Chunghwa Telecom Co., Ltd
EMC & Radio Equipment Testing Lab

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R.O.C

Issued Date：Dec.10, 2012

Testing Laboratory
0263

FCC Part 15 RF Test Report
For
Elegant Industrial PDA

Applicant	:	WINMATE Communication INC.
Address	:	9F, No.111-6, Shing-De Rd., San-Chung District,New Taipei City,Taiwan
Equipment	:	Elegant Industrial PDA
Model No.	:	E430T-3GB2 , X430XXXXXXXX (X=a~z,A~Z,0~9,’’-‘’,blank or Slash)
Trade Name	:	WINMATE

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CERTIFICATE

Applicant	WINMATE Communication INC.
Address	9F, No.111-6, Shing-De Rd., San-Chung District,New Taipei City,Taiwan
Equipment	Elegant Industrial PDA
Model No.	E430T-3GB2 , X430XXXXXXXX (X=a~z,A~Z,0~9,’’-‘’,blank or Slash)
Trade Name	WINMATE
Manufacturer	WINMATE Communication INC.
Address of Manufacturer	9F, No.111-6, Shing-De Rd., San-Chung District,New Taipei City,Taiwan

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in FCC Part 15 Subpart C §15.247、Industry Canada RSS-210

The device described above was tested by EMC & Radio Equipment Testing Lab, Chungwha Telecom Co. Ltd. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the procedures given in ANSI 603-C.The energy emitted by EUT is tested as described in this report is in compliance with conducted and radiated emission limits of FCC Part 15 Subpart C §15.247 and IC RSS-210 Issue 7

Date of Issue : Dec. 10 , 2012

Date of Test : Dec. 10 , 2012

Tester by : Chi-Min Tzou Chi-Min Tzou

Approved by : Ming-Hong Ko KoMingHong

Technical Manager

Test results given in this report apply only to the specific sample(s) tested under stated test conditions.
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TABLE OF CONTENTS

Description Page

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1. GENERAL INFORMATION

1.1 Applicant description

Applicant	WINMATE Communication INC
Address:	9F, No.111-6, Shing-De Rd., San-Chung District,New Taipei City,Taiwan

1.2 EUT description

Applicant	WINMATE Communication INC
Product	Elegant Industrial PDA
Brand Name	WINNATE
Model No	E430T-3GB2 , X430XXXXXXXX (X=a~z,A~Z,0~9,’’-‘’,blank or Slash)
FCC ID	PX94300WBW
Frequency Range	2402MHz~2480MHz
Number o f Channels	79
Maximum Output Power to Antenna(Normal condition)	3.2dBm(EIRP)
Modulation ty	G-FSK、Pi/4-DQPSK、8DPSK
Antenna Type:	Patch Antenna
Power supply	3.3 Vdc from AC/DC Adapter
Manufacture	WINMATE Communication INC.

1.3 Operating Condition of EUT

Test mode ：Normal Operation

1.4 Test Conditions

Temperature：19 ±2℃
Humidity：67 ±3 % R.H.

1.5 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and

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configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

Test Cases			
Test Item	Data Rate / Modulation		
	Bluetooth GFSK (1Mbps)	Bluetooth π/4-DQPSK (2Mbps)	Bluetooth 8-DPSK (3Mbps)
Test mode	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz

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2. Summary of Test Results

Report Section	FCC Rule	IC Rule	Description	Limit	Result
4.1	15.247(a)(1)	A8.1(b)	RF output power	≤ 1W	pass
4.2	15.247(b)(1)	A8.4(2)	Number of Channel	≥ 15Chs	pass
4.3	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass
4.4	15.247(a)(1)	A8.1(b)	Hopping Channel Separation	≥ 2/3 of 20dB BW	Pass
4.5	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec	Pass
4.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass
4.7	15.247(d)	A8.5	Radiated Emission	15.209(a) & 15.247(d)	Pass
4.8	15.203 & 15.247(b)	A8.4	Antenna Requirement	NA	Pass

3. Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

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3.1 Equipment Used during Test

Manufacturer	Description	Model	Calibration Date	Calibration Due Date
EMI Receiver	R&S	ESIB 40	101.05.17	1 year
EMI Receiver	HP	84125C	101.06.25	1 year
Spectrum Analyzer	HP	8593E	101.06.04	1 year
Horn Antenna	EMCO	3115	101.06.08	1 year
Horn Antenna	EMCO	3116	101.05.14	1 year
Broadband Antenna	EMCO	3142B	101.05.22	1 year
Preamplifier	EMCI	EMC051845	101.10.27	1 year
LISN	EMCO	3850/2	101.06.22	1 year
Standard Gain Horn	ETS	3160-03	NA	NA
Bluetooth Test Set	Agilent	N4010A	NA	NA

4 Measurements

4.1. RF output power

4.1.1. Required and Limits

Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1W (30 dBm).

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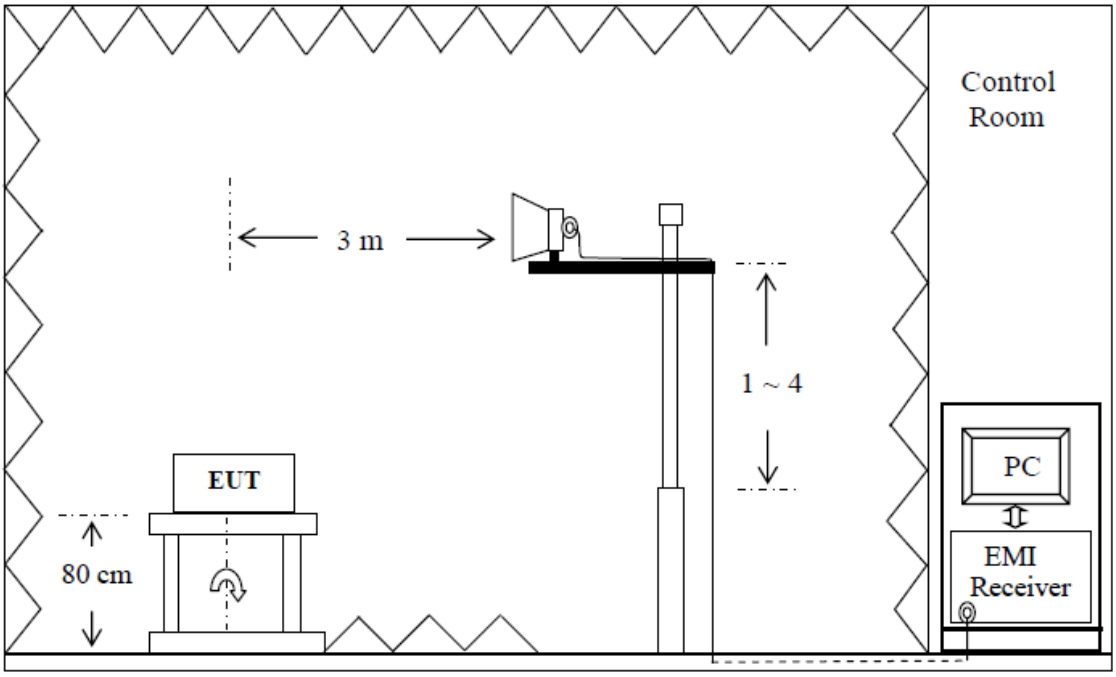
4.1.2. Test Configuration and Procedure



The EUT was placed on a turntable just above ground. The turntable rotates 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna, which were mounted on an antenna tower. The antenna can move up and down between 1 meter and 4 meter to find out the maximum emission level. Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement.

$$E = \frac{\sqrt{30 \times P \times G}}{D} \qquad PG(EIRP) = \frac{(E \times D)^2}{30}$$

E：Field Strength (V/m) PG：Equivalent Isotropic Radiated Power (W)

G：Antenna Gain D：distance (3m)

ERP= EIRP -2.15

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4.1.3. Test Results

Modulation： G-FSK (1Mbps)

Frequency (MHz)	Reading Value (dBμV)		Calibration Factor (dB)	Measure @3m (dBμV/m)		(EIRP) (dBm)		Limit (dBm)	Pass/ Fail
	H	V		H	V	H	V		
2402	60.7	64.9	33.5	94.2	98.4	-1.0	3.2	30	Pass
2440	59.6	63.4	33.6	93.2	97.0	-2.0	1.8	30	Pass
2480	56.1	59.3	33.7	89.8	93.0	-5.4	-2.2	30	Pass
Uncertainty：± 4.3dB									

Modulation： Pi/4-DQPSK (2Mbps)

Frequency (MHz)	Reading Value (dBμV)		Calibration Factor (dB)	Measure @3m (dBμV/m)		(EIRP) (dBm)		Limit (dBm)	Pass/ Fail
	H	V		H	V	H	V		
2402	59.5	60.3	33.5	93.0	93.8	-2.2	-1.4	30	Pass
2440	57.3	56.9	33.6	90.9	90.5	-4.3	-4.7	30	Pass
2480	57.0	56.8	33.7	90.7	90.5	-4.5	-4.7	30	Pass
Uncertainty：± 4.3dB									

Modulation： 8DPSK (3Mbps)

Frequency (MHz)	Reading Value (dBμV)		Calibration Factor (dB)	Measure @3m (dBμV/m)		(EIRP) (dBm)		Limit (dBm)	Pass/ Fail
	H	V		H	V	H	V		
2402	56.3	57.2	33.5	89.8	90.7	-5.4	-4.5	30	Pass
2440	56.3	56.8	33.6	89.9	90.4	-5.3	-4.8	30	Pass
2480	57.0	57.1	33.7	90.7	90.8	-4.5	-4.4	30	Pass
Uncertainty：± 4.3dB									

Remark: 1. Calibration Factor = Antenna Factor + Cable Loss
2.Measure Level = Reading Value + Calibration Factor

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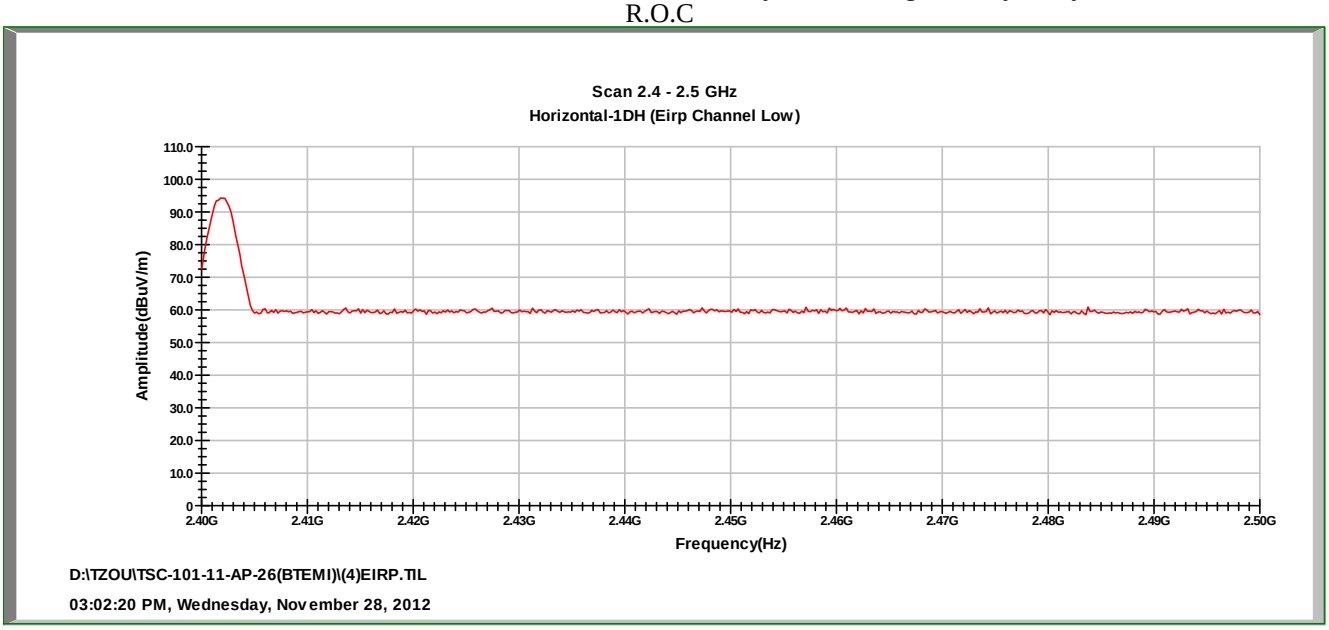

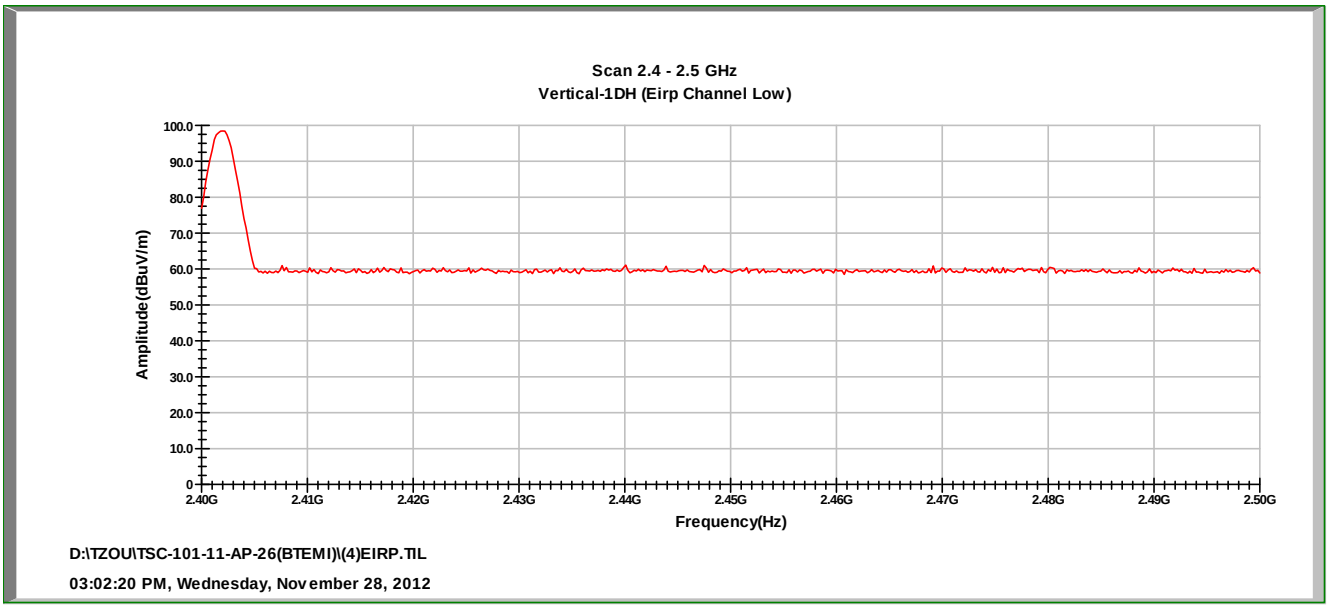

Radiation field strength (Tx: 2402MHz) (GFSK，1Mbps)

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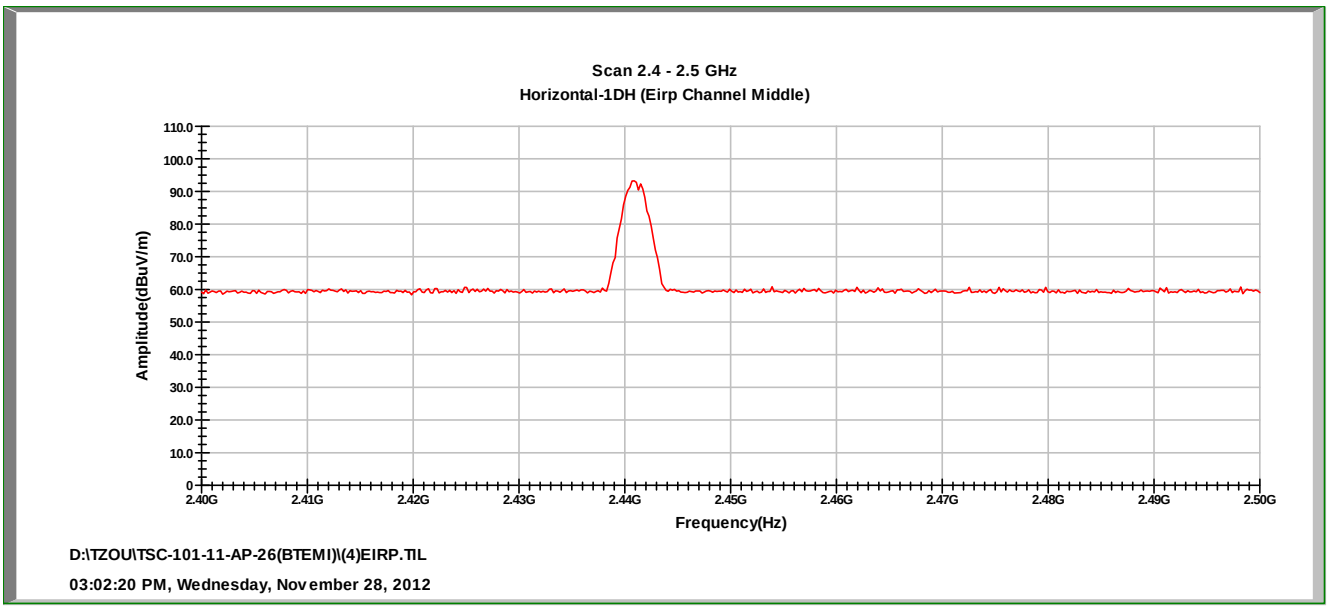

