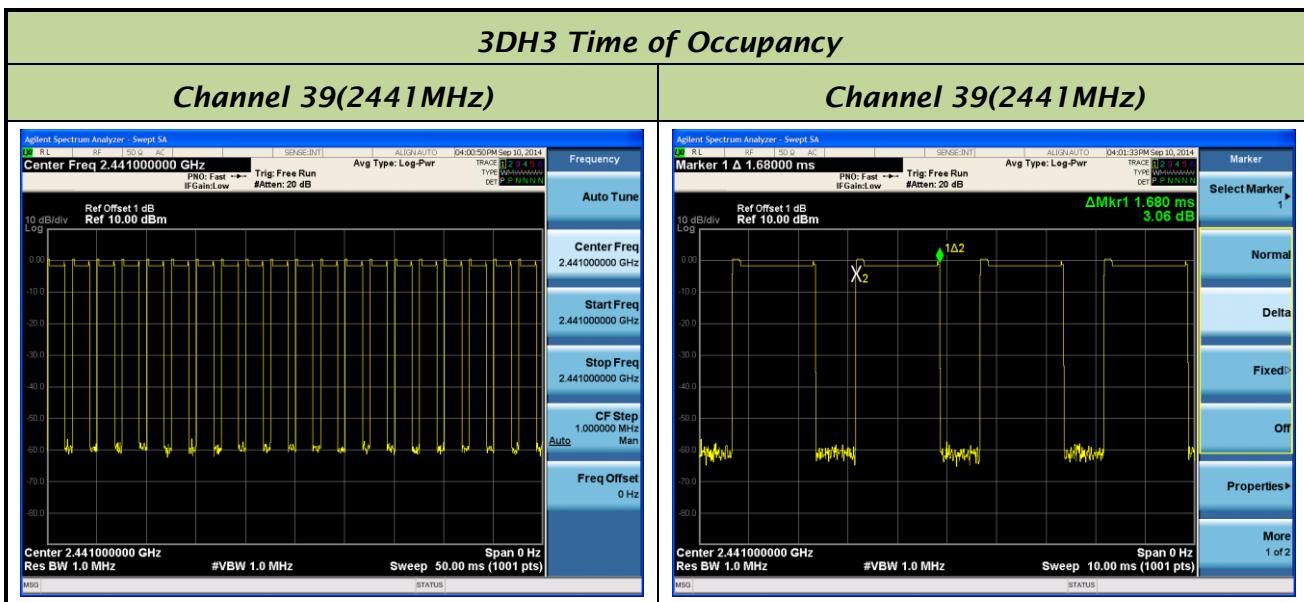
Packet	Channel No.	Dwell time(ms)	Limit(ms)	Pass/Fail
3DH1	39	131.20	400	Pass
3DH3	39	268.80	400	Pass
3DH5	39	327.04	400	Pass

Test result plot as follows:

