

FCC WIRELESS EQUIPMENT TEST&MEASUREMENT REPORT

On Model Name: IP Multimedia Phone

Model Numbers: GXV3240

Brand Name: Grandstream

FCC ID Number: YZZGXV3240

Prepared for Grandstream Networks, INC.

Test Specification: FCC Part 15, Subpart C

Test Report #: SHE-1402-11114-BT-FCC ID

Tested by: Daomen Galanz
Daomen/Engineer Company Name

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Jawen Yin/Senior Engineer Company Name

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Swall Zhang/QC Manager Company Name

Test Report Released by: Swall Zhang March 20th, 2014
Swall Zhang Date

List of Attached Files

Exhibit Type	File Description	File Name
<i>Test Report</i>	<i>Test Report</i>	<i>YZZGXV3240 _FHSS Test report.pdf</i>
<i>Operation Description</i>	<i>Technical Description</i>	<i>YZZGXV3240 _Operation Description.pdf</i>
<i>External Photos</i>	<i>External Photos</i>	<i>YZZGXV3240 _External Photos.pdf</i>
<i>Internal Photos</i>	<i>Internal Photos</i>	<i>YZZGXV3240 _Internal Photos.pdf</i>
<i>Block Diagram</i>	<i>Block Diagram</i>	<i>YZZGXV3240 _Block Diagram.pdf</i>
<i>Schematics</i>	<i>Circuit Diagram</i>	<i>YZZGXV3240 _Schematics.pdf</i>
<i>ID Label/Location</i>	<i>Label and Location</i>	<i>YZZGXV3240 _Label & Location.pdf</i>
<i>User Manual</i>	<i>User Manual</i>	<i>YZZGXV3240 _User Manual.pdf</i>
<i>Test Setup Photos</i>	<i>Test Setup Photos</i>	<i>YZZGXV3240 _Test Setup Photos.pdf</i>

Test Location

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

Test Site Location : Galanz

*25 South Ronggui Rd., Shunde,
Foshan, Guangdong, China*

Tel : (86)-757-23612785

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Test Facility

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

- **CNAL – LAB Code: L2244**

Galanz EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC – Registration No.: 580210**

Galanz EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC was maintained in our files.

List of Test and Measurement Instruments

No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated Untill
01	Shielding Room	ETS	N/A	N/A	2014-10-25
02	Spectrum Analyzer (9KHz-30GHz)	R&S	FSP30	100755	2014-10-25
03	EMI Receiver	SCHAFFNER	SMR4503	11725	2014-10-25
04	LISN	ETS	4825/2	1161	2014-10-25
05	Coaxial Cable	ATC-Lab	N/A	N/A	2014-10-25
06	Double-ridged Wave guide horn	ETS	3115	6587	2014-10-25
07	Double-ridged Wave guide horn	ETS	3160	00052486	2014-10-25
08	Microwave system amplifier (0.5G-26.5G)	Agilent	83017A	MY39500438	2014-10-25
09	Band-pass Filter	Micro-Tronic	BRM50702	S/N-030	2014-10-25
10	Biconilog Antenna	ETS	3142C	00042672	2014-10-25
11	Semi-anechoic Chamber	ETS	N/A	N/A	2014-10-25

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 result in additional deviation.

Administrative Data

Test Sample : *IP Multimedia Phone*

Model Number : *GXV3240*

Model Tested : *GXV3240*

Date Of Received : *March 5, 2014*

Date Tested : *March 13 to 16, 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*

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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 GXV3240 (referred to as the EUT in this report) is an IP Multimedia Phone.

The EUT is an IP Multimedia Phone with IEEE 80211.b/g/n(1T1R) and Bluetooth Radio functionalities. Technical specifications of the EUT are as follows:

Parameters		Ranges
Basic parameters	Rated voltage	DC +12V
	Rated Current	DC 1.5A
Specifications of Bluetooth	Operating band	2402-2480MHz
	Modulation Techniques	FHSS
	Number of Channels:	79 channels
	Data Rate	GFSK (1Mbps), $\pi/4$ -DQPSK (2Mbps), 8DPSK (3Mbps)
	Type of modulation:	GFSK, DPSK,DQPSK
	Antenna Gain:	Small antennas with 0~2 dBi peak gain
Specifications of IEEE 802.11b/g/n	Operating band	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)
	WLAN standard	IEEE 802.11b/g/n, WiFi compliant
	Modulation	802.11b : DQPSK, DBPSK, CCK 802.11 g/n : OFDM /64-QAM, 16-QAM, QPSK, BPSK
	Number of Channels:	11 channels
	Data Rate	802.11b : 1, 2, 5.5, 11Mbps; 802.11g : 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n : 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps; 802.11n : 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65,72.2Mbps
	Output Power	802.11b /11Mbps : 16 dBm \pm 1.5 dB @ EVM -9dB; 802.11g /54Mbps : 15 dBm \pm 1.5 dB @ EVM -25dB; 802.11n /65Mbps : 14 dBm \pm 1.5 dB @ EVM -28dB
	Antenna Type	FPC Antenna, 1T1R

Continue on to next page...

Parameter		Ranges
I/O Ports	USB Port	USB devices may be connected via the USB port
	Handset Port	3.5mm stereo headset connector port
	RJ9 Headset Port	Connect headsets
	LAN Port	10/100/1000Mbps Ethernet port connect to LAN. It supports PoE.
	PC Port	10/100/1000Mbps Ethernet port connect to PC.
	Power Jack	12V/5A Power Jack used to connect the power adapter
	SD Card Slot	SD card could be inserted in for picture/music/video files storage
	Mini HDMI Port	Connect the display device that supports HDMI.
	Extension Port	Connect the extension board.
Universal power supply	Input	AC 100-240V 50/60Hz,0.4A
	Output	DC 12V,1.5A
	Model	SFF1200150A1BY
	Trademark	Mass power

Note:For more detailed information's or features please refer to user's manual of EUT.

Working Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	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	2447	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	2447	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	---	

Test Summary

The Electromagnetic Compatibility requirements on tested model GXV3240 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 GXV3240 has been tested to conform to the following parts of the Part 15, Subpart C as detailed belows:

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 778498	RF Exposure Compliance Requirement	Compliant	Attachment 10

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: 2447MHz

Highest channel: 2480 MHz

Description Of Available Antennas

The radio utilizes a FPC 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 Ampak RF Test Tool, VER:4.1.

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			
Model Number:	GXV3240		
Description:	IP Multimedia Phone		
Manufacturer:	Grandstream Networks, INC.		
Input Voltage:	DC 12V		
Support Equipment			
Description	Model Number	Serial Number	Manufacturer
None			

<i>Cable Description</i>					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite (Y/N)</i>
<i>Power Adapter of EUT</i>	<i>EUT</i>	<i>Plug</i>	1.8	N	N
Note: The "EUT" means "IP Multimedia Phone".					

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:

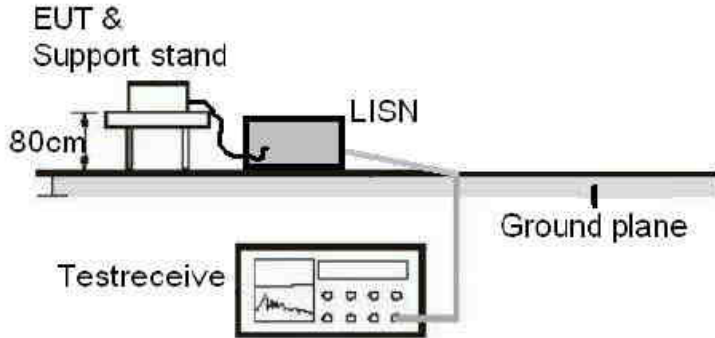
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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.

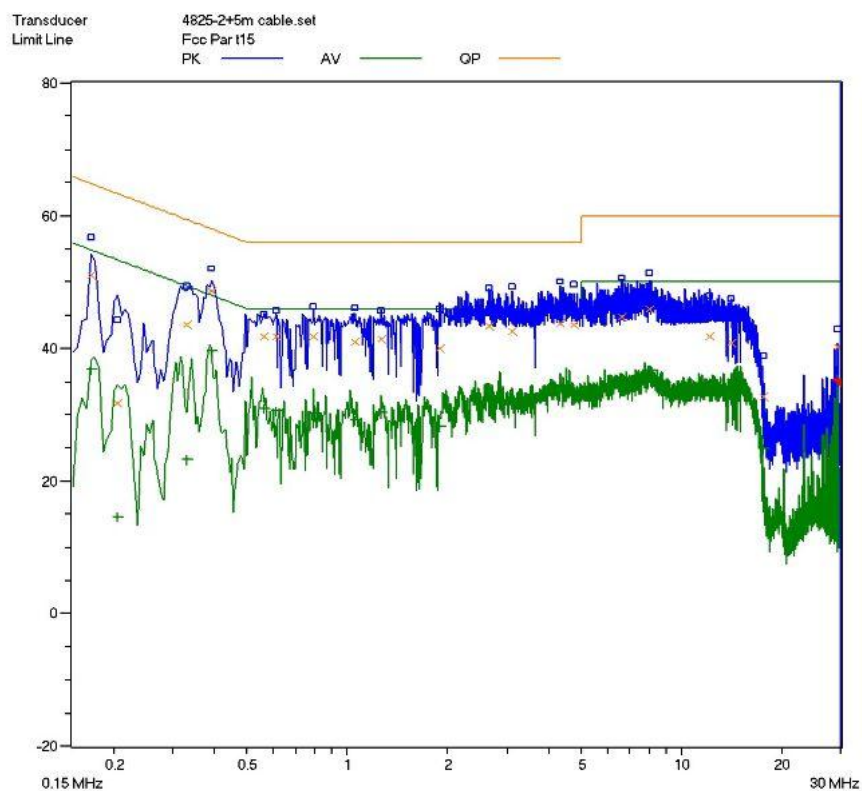
§15.247(c) (1)(i) Requirements:

(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.

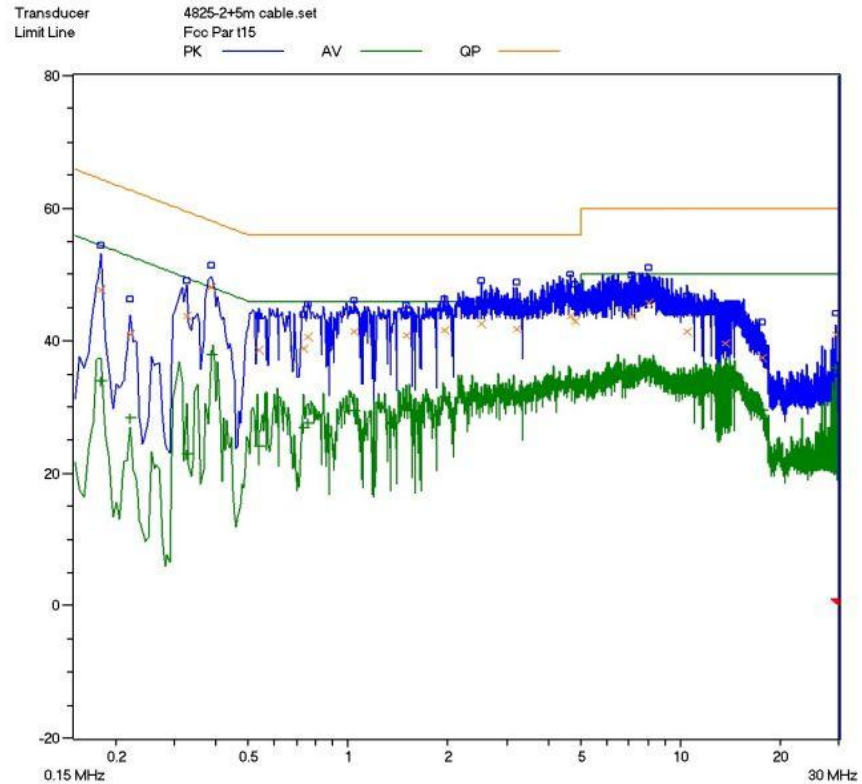
FCC Section	FCC Rules	Conclusion
§15.203& §15.207 (c) (1) (i)	<p><i>Described how the EUT complies with the requirements that either its antenna is permanently attached, or that it employ a unique antenna connector, for every antenna proposed for use with the EUT.</i></p> <p><i>The exception is in those 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"> <i>1. The application (or intended use) of the EUT.</i> <i>2. The installation requirements of the EUT.</i> <i>3. The method by which the EUT will be marketed.</i> 	<p><i>The EUT uses a FPC 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:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14, 2014
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	The EUT was set up according to the guidelines of ANSI C63.4:2003 for conducted emissions. The measurement was using a 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			
DESCRIPTIONS OF TEST MODE:	The EUT was connected to the artificial main network, and the test was performed with the EUT in BT transmit mode.		
TESTED RANGE:	150kHz to 30MHz		
TEST VOLTAGE:	120VAC/60Hz		
RESULTS:	The EUT meets the requirements of test reference for conducted emissions 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		



