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FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.247

Operating in 2400 ~ 2483.5 MHz Band

Prepared For :

Grandstream Networks, Inc.

126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

FCC ID: YZZ-GXP2130V2
EUT: IP Phone
Model: GXP2130

July 21, 2016 **Issue Date:**
Original Report **Report Type:**
Eric Guo **Test Engineer:** Eric Guo
Apollo Liu **Review By:** Apollo Liu / Manager

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1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.
FCC Test Site Registration Number: 962205
IC Test Site Registration Number: 4986A-2
Internet: www.kmolab.com

1. 3 Details of Applicant

Name : Grandstream Networks, Inc.
Address : 126 Brookline Ave, 3rd Floor Boston, MA 02215, USA

1. 4 Application Details

Date of Receipt of Application	: June 20, 2016
Date of Receipt of Test Item	: June 20, 2016
Date of Test	: June 29~July 6, 2016

1. 5 Test Item

Manufacturer	: Grandstream Networks, Inc.
Address	: 126 Brookline Ave, 3rd Floor Boston, MA 02215, USA
Trade Name	: Grandstream
Model No.(Base)	: GXP2130
Model No.(Extension)	: N/A
Description	: IP Phone

Additional Information

Product Type	: Bluetooth (1TX, 1RX)
Radio Type	: Intentional Transceiver
Power Type	: DC 12V/0.5A(Adapter model:F06US1200050A) DC 12.0V/0.5A(Adapter model:NBS05B120050VU) POE DC 48V
Modulation	: see the below tables
Data Modulation	: Bluetooth: GFSK (1Mbps); π/4-DQPSK (2Mbps) ; 8DPSK (3Mbps)
Date Rate (Mbps)	: see the below table
Frequency Range	: 2402~2480MHz
Channel Number	: 79
Antenna	: Internal, 2dBi

Bluetooth

Type of Modulation	Data Rate
GFSK	1Mbps
π/4-DQPSK	2Mbps
8DPSK	3Mbps

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.247

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC Rule	Test Type	Limit	Result	Notes
FCC 15.247(a)(1)	Number of Channels	>=15Chs	PASS	Complies
FCC 15.247(a)(1)	Hopping Channel Separation	>=2/3 of 20dB BW	PASS	Complies
FCC 15.247(a)(1)	Dwell Time of Each Channel	<=0.4sec in 31.6sec period	PASS	Complies
FCC 15.247(a)(1)	20dB Bandwidth	NA	PASS	Complies.
FCC 15.247(b)(1)	Peak Output Power	<=1 w for 1Mbps <=125 mW for 2,3Mbps	PASS	Complies.
FCC 15.247(d)	Conducted Band Edges	<=20dBc	PASS	Complies.
FCC 15.247(d)	Conducted Spurious Edges	<=20dBc	PASS	Complies.
FCC 15.247(d)	Radiated Band Edges and Radiated Spurious Emission	FCC15.209(a) & 15.247(d)	PASS	Complies.
FCC 15.205(a)	Restricted Bands Requirement	FCC 15.205(a)	PASS	Complies.
FCC 15.207	AC Conducted Emission	FCC15.207(a)	PASS	Complies.
FCC 15.203 & 15.247(b)	Antenna Requirement	N/A	PASS	Complies

* The digital circuit porting of the EUT has been tested and verified to comply with FCC Part 15, Subpart B., Class B Digital Devices and the associated Radio Receiver has also been tested and found to comply with FCC Part 15, Subpart B – Radio Receivers.

2. 2 Antenna Requirement

A. Regulation

FCC section 15.203, 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 Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, 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.

B. Result

The EUT no antenna connector for printed antenna. Therefore the EUT complies with Section 15.203 of the FCC rules.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

4. 1 Test Equipment

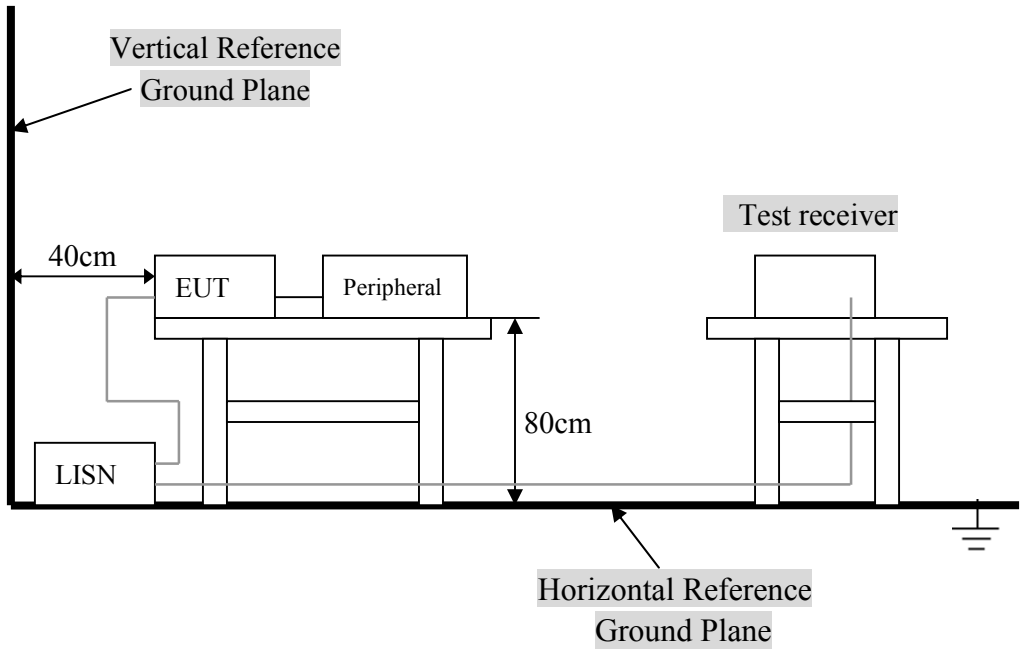
Please refer to Section 10 this report.

4. 2 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4. 3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4. 4 Configuration of the EUT

The EUT was configured according to ANSI C63.10:2013. EUT was used DC12V. The operation frequency is from 2400MHz~2483.5MHz. Enable the signal transmitted from the EUT to Notebook PC. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

Note:

1) Operating Modes: Each of lowest, middle and highest channel frequencies transmits continuously for emissions measurements. The EUT operates in normal FHSS.
2) Special Test Software & Hardware: Special firmware and hardware provided by the Applicant are installed to allow the EUT to operates in FHSS at each channel frequency continuously. For example, the transmitter will be operated at each of lowest, middle and highest frequencies individually continuously during testing.
3) Transmitter Test Antenna: The EUT is tested with the antenna fitted in a manner typical of normal intended use as an integral / non-integral antenna equipment as describe with the test results.
4) Frequency(ies) Tested: 2402MHz, 2441MHz and 2480MHz were pre-tested, The worst case one, was chosen for conducted emission test.
5) Above 1GHz, the 2402MHz, 2441MHz and 2480MHz were tested individually.
6) Normal Test Modulation: FHSS
7) Modulating Signal Source: Internal

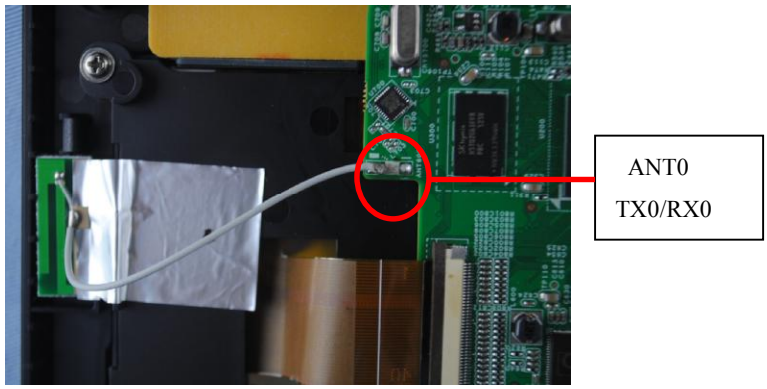
* Associated Antenna Descriptions: The antenna used in this product is embedded antenna.

A. EUT

Device	Manufacturer	Model #	FCC ID
IP Phone	Same as applicant	GXP2135	YZZGXP2135

Field Antenna For 2.4GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
0	SENLING	2.4G Bluetooth Antenna SLB-100030060	Internal	N/A	2.0	TX/RX



Bluetooth Test Modes For 2.4GHz Band

Worst Modulation Mode	Number of Transmit (Ntx)	Frequency (MHz)	Power Setting	Data Rate
BT-1M	1	2402	63	1 Mbps
BT-1M	1	2441	63	1 Mbps
BT-1M	1	2480	63	1 Mbps
BT-2M	1	2402	120	2 Mbps
BT-2M	1	2441	120	2 Mbps
BT-2M	1	2480	120	2 Mbps
BT-3M	1	2402	120	3 Mbps
BT-3M	1	2441	120	3 Mbps
BT-3M	1	2480	120	3 Mbps

B. Internal Devices

Device	Manufacturer	Model #	FCC ID
N/A			

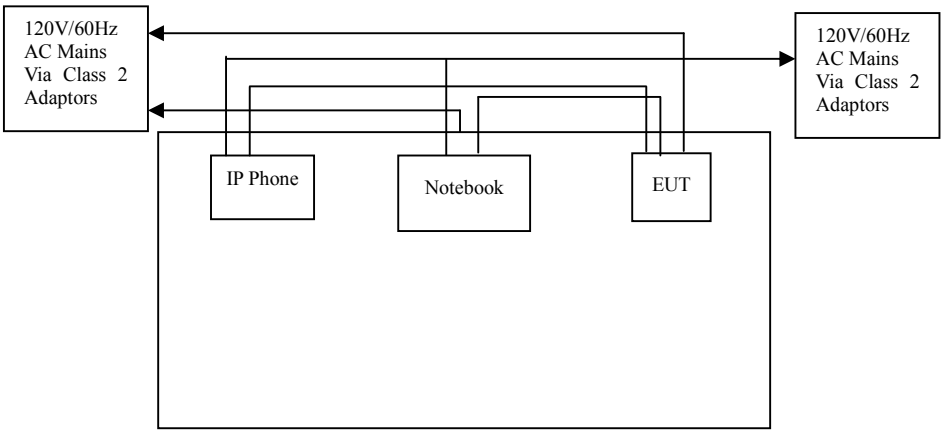
C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Notebook	ACER	ZQE	HLZ-AR5B97	1.5m unshielded power cord
IP Phone	YEALINK	T21P	T2C-T21P	N/A

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.10:2013.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	**Class A QP/AV**	**Class B QP/AV**
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

NOTE ：In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

Product	: IP Phone	Test Mode	: CH Low – CH High
Test Item	: Conducted Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V/POE	Humidity	: 56%RH
Test Result	: **PASS**		

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

· Temperature ： 26 ℃

· Humidity ： 53 % RH

Adapter model: F06US1200050A

FCC 15.207										
Frequency (MHz)	Read Level (dBuV)		Factor (dB)	Emission (dBuV)		Line/ Neutral	Limit (dBuV)		Margin QP	(dBuV) AV
	QP	AV		QP	AV		QP	AV		
0.534	28.27	18.74	10.40	38.67	29.14	Line	56.00	46.00	-17.33	-16.86
7.970	26.93	17.54	10.70	37.63	28.24	Neutral	60.00	50.00	-22.37	-21.76
8.426	29.75	18.77	10.70	40.45	29.47	Line	60.00	50.00	-19.55	-20.53
11.222	33.48	26.65	10.80	44.28	37.45	Neutral	60.00	50.00	-15.72	-12.55
11.246	30.15	18.97	10.80	40.95	29.77	Line	60.00	50.00	-19.05	-20.23
12.618	34.13	24.66	10.80	44.93	35.46	Neutral	60.00	50.00	-15.07	-14.54
FCC 15.207										

Note: NF = No Significant Peak was Found.

Adapter model: NBS05B120050VU

FCC 15.207										
Frequency (MHz)	Read Level (dBuV)		Factor (dB)	Emission (dBuV)		Line/ Neutral	Limit (dBuV)		Margin QP	(dBuV) AV
	QP	AV		QP	AV		QP	AV		
11.210	36.41	26.55	10.80	47.21	37.35	Line	60.00	50.00	-12.79	-12.65
0.518	29.05	24.71	10.40	39.45	35.11	Neutral	56.00	46.00	-16.55	-10.89
12.610	38.35	27.44	10.80	49.15	38.24	Line	60.00	50.00	-10.85	-11.76
11.210	31.29	25.03	10.80	42.09	35.83	Neutral	60.00	50.00	-17.91	-14.17
14.230	34.65	21.53	10.80	45.45	32.33	Line	60.00	50.00	-14.55	-17.67
12.606	32.52	25.31	10.80	43.32	36.11	Neutral	60.00	50.00	-16.68	-13.89
FCC 15.207										

Note: NF = No Significant Peak was Found.

Note:

1.Uncertainty in conducted emission measured is <+/ -2dB.

2.The emission levels of other frequencies were very low against the limit.

3.All Reading Levels are Quasi-Peak and Average value.

4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.

5.Margin Value = Emission Level - Limit Value.

Conducted Emission

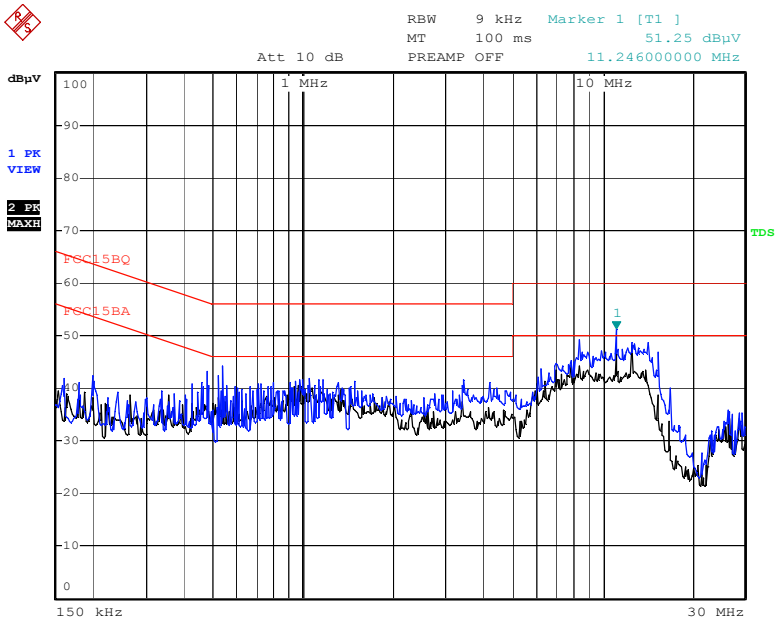
FCC 15.207

EUT: IP Phone

Test Specification: LINE&NEUTRAL

Comment:

Adapter model: F06US1200050A



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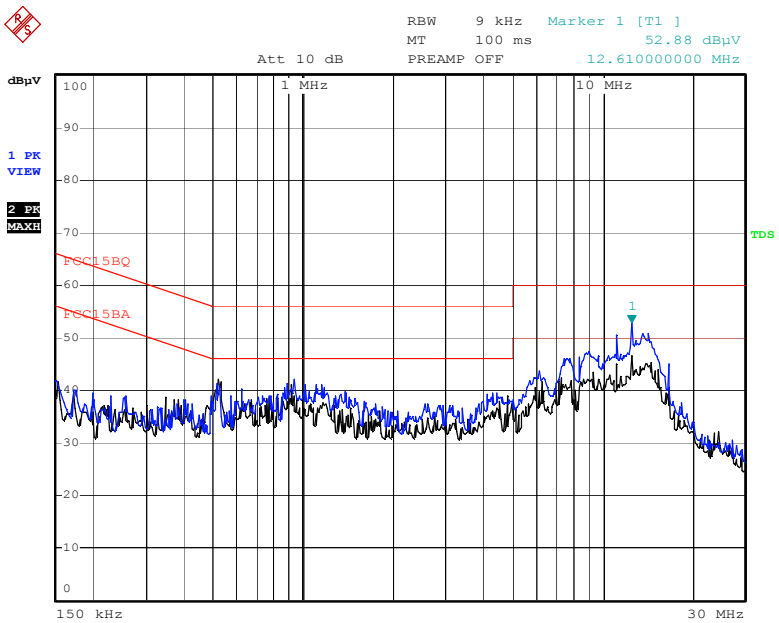
Adapter model: NBS05B120050VU



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5. FCC Part 15.247 Requirements for FHSS Systems

5. 1 Test Equipment

Refer to FCC 15.247(a)(2), ANSI C63.10:2013

20 dB Bandwidth:
a. Place the EUT on the table and set it in the transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
c. Set the spectrum analyzer as RBW = 30 kHz, VBW = 100 kHz, Span = 2 MHz, Sweep = 100ms.
d. Mark the peak frequency and –20dB (upper and lower) frequency.
e. Repeat until all the rest channels are investigated.

Peak Power:
Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured; VBW ≥ RBW; Sweep = auto
Detector function = peak; Trace = max hold

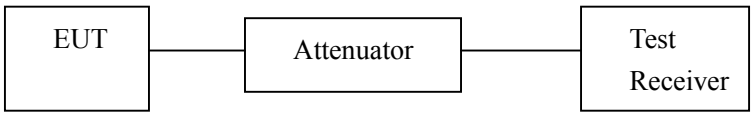
100kHz Bandwidth of Band Edges Measurement:
a. The transmitter output was connected to the spectrum analyzer via a low lose cable.
b. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.
c. The band edges was measured and recorded.

Frequency Separation:
a. Place the EUT on the table and set it in the transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
c. Set the spectrum analyzer as RBW = 100 kHz, VBW = 100 kHz, Span = 2 MHz, Sweep = 100ms.
d. Set center frequency spectrum analyzer = middle of hopping channel.

Number of Hopping Frequency:
a. Place the EUT on the table and set it in the transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
c. Set spectrum analyzer Start=2400MHz, Stop=2483.5MHz, RBW = 100 kHz, VBW = 300 kHz, Sweep=100ms
d. Max hold, view and count how many channel in the band.

Time of Occupancy (Dwell Time):
a. Place the EUT on the table and set it in the transmitting mode.
b. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
c. Set center frequency of spectrum analyzer = operating frequency, RBW = 100 kHz, VBW = 300 kHz, Sweep=2ms
d. Repeat above procedures until all frequency measured were complete.

5. 3 Test Setup



5. 4 Configuration of the EUT

Same as section 4.4 of this report

5. 5 EUT Operating Condition

Same as section 4.5 of this report.