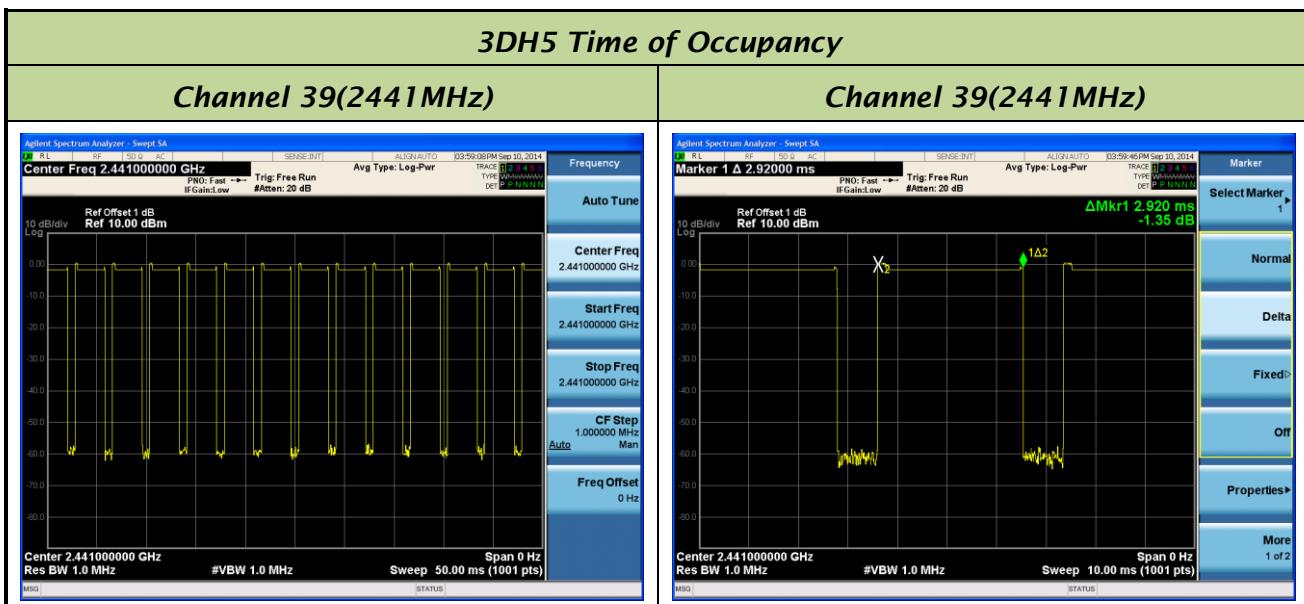


Note: Test Time Period: $0.4\text{sec} \times 79 = 31.6\text{sec}$, Hopping Times Within 1sec:
 $40/50\text{msec} = 800 \text{ hops/sec.}$

The Maximum Occupancy Time within 31.6sec:
 $[(0.410\text{ms} \times 800)/79] \times 31.6 = 131.20 \text{ msec.}$



Note: Test Time Period: $0.4 \times 79 = 31.6$ sec, Hopping Times Within 1sec:
 $20/50\text{msec} = 400\text{hops/sec}$. The Maximum Occupancy Time within
 $31.6\text{sec}: [(1.68\text{ms})^*400]/79] * 31.6 = 268.80\text{ msec}$.



Note: Test Time Period: $0.4 \times 79 = 31.6$ sec, Hopping Times Within 1sec:
 $14/50\text{msec} = 280\text{ hops/sec}$. The Maximum Occupancy Time within
 $31.6\text{sec}: [(2.920\text{ms})^*280]/79] * 31.6 = 327.04\text{ msec}$.

ATTACHMENT 9 – BAND EDGE AND CONDUCTED SPURIOUS MEASUREMENT

CLIENT:	Grandstream Networks, Inc.	TEST STANDERD:	Section 15.247(d)
MODEL NUMBERS:	GXP2130	PRODUCT:	IP Phone
EUT MODEL:	GXP2130	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Andy Zhu	DATE OF TEST:	Sep. 10 th , 2014
TEST REFERENCE:	ANSI C63.4:2009 and KDB DA 00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4:2009, tested to FHSS test procedure of KDB DA 00-705 for compliance to FCC 47CFR 15.247 requirements.		
DESCRIPTIONS OF TEST MODE:	Bluetooth in transmit mode		
EQUIPMENT SETUP:	RBW=100 KHz, VBW=300 KHz (Peak detector)		
TEST SETUP:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
LIMITS:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meet the requirements of test reference for Band Edge and Conduted spurious emissions Measurement.The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 1.5 dB		

Test Data:

Test result plot as follows:



Conducted Spurious test in GFSK mode(DH5)

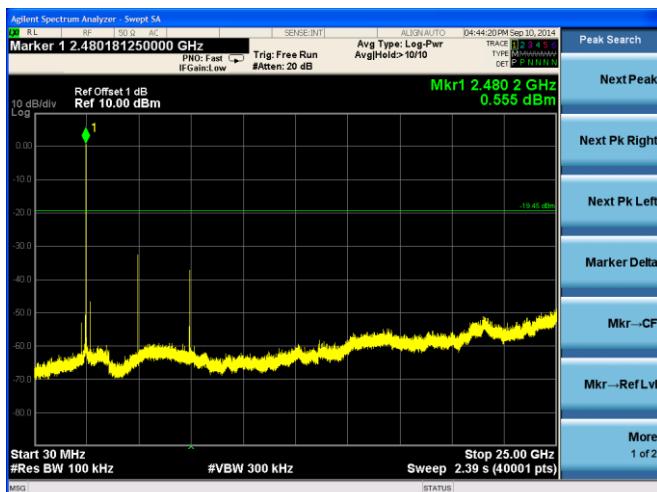
Transmitting mode in lowest channel=2402MHz