Line L Conducted Emission Graph



Line N Conducted Emission Graph

Test Data:

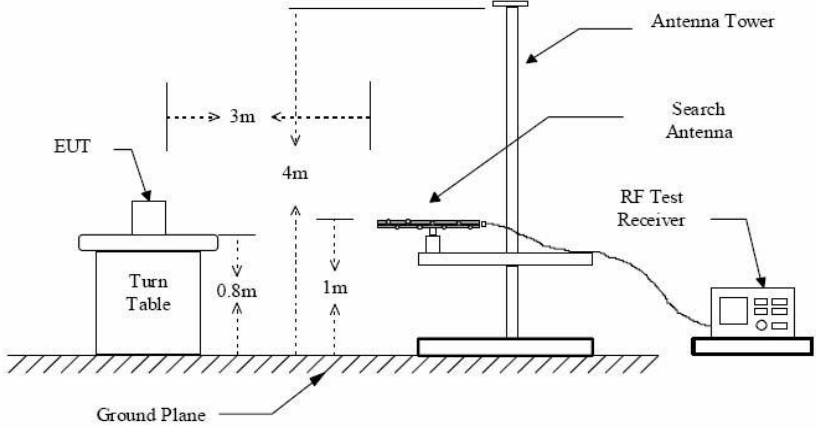
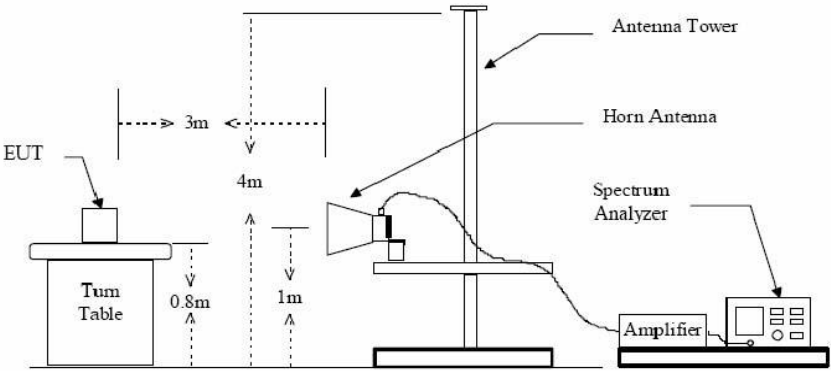
<i>Lines</i>	<i>Frequency (MHz)</i>	<i>Corrected QP Level (dBuV)</i>	<i>Limits QP (dBuV)</i>	<i>Margin QP (dB)</i>	<i>Frequency (MHz)</i>	<i>Corrected AV Level (dBuV)</i>	<i>Limits AV (dBuV)</i>	<i>Margin QP (dB)</i>
L	0.170	51.1	64.9	-13.8	0.170	36.9	54.9	-18.0
L	0.390	48.0	58.0	-10.0	0.390	39.7	48.0	-8.3
L	7.890	45.9	60.0	-14.1	7.890	36.6	50.0	-13.4
L	/	/	/	/	/	/	/	/
L	/	/	/	/	/	/	/	/
L	/	/	/	/	/	/	/	/
N	0.180	47.8	64.4	-16.6	0.180	33.9	54.4	-20.5
N	0.385	48.1	58.2	-10.1	0.385	37.8	48.2	-10.4
N	7.995	45.7	60.0	-14.3	7.995	36.6	50.0	-13.4
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:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014
TEST REFERENCE:	ANSI C63.4: 2003		
TEST PROCEDURE:	<p>The EUT was set up according to the guidelines of ANSI C63.4: 2003 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>		

<p>TEST SETUP:</p>	<p>Figure 1 : Frequencies measured below 1 GHz configuration</p>  <p>Figure 2 : Frequencies measured above 1 GHz configuration</p> 
<p>TESTED RANGE:</p>	<p>30MHz to 25GHz</p>
<p>TEST VOLTAGE:</p>	<p>120VAC/60Hz</p>
<p>RESULTS:</p>	<p>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.</p>
<p>CHANGES OR MODIFICATIONS:</p>	<p>There were no modifications installed by ECMG Electronic Technical Testing Corp (Shenzhen) test personnel.</p>
<p>M. UNCERTAINTY:</p>	<p>Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB</p>

Radiated Emission Below 1GHz:

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

<i>Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Reading Level (dBuV/m)</i>	<i>Ant./CL/ Amp. CF</i>	<i>Emission Level (dBuV/m)</i>	<i>QP Limit (dBuV/m)</i>	<i>Over Limit(dB)</i>	<i>Pass/Fail</i>
35.600	H	7.90	16.70	24.60	40	-15.40	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
30.8000	V	18.90	16.20	35.10	40	-4.90	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.*

Radiated Emission Above 1GHz:

Pre-scan the EUT in GFSK, $\pi/4$ -DQPSK and 8DPSK with transmitting and find out the worst case is GFSK mode 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
1045.000	H	43.25	-5.05	38.20	74	-35.80	Pass
4804.000	H	41.33	6.10	47.43	74	-26.57	Pass
7206.000	H	41.26	11.80	53.06	74	-20.94	Pass
-	-	-	-	-	-	-	-
1045.000	V	43.87	-5.05	38.82	74	-35.18	Pass
4804.000	V	41.02	6.10	47.12	74	-26.88	Pass
7206.000	V	42.36	11.80	54.16	74	-19.84	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
1045.000	H	31.44	-5.05	26.39	54	-27.61	Pass
4804.000	H	28.74	6.10	34.84	54	-19.16	Pass
7206.000	H	30.12	11.80	41.92	54	-12.08	Pass
-	-	-	-	-	-	-	-
1045.000	V	32.16	-5.05	27.11	54	-26.89	Pass
4804.000	V	28.80	6.10	34.90	54	-19.10	Pass
7206.000	V	30.05	11.80	41.85	54	-12.15	Pass
-	-	-	-	-	-	-	-

Transmitting mode (GFSK mode Middle channel=2447MHz)

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
1048.000	H	42.33	-5.05	37.28	74	-36.72	Pass
4894.000	H	40.98	6.10	47.08	74	-26.92	Pass
7341.000	H	41.28	11.92	53.20	74	-20.80	Pass
-	-	-	-	-	-	-	-
1048.000	V	43.20	-5.05	38.15	74	-35.85	Pass
4894.000	V	40.17	6.10	46.27	74	-27.73	Pass
7341.000	V	41.42	11.92	53.34	74	-20.66	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
1048.000	H	32.69	-5.05	27.64	54	-26.36	Pass
4894.000	H	28.75	6.10	34.85	54	-19.15	Pass
7341.000	H	31.33	11.92	43.25	54	-10.75	Pass
-	-	-	-	-	-	-	-
1048.000	V	32.67	-5.05	38.15	54	-26.38	Pass
4894.000	V	28.33	6.10	46.27	54	-19.57	Pass
7341.000	V	31.54	11.92	53.34	54	-10.54	Pass
-	-	-	-	-	-	-	-

Transmitting mode (GFSK mode Highest channel=2480MHz)

Peak Measurement:

<i>Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Reading Level (dBuV/m)</i>	<i>Ant./CL/ Amp. CF</i>	<i>Emission Level (dBuV/m)</i>	<i>PK Limit (dBuV/m)</i>	<i>Over Limit(dB)</i>	<i>Pass/Fail</i>
1042.000	H	43.33	-5.05	38.28	74	-35.72	Pass
4960.000	H	40.29	6.10	46.39	74	-27.61	Pass
7440.000	H	42.15	12.10	54.25	74	-19.75	Pass
-	-	-	-	-	-	-	-
1042.000	V	42.67	-5.05	37.62	74	-36.38	Pass
4960.000	V	40.08	6.10	46.18	74	-27.82	Pass
7440.000	V	42.31	12.10	54.41	74	-19.59	Pass
-	-	-	-	-	-	-	-

Average Measurement:

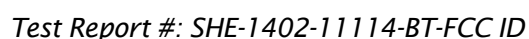
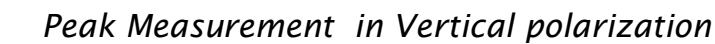
<i>Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Reading Level (dBuV/m)</i>	<i>Ant./CL/ Amp. CF</i>	<i>Emission Level (dBuV/m)</i>	<i>PK Limit (dBuV/m)</i>	<i>Over Limit(dB)</i>	<i>Pass/Fail</i>
1042.000	H	33.52	-5.05	28.47	54	-25.53	Pass
4960.000	H	28.96	6.10	35.06	54	-18.94	Pass
7440.000	H	31.42	12.10	43.52	54	-10.48	Pass
-	-	-	-	-	-	-	-
1042.000	V	32.18	-5.05	27.13	54	-26.87	Pass
4960.000	V	28.47	6.10	34.57	54	-19.43	Pass
7440.000	V	31.09	12.10	43.19	54	-10.81	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.*

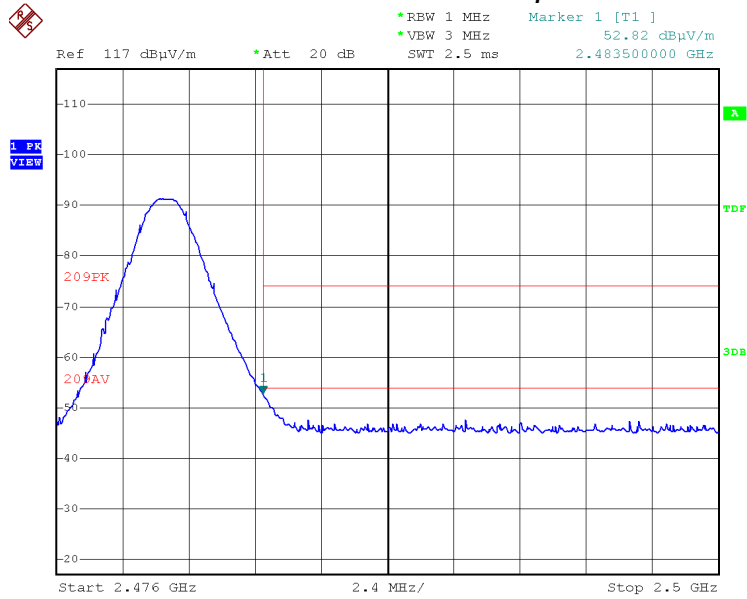
Pre-scan the EUT in GFSK, $\pi/4$ -DQPSK and 8DPSK with transmitting mode and find out the worst case is GFSK mode in transmitting.