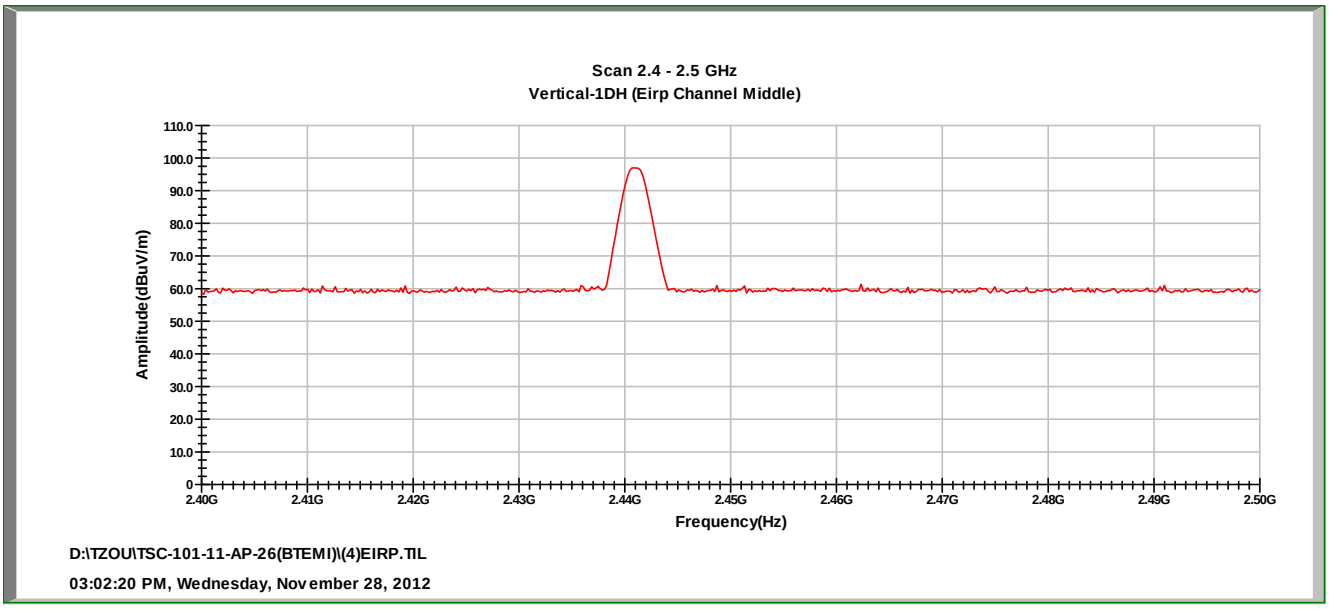

Radiation field strength (Tx: 2441MHz) (GFSK，1Mbps)

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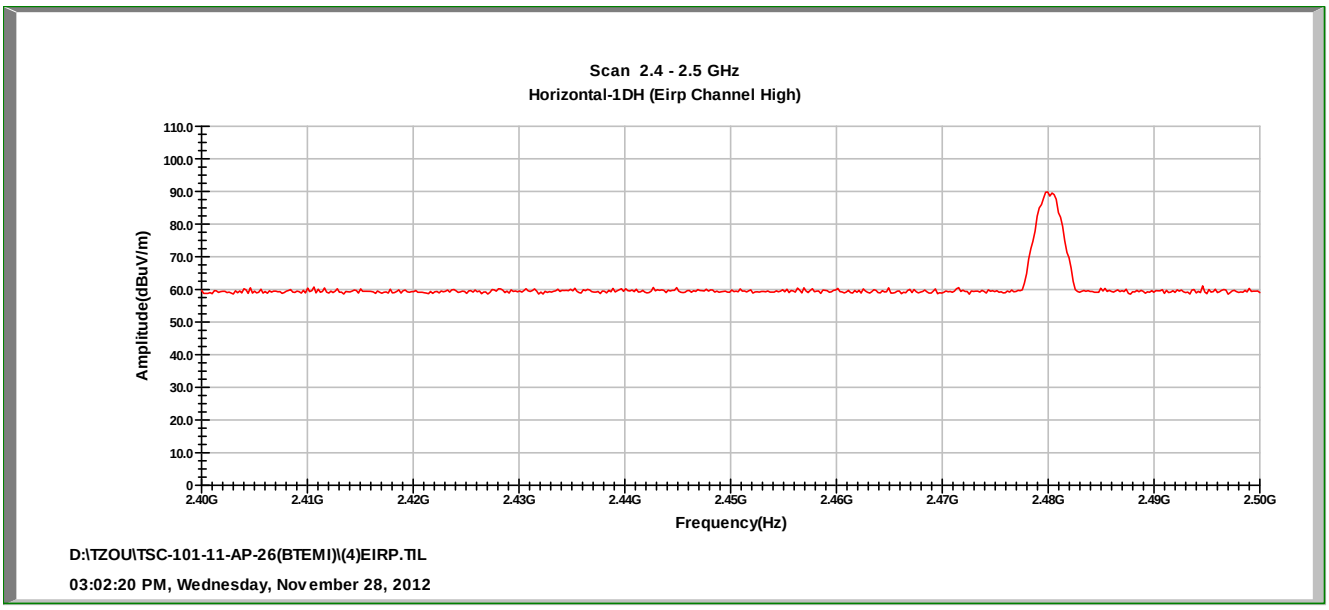

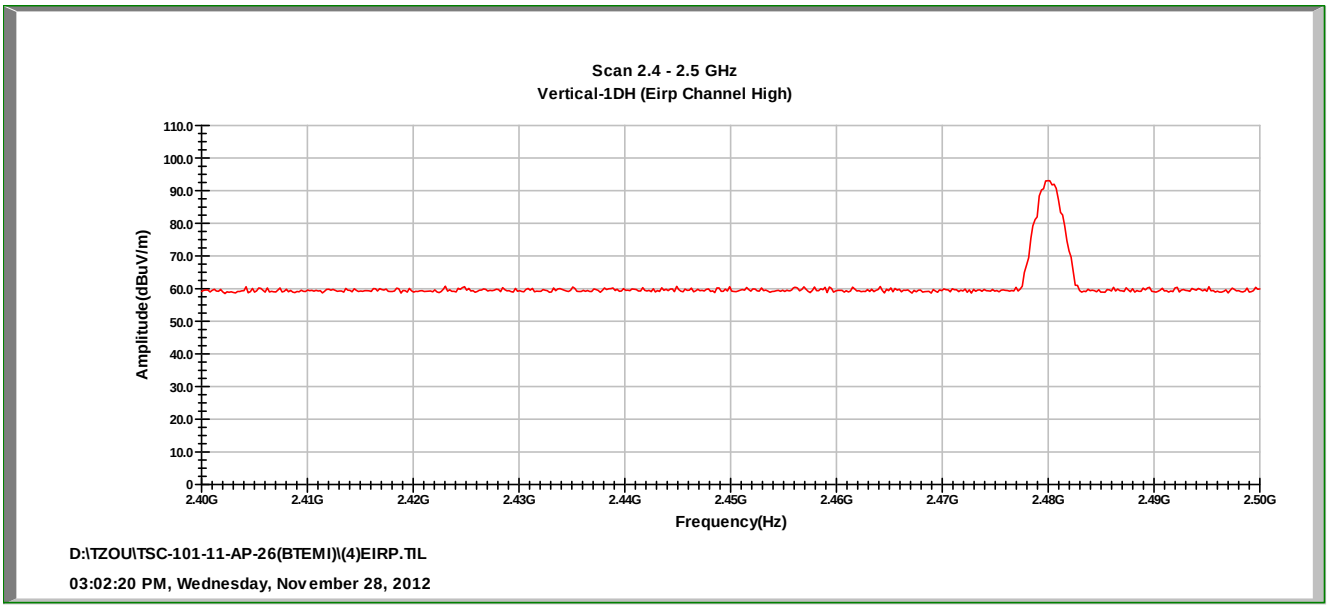

Radiation field strength (Tx: 2480MHz) (GFSK，1Mbps)

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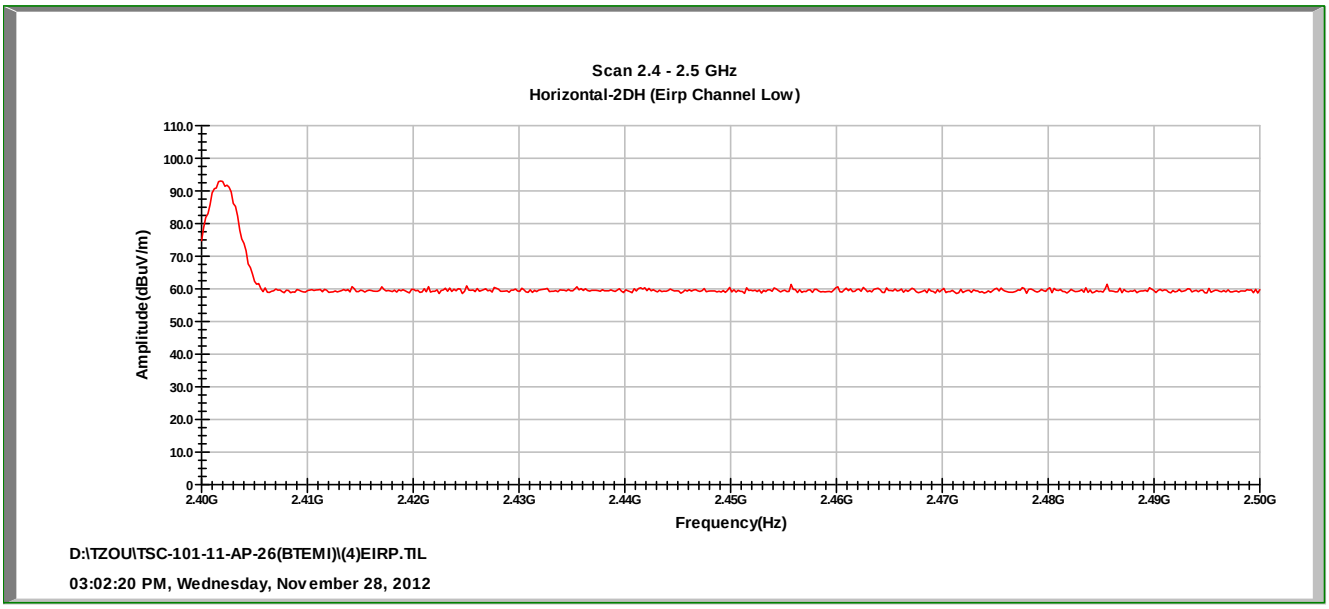

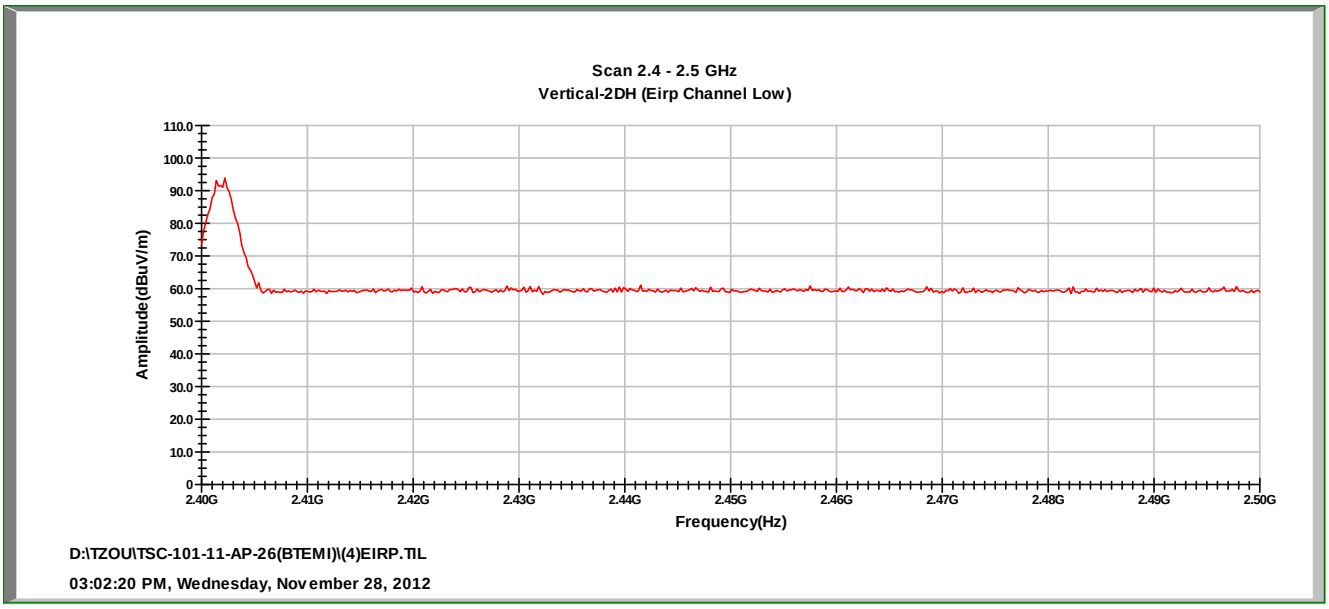

Radiation field strength (Tx: 2402MHz) (π /4-DQPSK，2Mbps)

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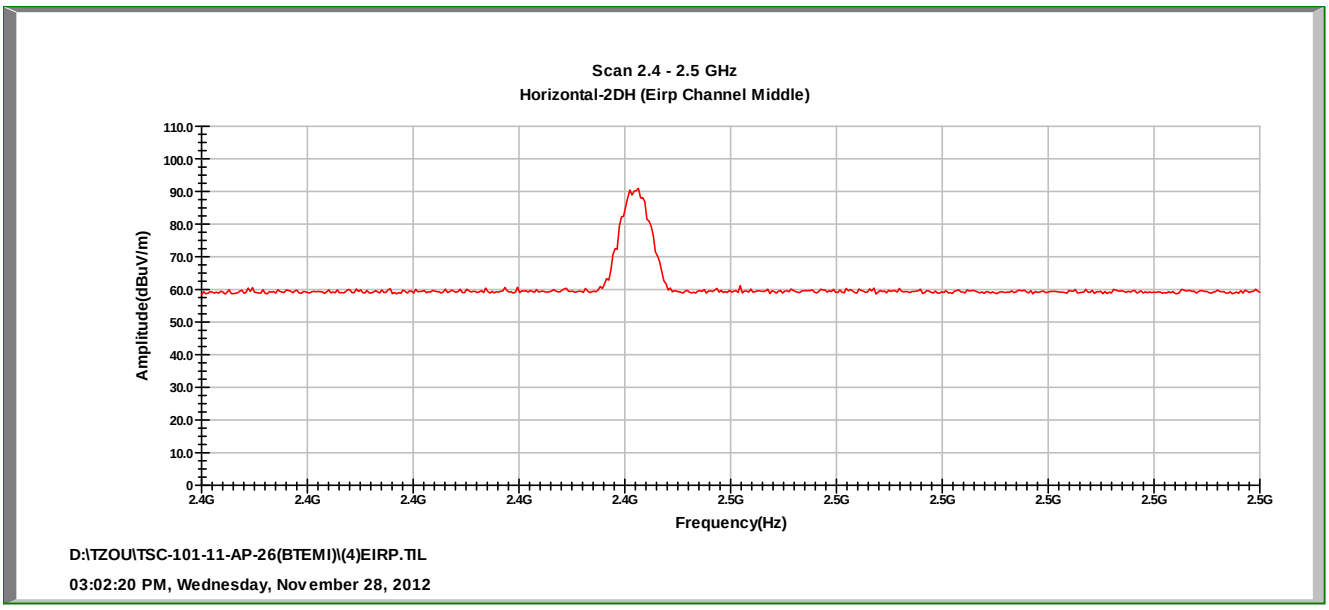