Transmitting mode in middle channel=2441MHz



Transmitting mode in highest channel=2480MHz

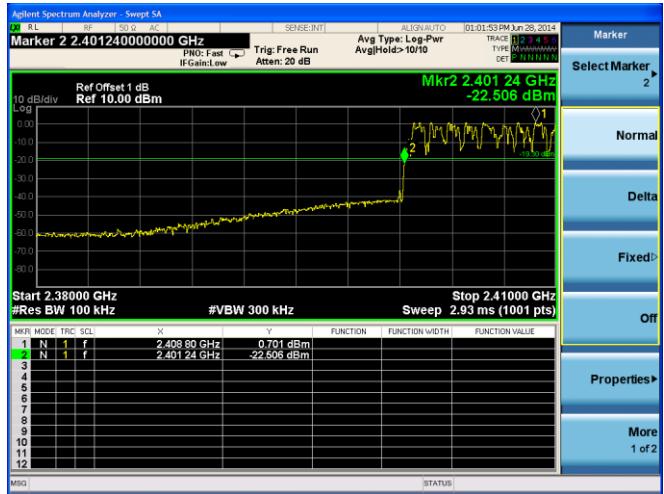


Band Edge test in $\pi/4$ -DQPSK mode(DH5)

Transmitting mode in lowest channel=2402MHz



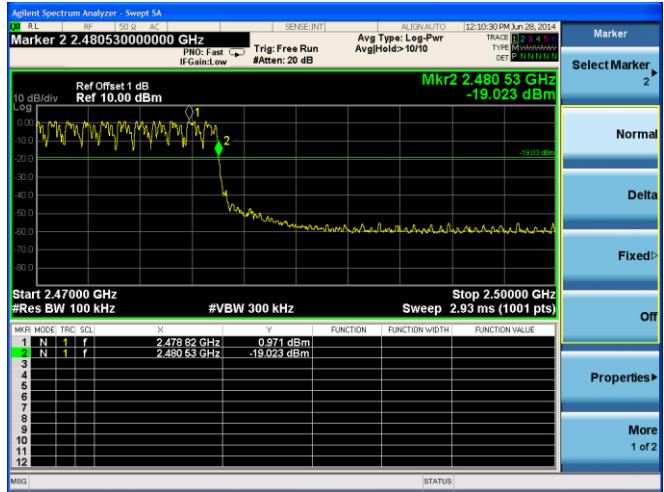
Hopping mode in lowest channel=2402MHz



Transmitting mode in highest channel=2480MHz



Hopping mode in high channel=2480MHz



Conducted Spurious test in $\Pi/4$ -DQPSK mode(DH5)

Transmitting mode in lowest channel=2402MHz



Transmitting mode in middle channel=2441MHz



Transmitting mode in highest channel=2480MHz



/

Band Edge test in 8DPSK mode(DH5)

Transmitting mode in lowest channel=2402MHz



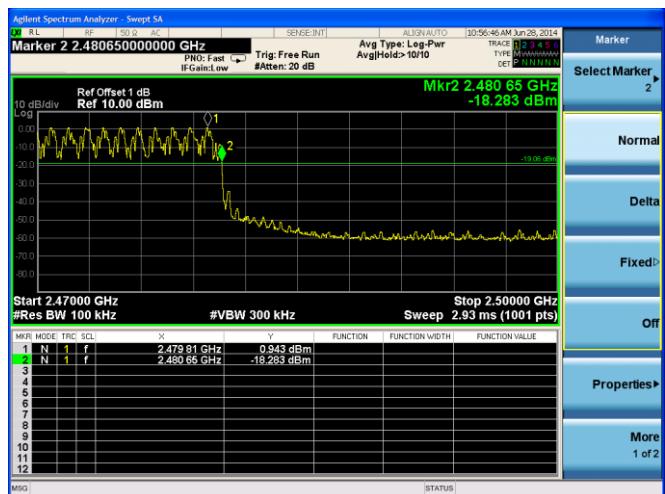
Hopping mode in lowest channel=2402MHz



Transmitting mode in highest channel=2480MHz



Hopping mode in high channel=2480MHz



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Conducted Spurious test in 8DPSK mode(DH5)