Peak Measurement in Horizontal polarization:

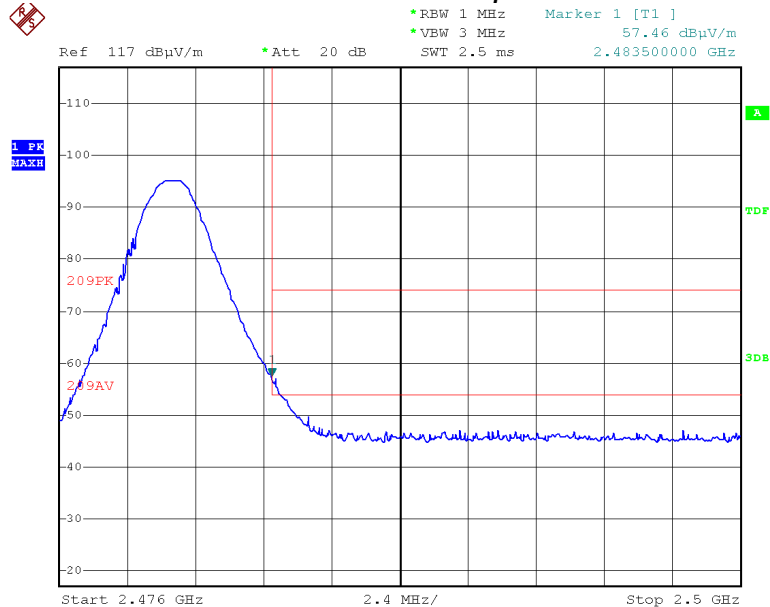


Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

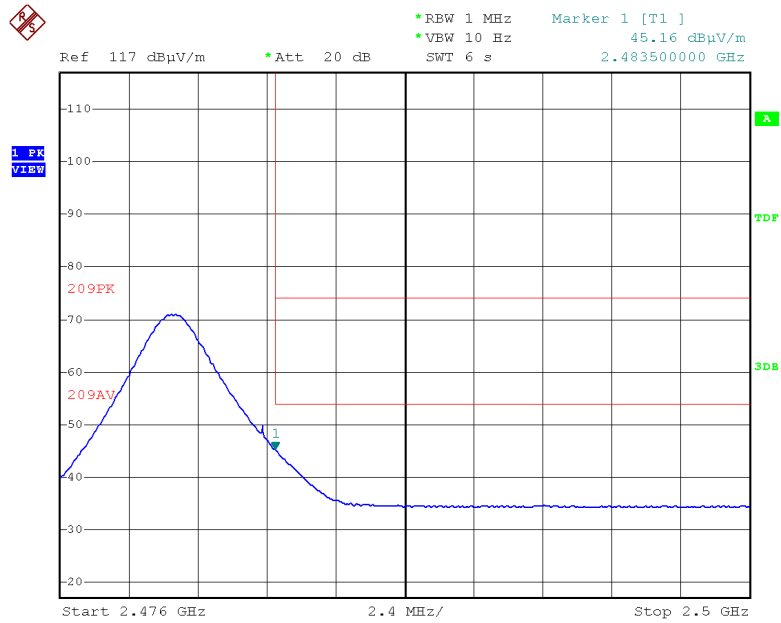
Transmitting with GFSK mode (Highest channel=2480MHz) Peak Measurement in Horizontal polarization:



Peak Measurement in Vertical 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:

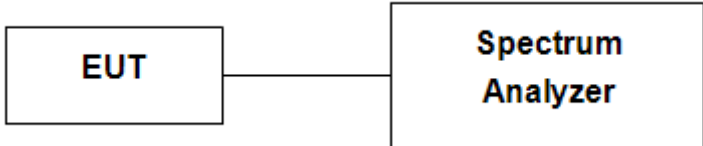
Section 15.205(a) Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 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:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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:			
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:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

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	-2.72	1.0	-1.72	30	-31.72
2447	-4.58	1.0	-3.58	30	-33.58
2480	-4.89	1.0	-3.89	30	-33.89

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	-2.48	1.0	-1.48	30	-31.48
2447	-4.22	1.0	-3.22	30	-33.22
2480	-4.28	1.0	-3.28	30	-33.28

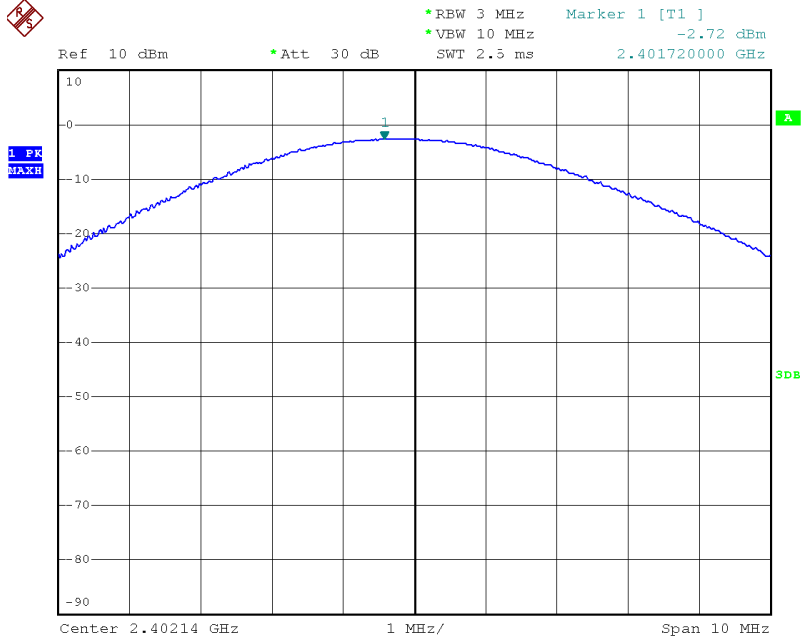
For EUT communicating with 8DPSK Mode:

Channel Frequency (MHz)	Peak output Power (dBm)	Cable Loss (dB)	Power Level (dBm)	Limit (dBm)	Over Limit(dB)
2402	-2.45	1.0	-1.45	30	-31.45
2447	-4.13	1.0	-3.13	30	-33.13
2480	-3.76	1.0	-2.76	30	-32.76

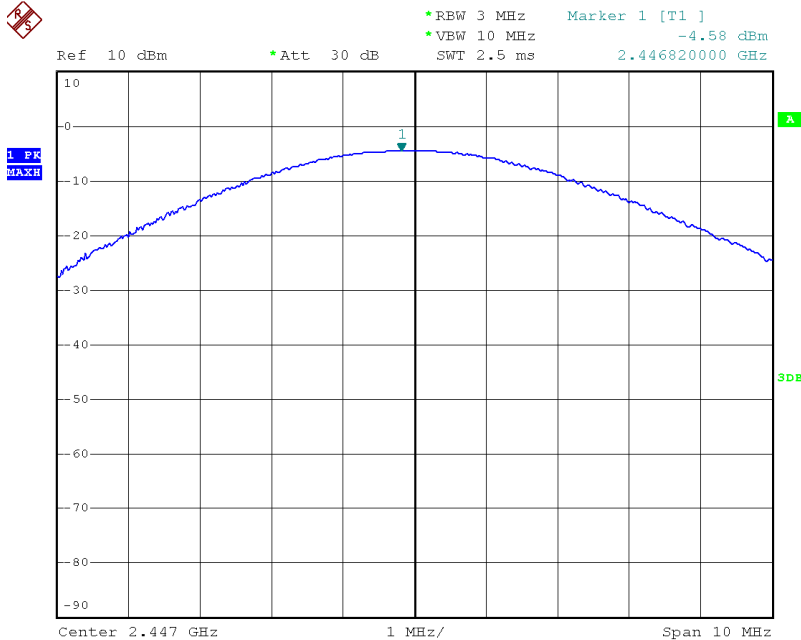
Test result plot as follows:

The EUT communicating with GFSK Mode

Lowest channel=2402MHz:



Middle channel=2447MHz



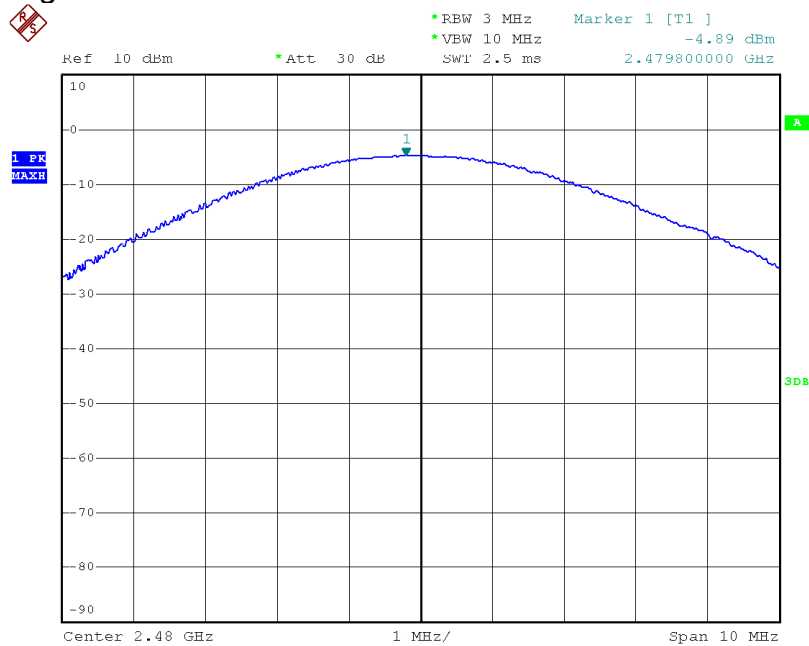
Test Report #: SHE-1402-11114-BT-FCC ID

Prepared for Shenzhen Grandstream Networks, INC.

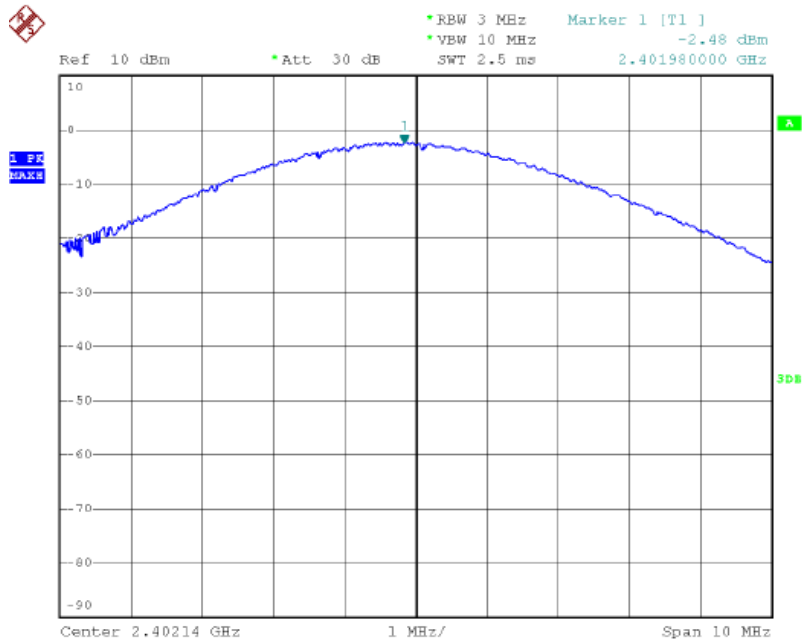
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

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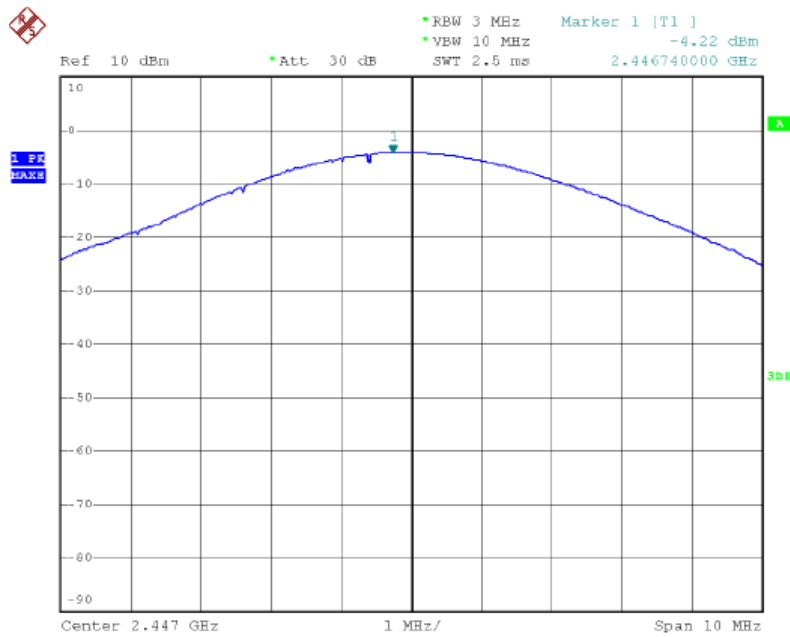
Highest channel=2480MHz



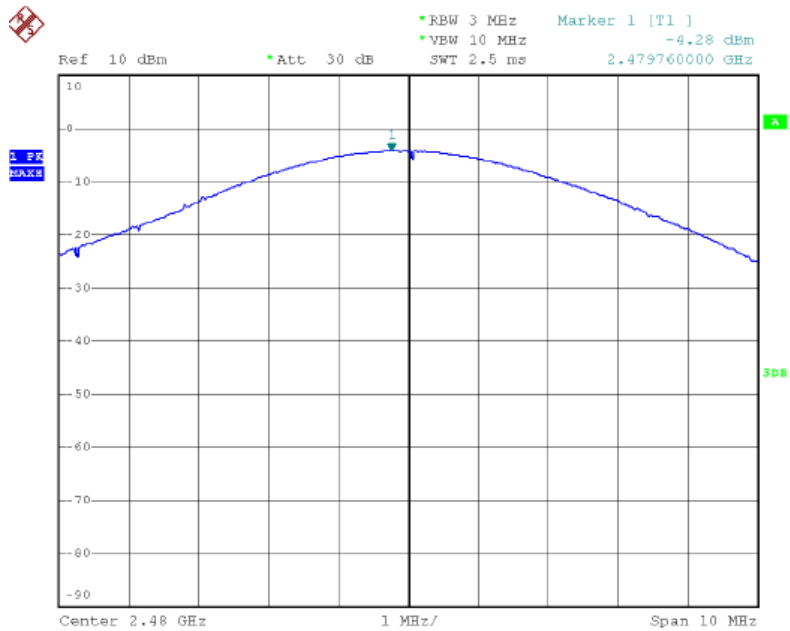
The EUT communicating with $\pi/4$ -DQPSK Mode
Lowest channel=2402MHz:



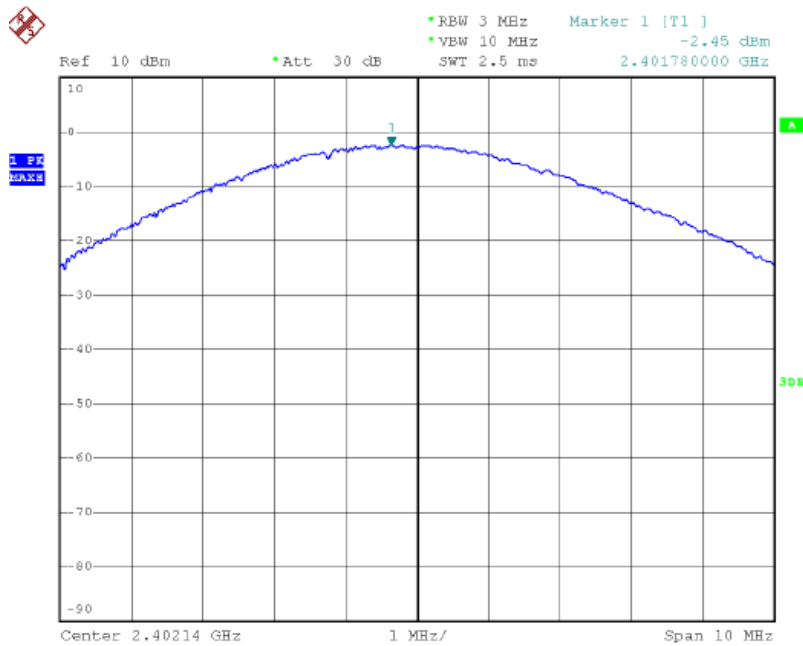
Middle channel=2447MHz:



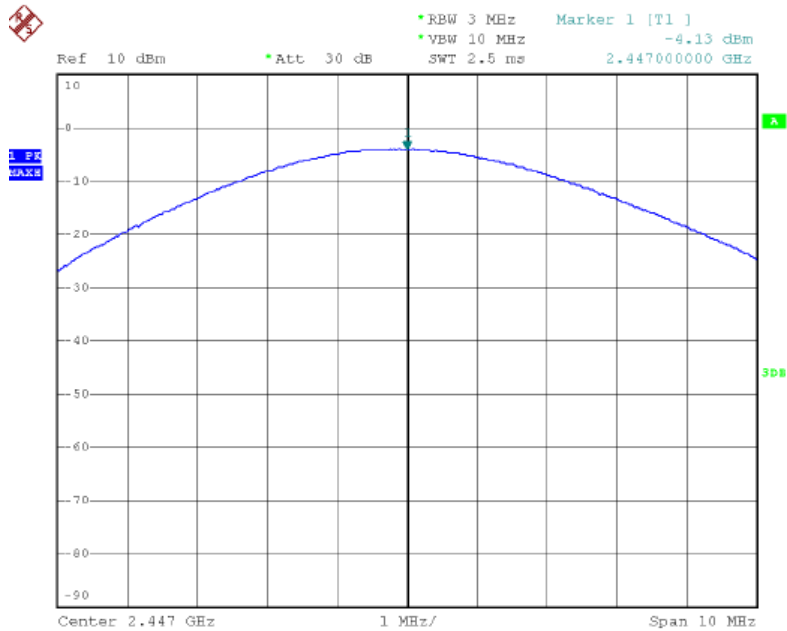
Highest channel=2480MHz:



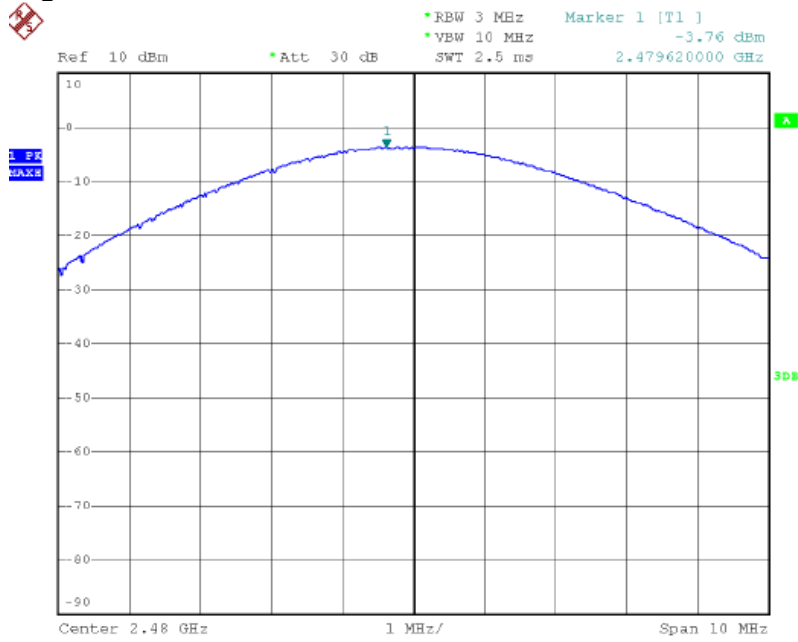
The EUT communicating with 8DPSK Mode
Lowest channel=2402MHz:



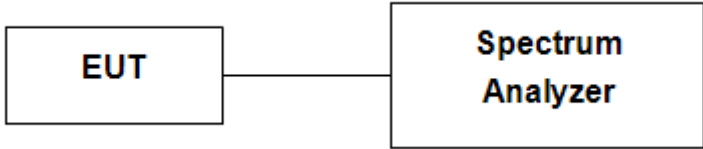
Middle channel=2447MHz



Highest channel=2480MHz:



ATTACHMENT 5 – 20dB BANDWIDTH TEST

CLIENT:	GRANDSTREAM NETWORKS, INC.	TEST STANDERD:	Section 15.247(b)
MODEL NUMBERS:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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	N/A		
TEST SETUP	 <pre>graph LR; EUT[EUT] --- SA[Spectrum Analyzer]</pre>		
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:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Test Data:

Chanel Frequency (GHz)	20 dB Bandwidth(MHz)		
	GFSK	$\pi/4$ -DQPSK	8DPSK
2.402	0.716	0.980	1.128
2.447	0.708	0.836	1.124
2.480	0.712	0.840	1.128

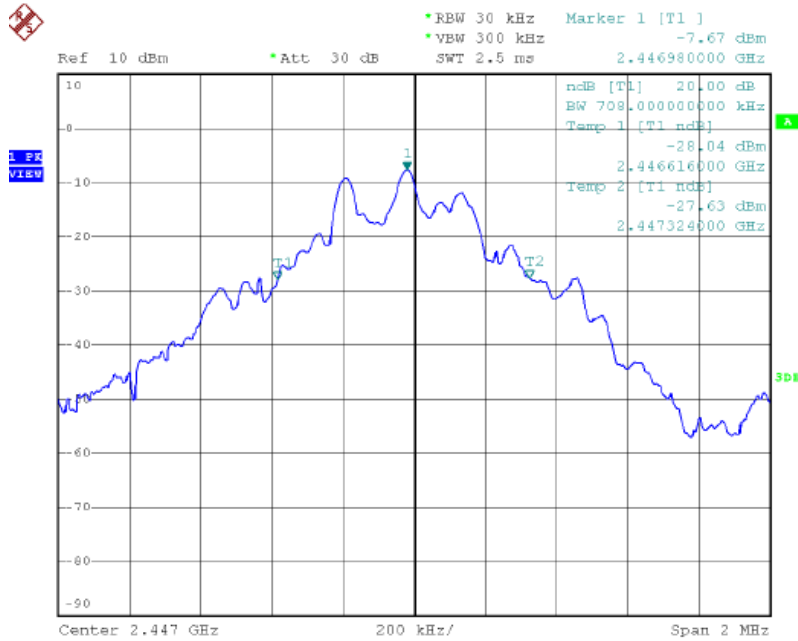
Test result: The unit does meet the requirements.

The EUT communicating with GFSK Mode:

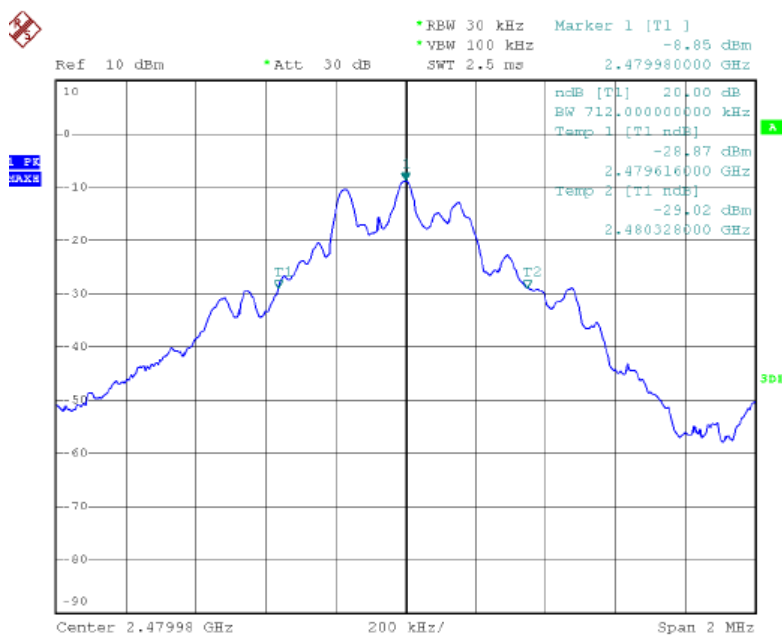
Lowest channel=2402MHz:



Middle channel=2447MHz



Highest channel=2480MHz



Test Report #: SHE-1402-11114-BT-FCC ID

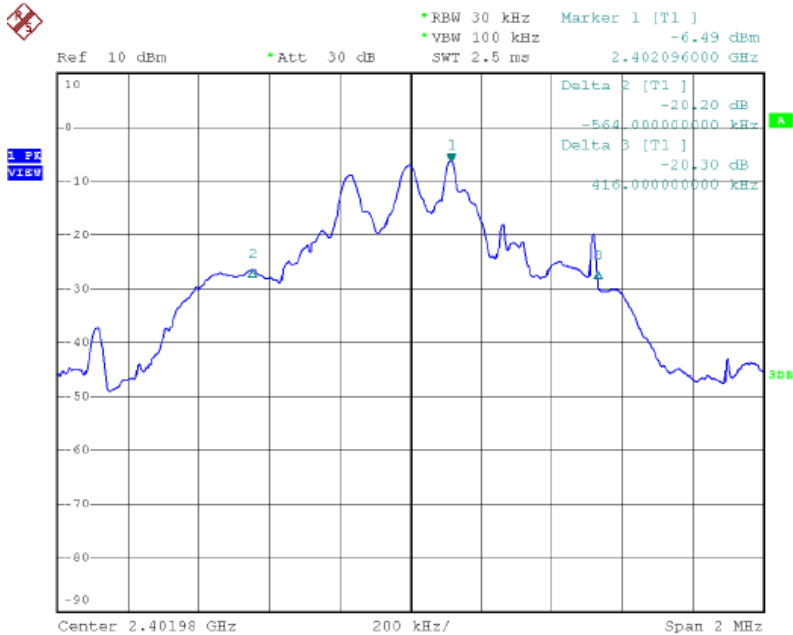
Prepared for Shenzhen Grandstream Networks, INC.

Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

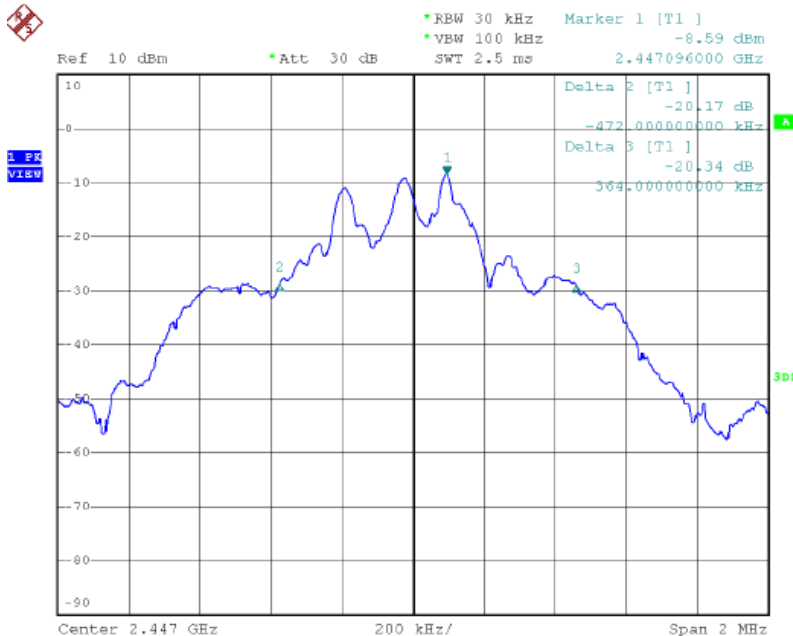
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The EUT communicating with $\pi/4$ -DQPSK Mode:

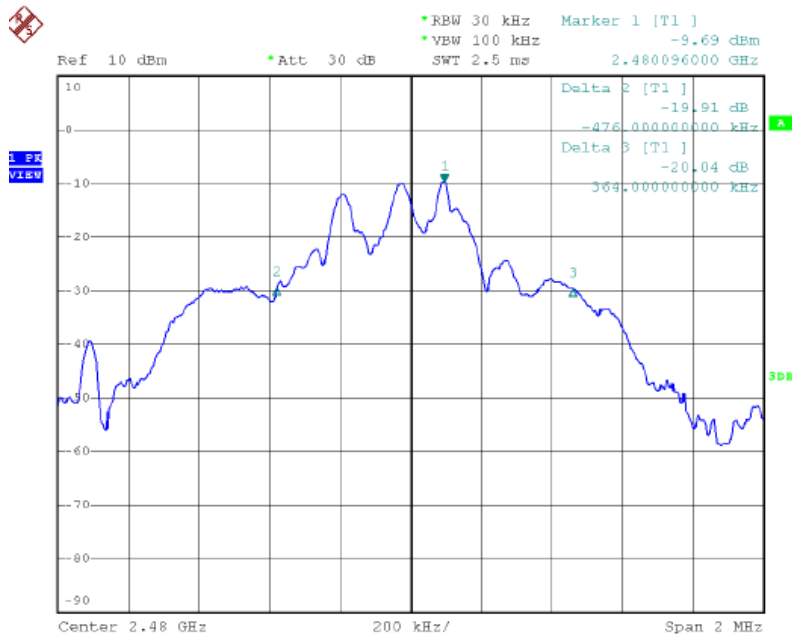
Lowest channel=2402MHz



Middle channel=2447MHz

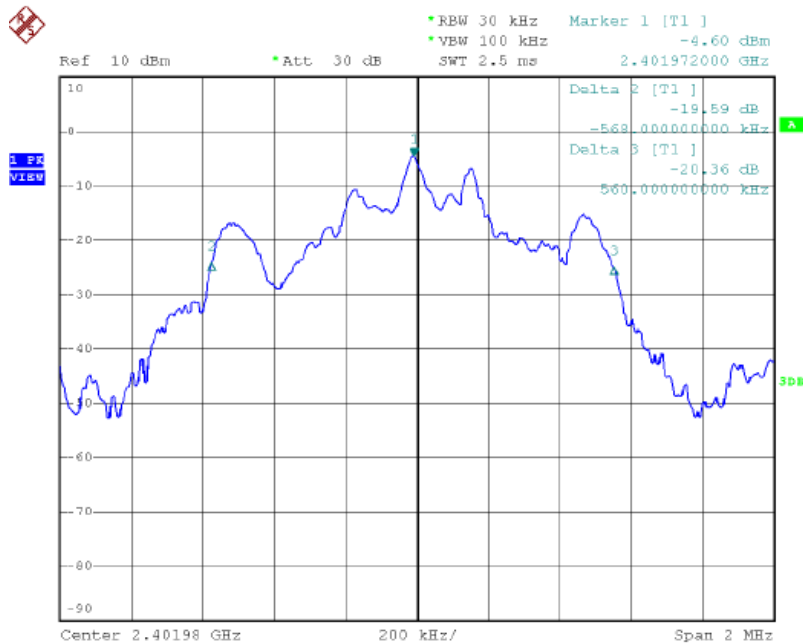


Highest channel=2480MHz

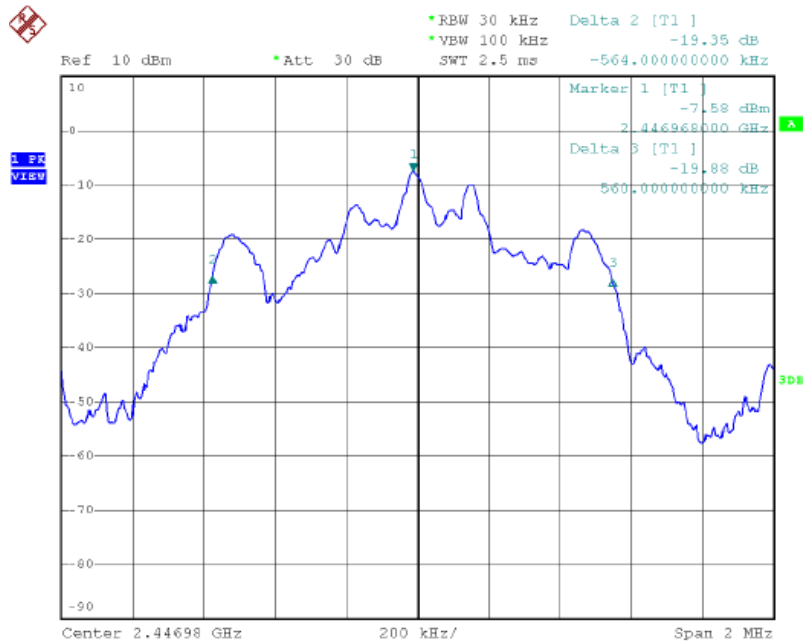


The EUT communicating with 8DPSK Mode:

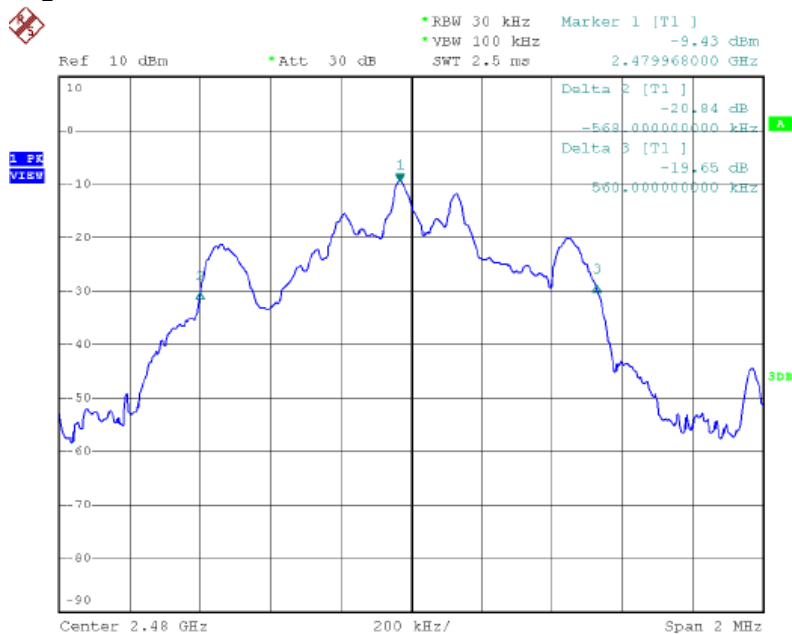
Lowest channel=2402MHz



Middle channel=2447MHz



Highest channel=2480MHz



Test Report #: SHE-1402-11114-BT-FCC ID

Prepared for Shenzhen Grandstream Networks, INC.

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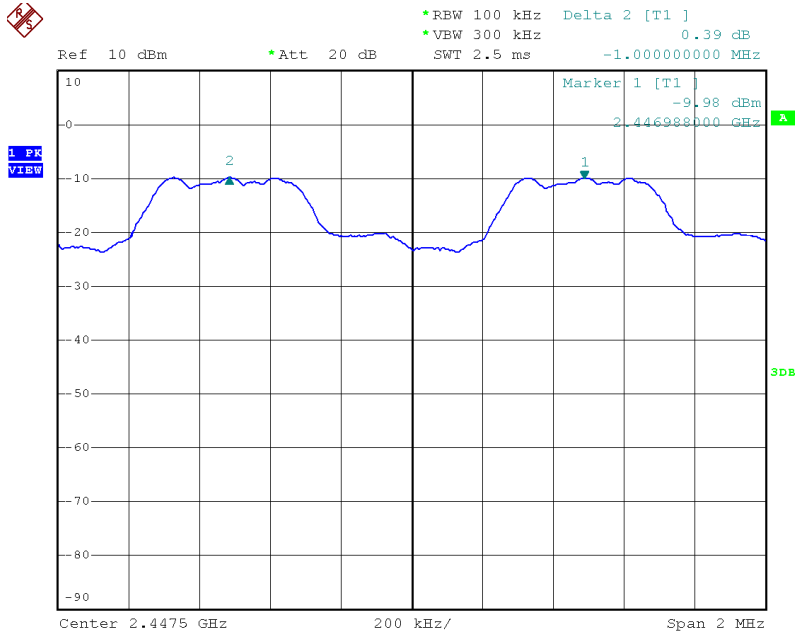
ATTACHMENT 6 – CARRIER FREQUENCY SEPARATION

CLIENT:	GRANDSTREAM NETWORKS, INC.	TEST STANDERD:	FCC 15.247(a)(1)												
MODEL NUMBERS:	GXV3240	PRODUCT:	IP Multimedia Phone												
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter												
TEMPERATURE:	23 °C	HUMIDITY:	47%RH												
ATM PRESSURE:	101.0kPa	GROUNDING:	None												
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014												
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705														
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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 SETUP:	<div><div>EUT</div><div>Spectrum Analyzer</div></div>														
LIMITS:	<p>≥0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater).</p> <p>According to 20dB bandwidth test result:</p> <table><tr><td>Mode</td><td>20dB bandwidth (MHz) (worse case)</td><td>Limit(MHz) (Carrier Frequencies Separaion)</td></tr><tr><td>GFSK</td><td>0.716</td><td>0.477</td></tr><tr><td>Π/4-DQPSK</td><td>0.980</td><td>0.653</td></tr><tr><td>8DPSK</td><td>1.128</td><td>0.752</td></tr></table> <p>So the limit is 0.752MHz.</p>			Mode	20dB bandwidth (MHz) (worse case)	Limit(MHz) (Carrier Frequencies Separaion)	GFSK	0.716	0.477	Π/4-DQPSK	0.980	0.653	8DPSK	1.128	0.752
Mode	20dB bandwidth (MHz) (worse case)	Limit(MHz) (Carrier Frequencies Separaion)													
GFSK	0.716	0.477													
Π/4-DQPSK	0.980	0.653													
8DPSK	1.128	0.752													

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:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB

Test Data:

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

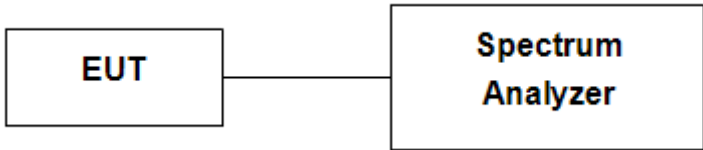


The minimum value of Carrier Frequencies Separation test is

$1.000\text{MHz} > 0.752\text{MHz}$

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:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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:	 <pre>graph LR; EUT[EUT] --- SA[Spectrum Analyzer]</pre>		
LIMITS:	At least 75 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:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

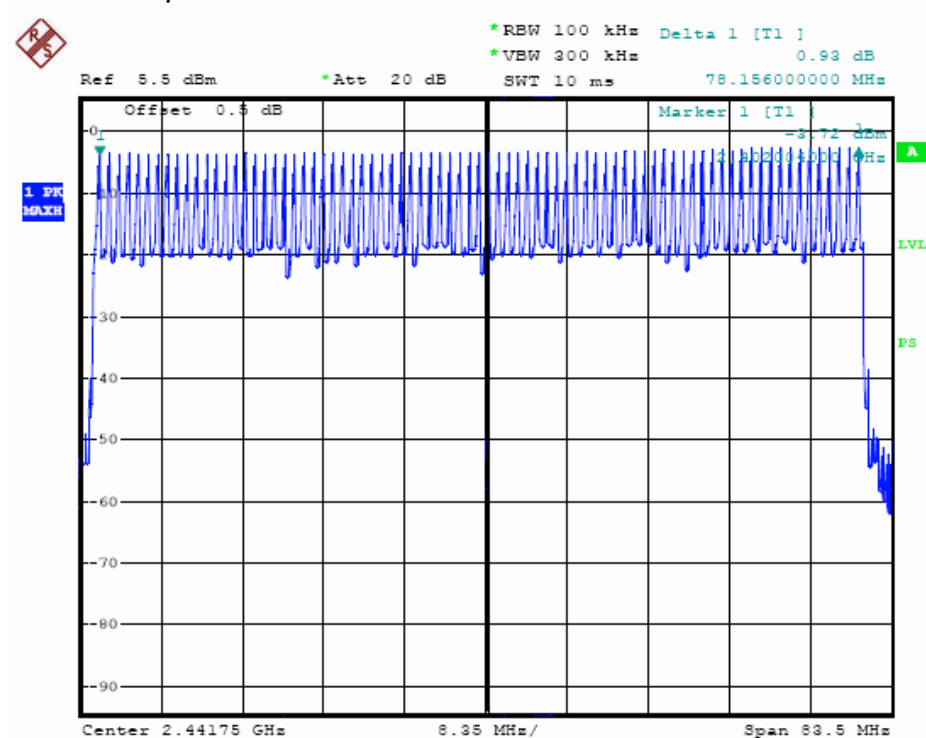
Test Data:

Pre-Scan has been conducted to determine the worst-case mode from all possible

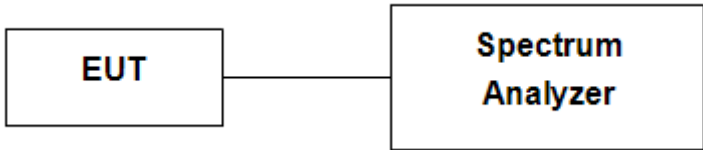
Hopping channels numbers	Minimum Limit
79	75

Test result: The unit does meet the requirements.