5. 6 Limit

20 dB Bandwidth: For frequency hopping systems operating in the 2400MHz~2483.5MHz no limit for 20dB bandwidth
Peak Power: For frequency hopping systems operating in the 2400~2483.5MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725~5850MHz band: 1Watt. For all other frequency hopping systems in the 2400~2483.5MHz band: 0.125Watts.
100kHz Bandwidth of Band Edges Measurement: According to §15.247(c), in any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.3209(a).
Peak Power Spectral Density: According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission
Frequency Separation: According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.
Number of Hopping Frequency: According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400~2483.5MHz bands shall use at least 15 hopping frequencies.
Time of Occupancy (Dwell Time): According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400~2483.5MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

5. 7 Test Result

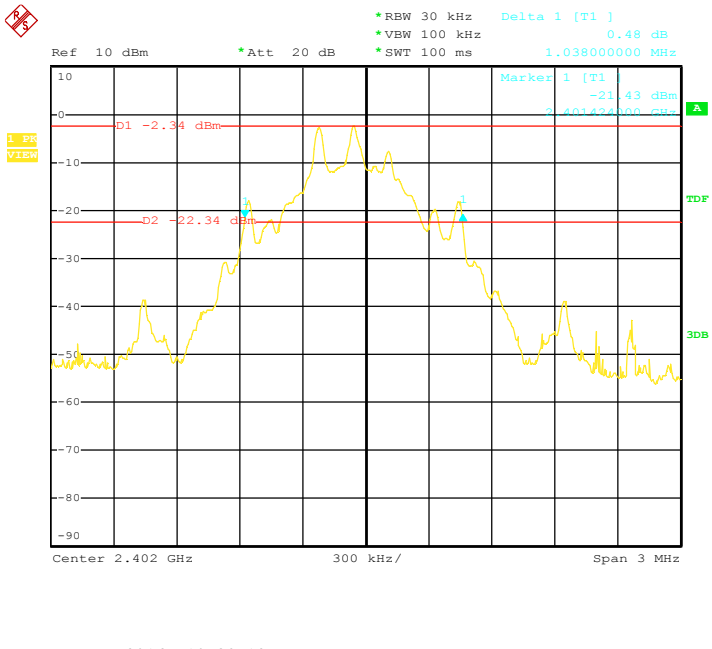
A. 20 dB Bandwidth

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: 20 dB BW	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

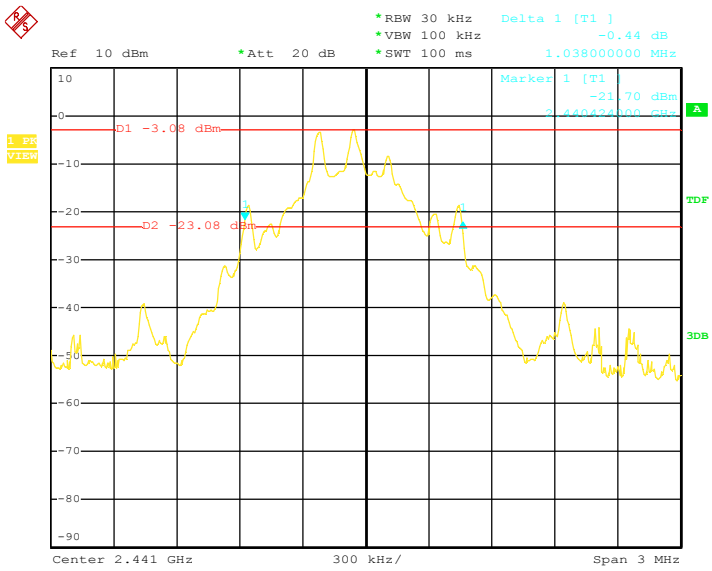
GFSK

Channel	Channel Frequency	20 dB Down BW (kHz)
Low	2402	1038
Mid	2441	1038
High	2480	1038

CH Low



CH Mid



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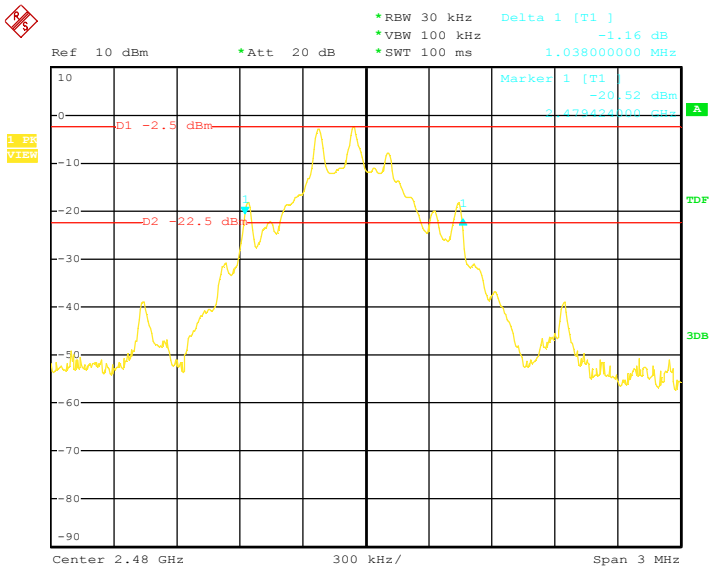
CH High



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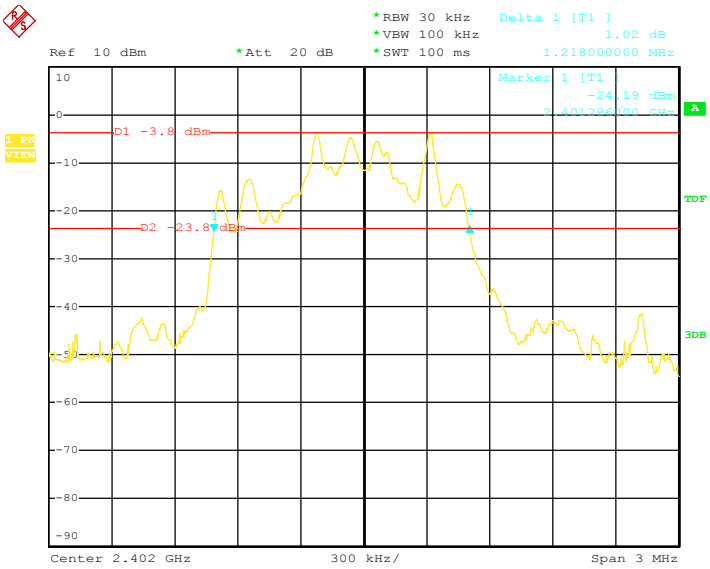
π/4-DQPSK

Channel	Channel Frequency	20 dB Down BW (kHz)
Low	2402	1218
Mid	2441	1218
High	2480	1218

CH Low



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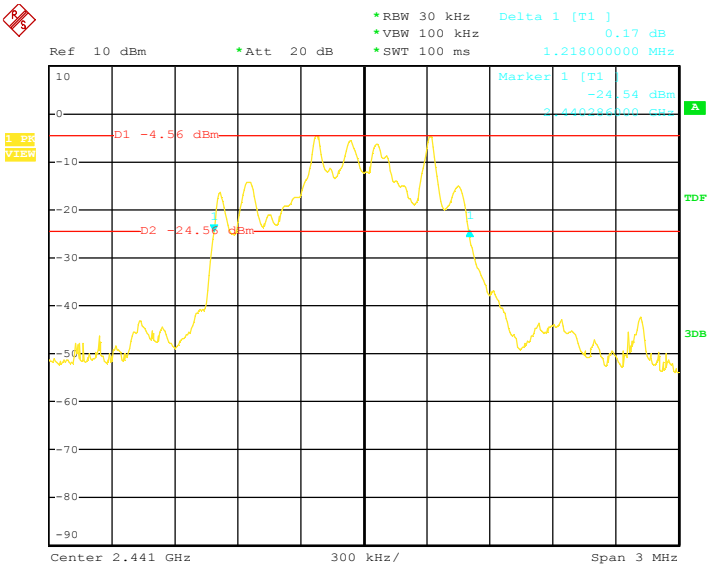
CH Mid



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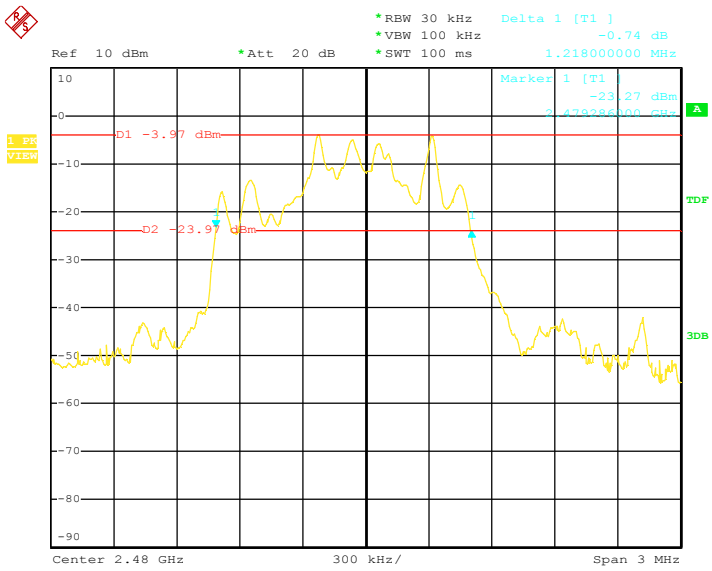
CH High



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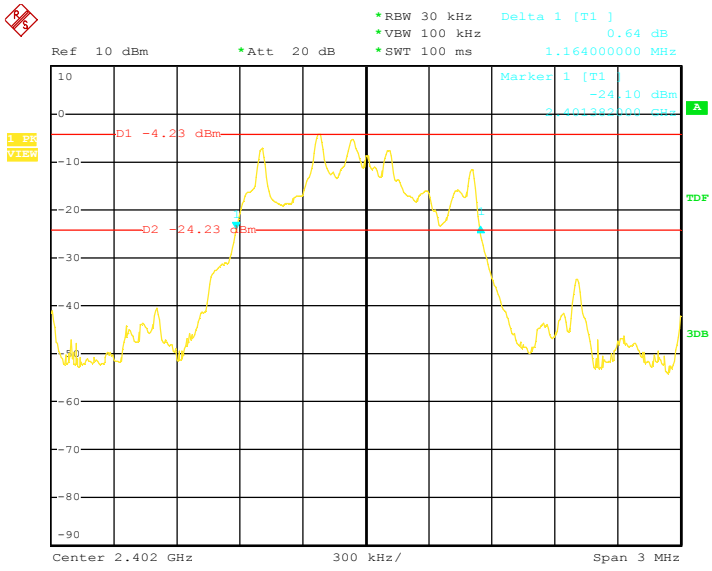
8DPSK

Channel	Channel Frequency	20 dB Down BW (kHz)
Low	2402	1164
Mid	2441	1164
High	2480	1164

CH Low



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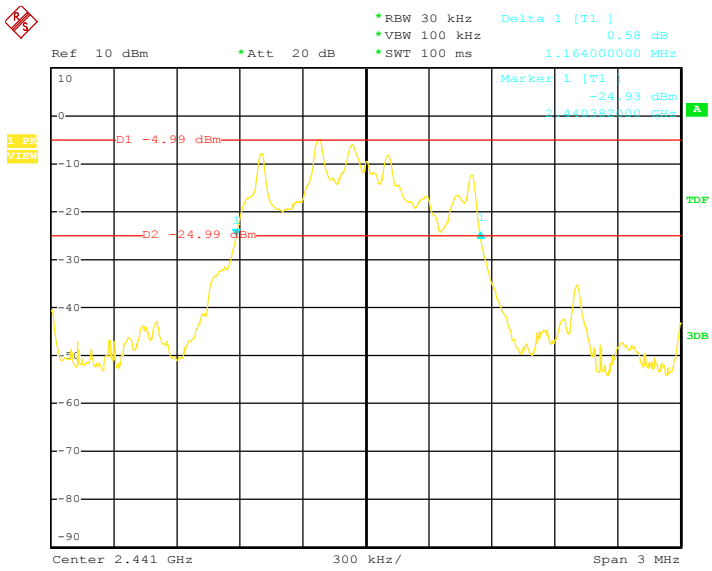
CH Mid



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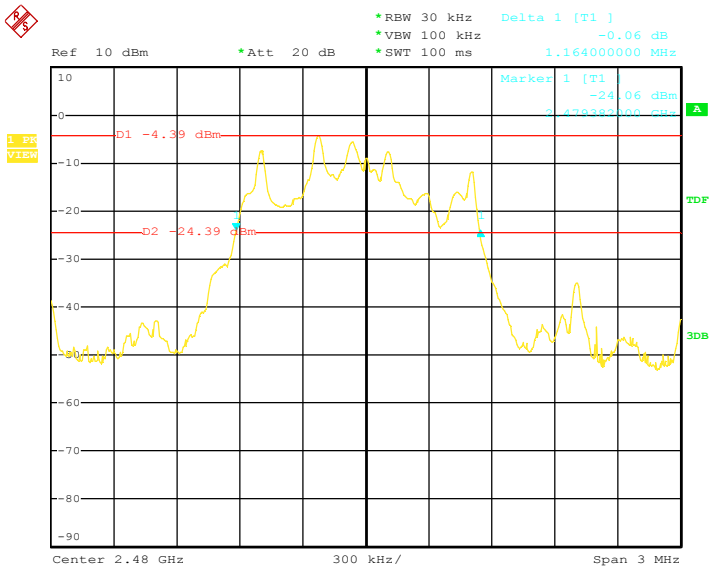
CH High



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B. Peak Power

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Peak Power	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS		

GFSK

Channel	Frequency (MHz)	Output Power (dBm)	FCC Limit (W/dBm)	Result
Low	2402	-2.32	1.00/30.00	PASS
Mid	2441	-3.06		PASS
High	2480	-2.44		PASS

π/4-DQPSK

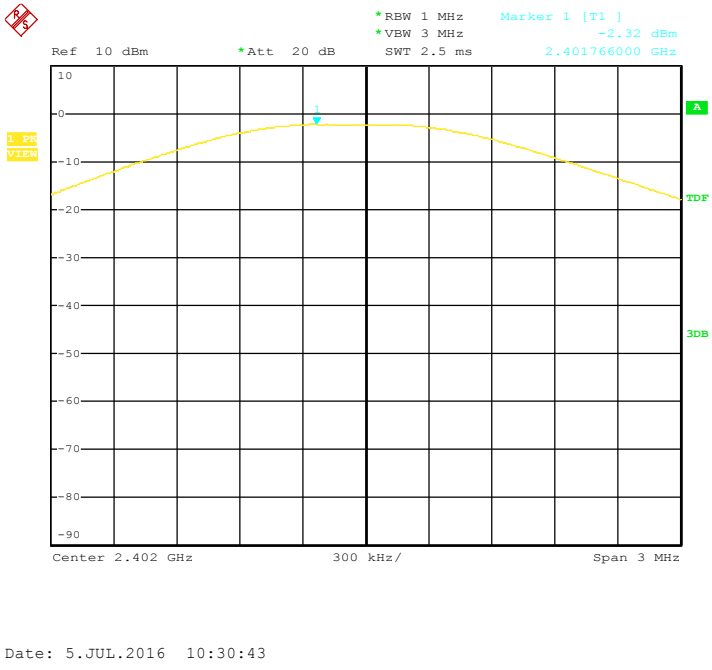
Channel	Frequency (MHz)	Output Power (dBm)	FCC Limit (W/dBm)	Result
Low	2402	-2.12	0.125/21.00	PASS
Mid	2441	-2.92		PASS
High	2480	-2.33		PASS

8DPSK

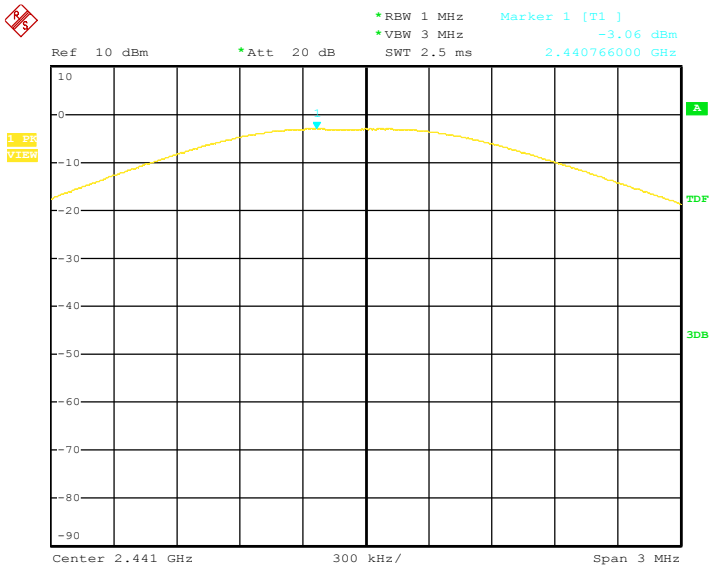
Channel	Frequency (MHz)	Output Power (dBm)	FCC Limit (W/dBm)	Result
Low	2402	-1.73	0.125/21.00	PASS
Mid	2441	-2.48		PASS
High	2480	-1.88		PASS

GFSK

Channel: Low



Channel: Middle



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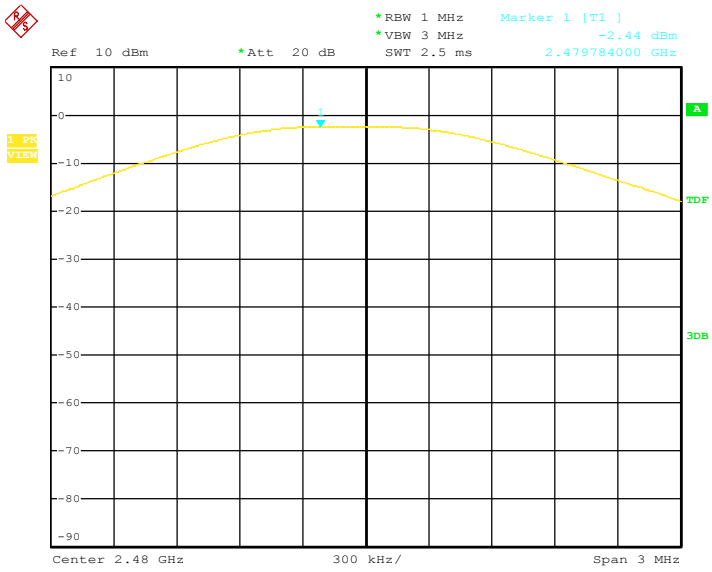
Channel: High



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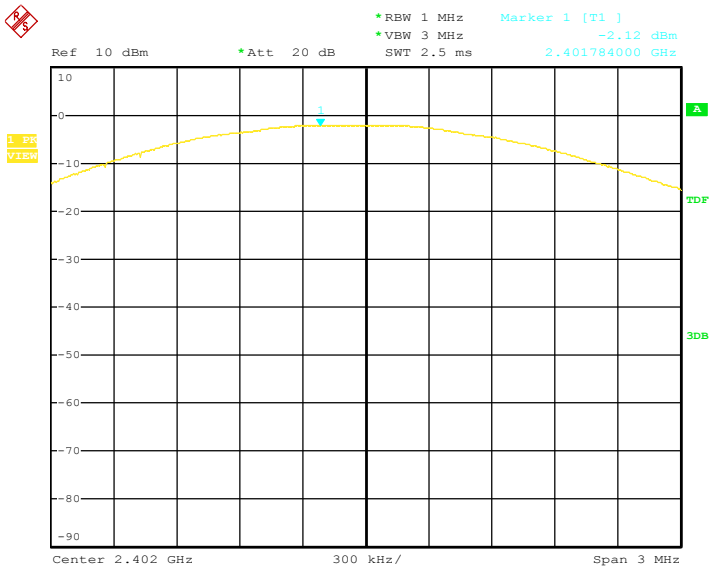
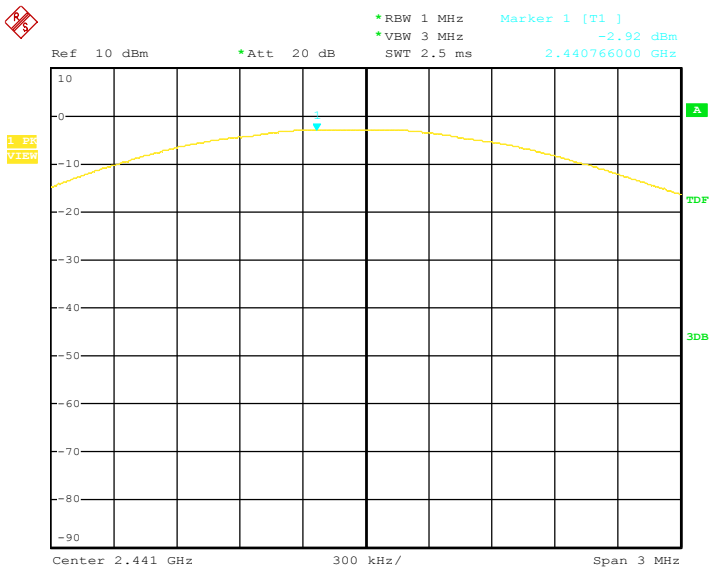
π/4-DQPSK