Transmitting mode in lowest channel=2402MHz



Transmitting mode in middle channel=2441MHz



Transmitting mode in highest channel=2480MHz



ATTACHMENT 10 -RF EXPOSURE COMPLIANCE

Standard requirement

15.247(i) requirement:

(i) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

EUT RF Exposure

The Max Conducted Peak Output Power is 1.633dBm (0.00146 Watts) in the highest channel (2.480GHz) at $\pi/4$ -DQPSK Mode ;

The best case gain of the antenna is 2dBi.

2dBi logarithmic terms convert to numeric result is nearly 1.58.

MPE Calculation Method:

$$E \text{ (V/m)} = (30 * P * G) / d \quad \text{Power Density: } S \text{ (mW/m}^2\text{)} = E^2 / 377$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$S = (30 * P * G) / (377 * d^2) = (30 * 0.00146 * 1.58) / 377 * 0.02 = 0.0046 \text{ (mW/cm}^2\text{)}$$

From the peak EUT RF output power, the minimum mobile separation distance $d=0.2m$, as well as the gain of the used antenna, the RF power density can be obtained.

Test Result:

Channel (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (W)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2402	1.58	1.633	0.00146	0.0046	1.0	Compliant

The unit does meet the requirement.

ATTACHMENT 11 -TEST SET-UP PHOTOGRAPH



Conducted Emission Test Set-up- Front View



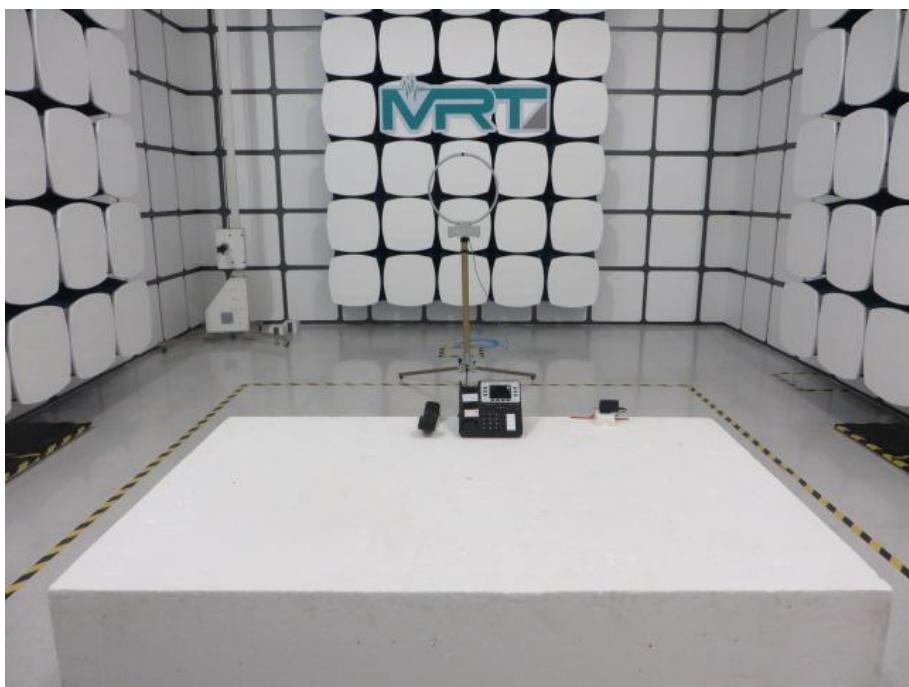
Conducted Emission Test Set-up- Rear View