Test result plot as follows:



ATTACHMENT 8 – TIME OF OCCUPY(DWELL TIME)

CLIENT:	GRANDSTREAM NETWORKS, INC.	TEST STANDERD:	FCC 15.247(a)(1)
MODEL NUMBERS:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23°C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 14 th , 2014
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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:	 <pre>graph LR; EUT[EUT] --- SA[Spectrum Analyzer]</pre>		
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:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Test Data:

Pre-Scan has been conducted to determine the worst-case mode from all possible, found that the duty cycle is same in the follow several types.

Packet	Dwell time(second)	Limti(second)
DH1,2-DH1,3-DH1	0.0512	0.4
DH3,2-DH3,3-DH3	0.0304	0.4
DH5,2-DH5,3-DH5	0.2421	0.4

The test period: $T=0.4\text{Second/channel} \times 79 \text{ channel}=31.6 \text{ s}$

$DH1, 2DH1, 3DH1 \text{ time slot} = 0.160\text{ms} \times [1600/(2 \times 79)] \times 31.6 = 51.2\text{ms}$

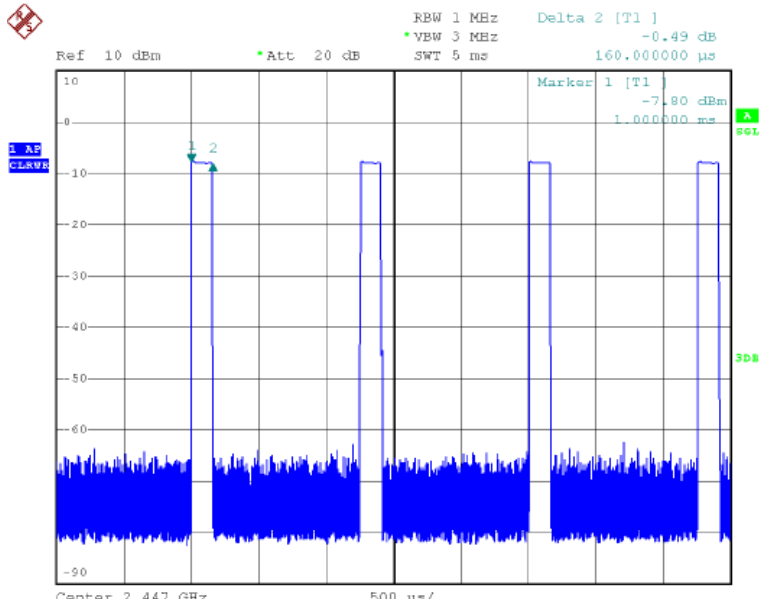
$DH3, 2DH3, 3DH3 \text{ time slot} = 0.190\text{ms} \times [1600/(4 \times 79)] \times 31.6 = 30.4 \text{ ms}$

$DH5, 2DH5, 3DH5 \text{ time slot} = 2.270\text{ms} \times [1600/(6 \times 79)] \times 31.6 = 242.1\text{ms}$

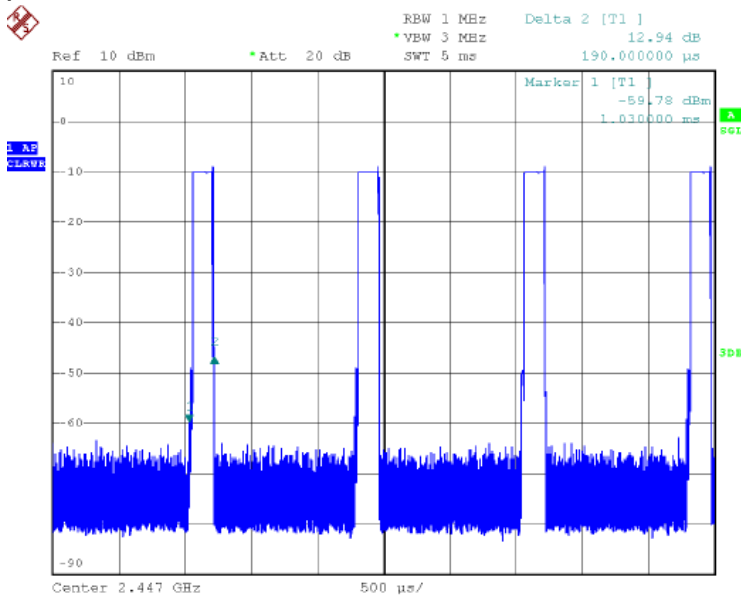
Test result: The unit does meet the requirements.

Test result plots as follows:

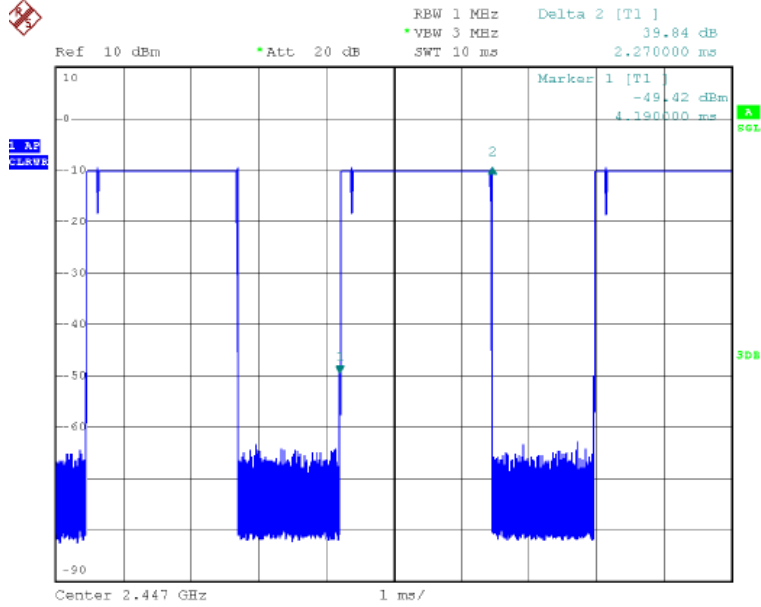
GFSK, $\Pi/4$ -DQPSK and 8DPSK mode with DH1,2-DH1,and 3-DH1 test packet.



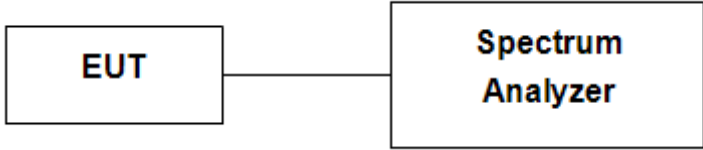
GFSK, $\Pi/4$ -DQPSK and 8DPSK mode with DH3,2-DH3,and 3-DH3 test packet.



GFSK, $\Pi/4$ -DQPSK and 8DPSK mode with DH5,2-DH5,and 3-DH5 test packet.



ATTACHMENT 9 – BAND EDGE AND CONDUCTED SPURIOUS MEASUREMENT

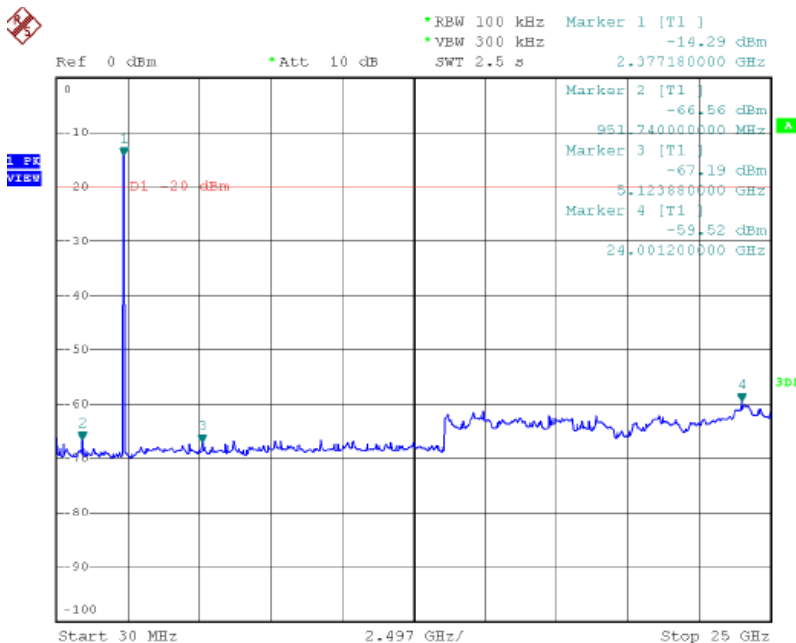
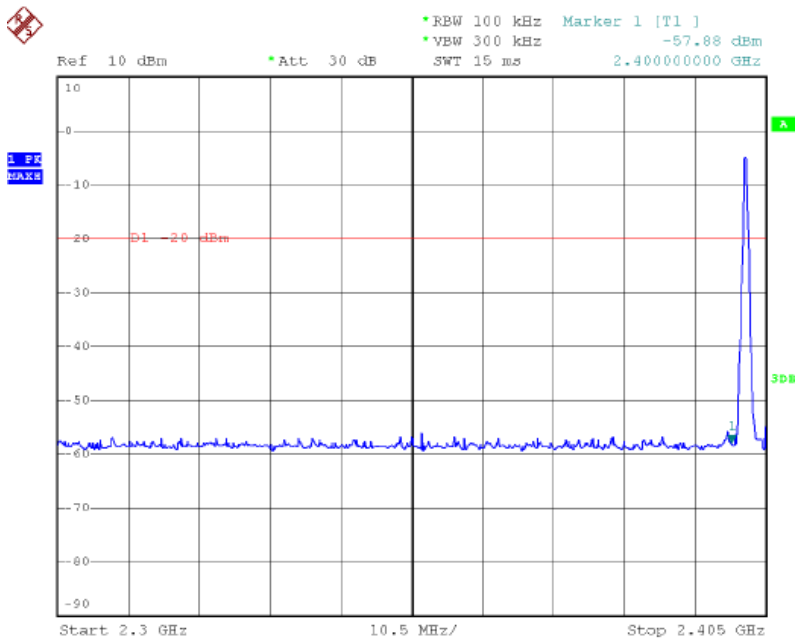
CLIENT:	GRANDSTREAM NETWORKS, INC.	TEST STANDERD:	Section 15.247(d)
MODEL NUMBERS:	GXV3240	PRODUCT:	IP Multimedia Phone
EUT MODEL:	GXV3240	EUT DESIGNATION:	Spread spectrum transmitter
TEMPERATURE:	23 °C	HUMIDITY:	47%RH
ATM PRESSURE:	101.0kPa	GROUNDING:	None
TESTED BY:	Daomen	DATE OF TEST:	March 16 th , 2014
TEST REFERENCE:	ANSI C63.4:2003 and KDB DA00-705		
TEST PROCEDURE:	The EUT was setup to ANSI C63.4, 2003, tested to FHSS test procedure of KDB DA00-705 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:	 <pre> graph LR EUT[EUT] --- SA[Spectrum Analyzer] </pre>		
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 Conduced 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 ± 2.6 dB		

Test Data:

Pre-scan the EUT in hopping and without hopping modes and find out the worst case is without hopping mode.