Channel: Low



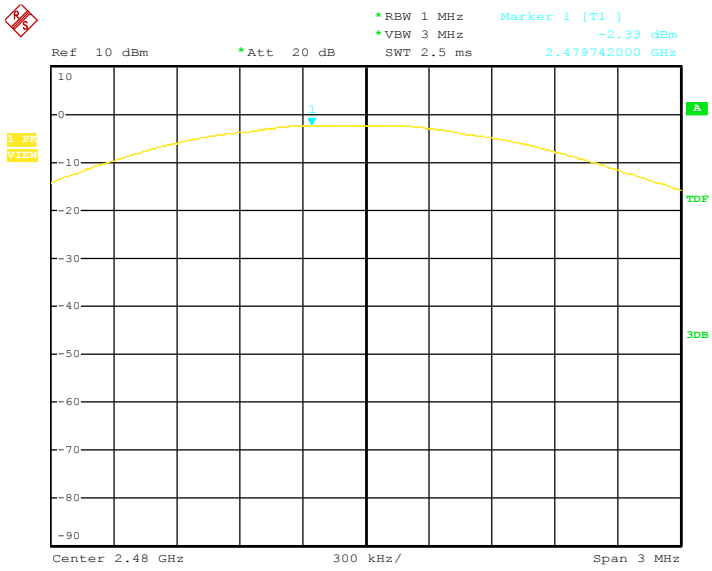
Date: 5.JUL.2016 13:41:32

Channel: Middle



Date: 5.JUL.2016 13:42:40

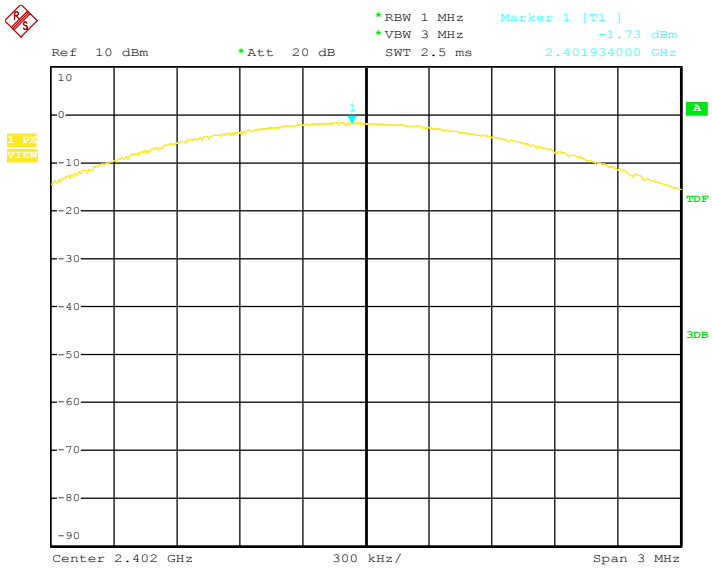
Channel: High



Date: 5.JUL.2016 13:44:09

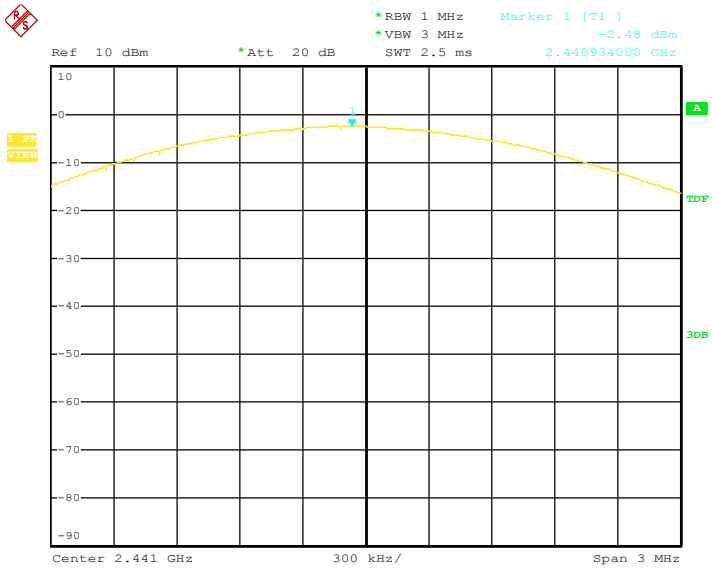
8DPSK

Channel: Low



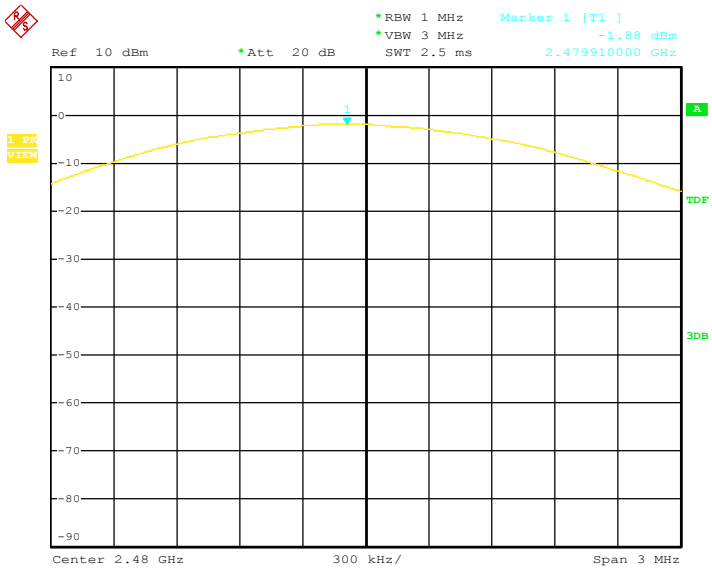
Date: 5.JUL.2016 14:50:15

Channel: Middle



Date: 5.JUL.2016 14:51:22

Channel: High



Date: 5.JUL.2016 14:52:27

C. 100kHz Band Edges Measurement

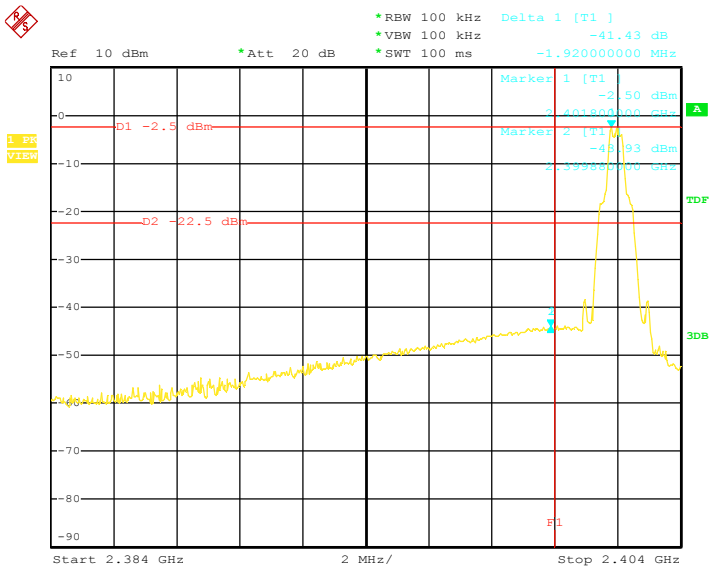
Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Band Edges Measurement	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

GFSK

Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	82.50	41.43	41.07	74.0 / 54.0	-32.93
High	Peak	81.28	52.38	28.90	74.0 / 54.0	-45.10

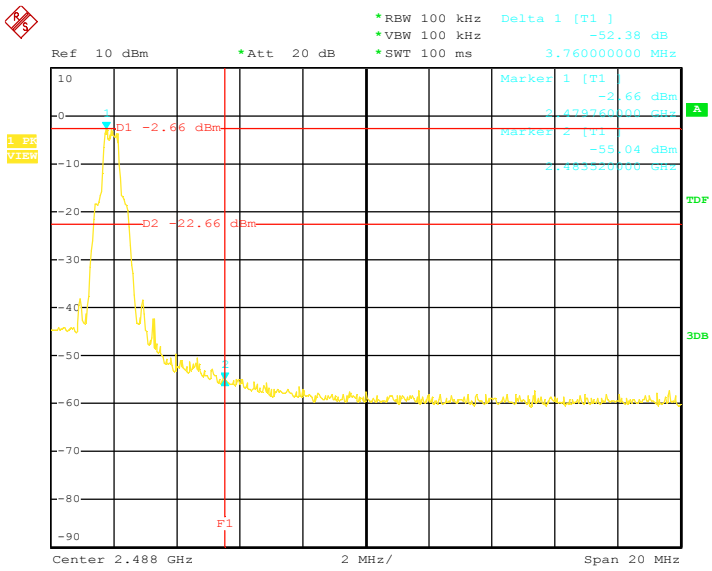
Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Date: 5.JUL.2016 10:52:12

Channel: High

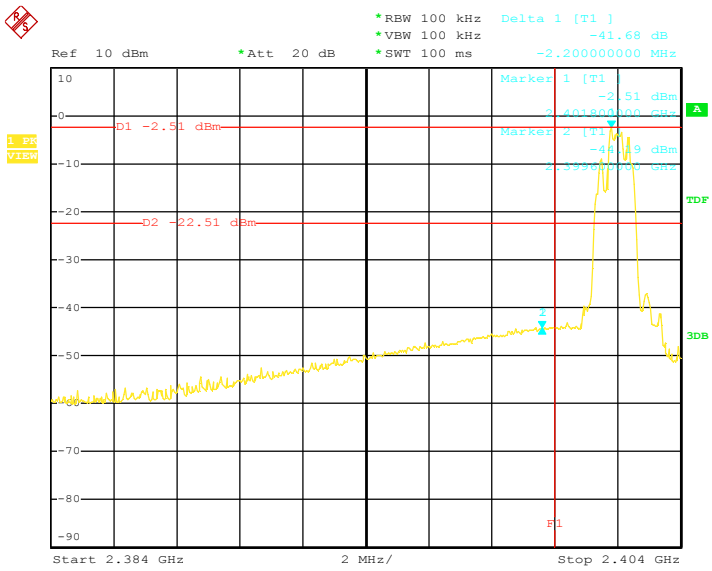


π/4-DQPSK

Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	81.68	41.68	40.00	74.0 / 54.0	-34.00
High	Peak	80.25	52.05	28.20	74.0 / 54.0	-45.80

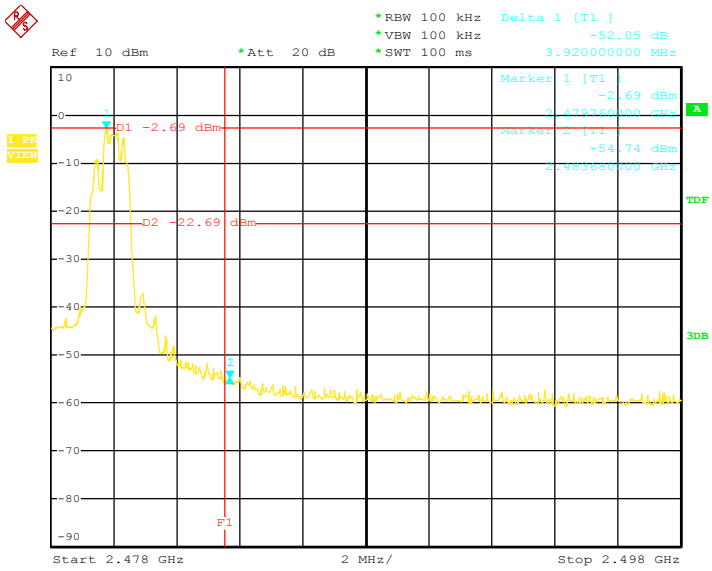
Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Date: 5.JUL.2016 13:53:15

Channel: High



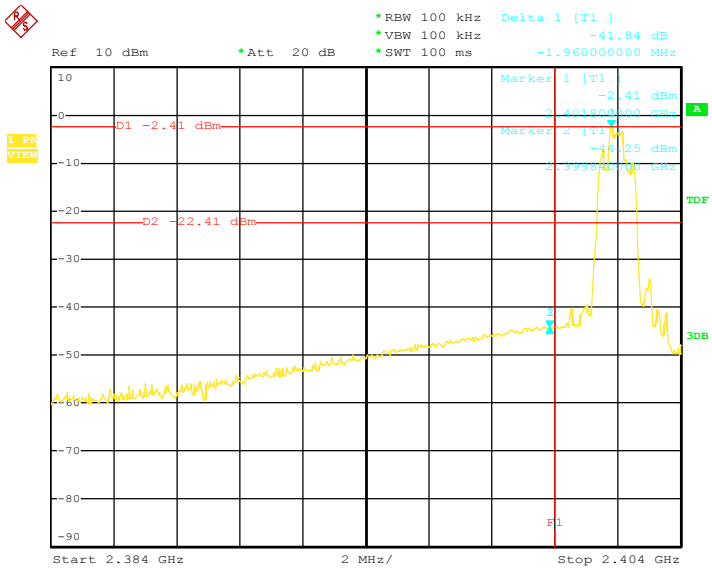
Date: 5.JUL.2016 13:54:46

8DPSK

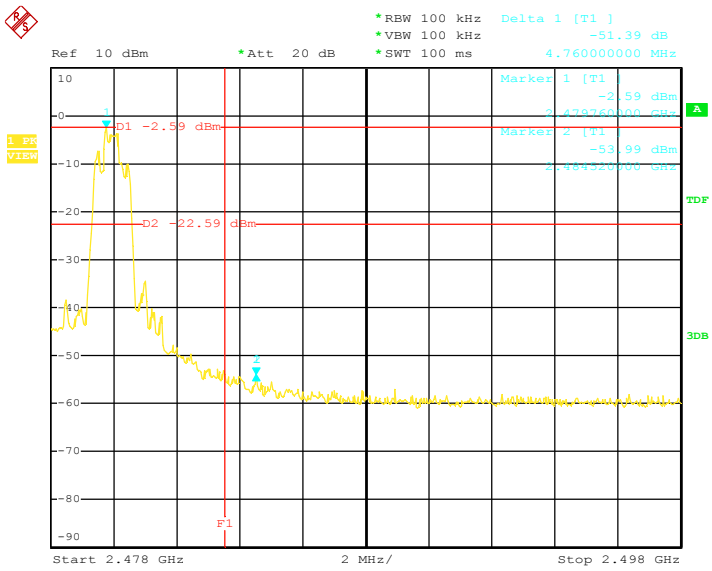
Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	80.67	41.84	38.83	74.0 / 54.0	-35.17
High	Peak	80.10	51.39	28.71	74.0 / 54.0	-45.29

Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Channel: High



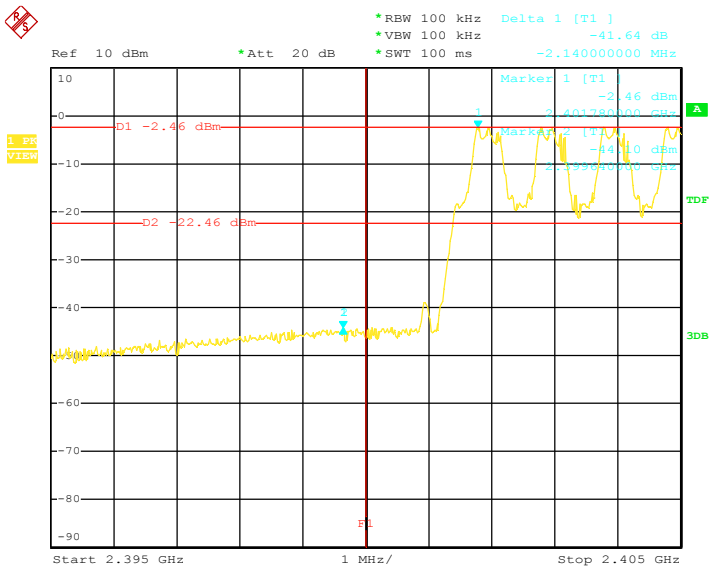
Date: 5.JUL.2016 15:05:59

GFSK

Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	82.50	41.64	40.86	74.0 / 54.0	-33.14
High	Peak	81.28	52.66	28.62	74.0 / 54.0	-45.38

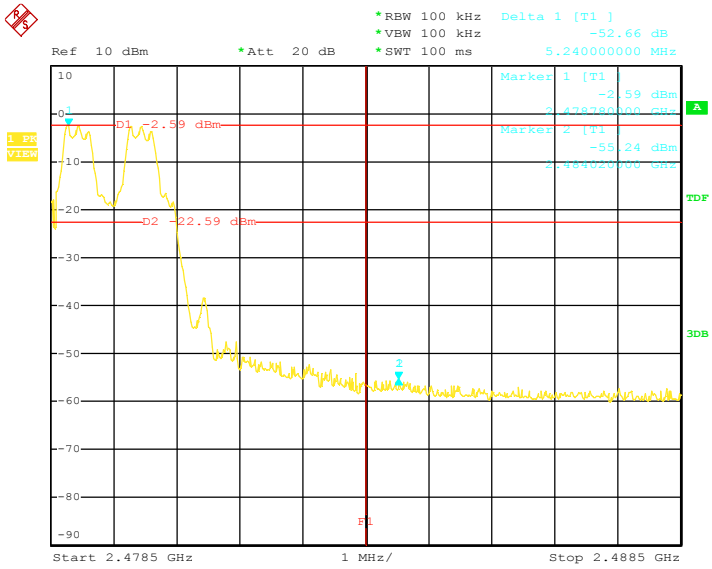
Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Date: 5.JUL.2016 11:23:46