Test Report #: SHE-1408-11202-BT-FCC ID

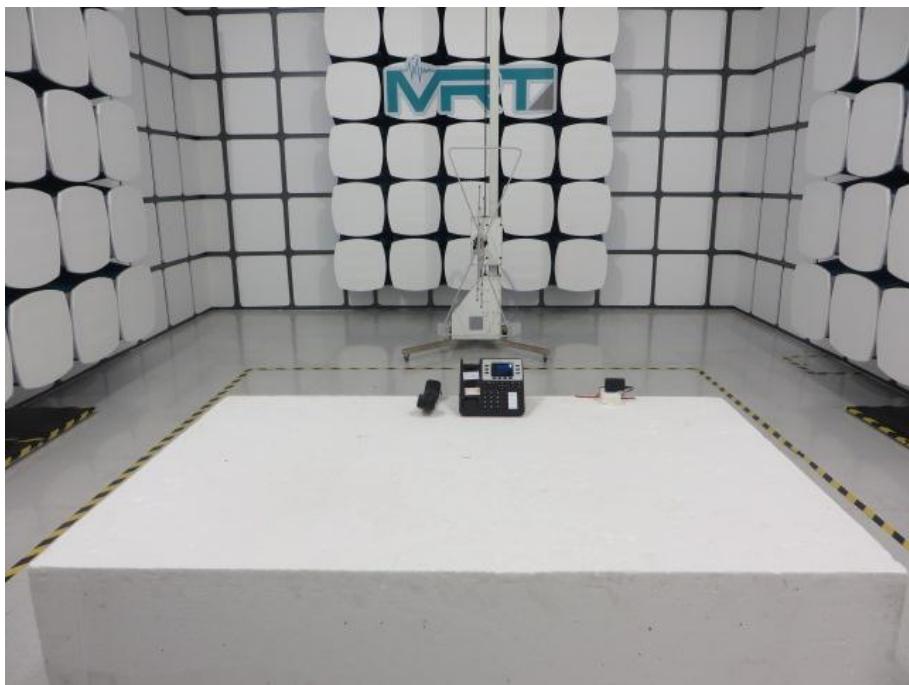
Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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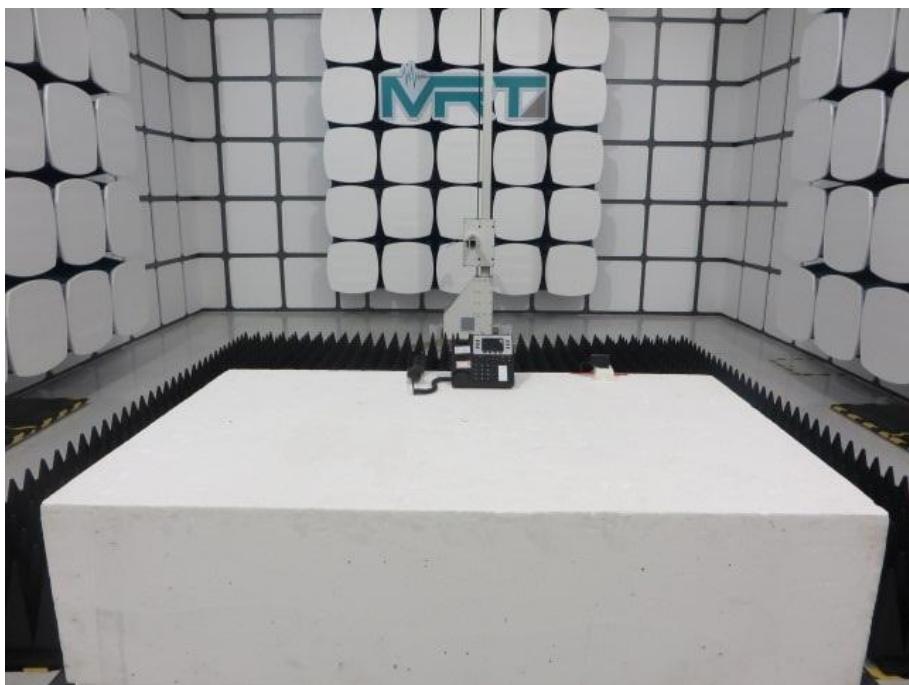
Radiated Emission Test Set-up (9KHz-30MHz)



Radiated Emission Test Set-up (30-1000MHz)



Radiated Emission Test Set-up (1-18GHz)



Radiated Emission Test Set-up (18-40GHz)

※※※ **End Of Report** ※※※

Test Report #: SHE-1408-11202-BT-FCC ID

Prepared for Grandstream Networks, Inc.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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