Test result plot as follows:

Transmitting mode in lowest channel=2402MHz (GFSK)



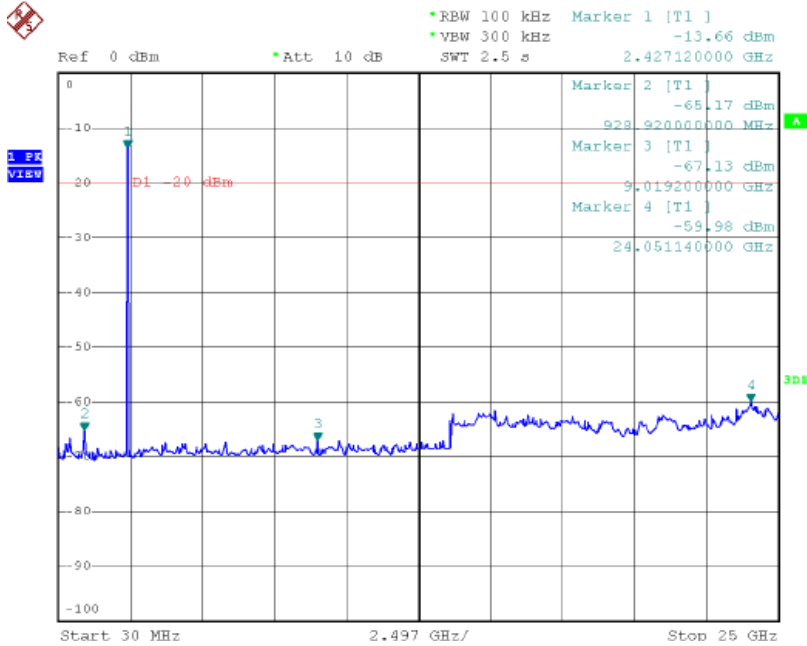
Test Report #: SHE-1402-11114-BT-FCC ID

Prepared for Shenzhen Grandstream Networks, INC.

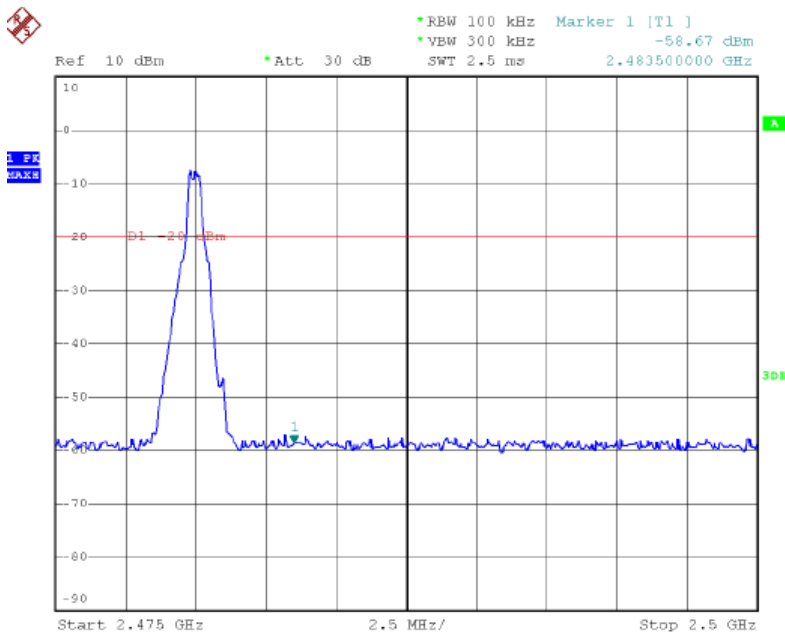
Prepared by ECMG Electronic Technical Testing Corp (Shenzhen).

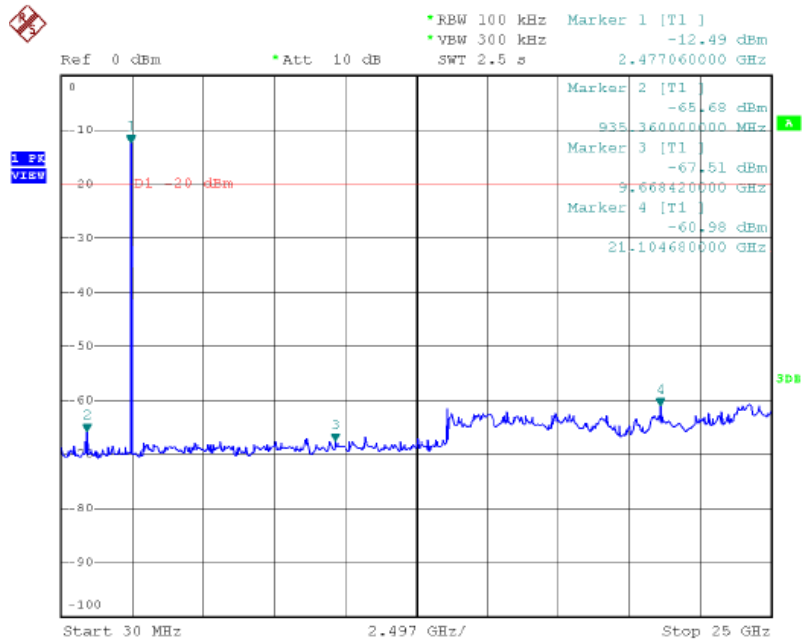
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Transmitting mode in middle channel=2447MHz (GFSK)

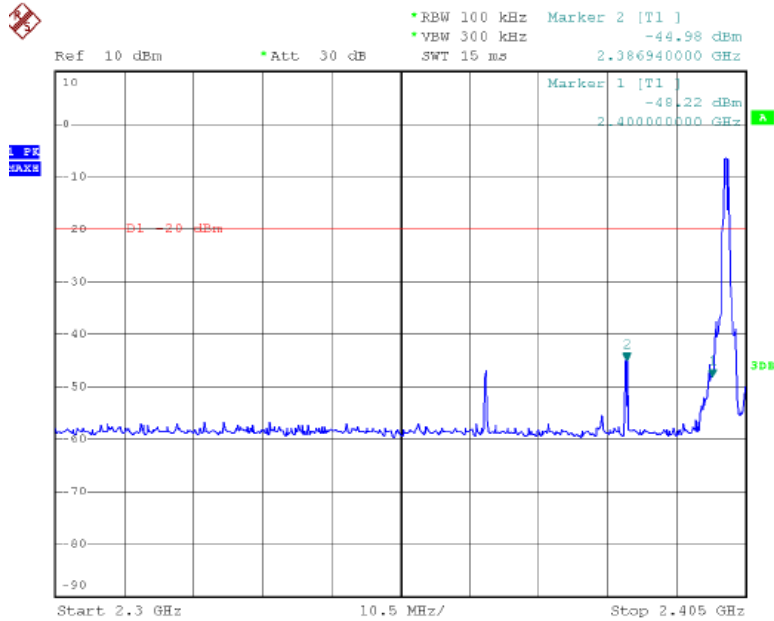


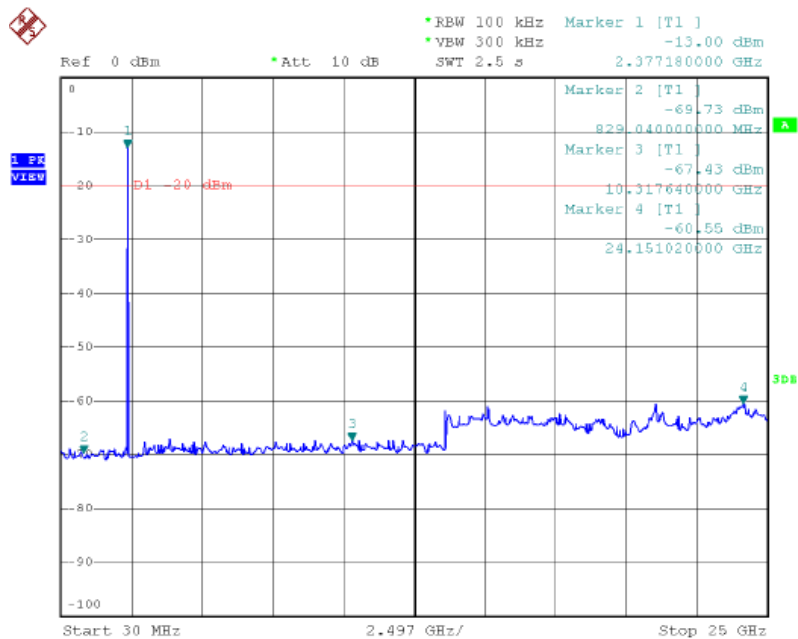
Transmitting mode in highest channel=2480MHz (GFSK)



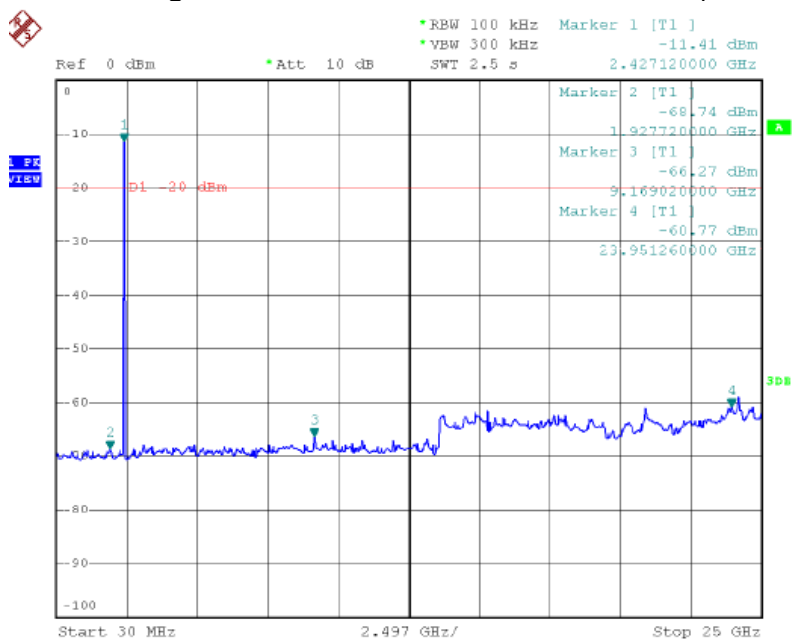


Transmitting mode in lowest channel=2402MHz ($\pi/4$ -DQPSK)

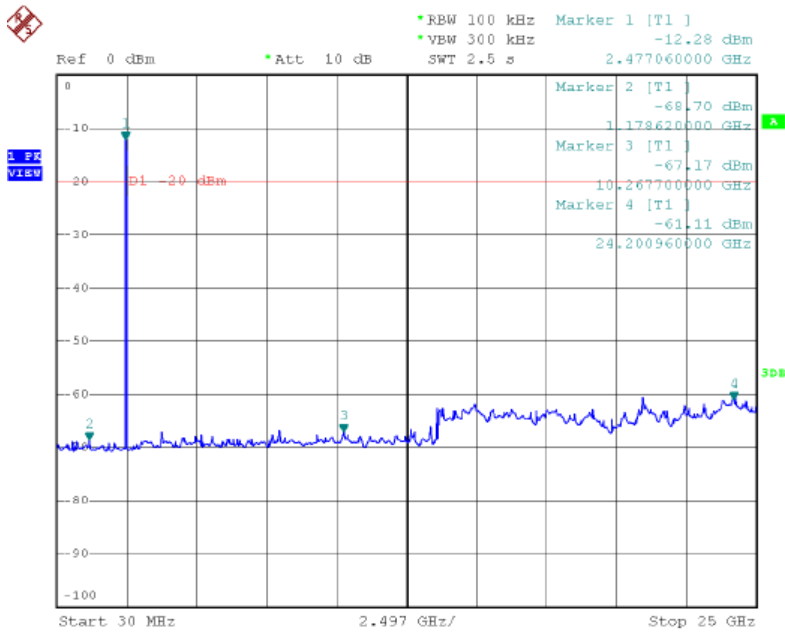
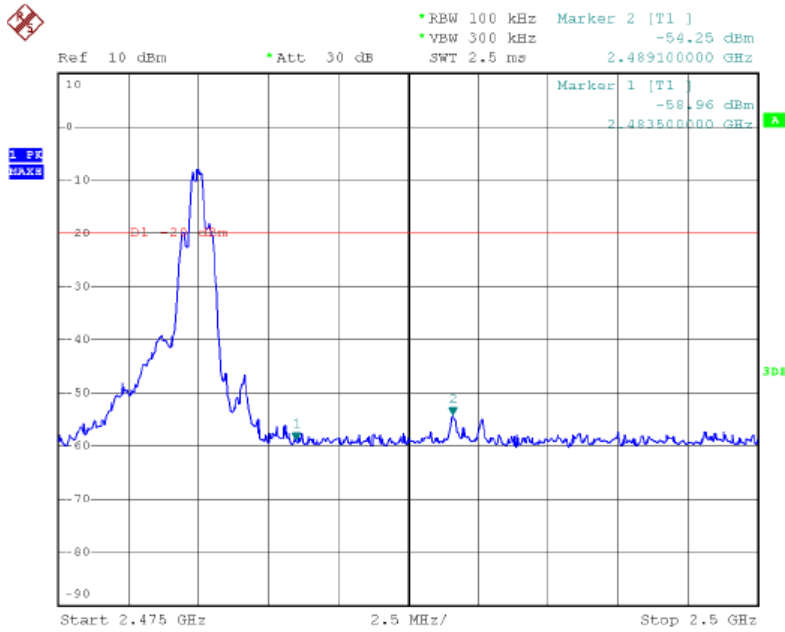