Channel: High



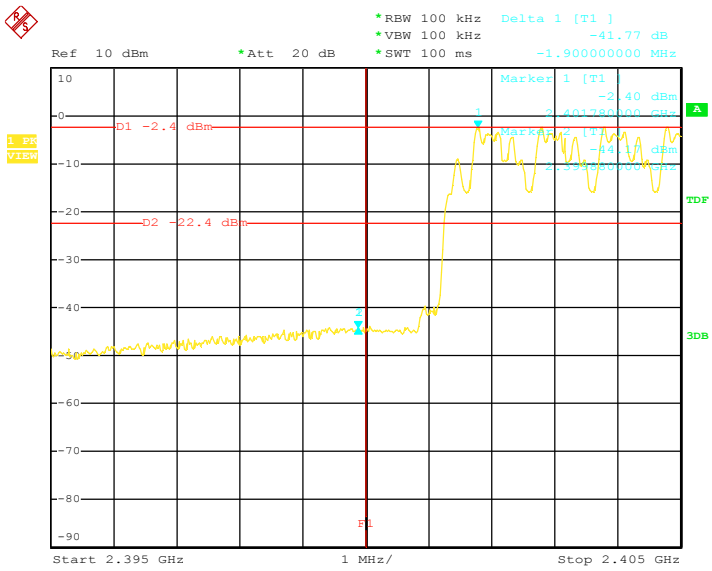
Date: 5.JUL.2016 11:22:00

π/4-DQPSK

Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	81.68	41.77	39.91	74.0 / 54.0	-34.09
High	Peak	80.25	51.70	28.55	74.0 / 54.0	-45.45

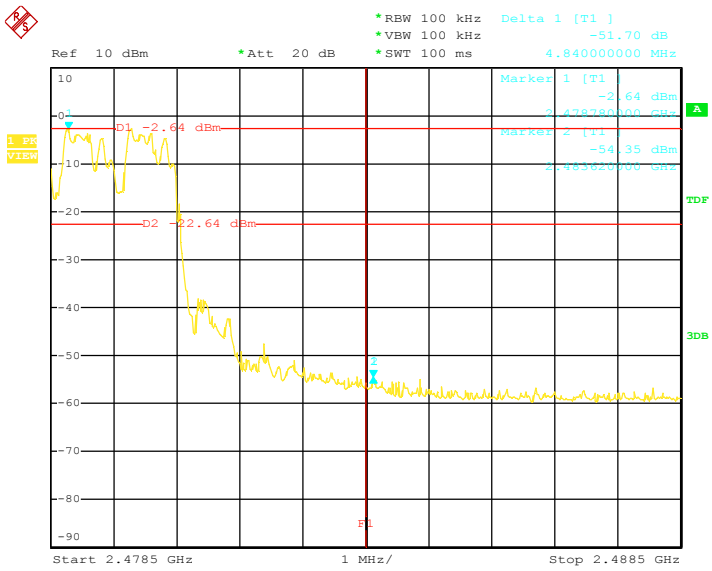
Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Date: 5.JUL.2016 14:39:56

Channel: High

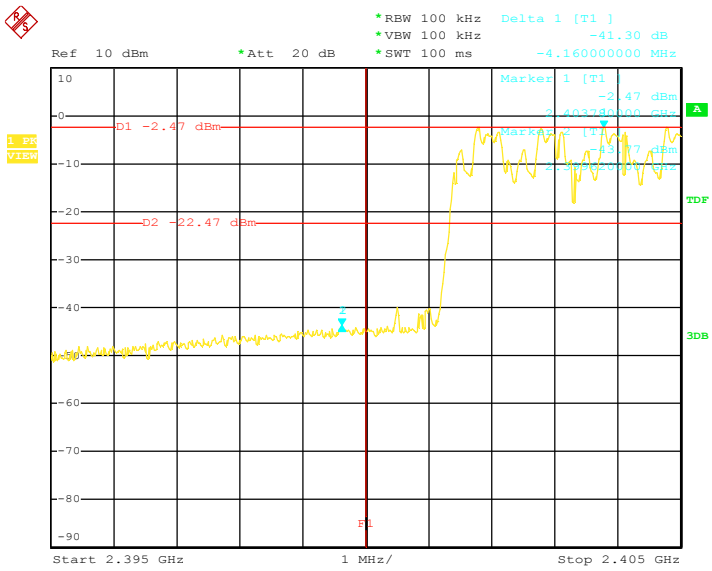


8DPSK

Channel	Detector	Radiated Method Max. Field Strength of Fundamental (dBuV/m)	Conducted Method Between Carrier Max. Power and Local Max. Emission in Restrict Band(dBc)	The Max. Field Strength in Restrict Band (dBuV/m)	Limt @3m (dBuVm) Peak / Average	Margin (dB)
Low	Peak	80.67	41.30	39.37	74.0 / 54.0	-34.63
High	Peak	80.10	51.84	28.26	74.0 / 54.0	-45.74

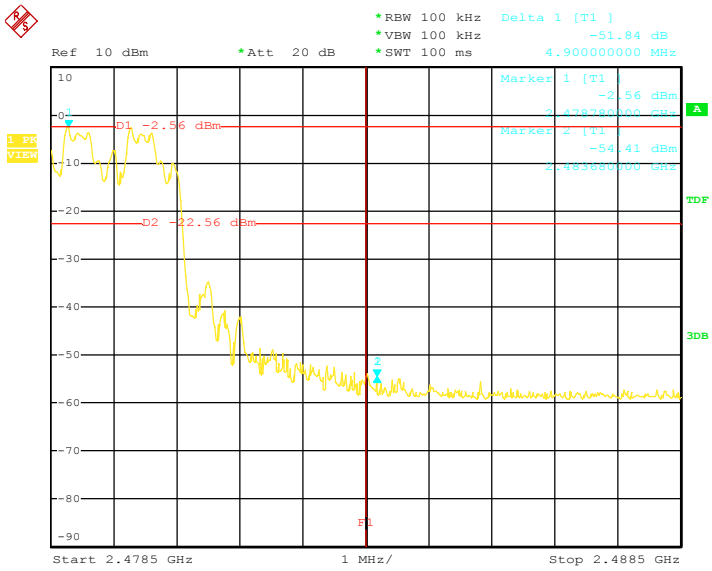
Note: (1) According to step 2 of Marker-Delta Method DA 00-705 (following plots included).
(2) According to step 3 of Marker-Delta Method:
The Max. Field Strength in Restrict Band = Filed Strength of Fundamental – Between Carrier Max Power and Local Max. Emission in Restrict Band
(3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Channel: Low



Date: 5.JUL.2016 16:10:35

Channel: High



Date: 5.JUL.2016 16:15:03

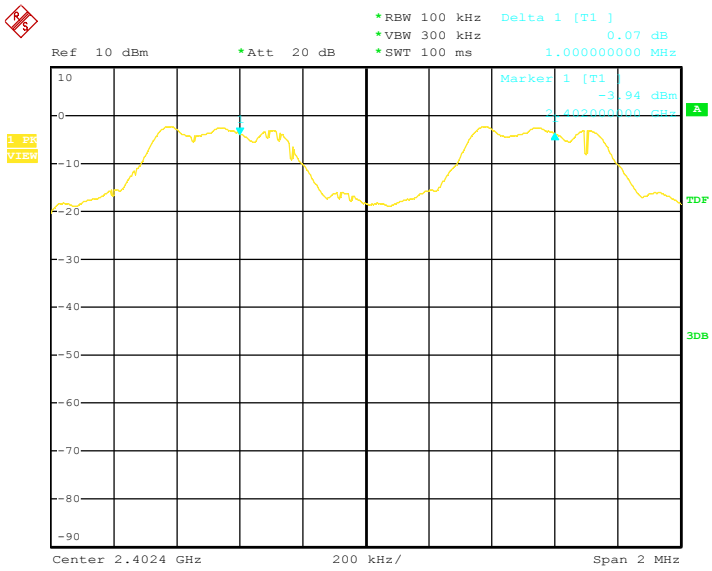
D. Frequency Separation

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Frequency Separation	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

GFSK

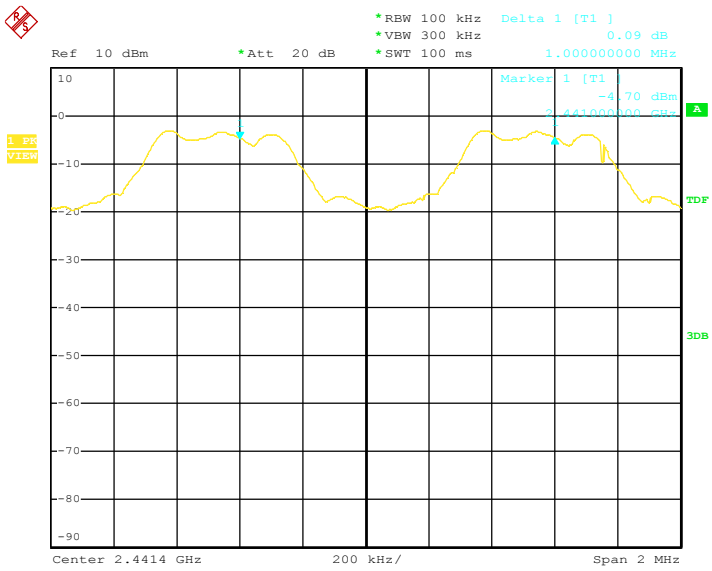
Channel	Channel Frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
Low	2402	1000	>25kHz
Mid	2441	1000	>25kHz
High	2480	1000	>25kHz

Channel: Low



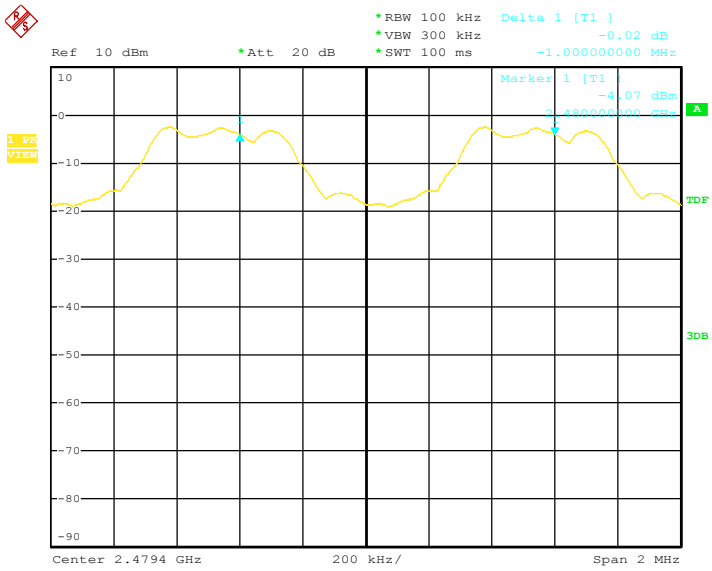
Date: 5.JUL.2016 11:27:24

Channel: Mid



Date: 5.JUL.2016 11:31:32

Channel: High

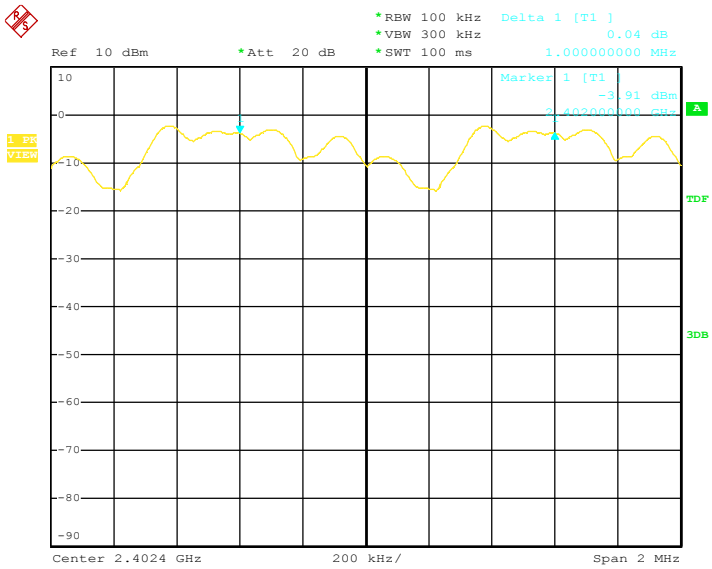


Date: 5.JUL.2016 11:35:54

π/4-DQPSK

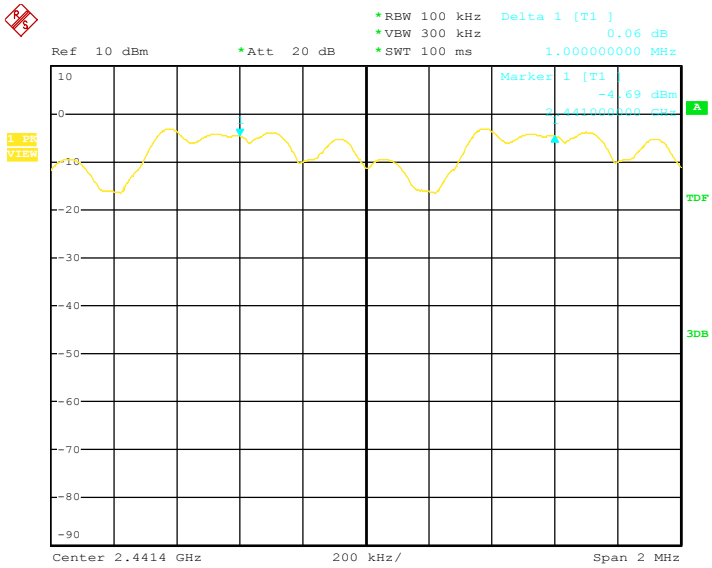
Channel	Channel Frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
Low	2402	1000	>25kHz
Mid	2441	1000	>25kHz
High	2480	1000	>25kHz

Channel: Low



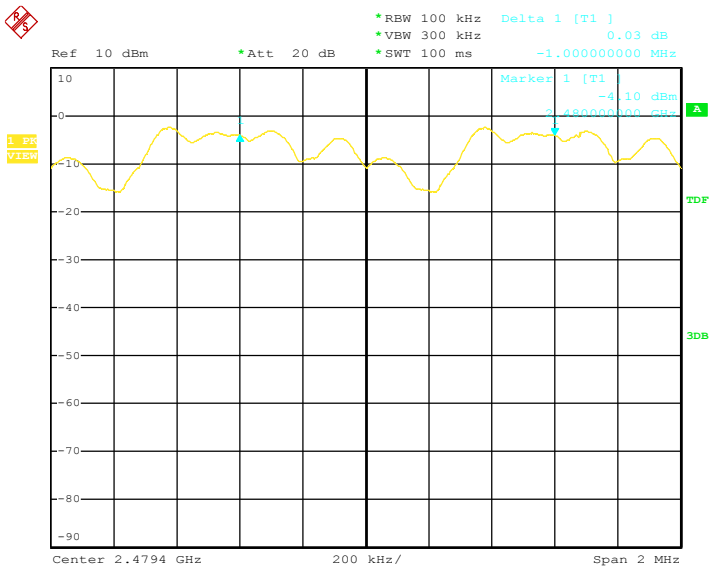
Date: 5.JUL.2016 14:20:59

Channel: Mid



Date: 5.JUL.2016 14:24:11

Channel: High

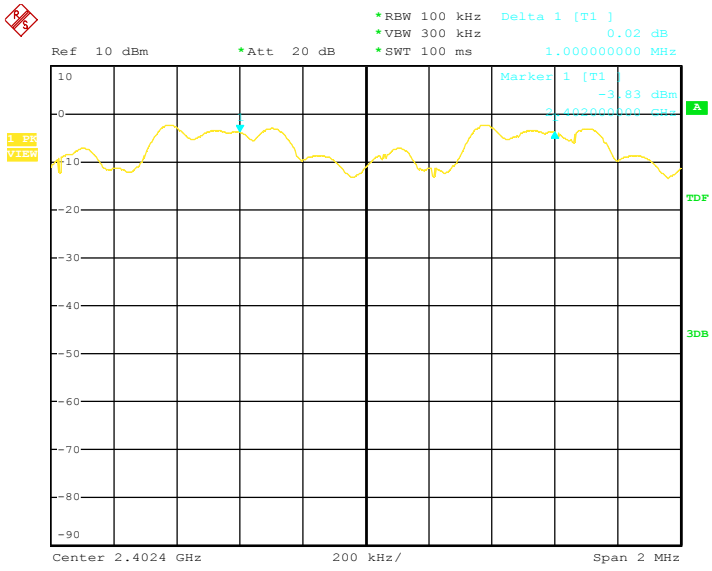


Date: 5.JUL.2016 14:28:38

8DPSK

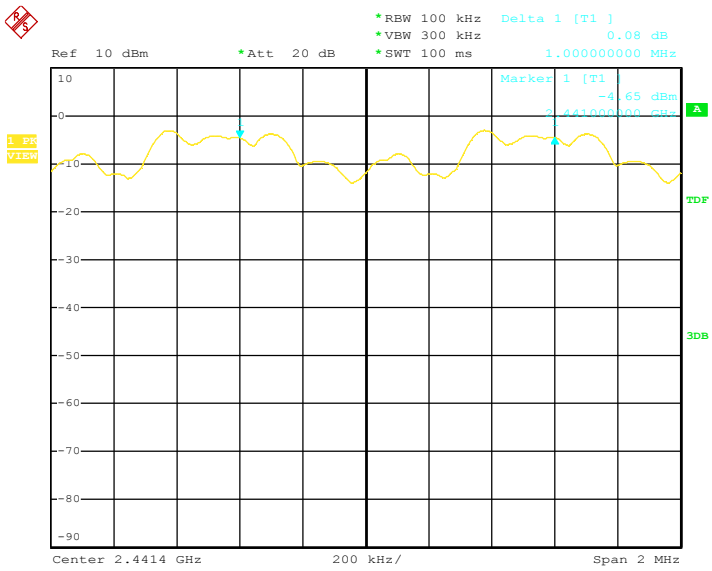
Channel	Channel Frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
Low	2402	1000	>25kHz
Mid	2441	1000	>25kHz
High	2480	1000	>25kHz

Channel: Low



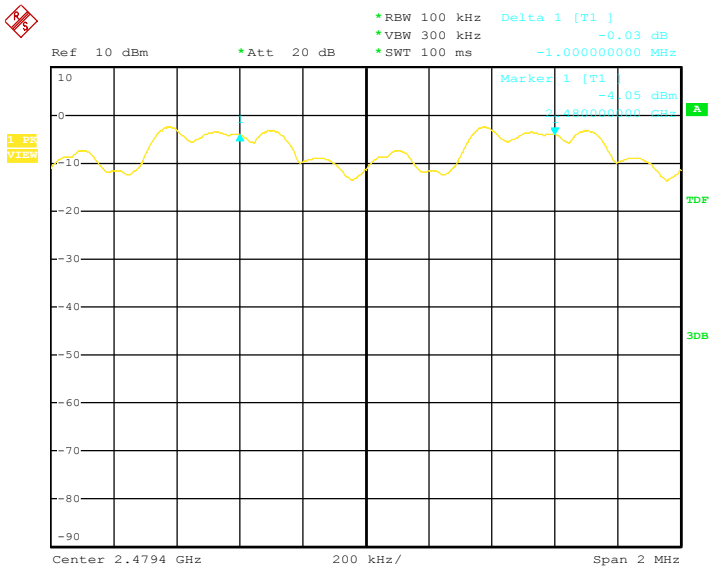
Date: 5.JUL.2016 15:52:46

Channel: Mid



Date: 5.JUL.2016 16:00:25

Channel: High



Date: 5.JUL.2016 16:05:46

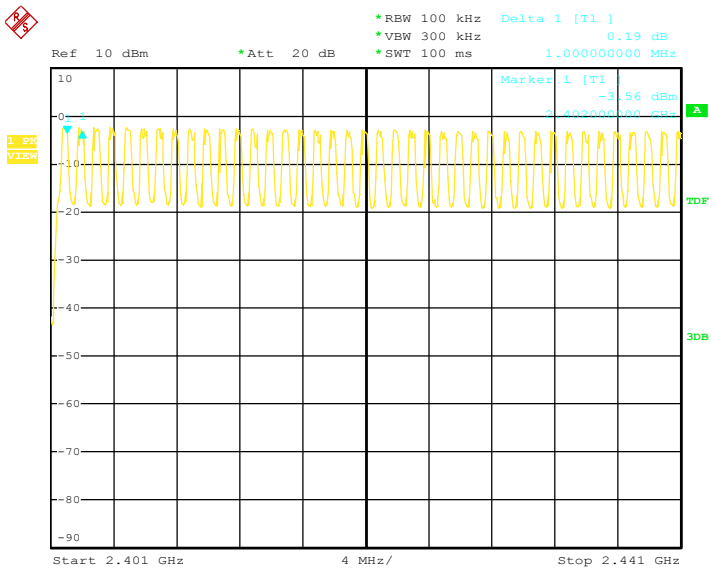
E. Number of Hopping Frequency

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Number of Hopping Frequency	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