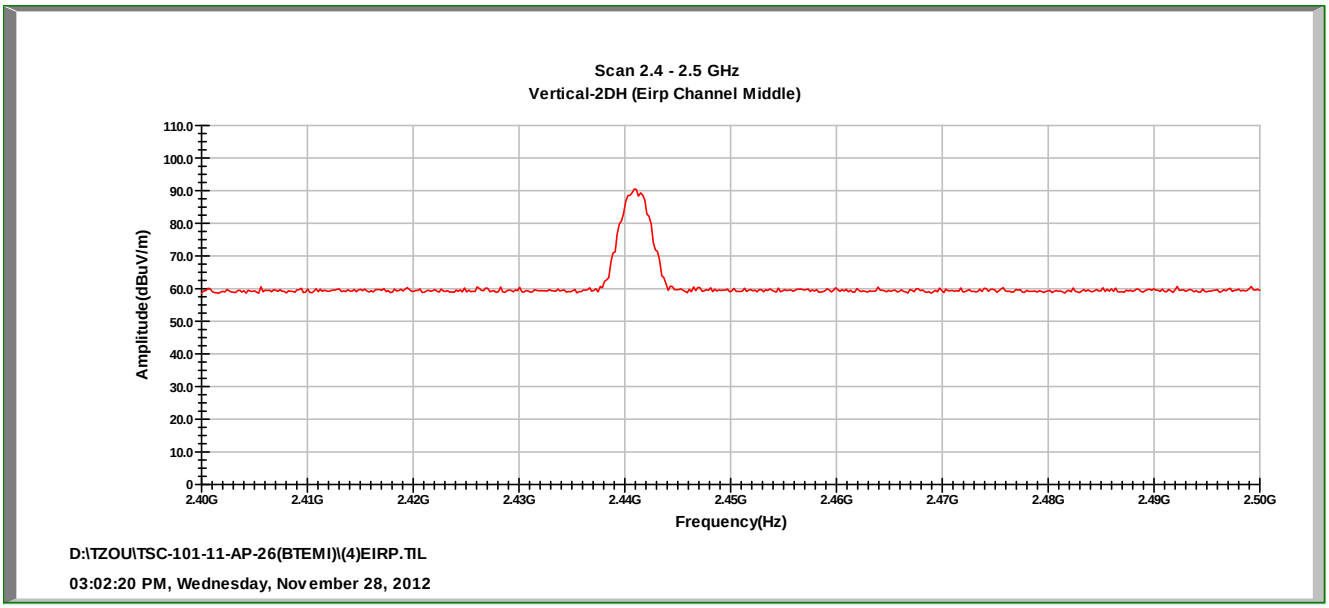

Radiation field strength (Tx: 2441MHz) (π /4-DQPSK，2Mbps)

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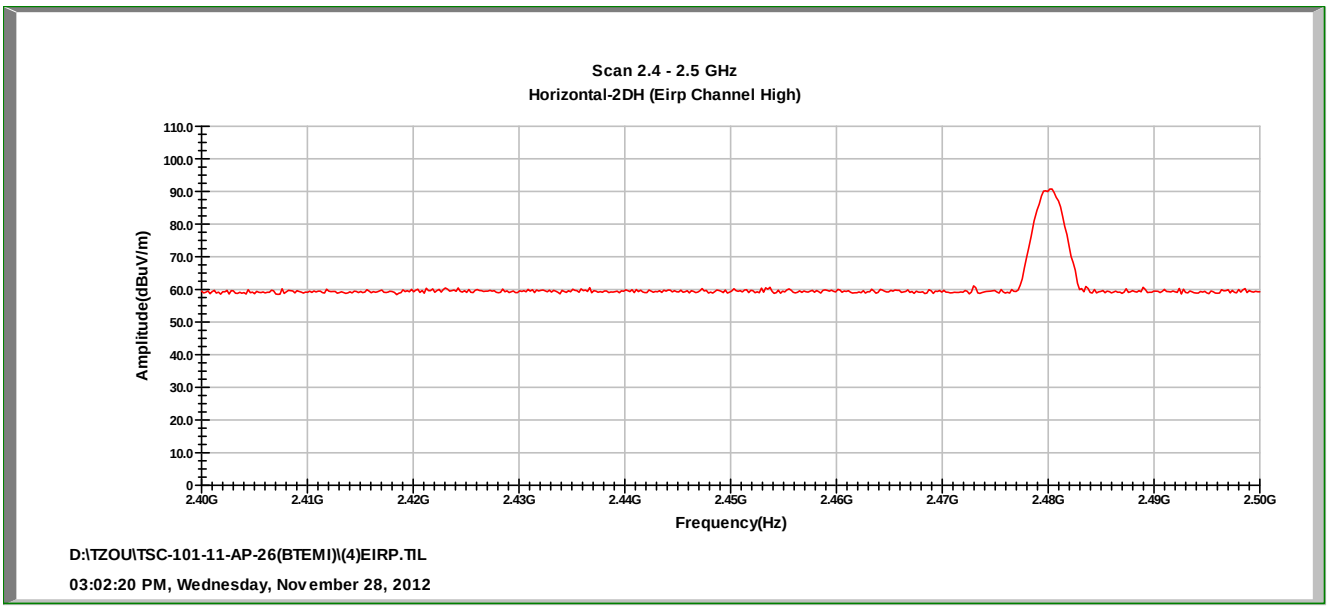

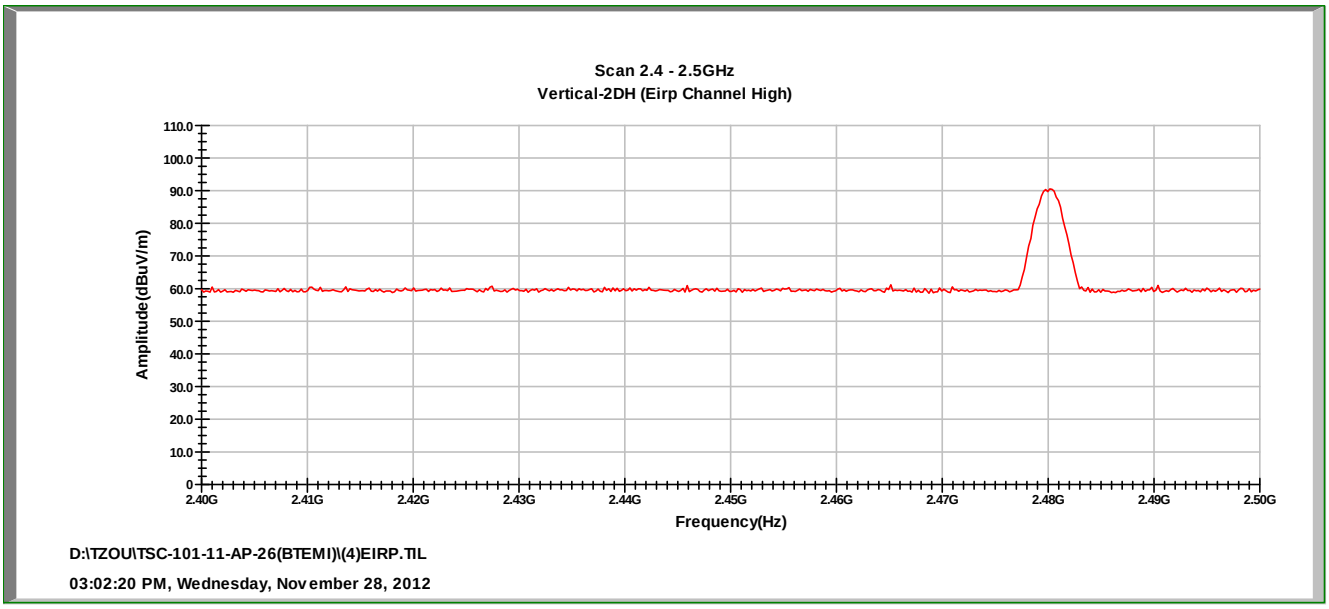

Radiation field strength (Tx: 2480MHz) (π /4-DQPSK，2Mbps)

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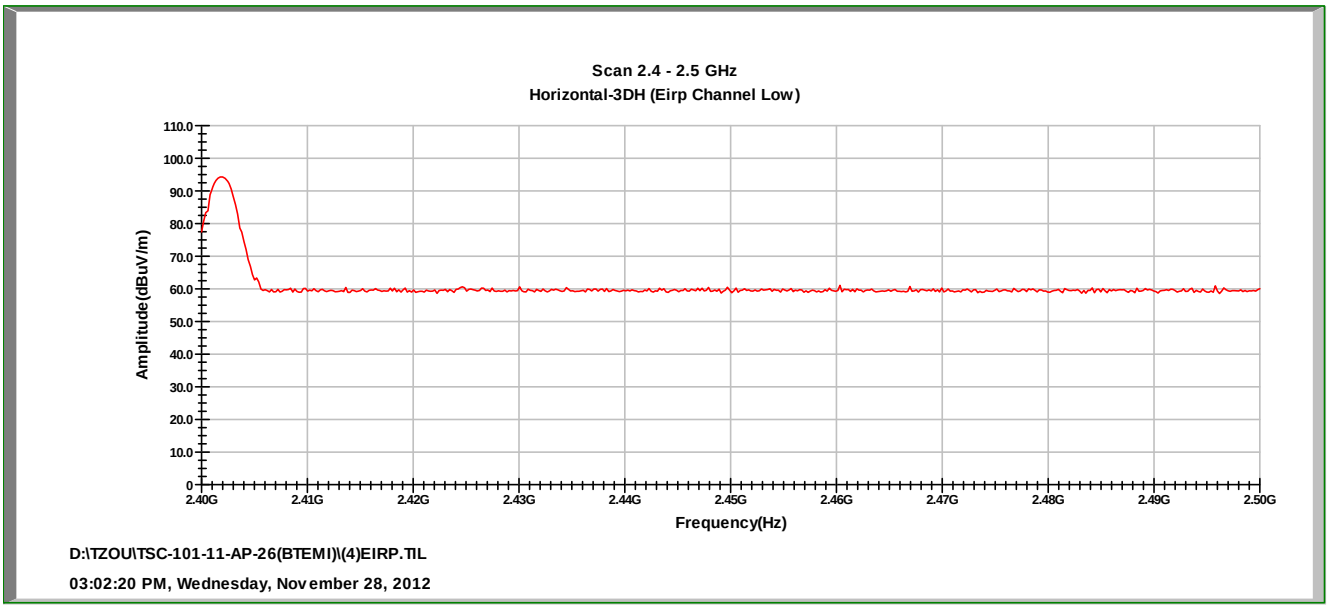

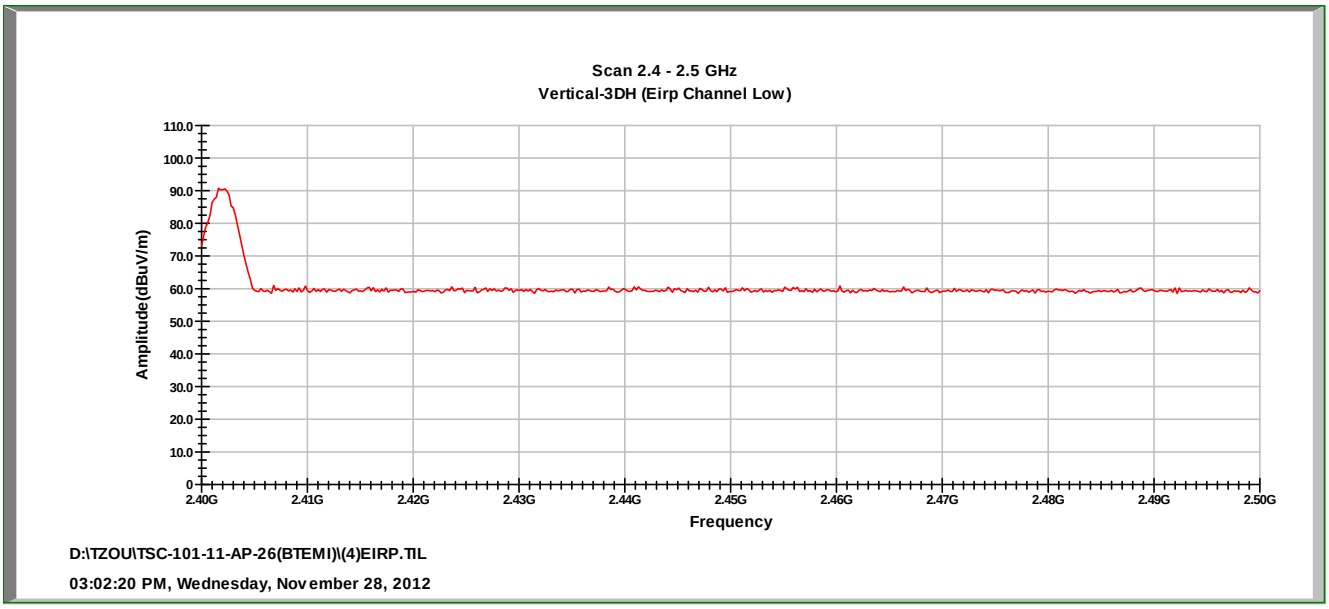

Radiation field strength (Tx: 2402MHz) (8-DPSK，3Mbps)

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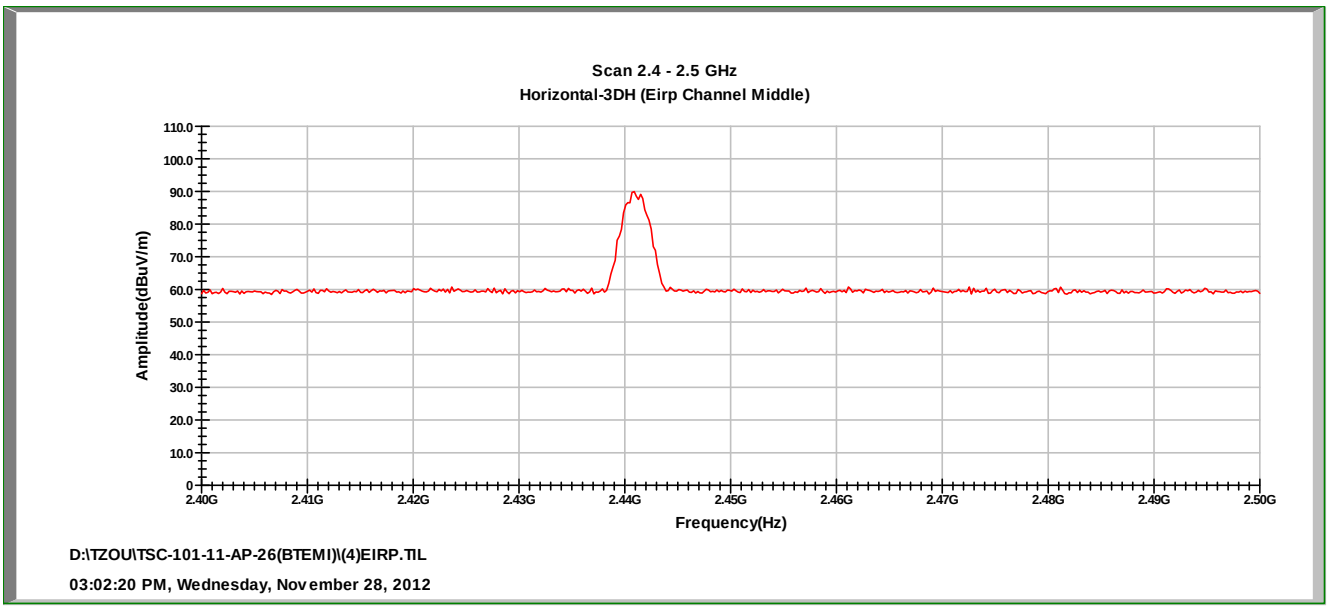

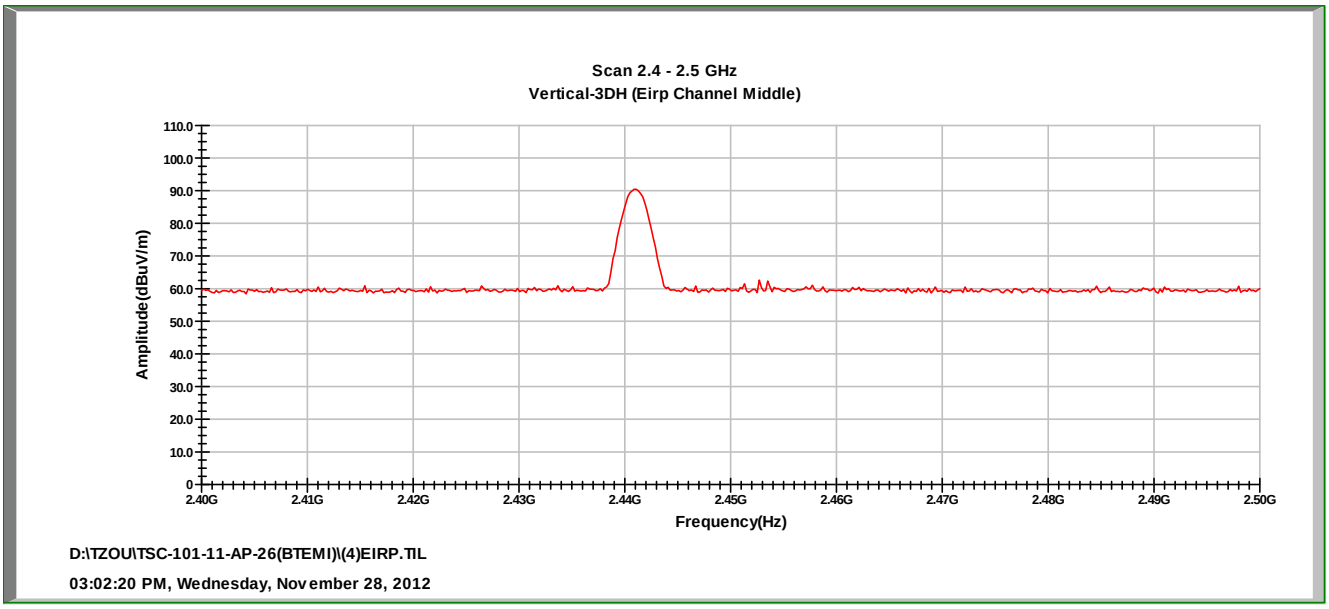

Radiation field strength (Tx: 2441MHz) (8-DPSK，3Mbps)