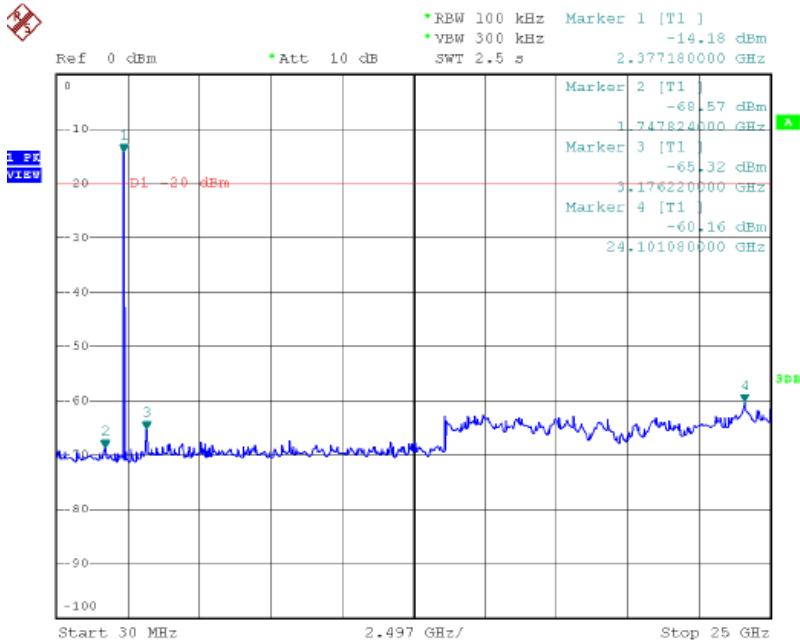
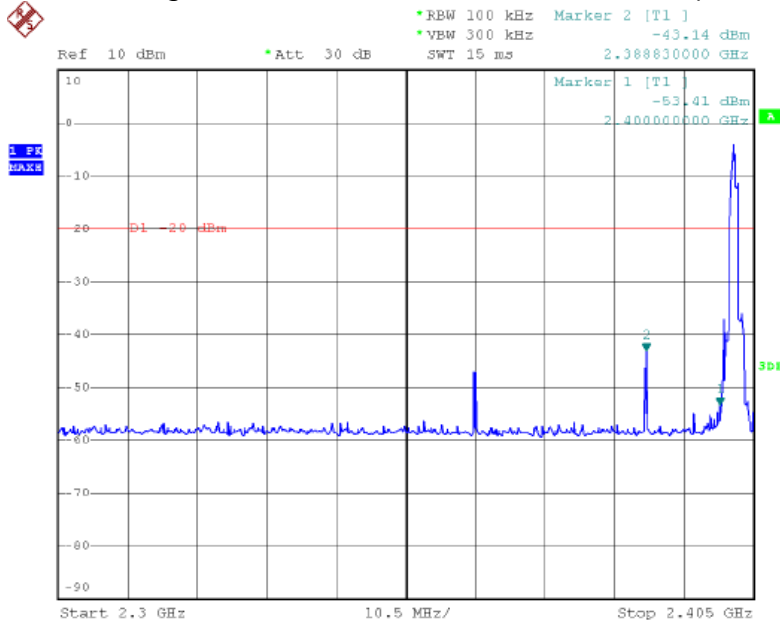
Transmitting mode in middle channel=2447MHz ($\pi/4$ -DQPSK)



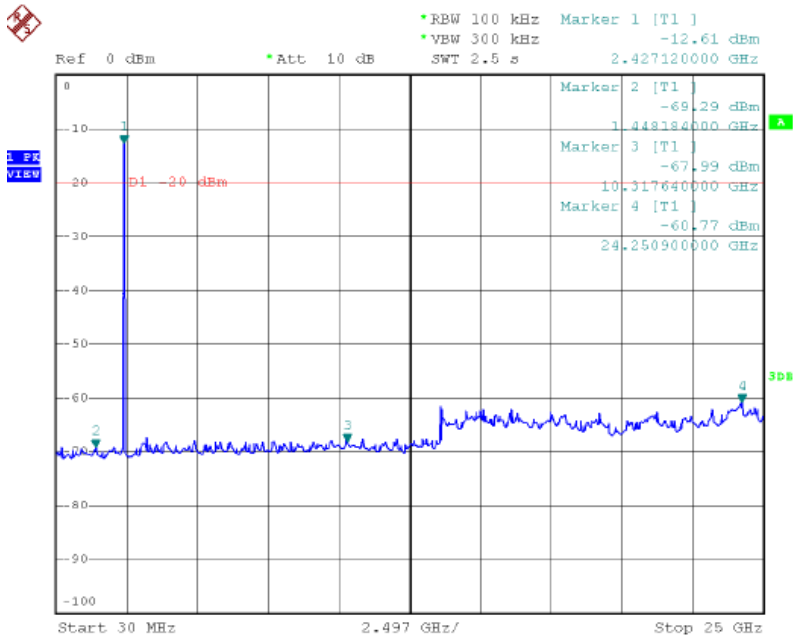
Transmitting mode in highest channel=2480MHz ($\pi/4$ -DQPSK)



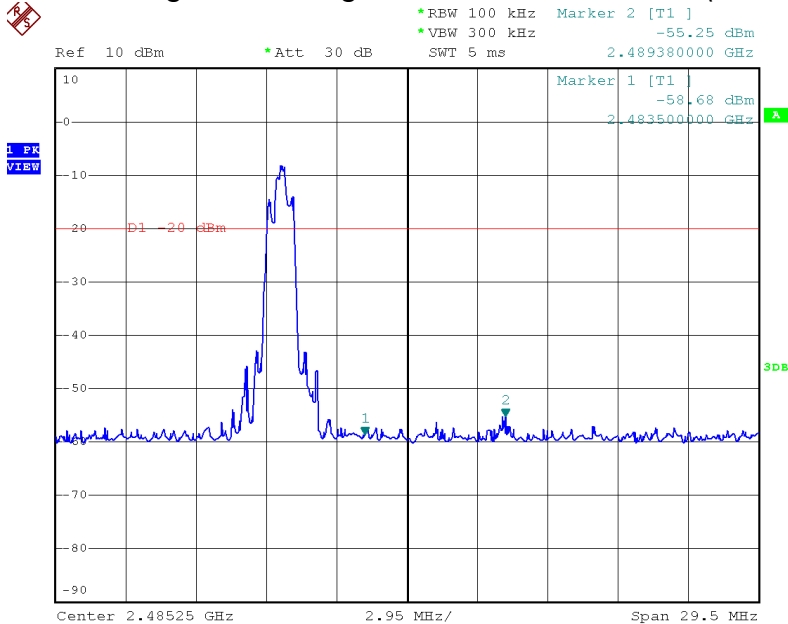
Transmitting mode in lowest channel=2402MHz (8DPSK)

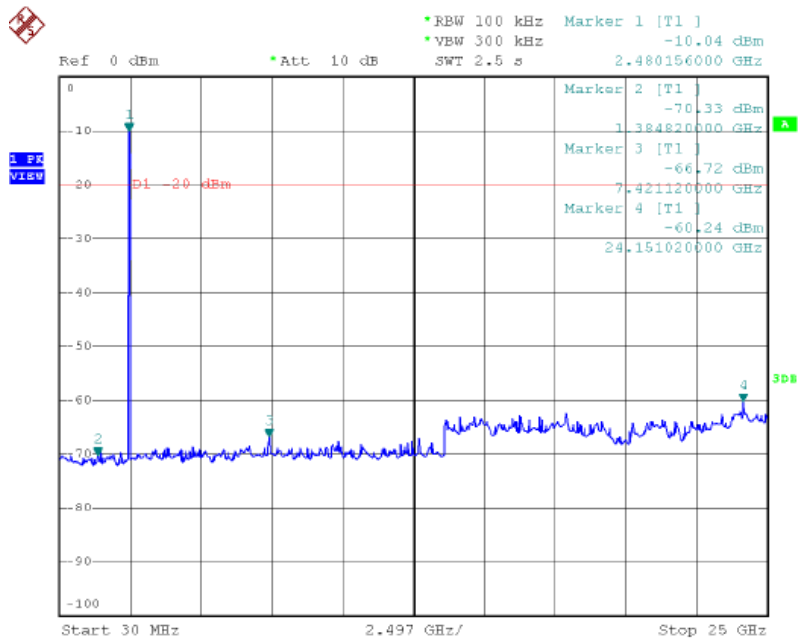


Transmitting mode in middle channel=2447MHz (8DPSK)



Transmitting mode in highest channel=2480MHz (8DPSK)





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 -1.45dBm (0.000716Watts) in the Lowest channel (2.402GHz);

The best case gain of the antenna is 2dBi.

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

MPE Calculation Method:

$$E \text{ (V/m)} = (30 * P * G)^{0.5} / d \quad \text{Power Density: } S \text{ (mW/m}^2\text{)} = E^2 / 377$$

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

$$S = (30 * P * G) / (377 * d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance $d=0.2\text{m}$, 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	-1.45	0.000716	0.0023	1.0	Compliant

The unit does meet the requirement.

ATTACHMENT: TEST SET-UP PHOTOGRAPH



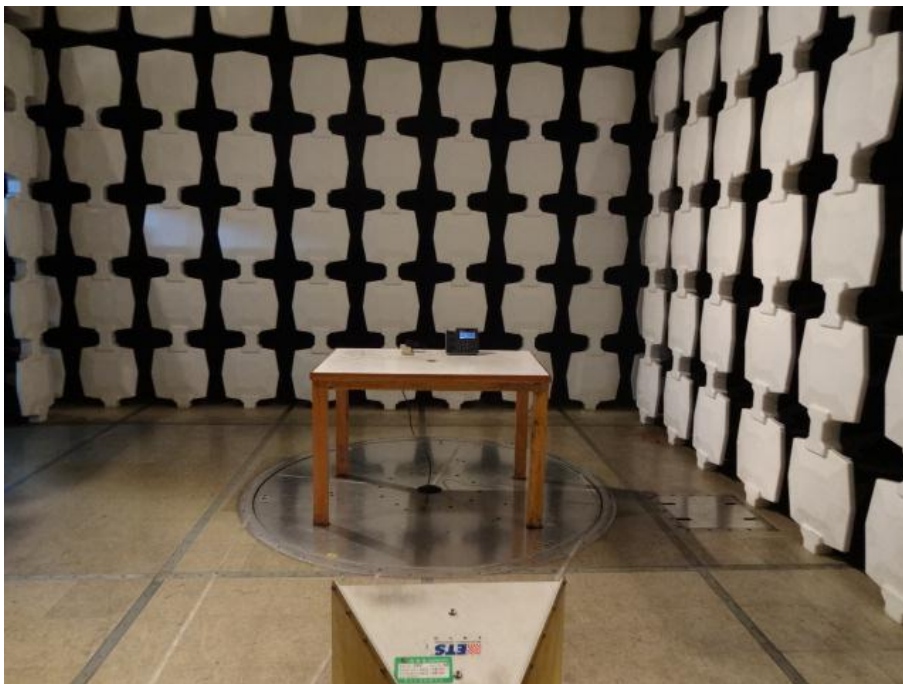
Conducted Emission Test Set-up –Front View



Conducted Emission Test Set-up –Rear View



Radiated Emission Test Set-up -below 1GHz



Radiated Emission Test Set-up - Above 1GHz