GFSK

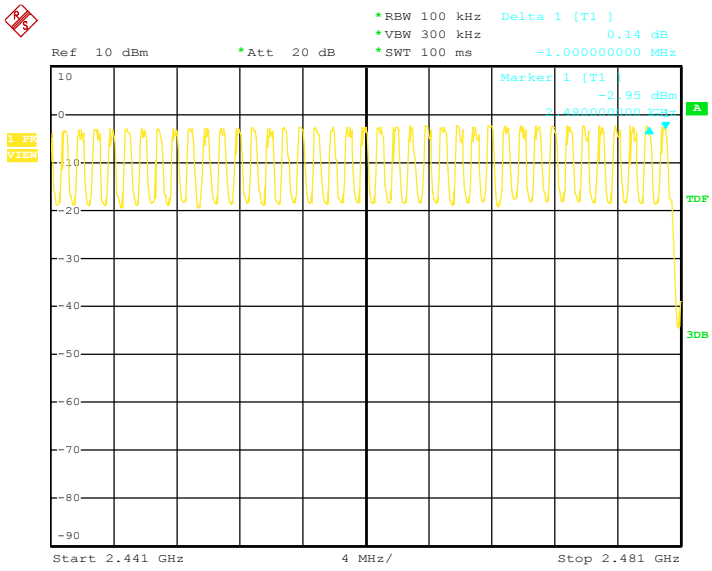
Hopping Channel Frequency Ranger	Quantity Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

Channel: Low



Date: 5.JUL.2016 11:15:45

Channel: High

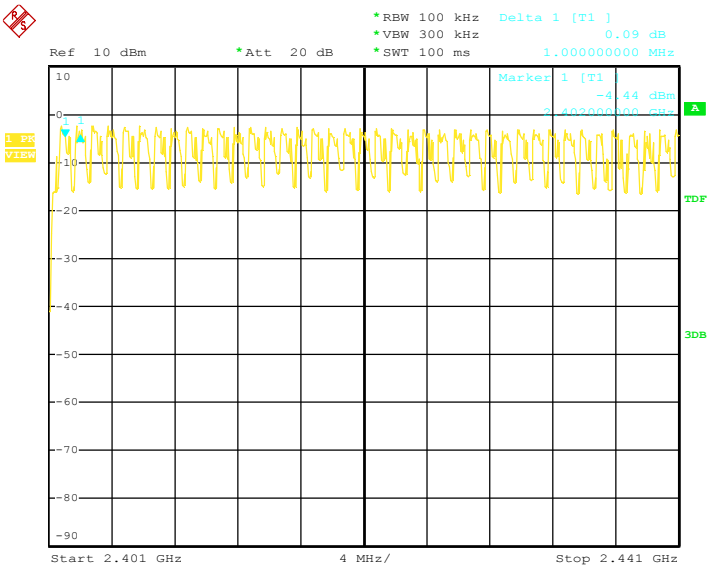


Date: 5.JUL.2016 11:17:32

π/4-DQPSK

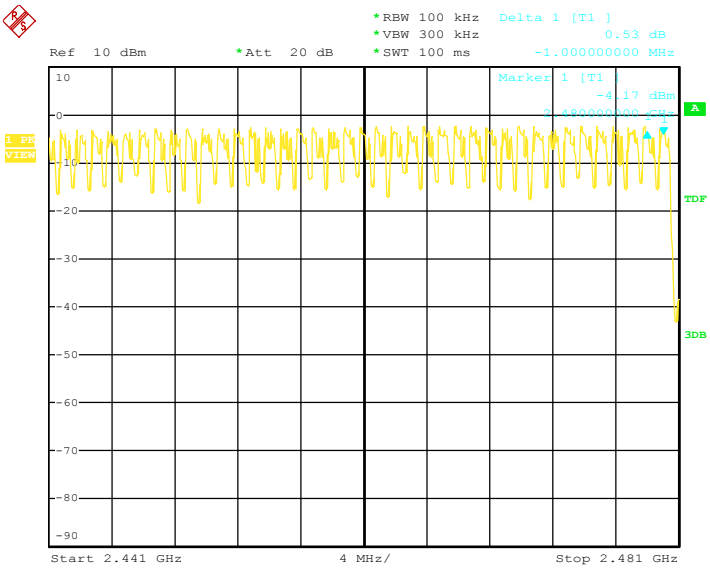
Hopping Channel Frequency Ranger	Quantity Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

Channel: Low



Date: 5.JUL.2016 14:09:52

Channel: High

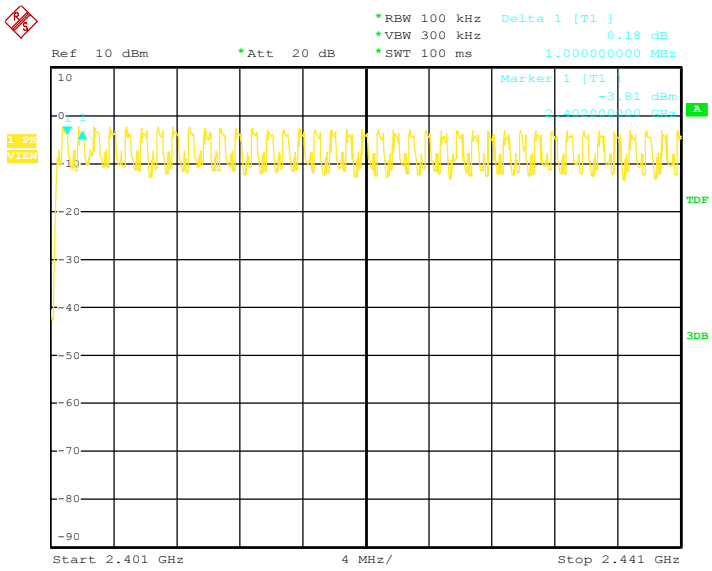


Date: 5.JUL.2016 14:15:26

8DPSK

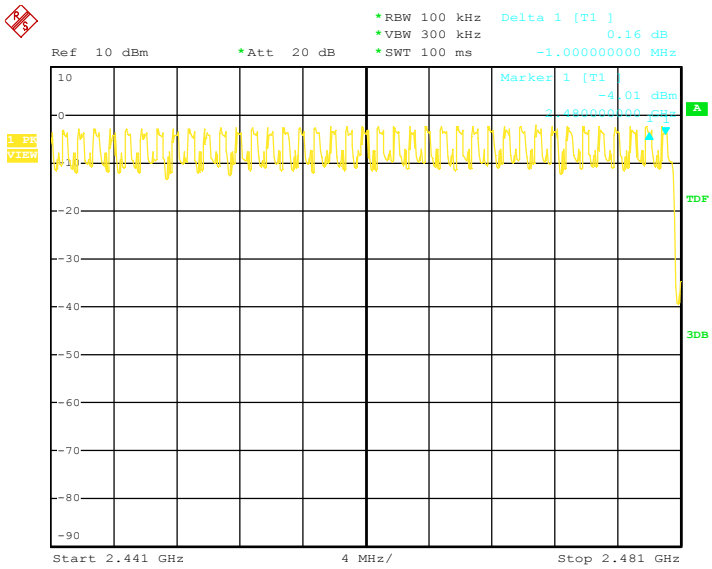
Hopping Channel Frequency Ranger	Quantity Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402~2480	79	75

Channel: Low



Date: 5.JUL.2016 15:48:21

Channel: High



Date: 5.JUL.2016 15:43:30

F. Time of Occupancy (Dwell Time)

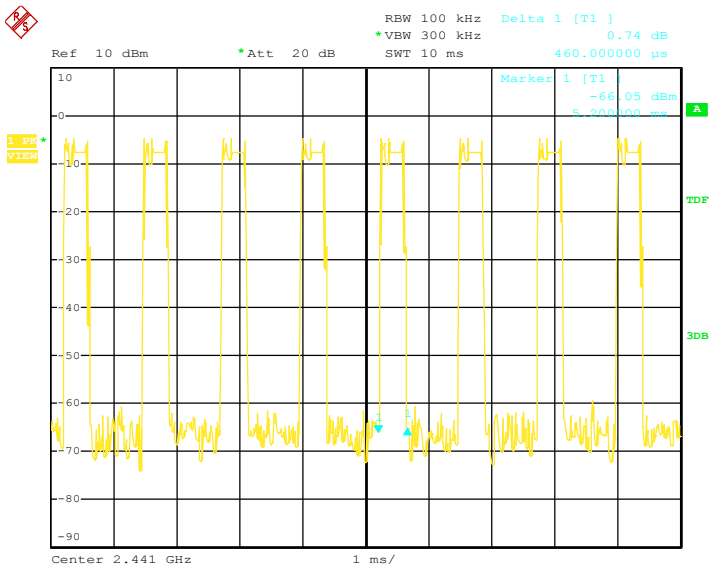
Product	: IP Phone	Test Mode	: CH Mid
Test Item	: Time of Occupancy	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS		

GFSK

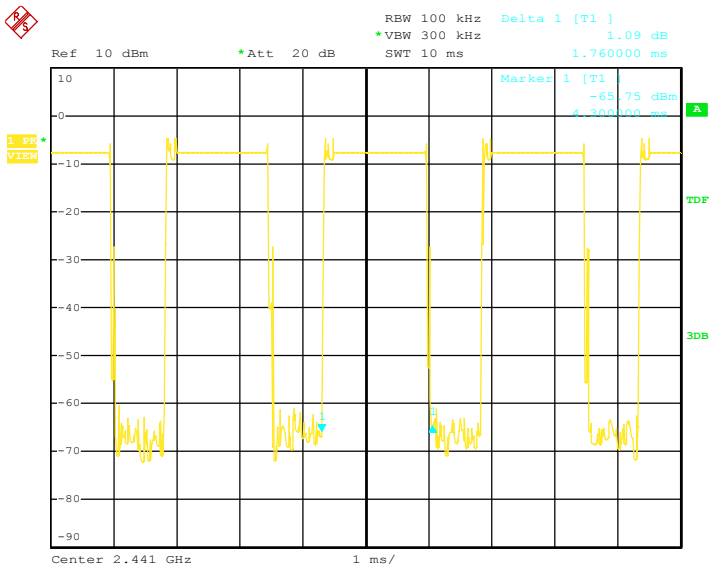
Channel	Channel Frequency(MHz)	Dwell Time (ms)	Time of occupancy on the Tx channel in 31.6sec	Average time of occupancy Limit(ms)
DH1	2441	0.460	147.20	400
DH3	2441	1.760	281.60	400
DH5	2441	3.000	320.00	400

DH1 Dwell time = 0.460 ms x (1600/2)/79 x 31.6 = 147.20(ms)
DH3 Dwell time = 1.760 ms x (1600/4)/79 x 31.6 = 281.60(ms)
DH5 Dwell time = 3.000 ms x (1600/6)/79 x 31.6 = 320.00(ms)

DH1

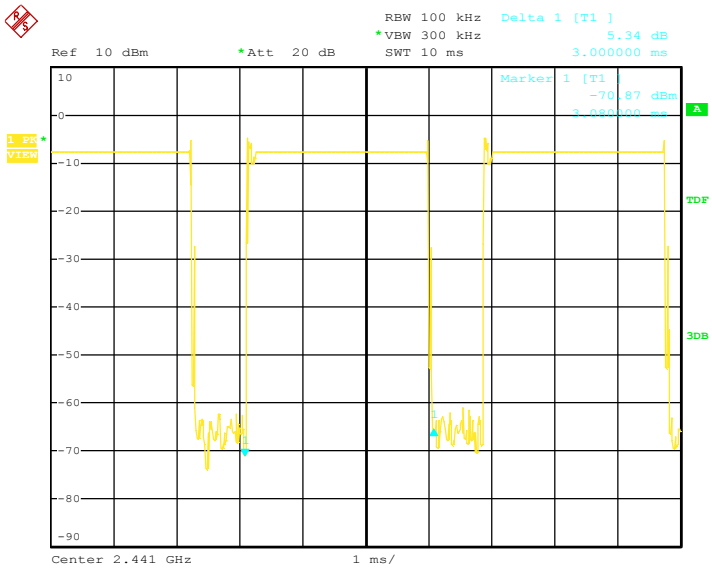


DH3



Date: 5.JUL.2016 11:42:08

DH5



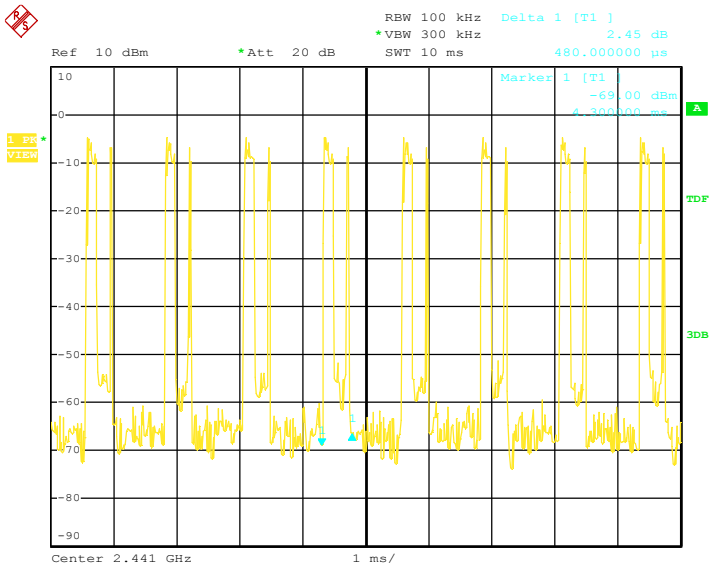
Date: 5.JUL.2016 11:42:57

π/4-DQPSK

Channel	Channel Frequency(MHz)	Dwell Time (ms)	Time of occupancy on the Tx channel in 31.6sec	Average time of occupancy Limit(ms)
DH1	2441	0.480	153.60	400
DH3	2441	1.760	281.60	400
DH5	2441	3.000	320.00	400

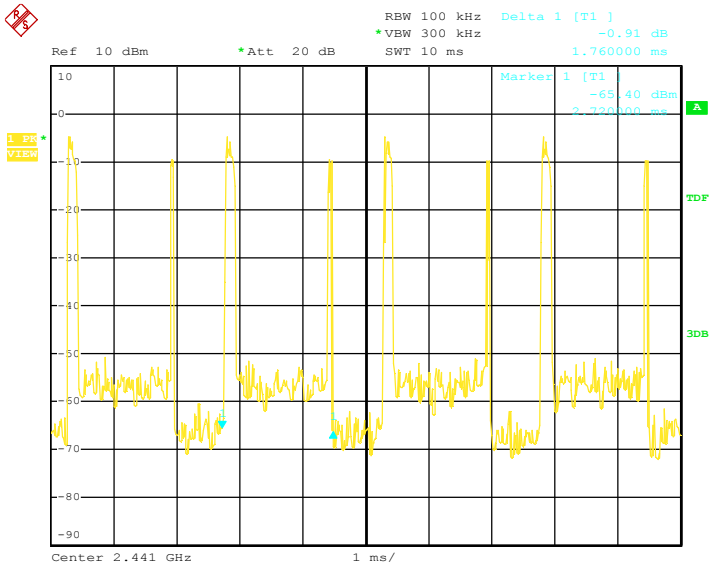
DH1 Dwell time = 0.480 ms x (1600/2)/79 x 31.6 = 153.60(ms)
DH3 Dwell time = 1.760 ms x (1600/4)/79 x 31.6 = 281.60(ms)
DH5 Dwell time = 3.000 ms x (1600/6)/79 x 31.6 = 320.00(ms)

DH1



Date: 5.JUL.2016 14:01:28

DH3



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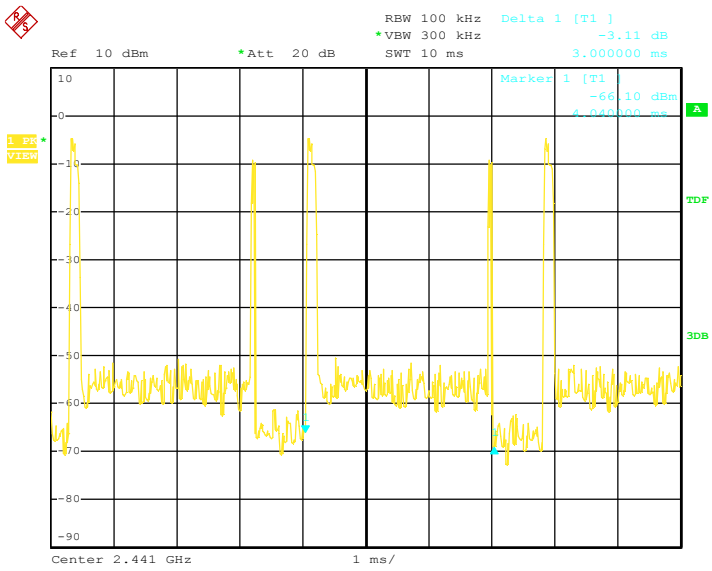
DH5



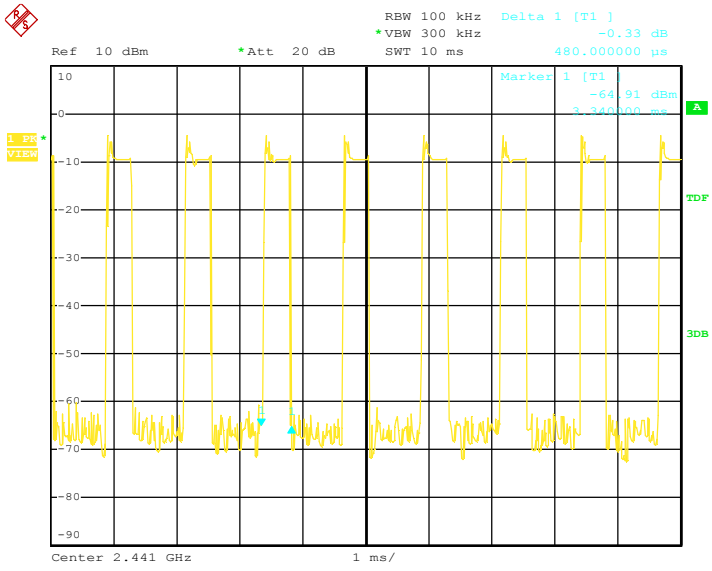
Date: 5.JUL.2016 14:03:14

8DPSK

Channel	Channel Frequency(MHz)	Dwell Time (ms)	Time of occupancy on the Tx channel in 31.6sec	Average time of occupancy Limit(ms)
DH1	2441	0.480	153.60	400
DH3	2441	1.760	281.60	400
DH5	2441	3.000	320.00	400