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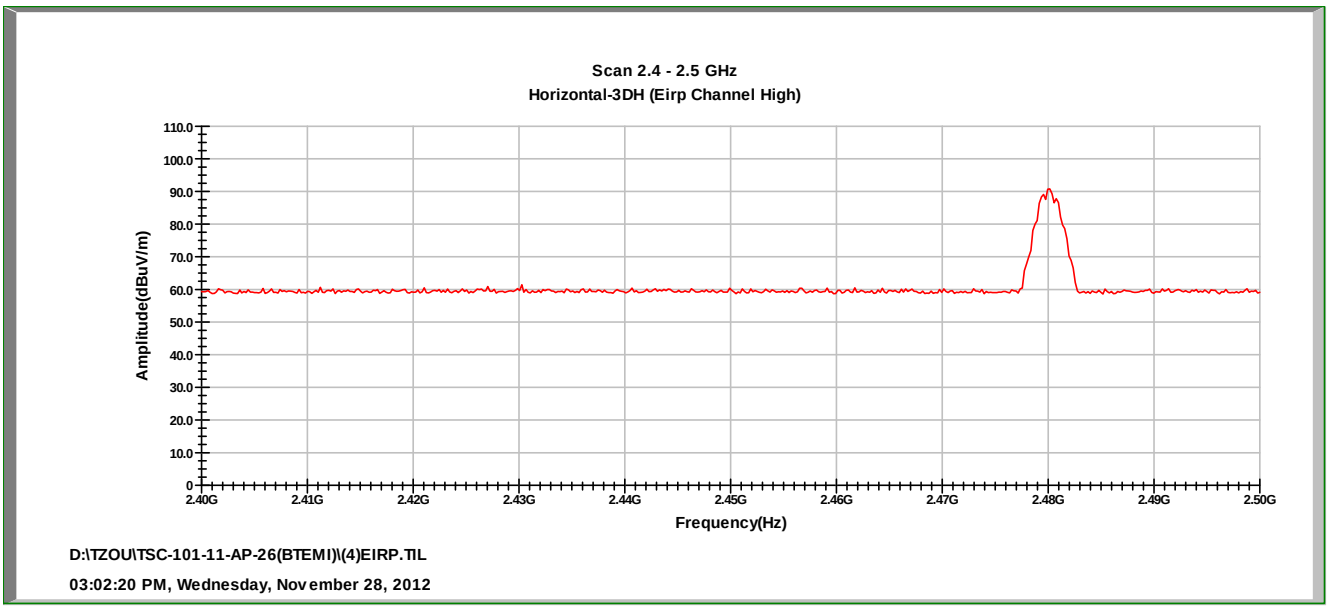

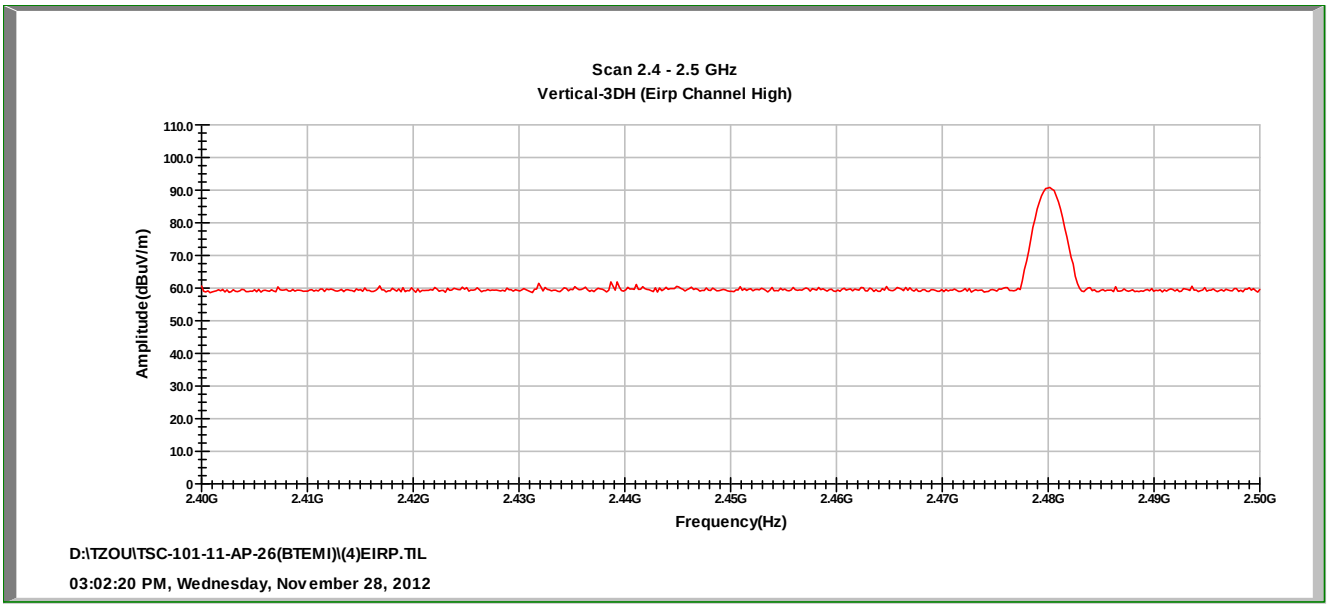

Radiation field strength (Tx: 2480MHz) (8-DPSK，3Mbps)

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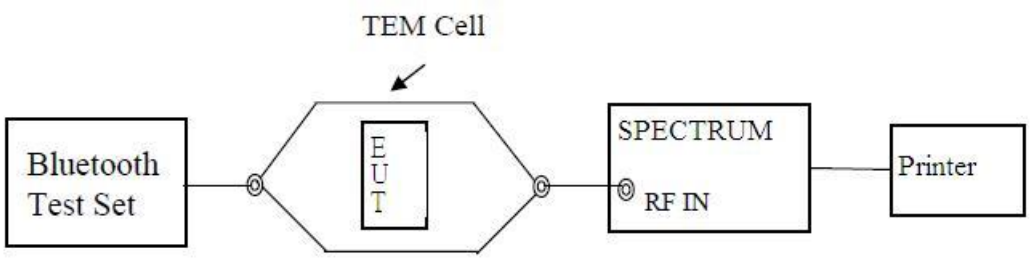
4.2. Number of Channel Measurement

4.2.1 Required and Limits

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

4.2.2 Test Configuration and Procedure



1. The EUT was connected to Communication Test Set.
2. The modulation types of EUT are irrelevant to number of hopping channels deviation.
3.. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
4.The number of hopping frequency used is defined as the device has the numbers of total channel.

4.2.3 Test Results

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
More than 79 hopping channels and more than 15 non-overlapping channels	More than 75 hopping channels and more than 15 non-overlapping channels	Pass

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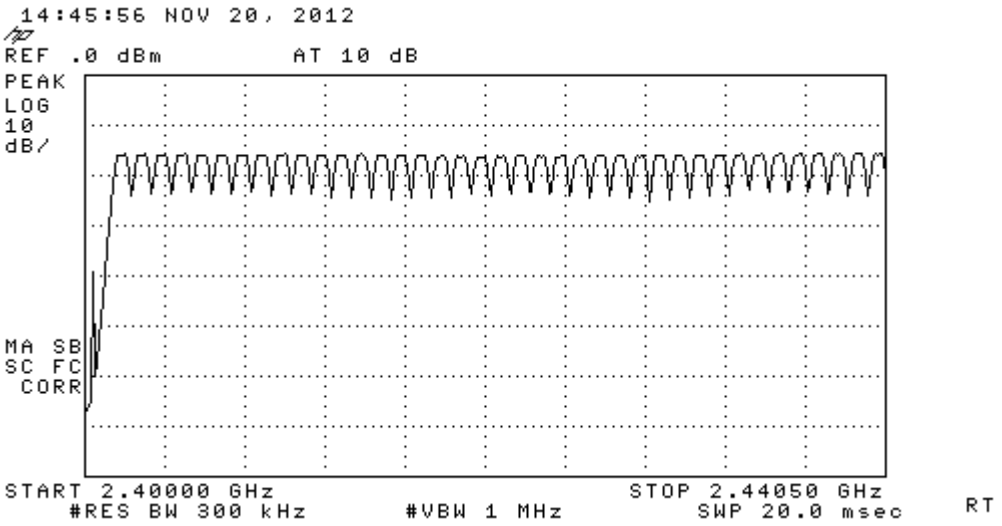

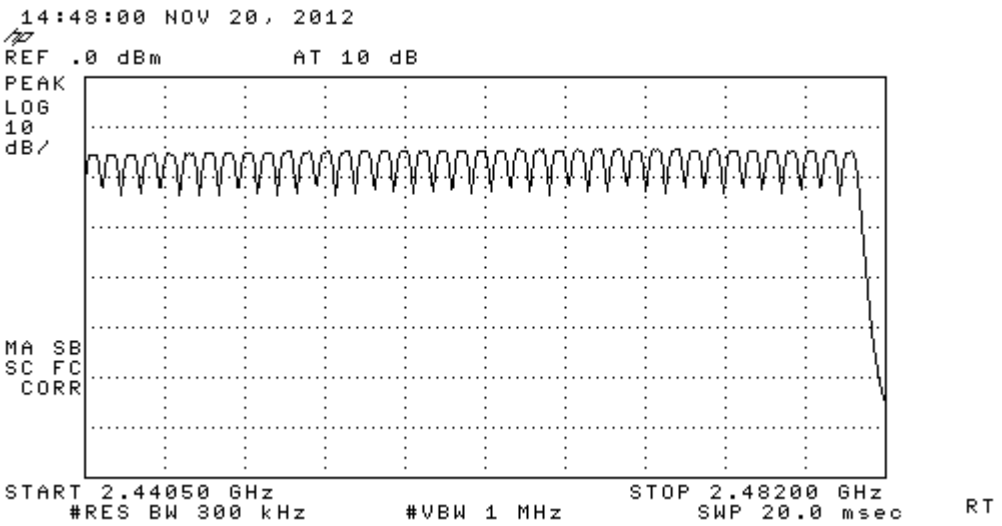

hopping channels number

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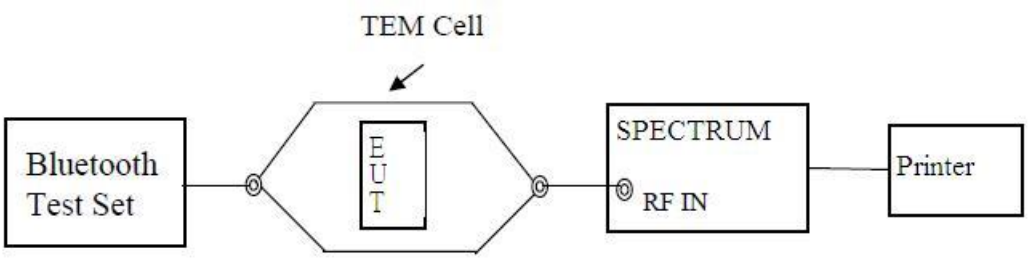
4.3. 20dB and 99% Bandwidth Measurement

4.3.1. Required and Limits

N/A

4.3.2. Test Configuration and Procedure



1.The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

2. The EUT should be transmitting at its maximum data rate as the worst cases.

3. Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW ≥1% of the 20 dB bandwidth; VBW≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

4. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

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4.3.3. Test Results

Modulation： G-FSK

Frequency	20dB Bandwidth	limits
(MHz)	(kHz)	(kHz)
2402	935	Reference
2441	940	Reference
2480	935	Reference
Uncertainty± 13.8%		

Modulation： Pi/4-DQPSK

Frequency	20dB Bandwidth	limits
(MHz)	(kHz)	(kHz)
2402	1330	Reference
2441	1345	Reference
2480	1300	Reference
Uncertainty± 13.8%		

Modulation： 8DPSK

Frequency	20dB Bandwidth	limits
(MHz)	(kHz)	(kHz)
2402	1310	Reference
2441	1345	Reference
2480	1295	Reference
Uncertainty± 13.8%		

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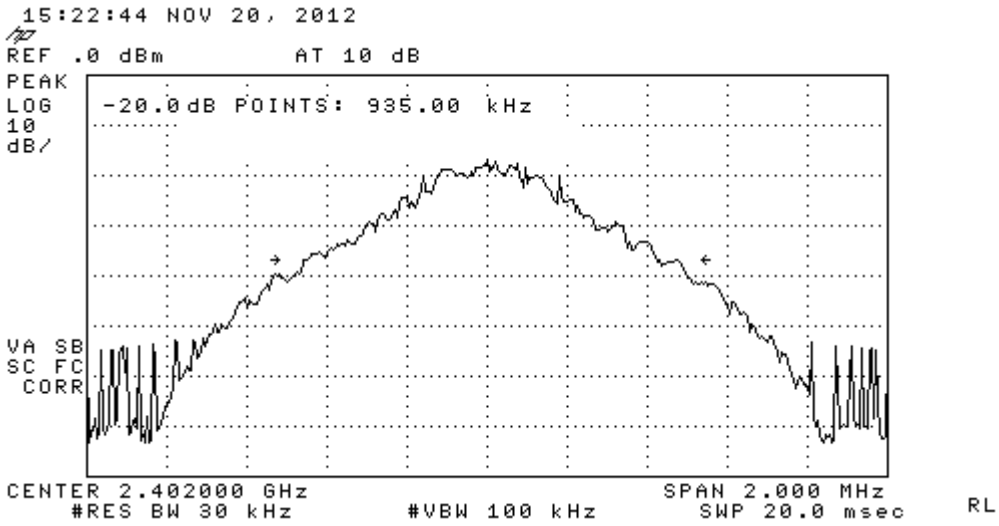

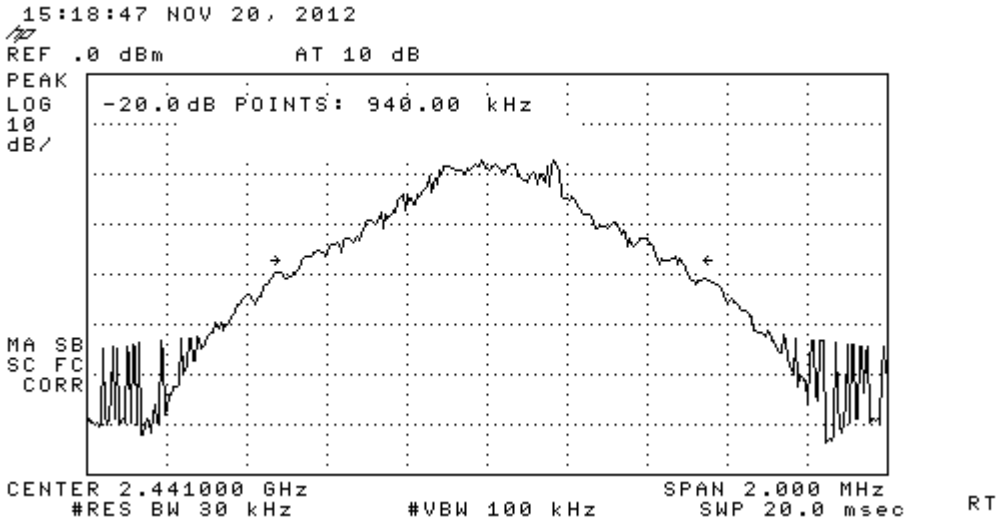

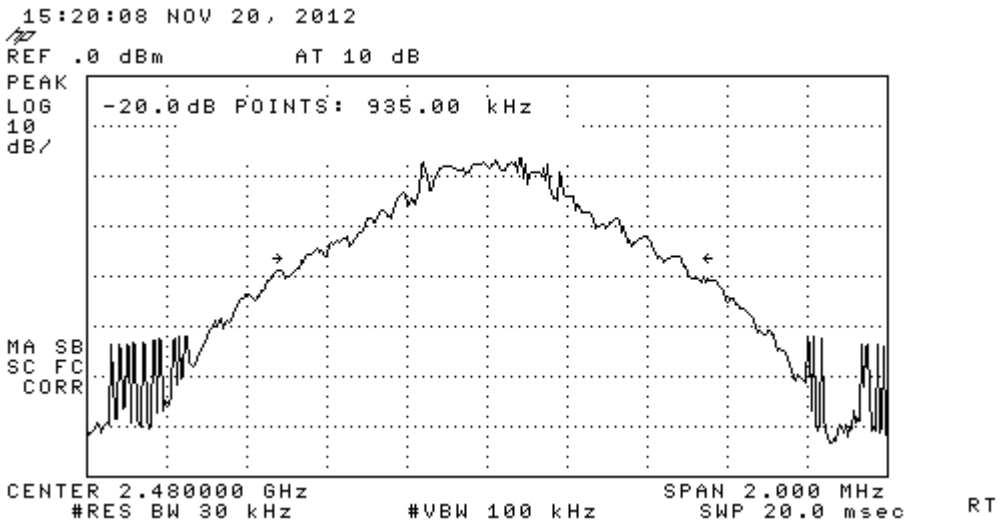

20dB Bandwidth (G-FSK)

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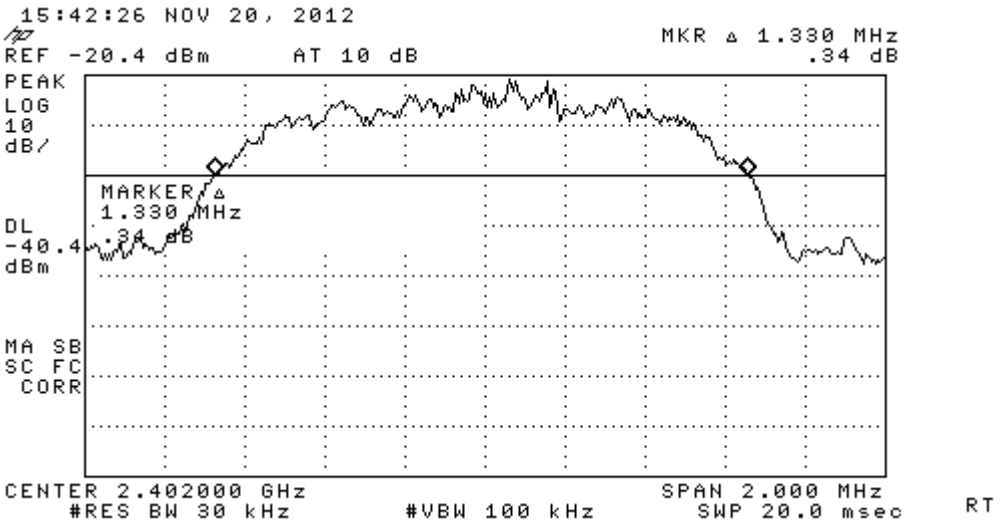

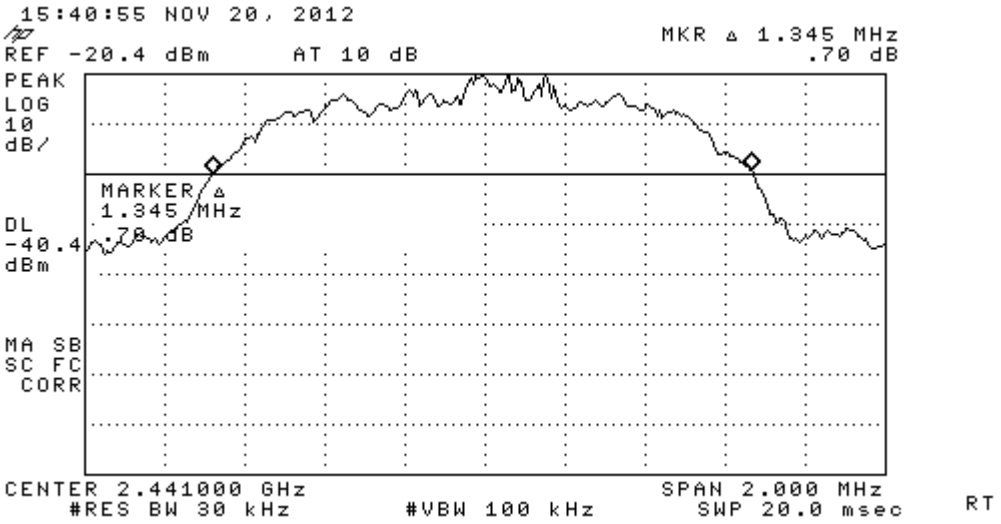

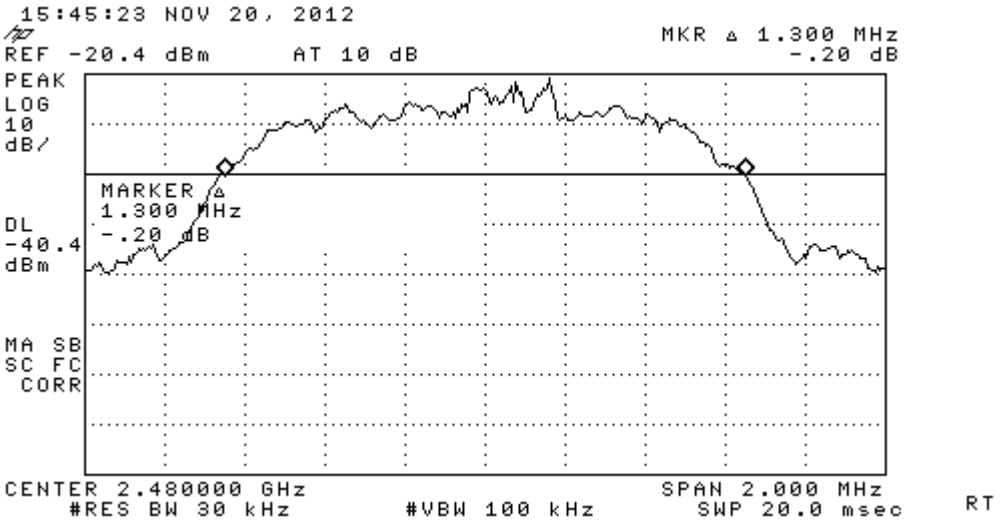

20dB Bandwidth (Pi/4-DQPSK)

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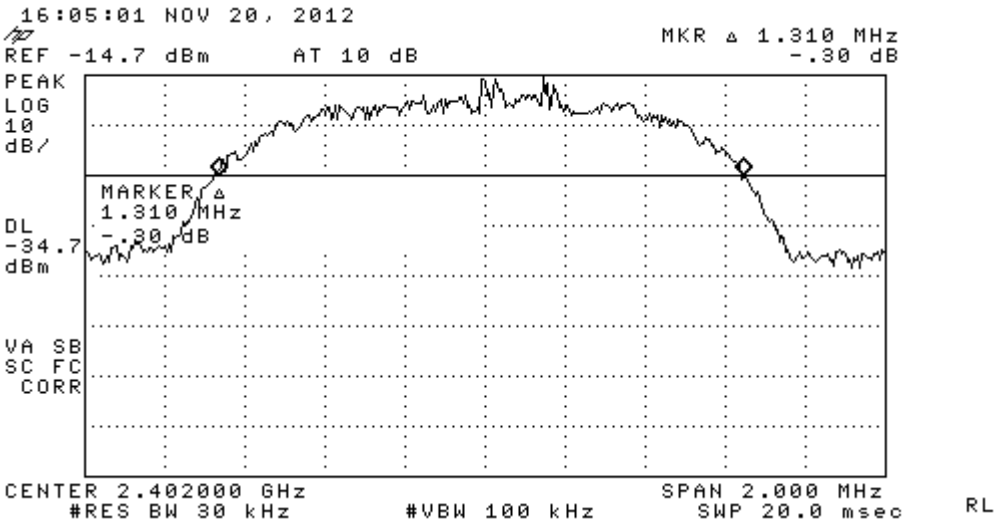

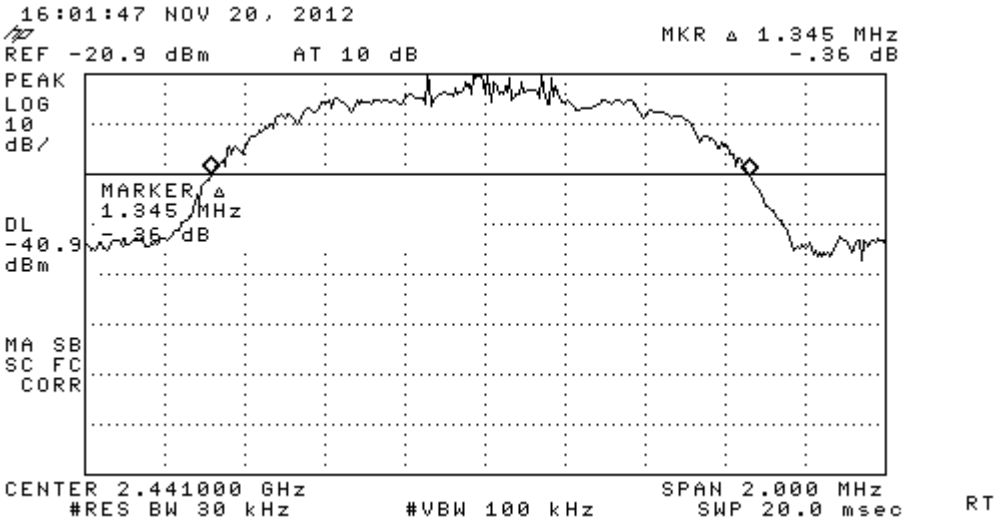

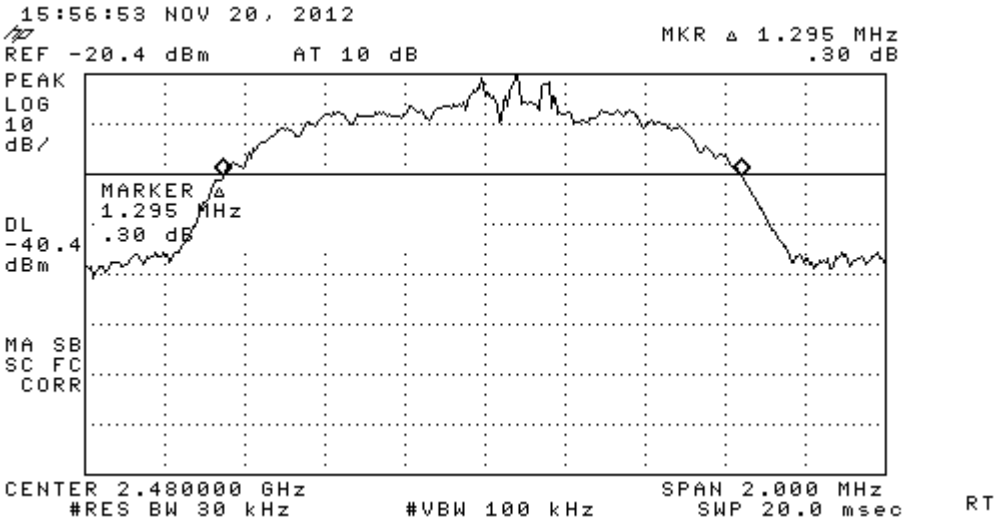

20dB Bandwidth (8DPSK)

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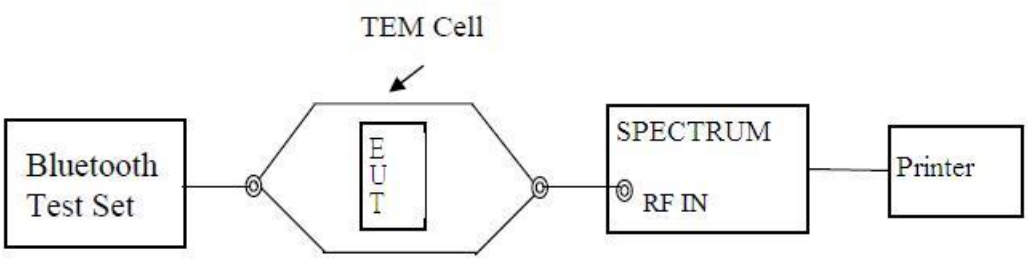
4.4. Hopping Channel Separation Measurement

4.4.1. Required and Limits

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping

4.4.2. Test Configuration and Procedure



1.The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

2. The EUT should be transmitting at its maximum data rate as the worst cases.

3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW 1% of the span; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold.

4. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

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4.4.3. Test Results

Modulation： G-FSK

Frequency	20dB Bandwidth	limits	Adjacent channel spacing	limits	Result
(MHz)	(kHz)	(kHz)	(kHz)	(kHz)	
2402	935	Reference	1005	> 623	pass
2441	940	Reference	1005	> 627	pass
2480	935	Reference	1005	> 623	pass
Uncertainty± 13.8%			Uncertainty± 13.8%		

Modulation： Pi/4-DQPSK

Frequency	20dB Bandwidth	limits	Adjacent channel spacing	limits	Result
(MHz)	(kHz)	(kHz)	(kHz)	(kHz)	
2402	1330	Reference	1005	> 887	pass
2441	1345	Reference	1005	> 897	pass
2480	1300	Reference	1005	> 867	pass
Uncertainty± 13.8%			Uncertainty± 13.8%		

Modulation： 8DPSK

Frequency	20dB Bandwidth	limits	Adjacent channel spacing	limits	Result
(MHz)	(kHz)	(kHz)	(kHz)	(kHz)	
2402	1310	Reference	1005	> 873	pass
2441	1345	Reference	1005	> 897	pass
2480	1295	Reference	1005	> 863	pass
Uncertainty± 13.8%			Uncertainty± 13.8%		

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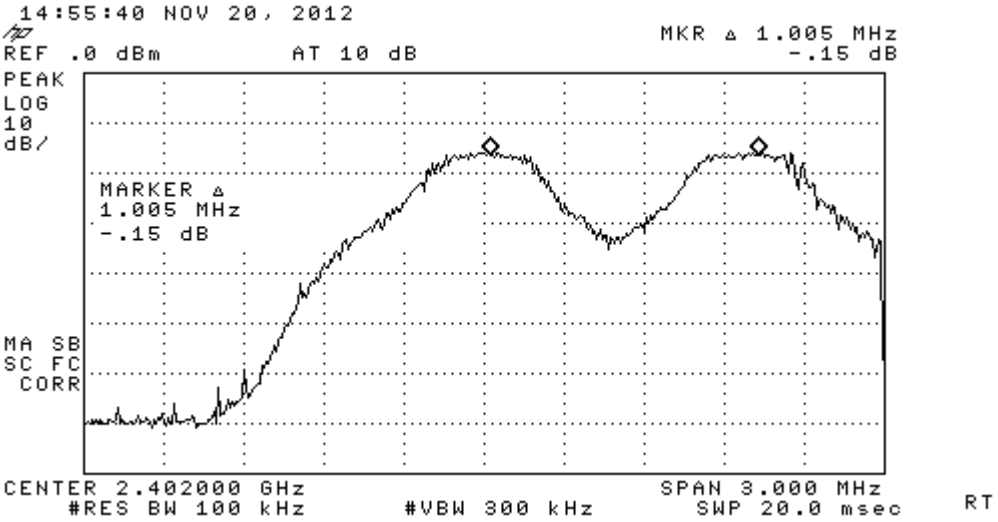

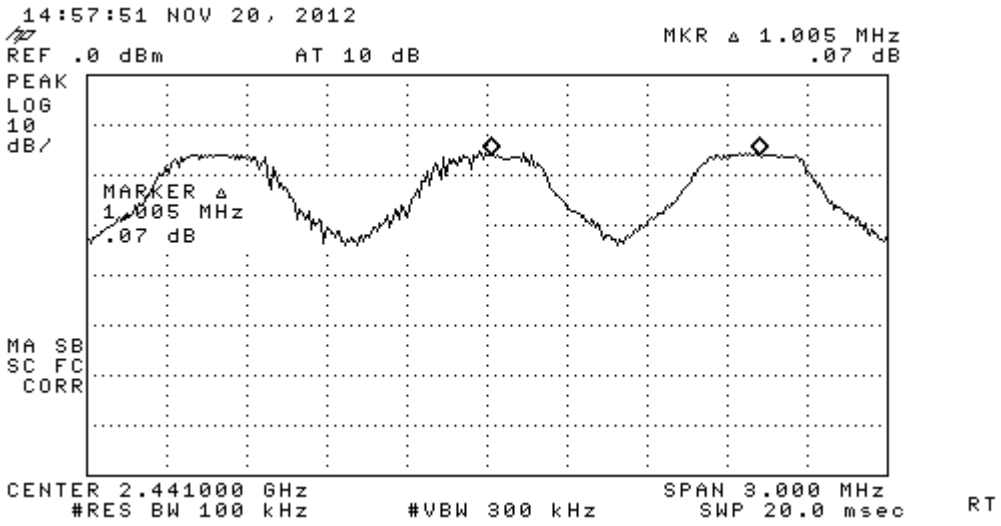

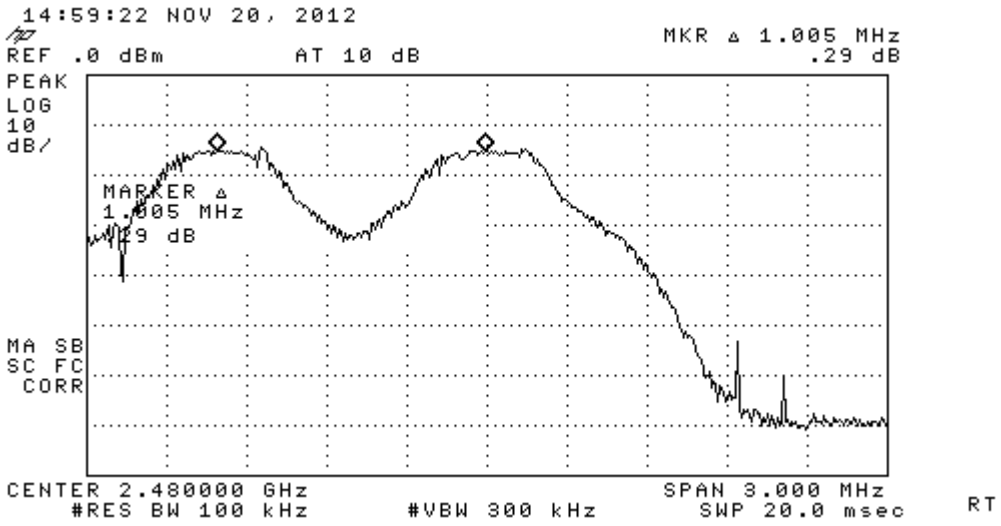

Adjacent channel spacing

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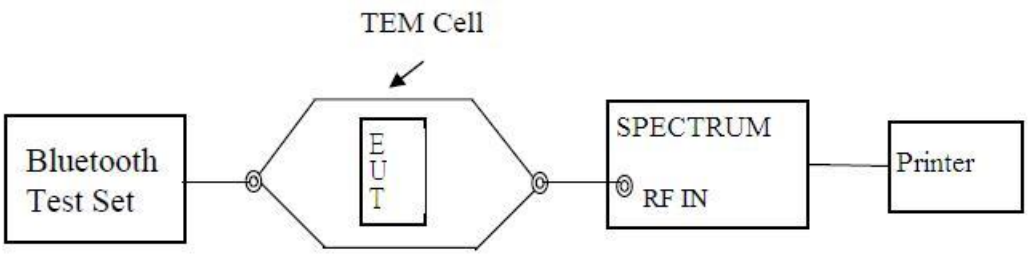
4.5. Dwell Time Measurement

4.4.1. Required and Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

4.4.2. Test Configuration and Procedure



1.The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

2. The EUT should be transmitting at its maximum data rate as the worst cases.

3. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels; RBW 1% of the span; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold.