DH1 Dwell time = 0.480 ms x (1600/2)/79 x 31.6 = 153.60(ms)
DH3 Dwell time = 1.760 ms x (1600/4)/79 x 31.6 = 281.60(ms)
DH5 Dwell time = 3.000 ms x (1600/6)/79 x 31.6 = 320.00(ms)

DH1



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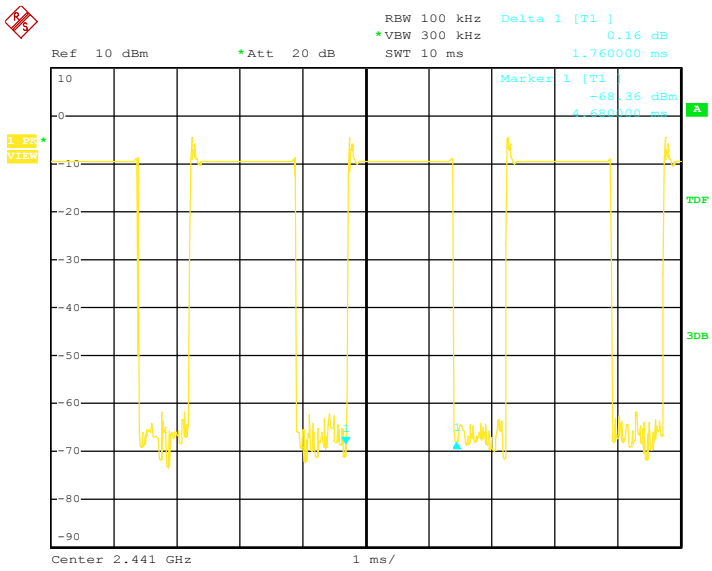
DH3



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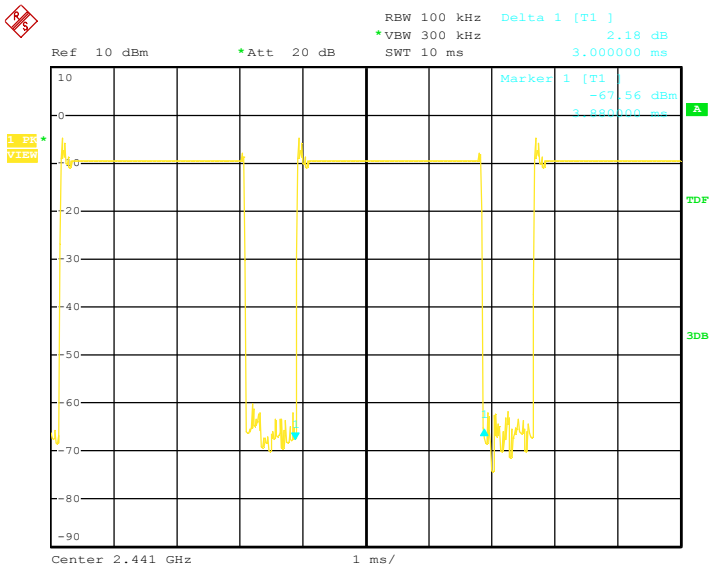
DH5



Date: 5.JUL.2016 15:20:28

6. Transmitter Spurious Radiated Emission at 3 Meters

6. 1 Test Equipment

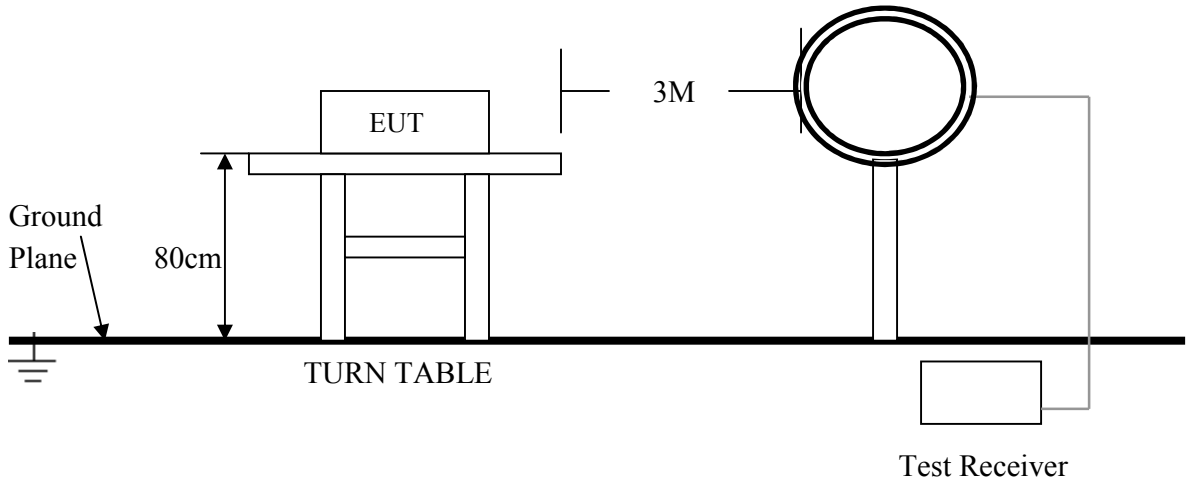
Please refer to Section 10 this report.

6. 2 Test Procedure

1. The EUT was tested according to ANSI C63.10:2013.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10:2013.
3. The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz Measurements were made at 3 meters.
4. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.10:2013.

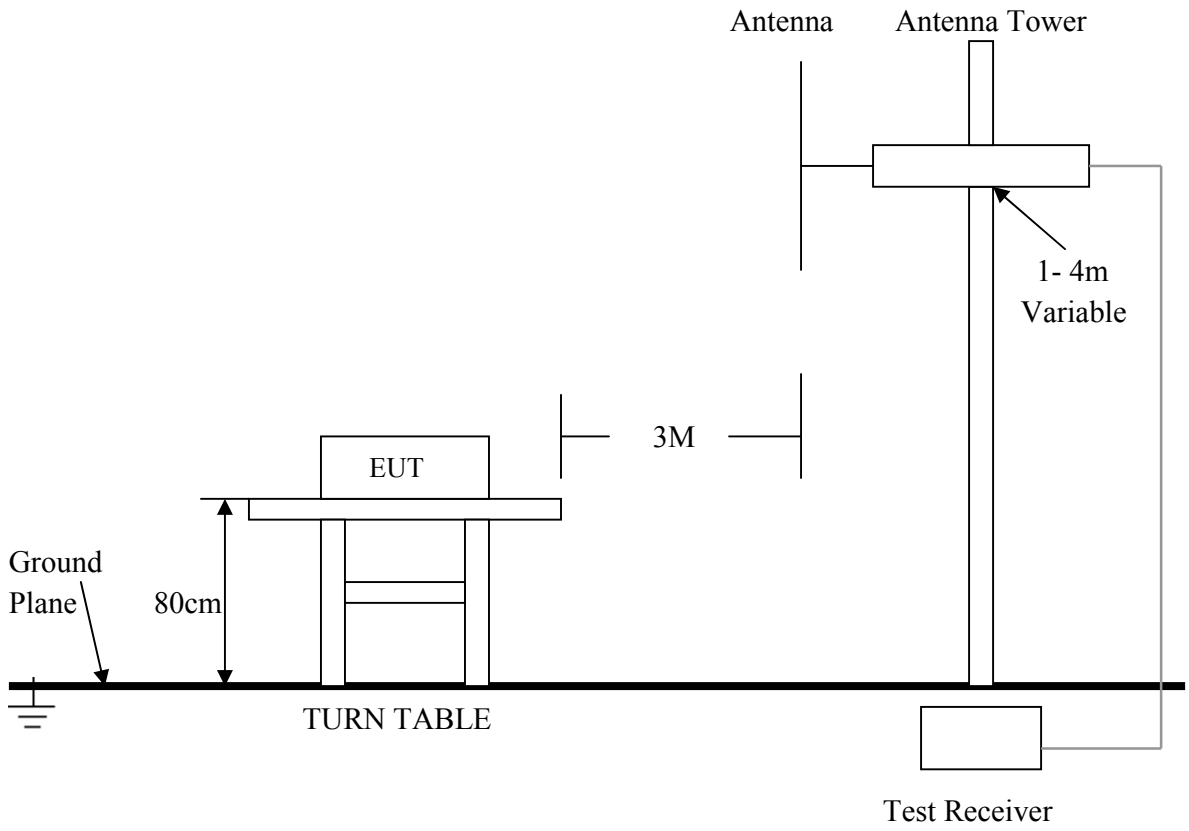
6. 3 Test Setup

For Frequencies below 30 MHz



For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies above 30 MHz



For the actual test configuration , please refer to the related items – Photos of Testing

6. 4 Configuration of the EUT

Same as section 4.4 of this report

6. 5 EUT Operating Condition

Same as section 4.5 of this report.

6. 6 Limit

In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in section 15.209(a), which lesser attenuation.

All other emissions inside restricted bands specified in section 15.205(a) shall not exceed the general radiated emission limits specified in section 15.209(a)

Note:

Applies to harmonics/spurious emissions that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

47 CFR § 15.237(c): The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

FCC CFR 47, Part 15, Subpart C, Para, 15.205(a) – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	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	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	[2]
13.36–13.41.			

[1] Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2] Above 38.6

FCC 47 CFR, Part 15.209(a) – Field Strength Limits within Restricted Frequency Bands

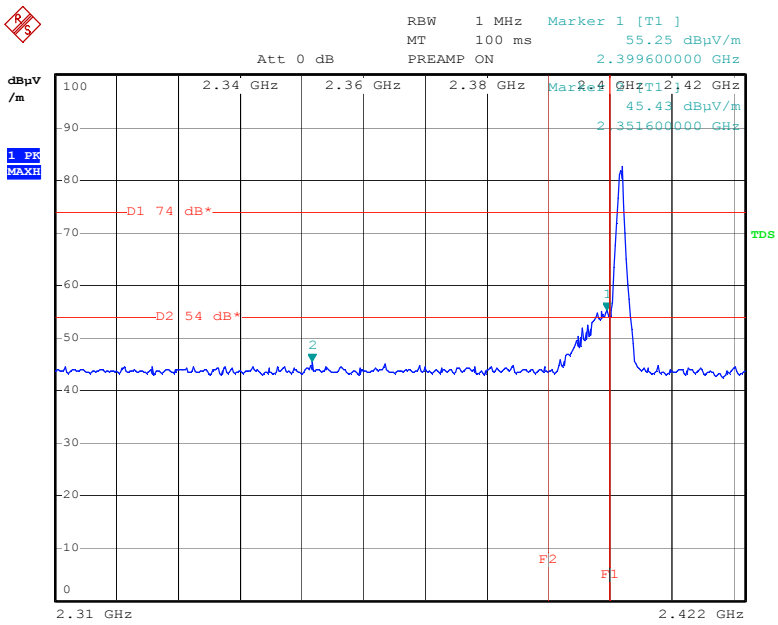
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

6. 7 Test Result

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Spurious Radiated Emissions	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

Restricted Frequency Bands Data

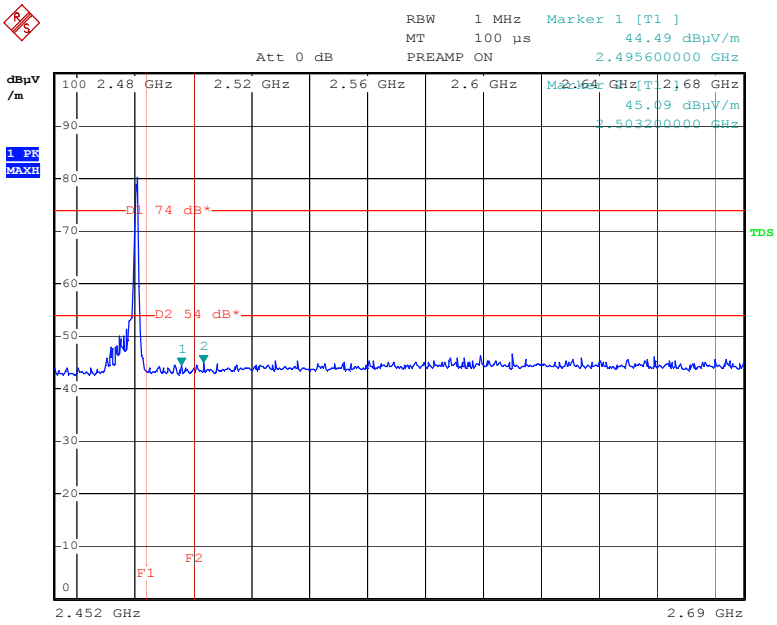
GFSK CH Low



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		**Non-restricted Band Emissions**					
Non-restricted Band (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**NBE Freq. (MHz)**	**Out-band PSD [o] (dBuV/100kHz)**	**[i] – [o] (dB)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2390-2400	2402	82.51	2399.600	55.25	27.26	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		**Restricted Band Emissions**					
Restricted BandBand (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2310-2390	2402	82.50	2351.600	3	45.43	74	PK	H
2310-2390	2402	/	2351.600	3	/	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

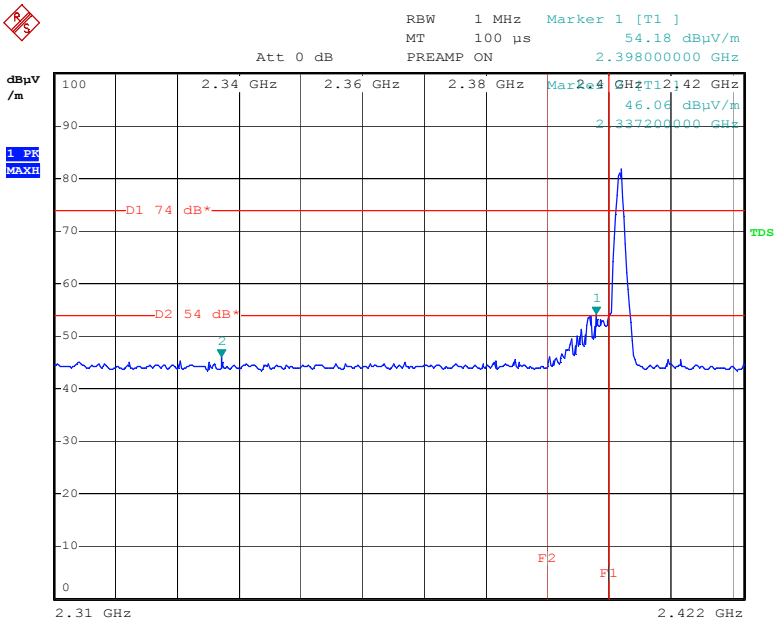
GFSK CH High



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		Non-restricted Band Emissions					
Non-restricted Band (MHz)	Channel (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2500-2690	2480	81.29	2503.200	45.09	36.20	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		Restricted Band Emissions					
Restricted BandBand (MHz)	Channel (MHz)	In-band PSD [i] (dBuV/100kHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dB)	Level Type	Pol. note 1
2483.5-2500	2480	81.28	2495.600	3	44.49	74	PK	H
2483.5-2500	2480	/	2495.600	3	/	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

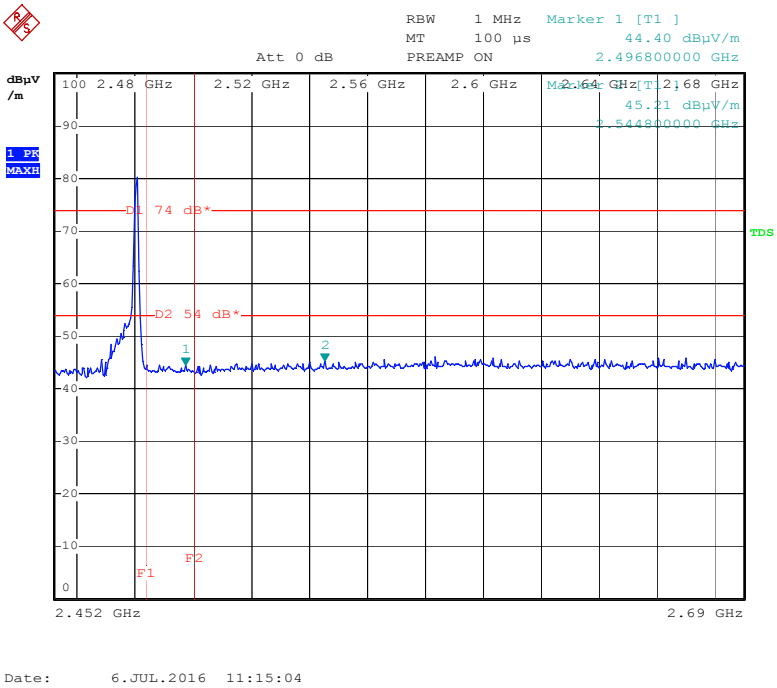
π/4-DQPSK CH Low



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		**Non-restricted Band Emissions**					
Non-restricted Band (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**NBE Freq. (MHz)**	**Out-band PSD [o] (dBuV/100kHz)**	**[i] – [o] (dB)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2390-2400	2402	81.69	2398.000	54.18	27.51	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		**Restricted Band Emissions**					
Restricted BandBand (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2310-2390	2402	81.68	2337.200	3	46.06	74	PK	H
2310-2390	2402	/	2337.200	3		54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

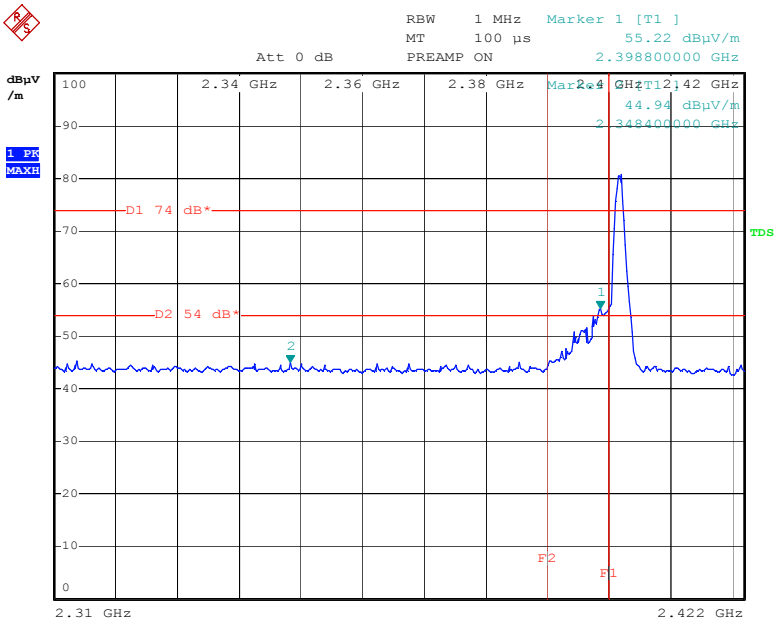
π/4-DQPSK CH High



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		**Non-restricted Band Emissions**					
Non-restricted Band (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**NBE Freq. (MHz)**	**Out-band PSD [o] (dBuV/100kHz)**	**[i] – [o] (dB)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2500-2690	2480	80.25	2544.800	45.21	35.04	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		**Restricted Band Emissions**					
Restricted BandBand (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2483.5-2500	2480	80.26	2496.800	3	44.40	74	PK	H
2483.5-2500	2480	/	2496.800	3	/	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