5. Use the marker-delta function to calculate the dwell time.

4.4.3. Test Results

mode： G-FSK

Frequency	Result (mS)			Limits (mS)	Pass/ Fail
(MHz)	DH1-Packet	DH3-Packet	DH5-Packet		
2402	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.87×3.37×31.6=306	400	**Pass**
2441	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.85×3.37×31.6=304	400	**Pass**
2480	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.87×3.37×31.6=306	400	**Pass**
Uncertainty：± 10%					

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mode：Pi/4-DQPSK

Frequency	Result (mS)			Limits (mS)	Pass/ Fail
(MHz)	DH1-Packet	DH3-Packet	DH5-Packet		
2402	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.82×3.37×31.6=300	400	**Pass**
2441	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.82×3.37×31.6=300	400	**Pass**
2480	0.39×10.12×31.6=125	1.63×5.06×31.6=261	2.82×3.37×31.6=300	400	**Pass**
Uncertainty：± 10%					

mode：8DPSK

Frequency	Result (mS)			Limits (mS)	Pass/ Fail
(MHz)	DH1-Packet	DH3-Packet	DH5-Packet		
2402	0.39×10.12×31.6=125	1.64×5.06×31.6=262	2.9×3.37×31.6=309	400	**Pass**
2441	0.39×10.12×31.6=125	1.64×5.06×31.6=262	2.9×3.37×31.6=309	400	**Pass**
2480	0.39×10.12×31.6=125	1.64×5.06×31.6=262	2.9×3.37×31.6=309	400	**Pass**
Uncertainty：± 10%					

note：

1. DH1-Packet：Each channel hopping number of times per second (1600÷79÷2=10.12)
2. DH3-Packet：Each channel hopping number of times per second (1600÷79÷4=5.06)
3. DH5-Packet：Each channel hopping number of times per second (1600÷79÷6=3.37)
4. 0.4 seconds multiplied by the the hopping cycles (0.4 × 79 = 31.6 seconds)

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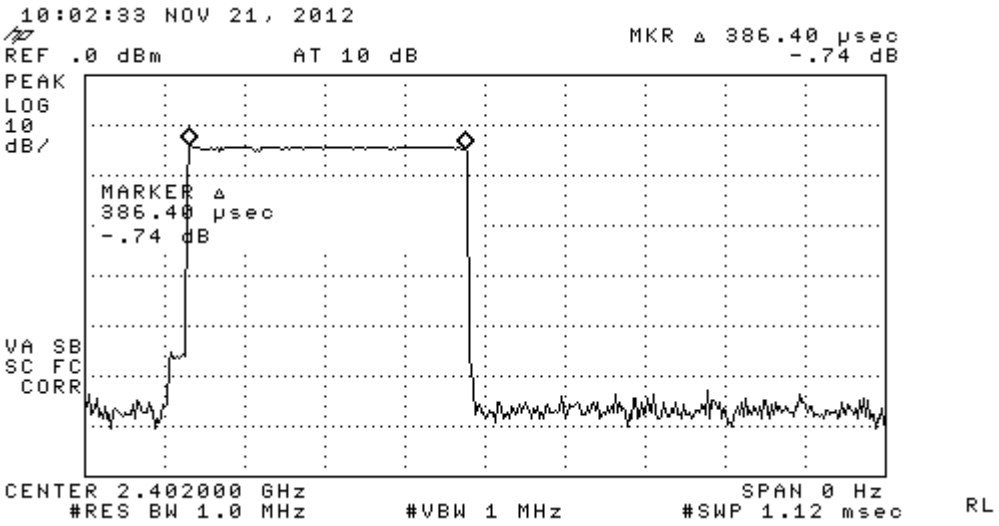

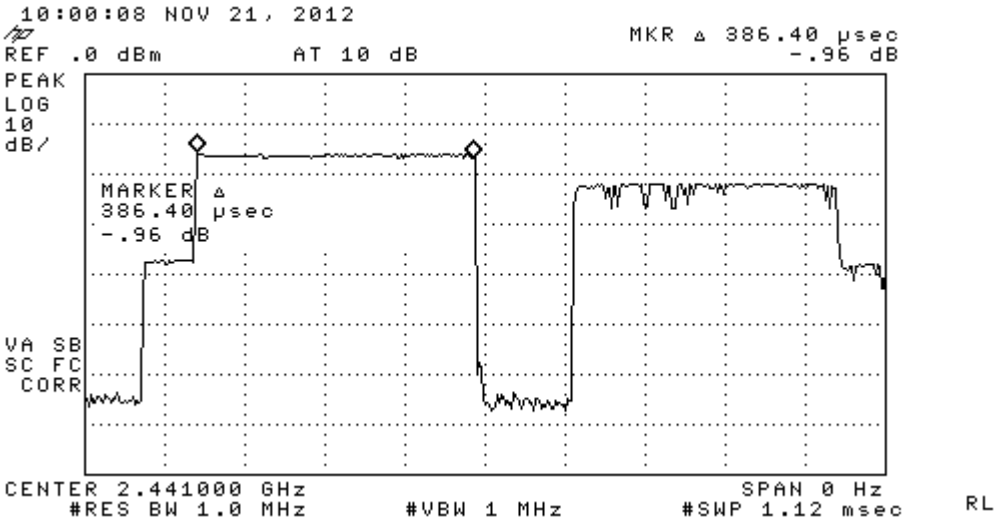

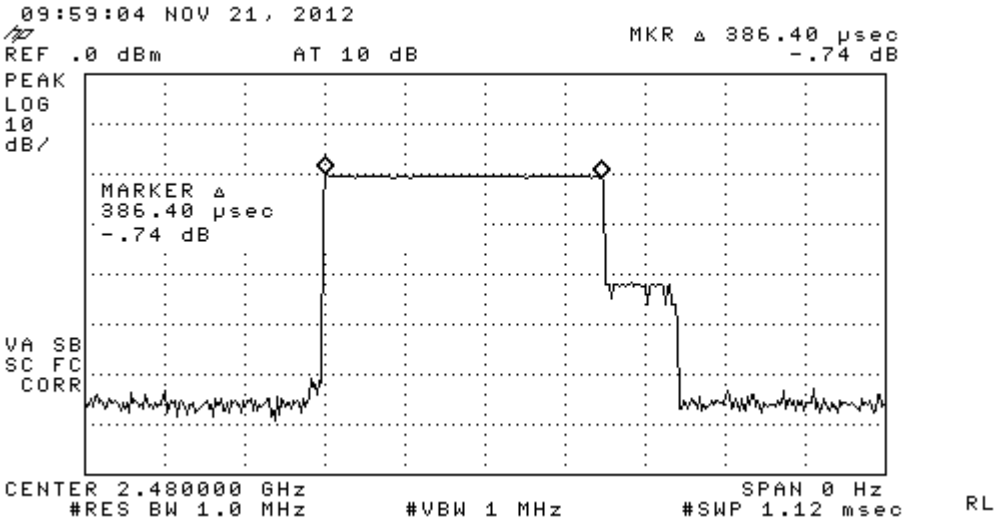

DH1-Packet Dwell Time (G-FSK)

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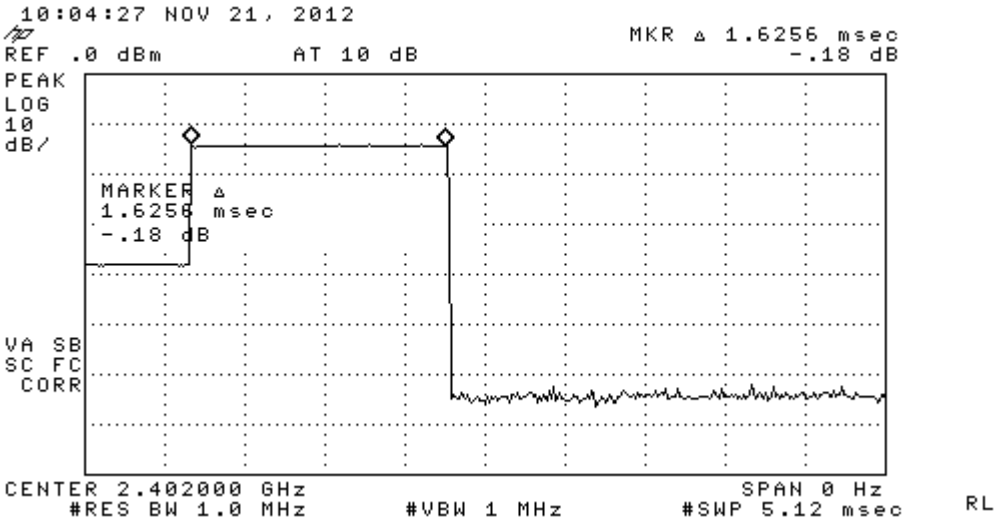

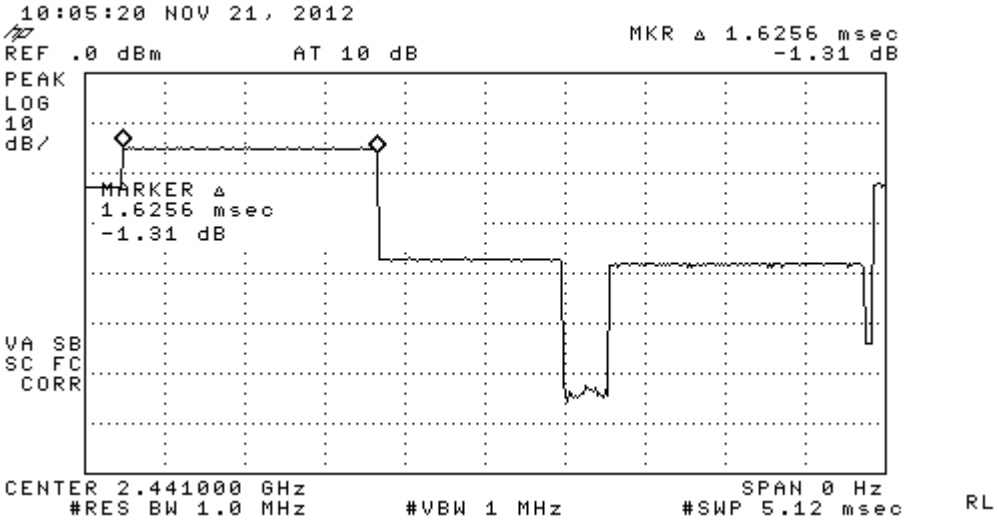

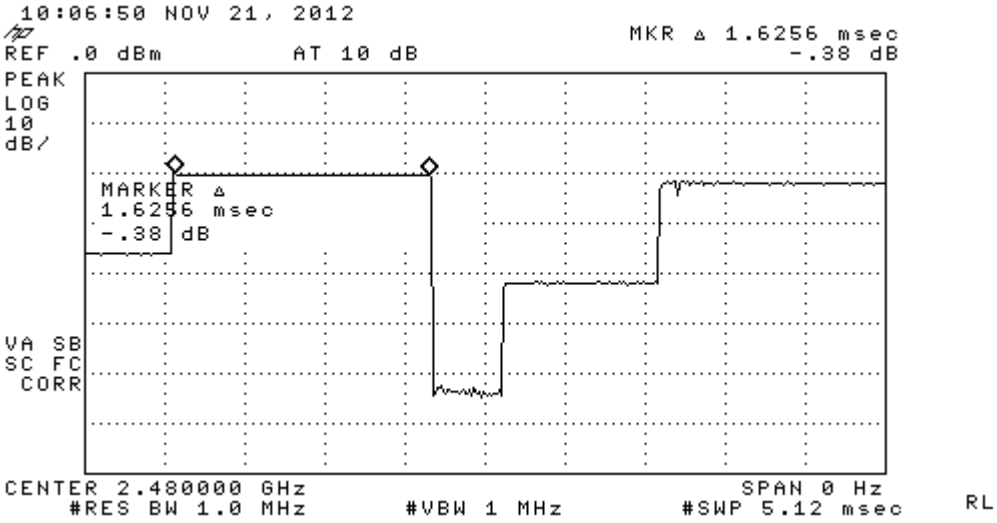

DH3-Packet Dwell Time (G-FSK)

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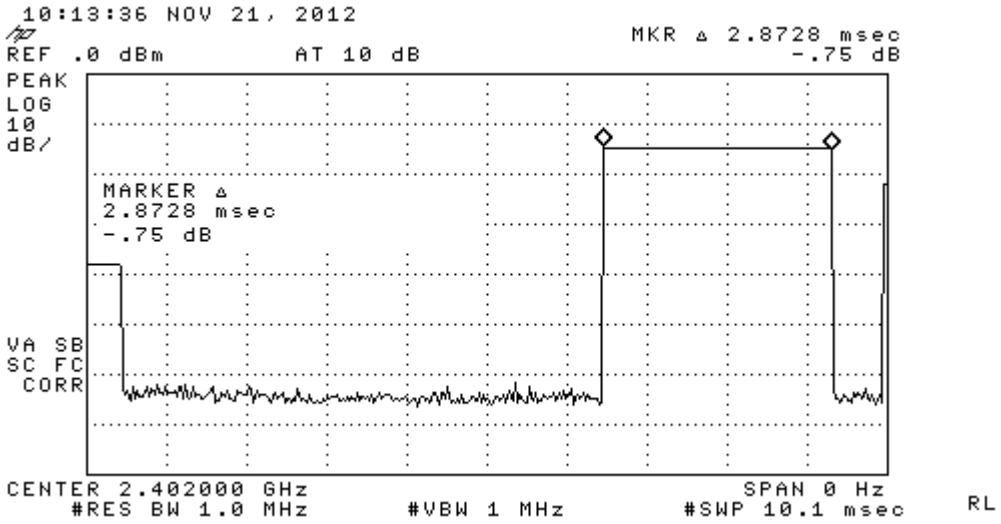

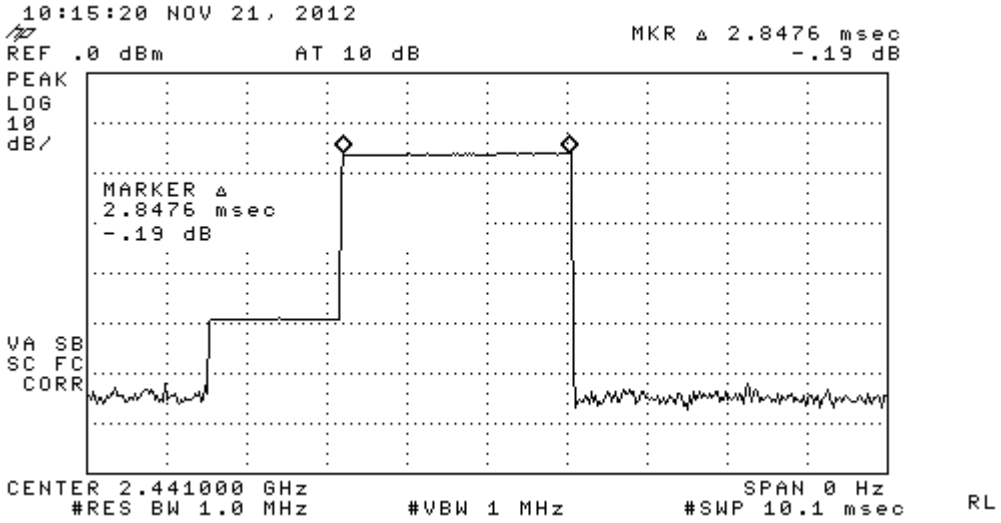

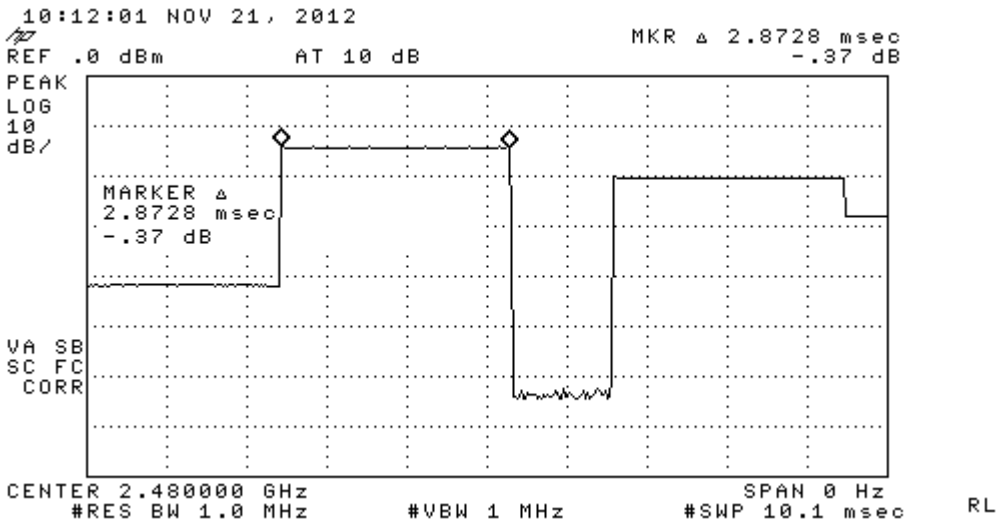

DH5-Packet Dwell Time (G-FSK)

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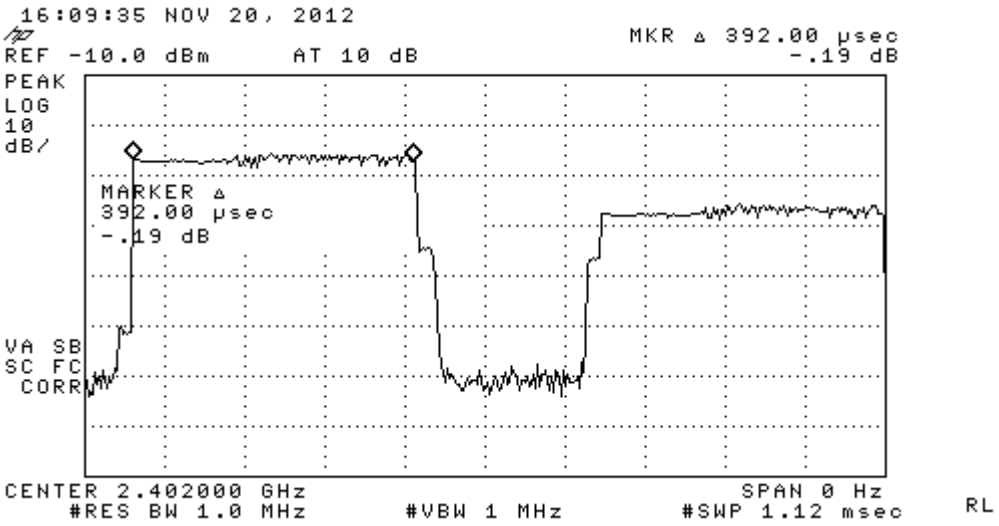

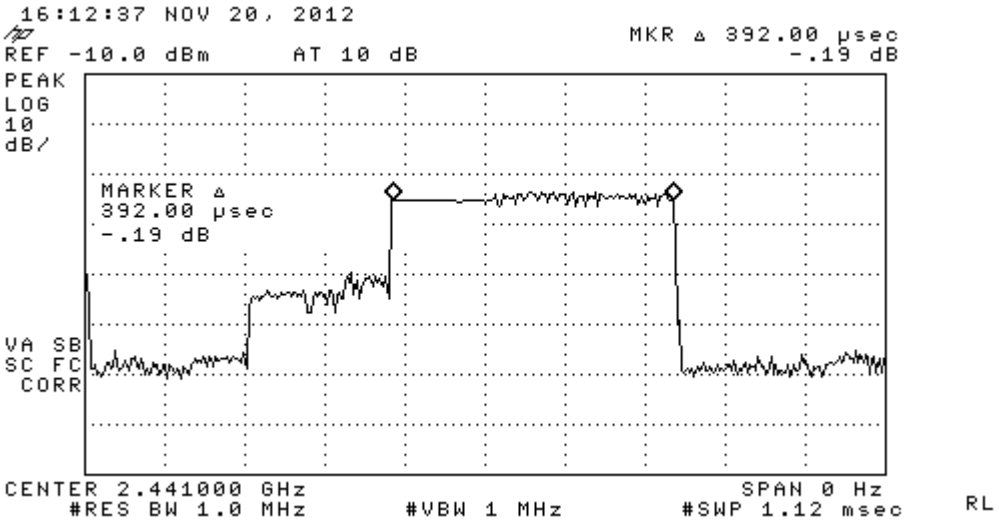

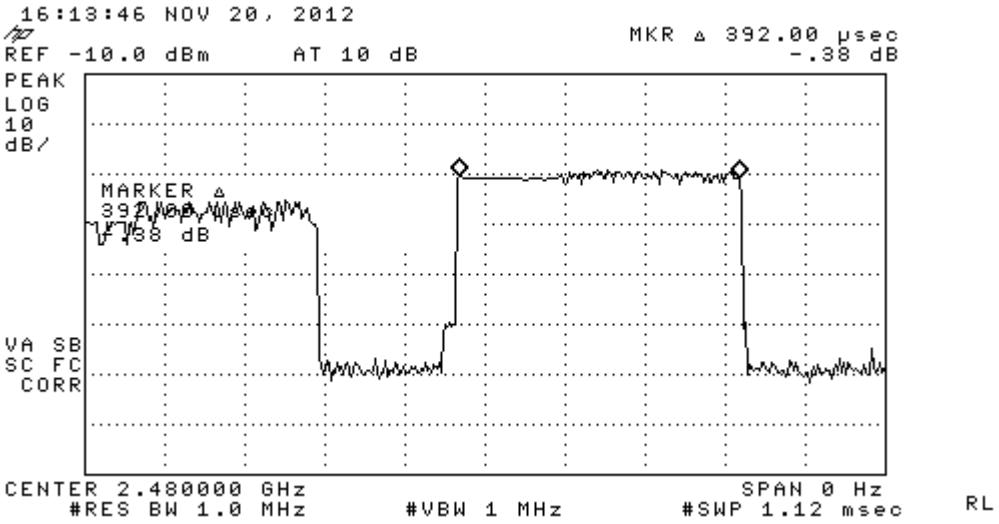

DH1-Packet Dwell Time (Pi/4-DQPSK)

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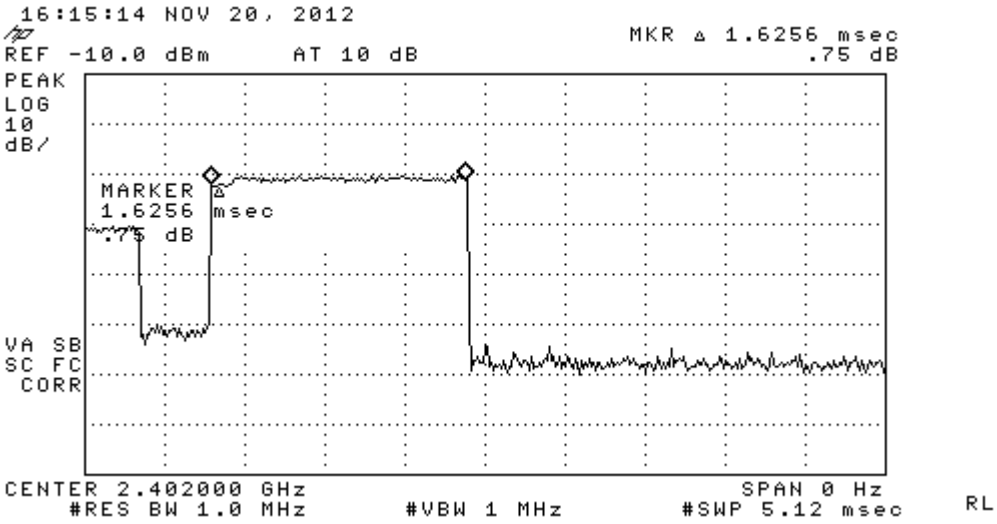

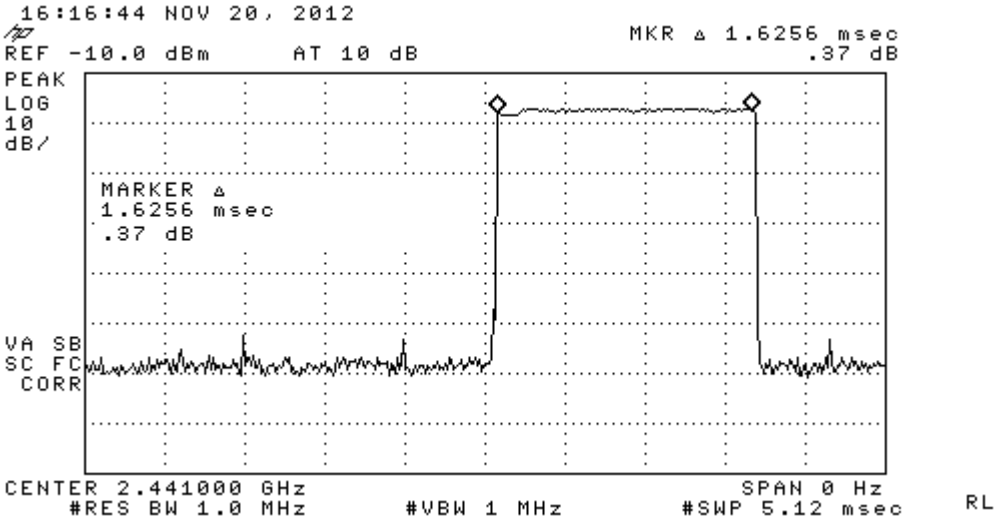

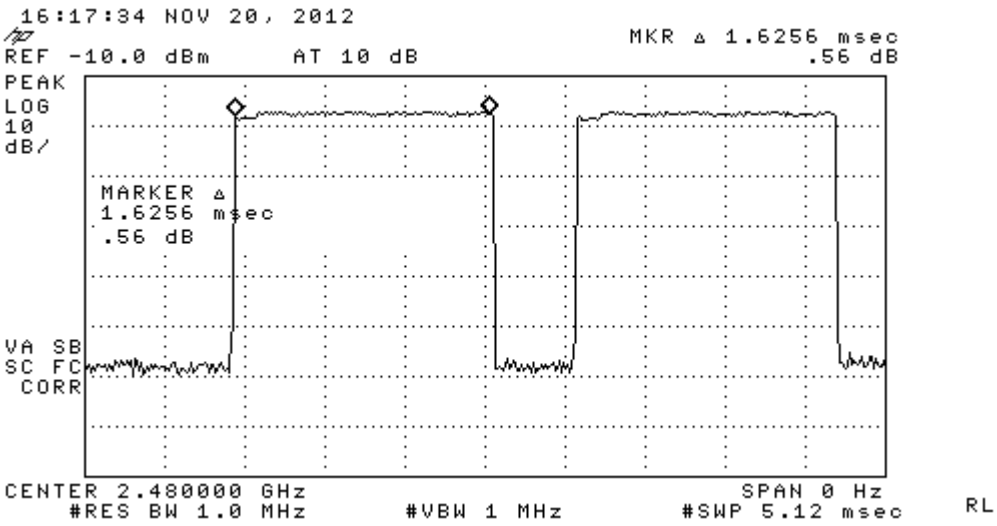

DH3-Packet Dwell Time (Pi/4-DQPSK)

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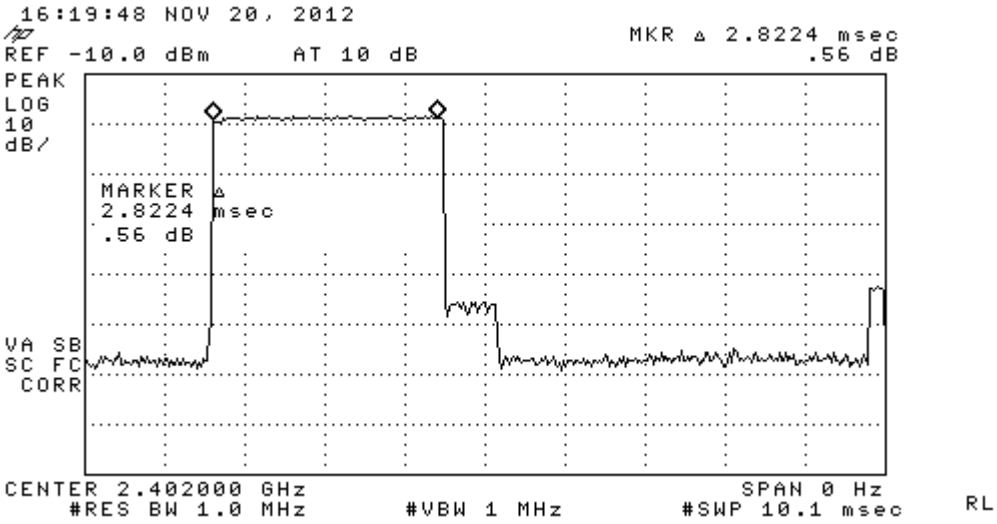

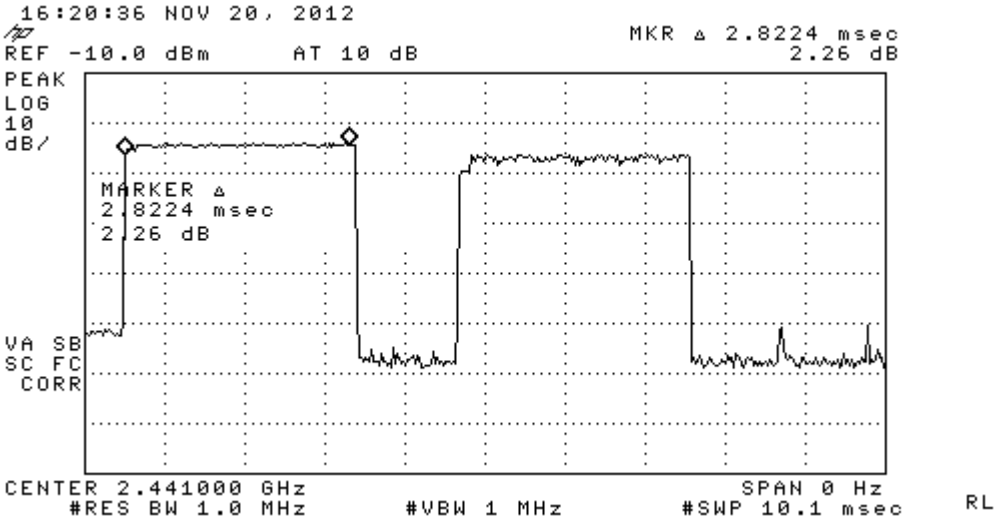

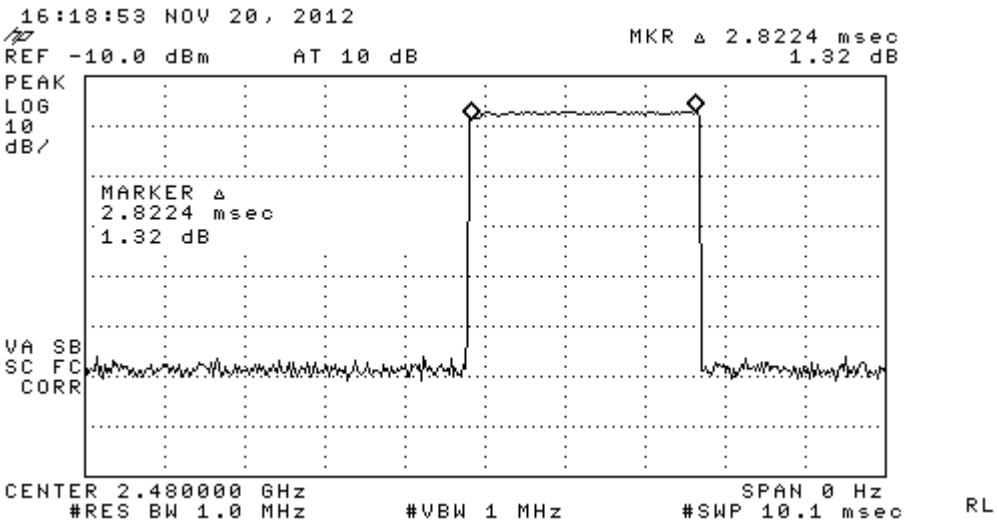

DH5-Packet Dwell Time (Pi/4-DQPSK)

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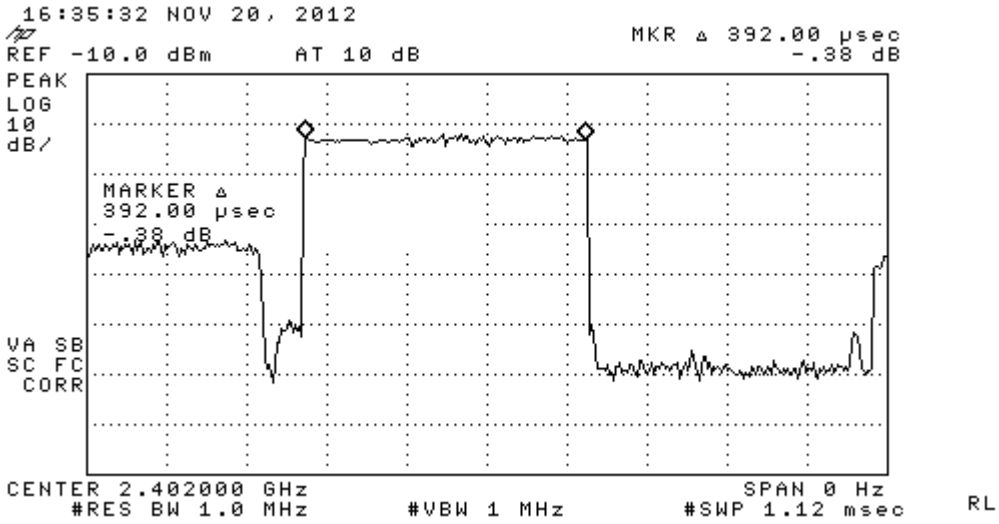