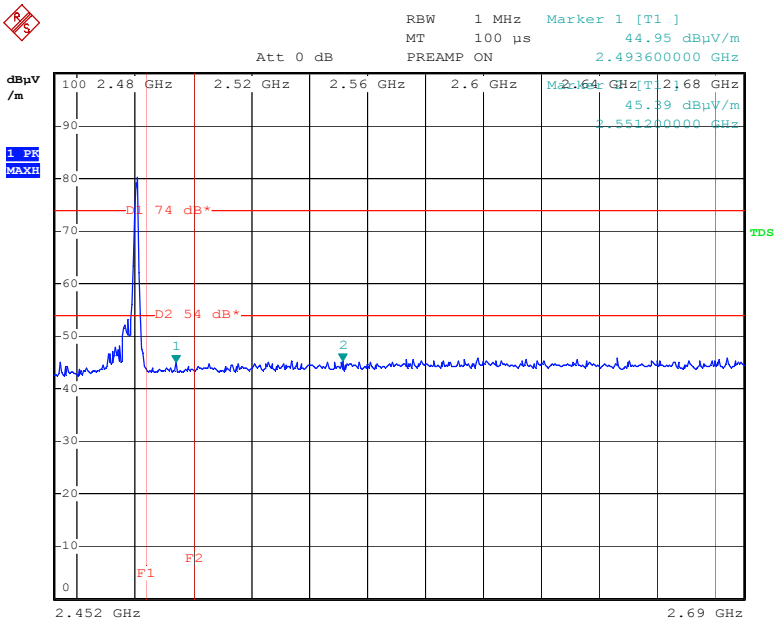
8DPSK CH Low



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		Non-restricted Band Emissions					
Non-restricted Band (MHz)	Channel (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	2402	80.67	2398.800	55.22	25.45	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		Restricted Band Emissions					
Restricted BandBand (MHz)	Channel (MHz)	In-band PSD [i] (dBuV/100kHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dB)	Level Type	Pol. note 1
2310-2390	2402	80.69	2348.400	3	44.94	74	PK	H
2310-2390	2402	/	2348.400	3	/	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

8DPSK CH High



Transmitter Radiated Bandedge Emissions Result								
Modulation	GFSK-1Mbps		**Non-restricted Band Emissions**					
Non-restricted Band (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**NBE Freq. (MHz)**	**Out-band PSD [o] (dBuV/100kHz)**	**[i] – [o] (dB)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2500-2690	2480	80.10	2551.200	45.39	34.71	20	PK	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)								

Modulation	GFSK-1Mbps		**Restricted Band Emissions**					
Restricted BandBand (MHz)	**Channel (MHz)**	**In-band PSD [i] (dBuV/100kHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dB)**	**Level Type**	**Pol. note 1**
2483.5-2500	2480	82.19	2493.600	3	44.95	74	PK	H
2483.5-2500	2480	/	2493.600	3	/	54	AV	H
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.								

Harmonics Radiated Emission Data

CH Low

Frequency	Read Level(dBuV)		Factor	Emission(dBuV/m)		Horiz./	Limit (dBuV/m)		Margin(dB)	
(MHz)	PK	AV	(dB)	PK	AV	Vert.	PK	AV	PK	AV
4804.00	38.35	-	10.10	48.45	-	Horiz./	74.0	54.0	-25.55	-
4804.00	38.13	-	10.10	48.23	-	Vert.	74.0	54.0	-25.77	-
7206.00	35.09	-	13.10	48.19	-	Horiz./	74.0	54.0	-25.81	-
7206.00	35.02	-	13.10	48.12	-	Vert.	74.0	54.0	-25.88	-
24020.00	-	-	-	-	-	Horiz./	74.0	54.0	-	-
24020.00	-		-	-	-	Vert.	74.0	54.0		-

CH Mid

Frequency	Read Level(dBuV)		Factor	Emission(dBuV/m)		Horiz./	Limit (dBuV/m)		Margin(dB)	
(MHz)	PK	AV	(dB)	PK	AV	Vert.	PK	AV	PK	AV
4882.00	38.15	-	10.10	48.25	-	Horiz./	74.0	54.0	-25.75	-
4882.00	38.06	-	10.10	48.16	-	Vert.	74.0	54.0	-25.84	-
7323.00	34.96	-	13.10	48.06	-	Horiz./	74.0	54.0	-25.94	-
7323.00	34.91	-	13.10	48.01	-	Vert.	74.0	54.0	-25.99	-
24410.00	-	-	-	-	-	Horiz./	74.0	54.0	-	-
24410.00	-		-	-	-	Vert.	74.0	54.0		-

CH High

Frequency	Read Level(dBuV)		Factor	Emission(dBuV/m)		Horiz./	Limit (dBuV/m)		Margin(dB)	
(MHz)	PK	AV	(dB)	PK	AV	Vert.	PK	AV	PK	AV
4960.00	38.04	-	10.10	48.14	-	Horiz./	74.0	54.0	-25.75	-
4960.00	37.93	-	10.10	48.03	-	Vert.	74.0	54.0	-25.84	-
7440.00	34.88	-	13.10	47.98	-	Horiz./	74.0	54.0	-25.94	-
7440.00	34.73	-	13.10	47.83	-	Vert.	74.0	54.0	-25.99	-
24800.00	-	-	-	-	-	Horiz./	74.0	54.0	-	-
24800.00	-		-	-	-	Vert.	74.0	54.0		-

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss - Preamp Factor.
Factor includes antenna factor, cable loss and amplifier gain.
(3) Span shall wide enough to fully capture the emission being measured;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.
For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geqslant$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
(4) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
(5) Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

Product	: IP Phone	Test Mode	: CH Low ~ CH High
Test Item	: Spurious Radiated Emissions	Temperature	: 25 ℃
Test Voltage	: DC 12V/POE	Humidity	: 56%RH
Test Result	: PASS		

For Frequency below 30MHz

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				

Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency from 30MHz to 1GHz

Adapter model: F06US1200050A

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
234.400	18.78	18.19	36.97	Horiz./	46.0	-9.03
30.640	19.55	12.06	31.61	Vert.	40.0	-8.39
375.000	20.63	20.91	41.54	Horiz./	46.0	-4.46
134.880	18.76	13.83	32.59	Vert.	43.5	-10.91
750.040	22.59	20.89	43.48	Horiz./	46.0	-2.52
450.040	22.05	15.59	37.64	Vert.	46.0	-8.36

Adapter model: NBS05B120050VU

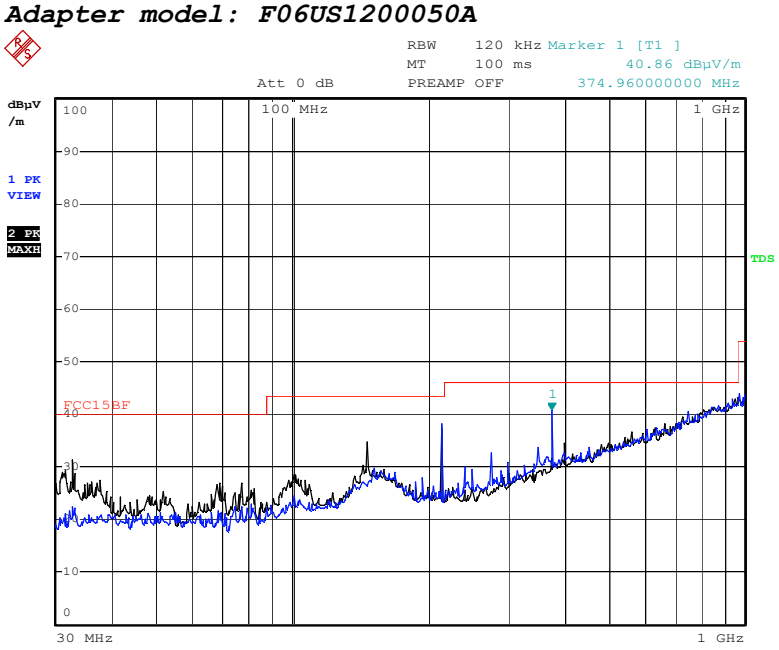
Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
246.120	23.69	18.19	41.88	Horiz./	46.0	-4.12
32.240	17.52	12.06	29.58	Vert.	40.0	-10.42
375.000	19.00	20.91	39.91	Horiz./	46.0	-6.09
134.800	14.62	13.83	28.45	Vert.	43.5	-15.05
750.000	22.69	20.89	43.58	Horiz./	46.0	-2.42
750.000	19.33	20.89	40.22	Vert.	46.0	-5.78

POE

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Emission (dBuV/m)	Horiz./ Vert.	Limit (dBuV/m)	Margin (dB)
234.400	18.59	18.19	36.78	Horiz./	46.0	-9.22
30.600	14.56	12.06	26.62	Vert.	40.0	-13.38
375.000	19.60	20.91	40.51	Horiz./	46.0	-5.49
108.800	21.57	8.67	30.24	Vert.	43.5	-13.26
750.040	22.44	20.89	43.33	Horiz./	46.0	-2.67
175.440	15.80	15.18	30.98	Vert.	43.5	-12.52

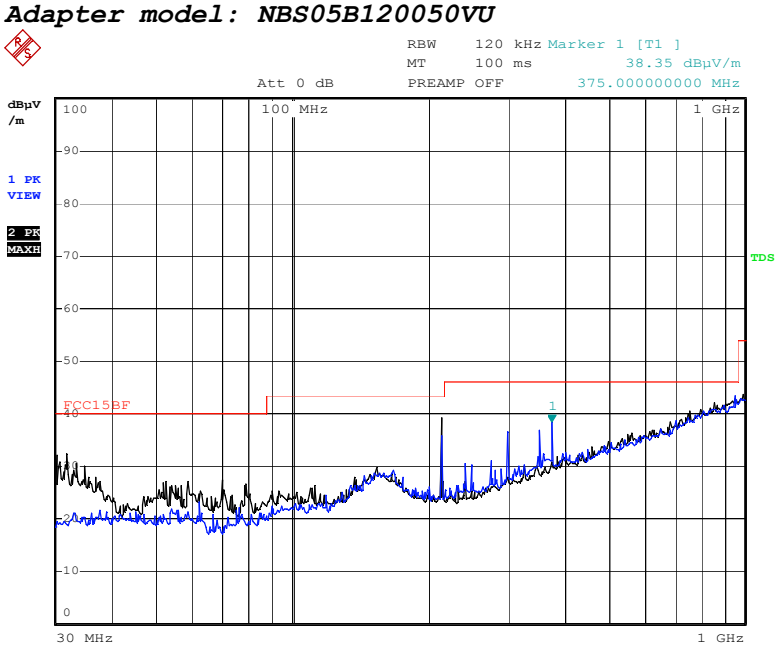
Note: (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
(2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
(3) Emission Level = Reading Level + Probe Factor + Cable Loss.

Radiated Emission
FCC 15.209
Adapter model: F06US1200050A



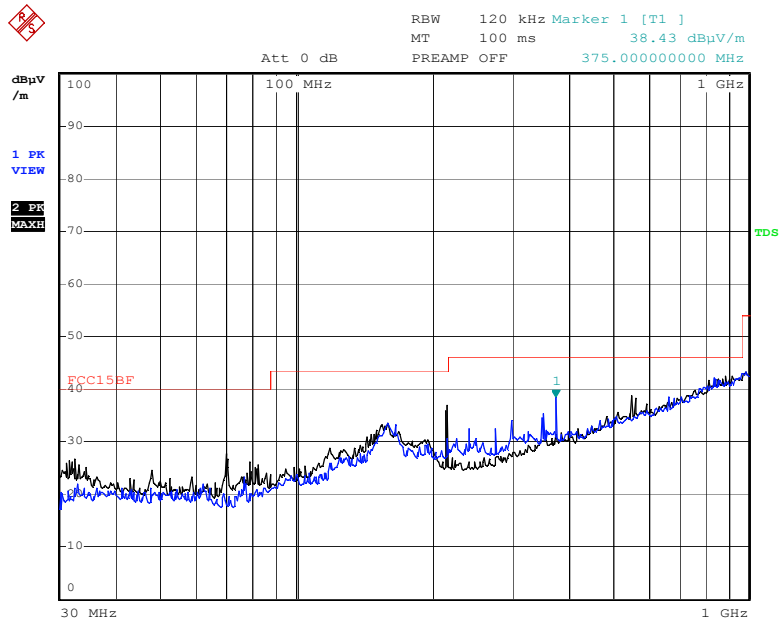
Date: 29.JUN.2016 14:11:51

Adapter model: NBS05B120050VU



Date: 29.JUN.2016 14:28:48

POE



Date: 29.JUN.2016 14:44:10

7. RF Exposure Requirements

7. 1 Test Equipment

Please refer to Section 10 this report.

7. 2 Limit

According to FCC 15.247(e)(i) and FCC 1.1307(b)(1), Systems operating under 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 Commissions guidelines.
According to KDB 447498 D01 General RF Exposure v05, section 4.3.1
SAR Test Exclusion Thresholds for 100 MHz-6GHz and <=50mm

Frequency Range		Maximum measured transmitter power frequency(MHz)	SAR Limitation (mW)
Low Frequency(MHz)	High Frequency(MHz)		
2402	2480	2402	10

7. 3 Test Result

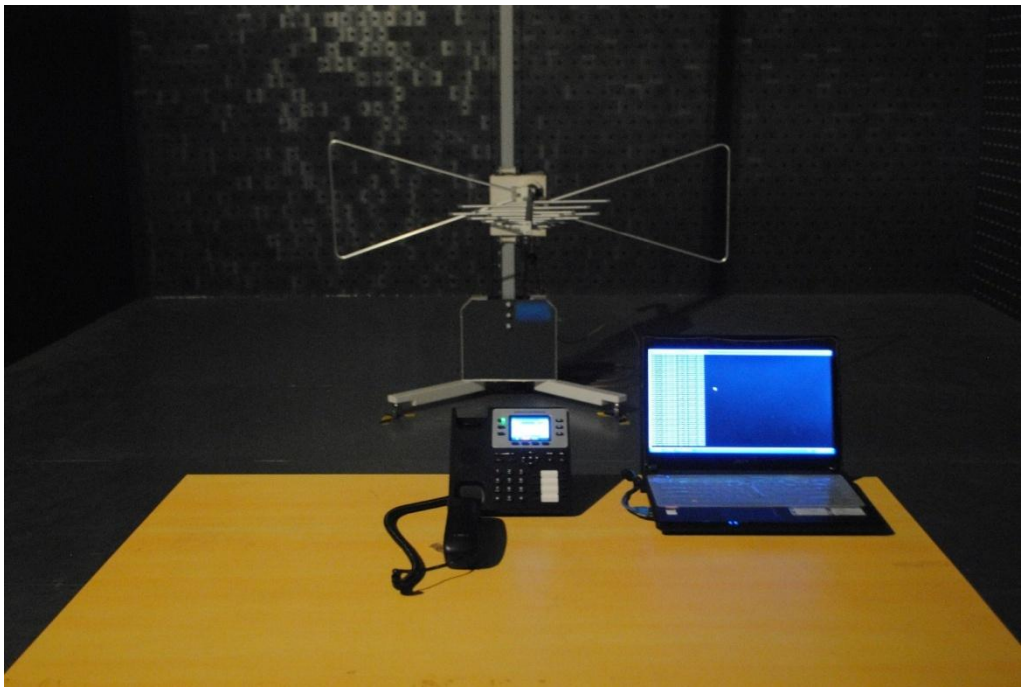
Product	: IP Phone	Test Mode	: Bluetooth
Test Item	: RF Exposure	Temperature	: 25 ℃
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: **PASS**		

RF Exposure Requirements	Compliance with FCC Rules
EIRP=PxG Where: P=Power input to antenna G=Power gain of the antenna relative to an isotropic radiator	Maximum output power at antenna input terminal: -1.73dBm = 0.67mW (2402MHz-8DPSK) Prediction distance: <=50mm Antenna gain : 2.0dBi SAR Test Exclusion Threshold is 10mW FHSS : 1.06mW The max. output power E.I.R.P < 10mW Conclusion: No SAR is required.

8. Photos of Testing

8. 1 EUT Test Photographs

Conducted Emission test view

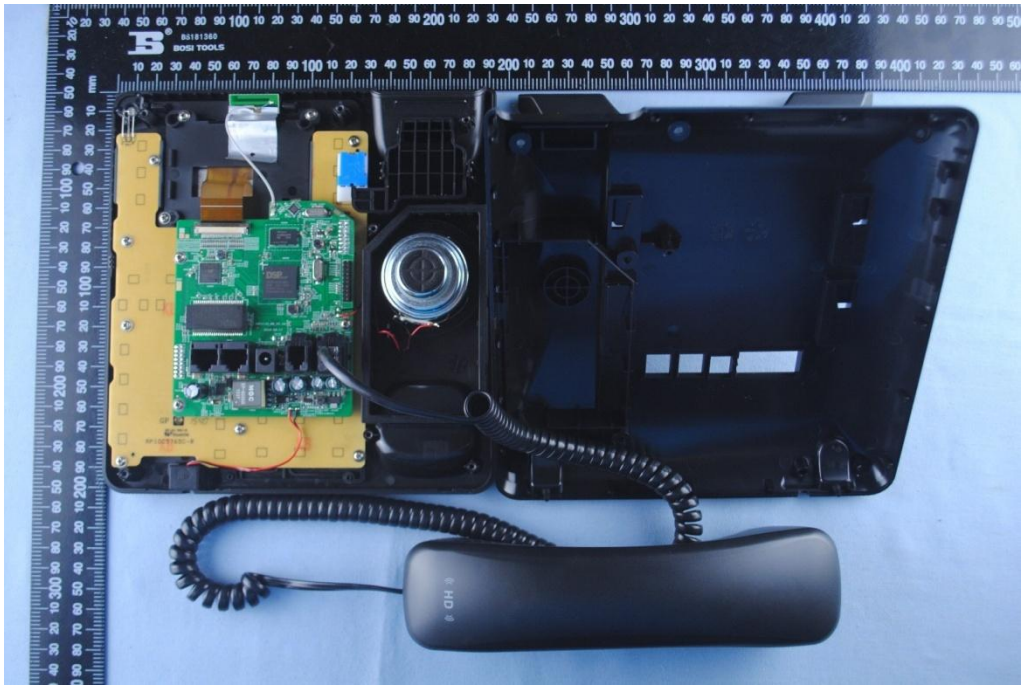

Radiated Emission test view (Frequency from 30MHz to 1GHz)

Radiated Emission test view (Frequency above 1GHz)


8. 2 EUT Detailed Photographs

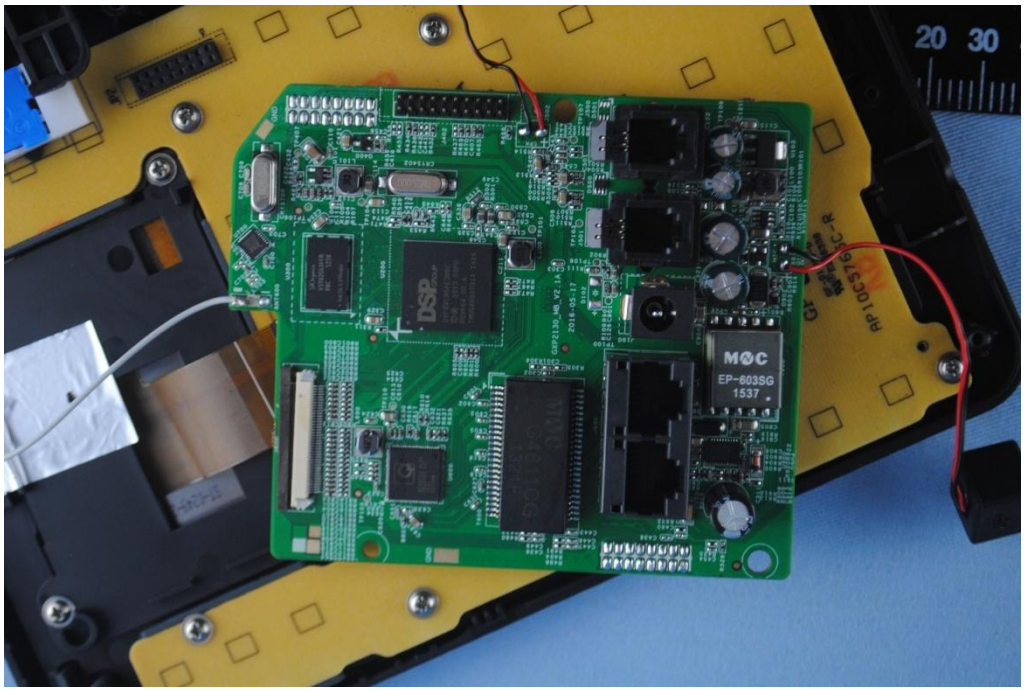
EUT top view

EUT bottom view

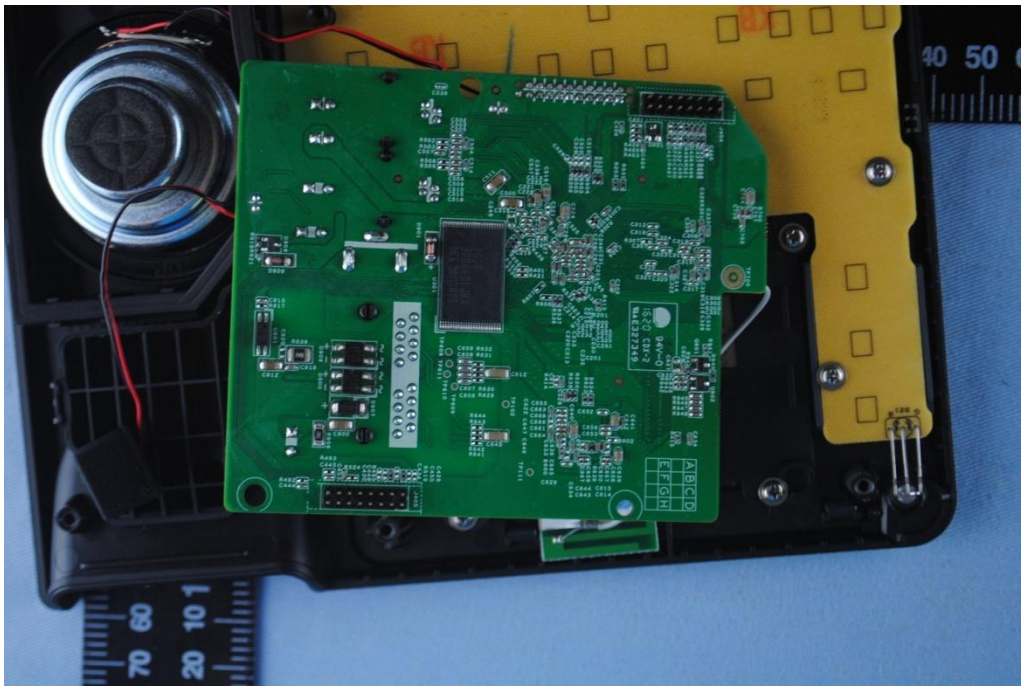
EUT inside whole view

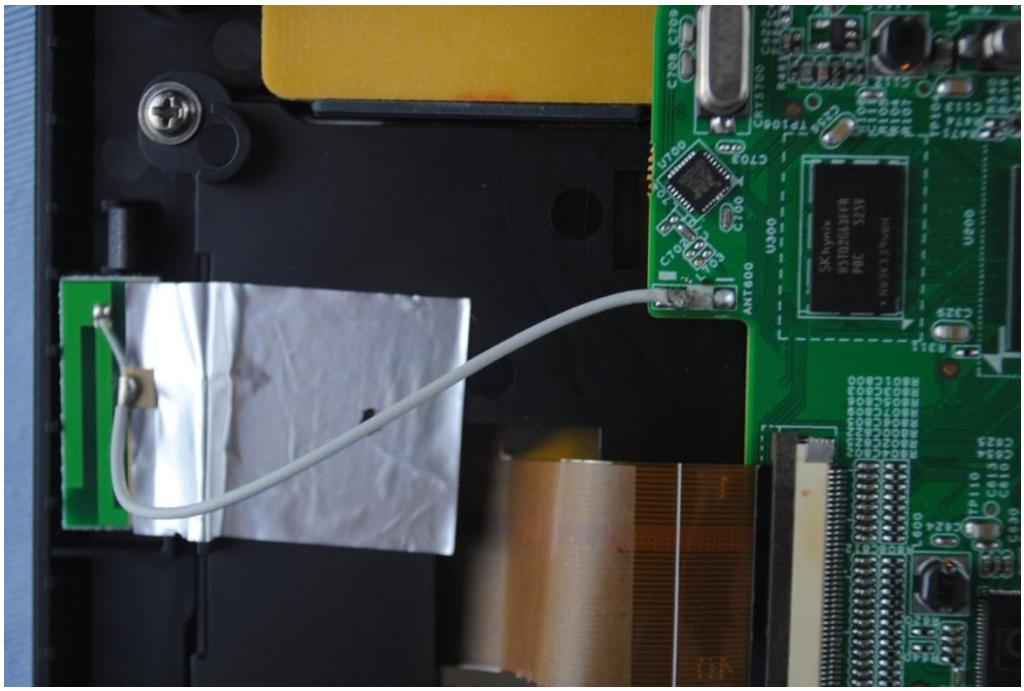


Main board component side

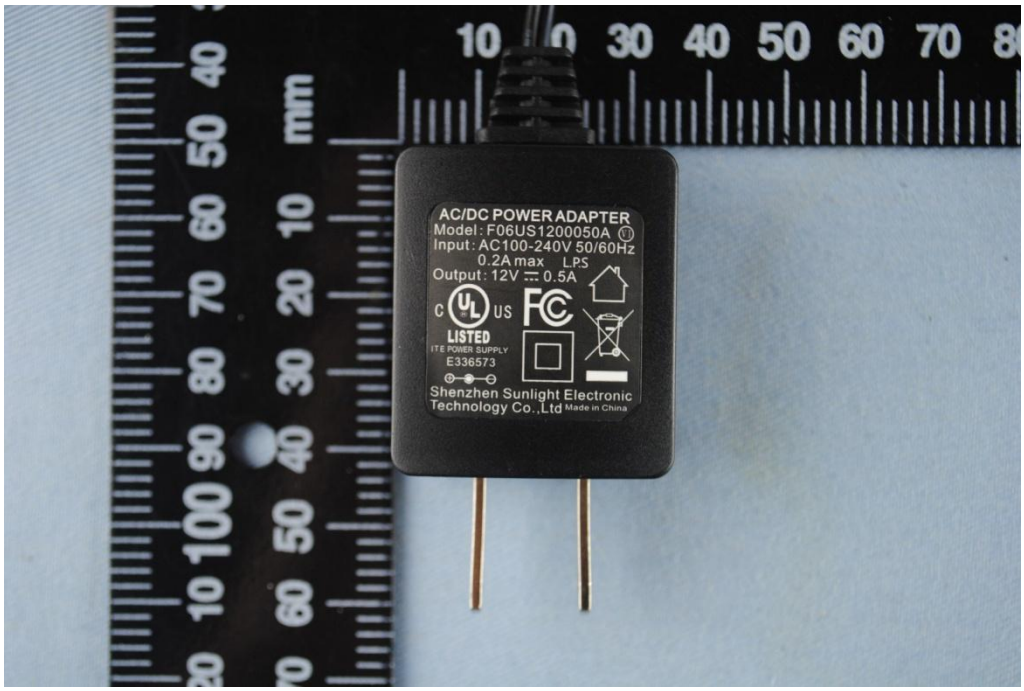


Main board solder side

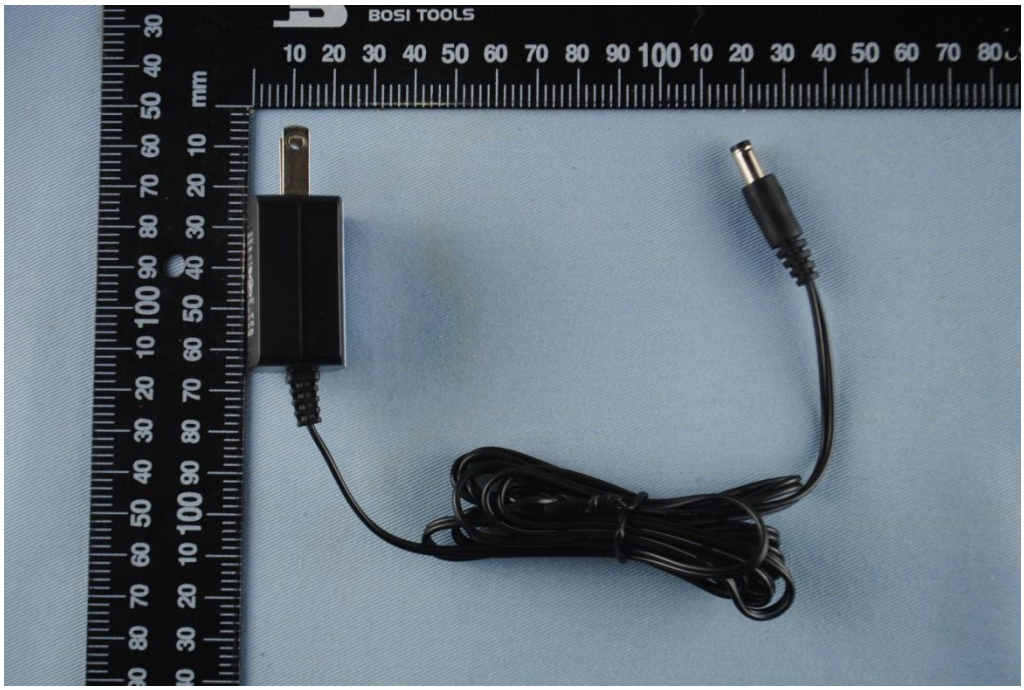


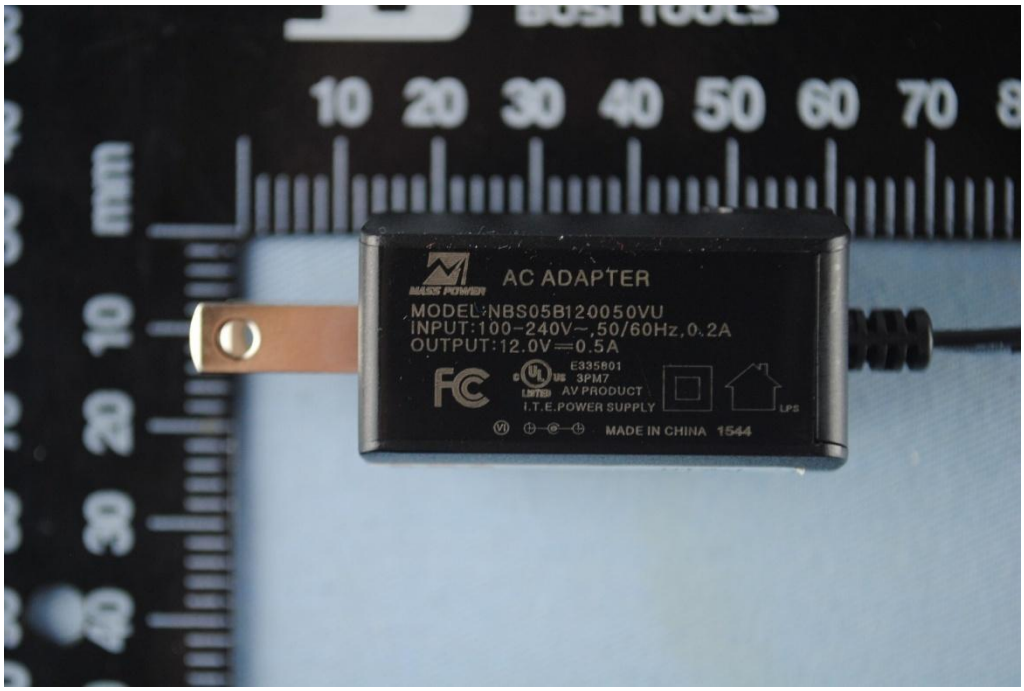
RF Antenna view


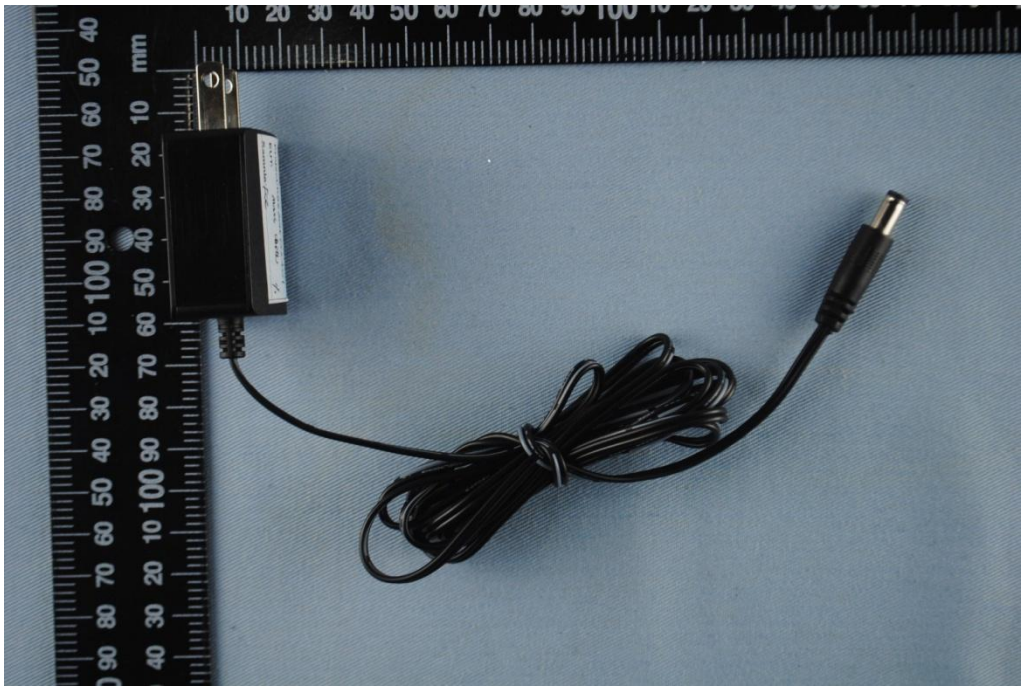
FCC Adapter top view SUNLIGHT



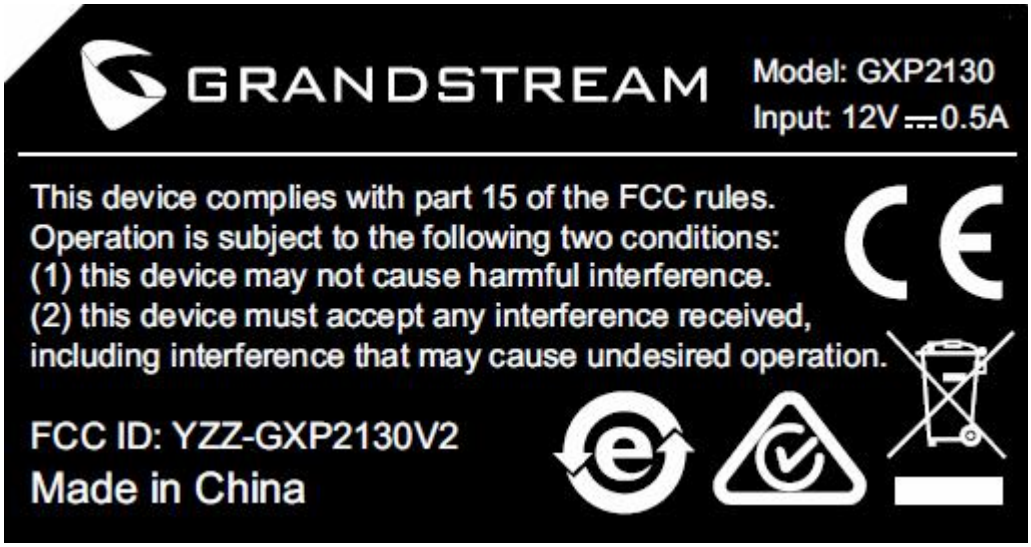
Adapter side view



FCC Adapter top view MASS


Adapter side view


9. FCC ID Label



The following note shall be conspicuously placed in the users manual: "**Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.**"

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT


10. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	Innco systems GmbH	CT-0801	KMO-SZ114	NCR
Antenna Tower	Innco systems GmbH	MM4000-PP	KMO-SZ115	NCR
Controller	Innco systems GmbH	CO2000	KMO-SZ116	NCR
Pre-Amplifier	Agilent	87405C	KMO-SZ155	Dec.6, 2016
Pre-Amplifier	Com-Power	PAM-840	KMO-SZ156	Dec.6, 2016
EMI Test Receiver	Rohde & Schwarz	ESPI7	KMO-SZ002	June 27, 2017
Spectrum Analyzer	Rohde & Schwarz	FSP40	KMO-SZ003	June 27, 2017
Loop Antenna	Rohde & Schwarz	HFH2-Z2	KMO-SZ004	August 19, 2018
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	August 27, 2018
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ006	August 19, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ007	August 19, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ008	August 19, 2018
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	9170-359	Jan. 9, 2017
AMN	Rohde & Schwarz	ESH3-Z5	KMO-SZ009	June 27, 2017
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	KMO-SZ077	Nov.29, 2016
KMO Shielded Room	KMO	KMO-001	KMO-SZ036	NCR
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	KMO-SZ037	Sep.18, 2016
Power Meter	Rohde & Schwarz	OSP-B157	KMO-HK015	Nov.6, 2016
3m Anechoic Chamber	KMO	KMO-3AC	KMO-3AC-1	Nov.12, 2016