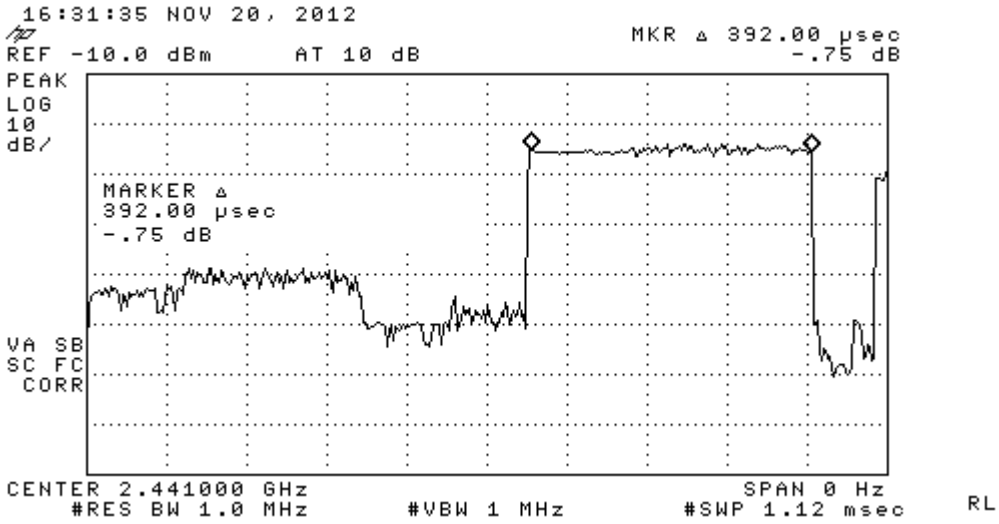

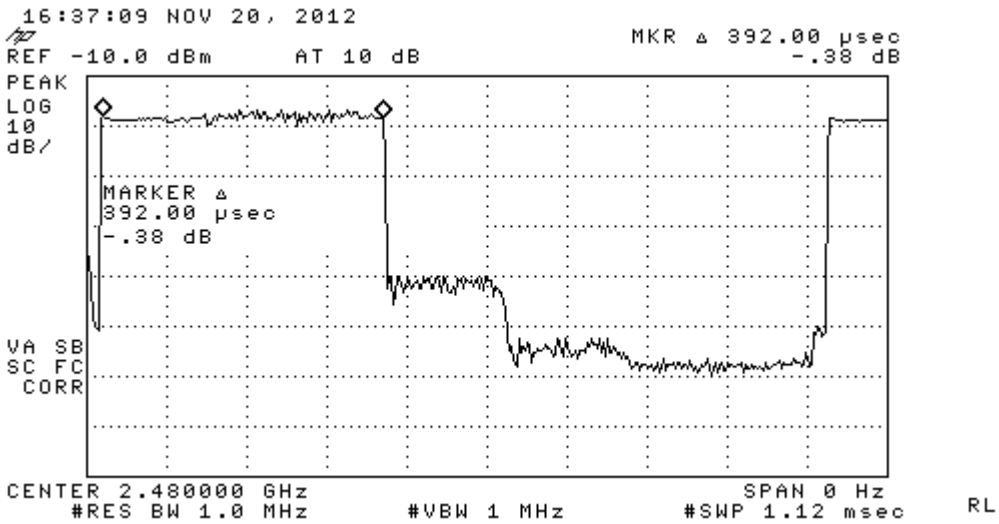

DH1-Packet Dwell Time (8DPSK)

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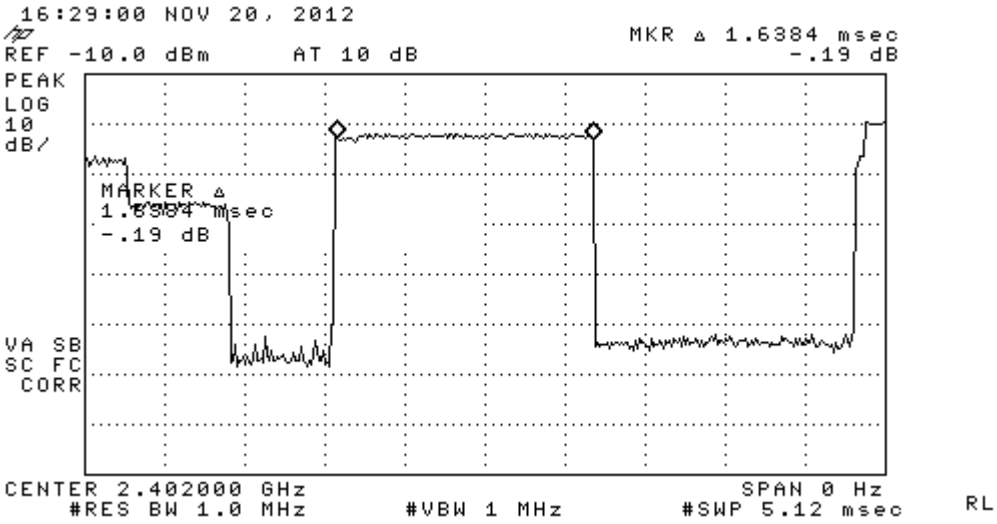

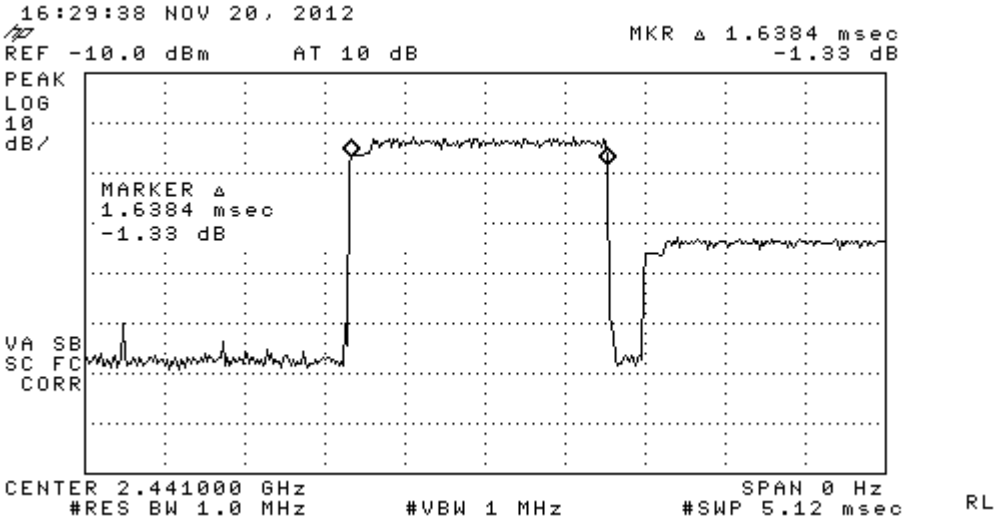

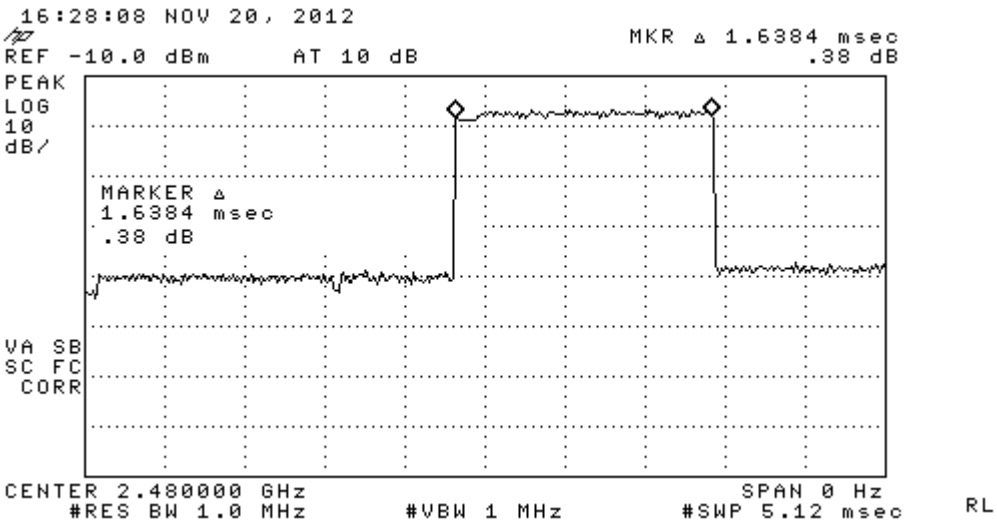

DH3-Packet Dwell Time (8DPSK)

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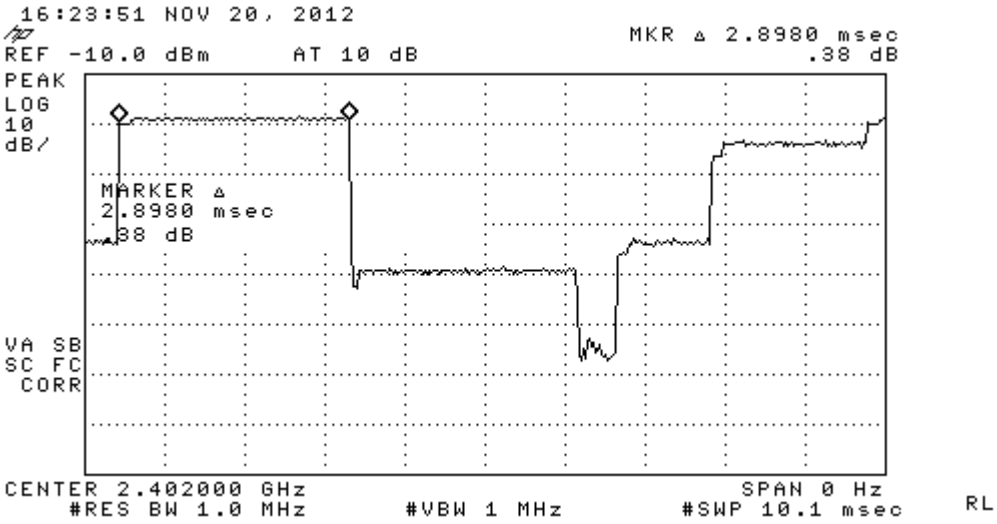

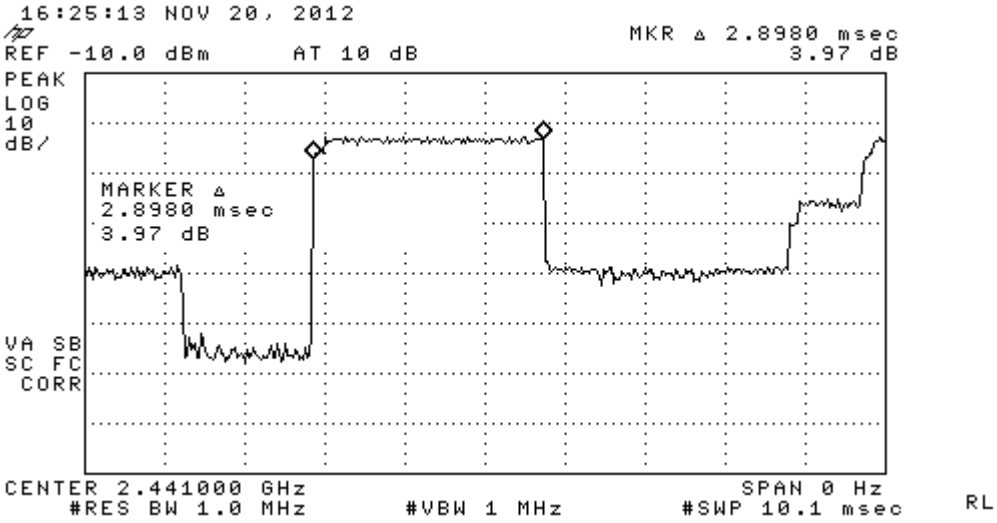

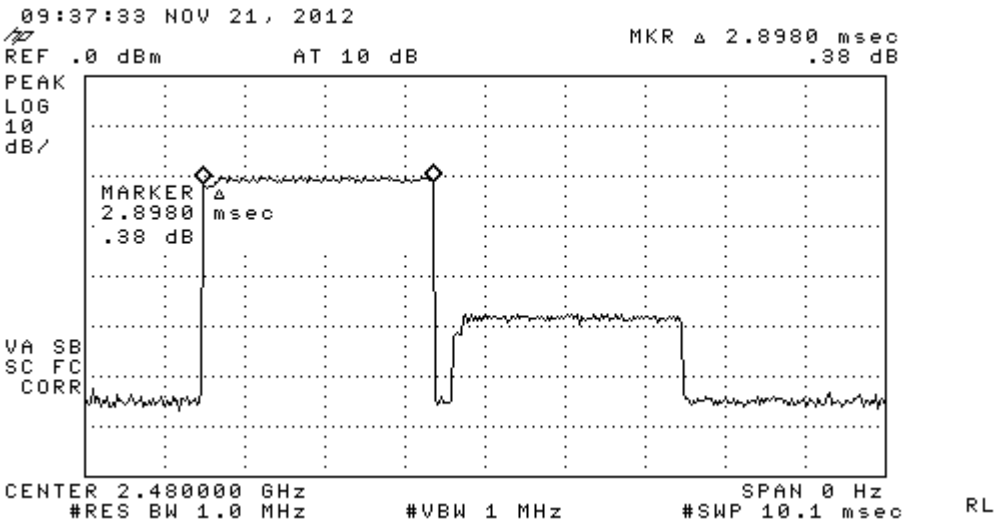

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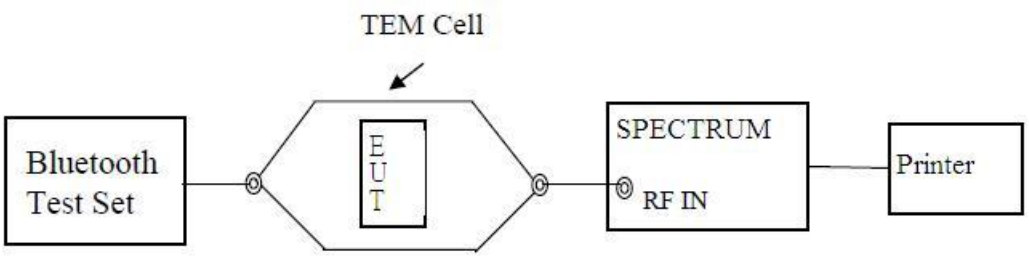
4.6. Band Edges Measurement

4.4.1. Required and Limits

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits

4.4.2. Test Configuration and Procedure



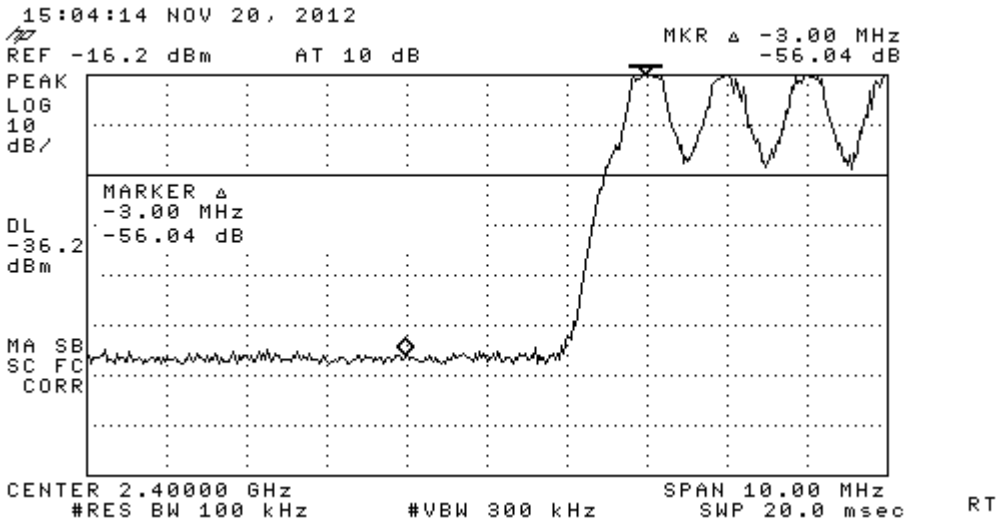
1.The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

2. RF antenna conducted test: Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.

3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).

4.4.3. Test Results

Result			
Low Band Edge emission	**High Band Edge emission**	**Limits (dB)**	**Pass/Fai**
56 dB	56.5 dB	least 20 dB below the highest level of the radiated powe	**Pass**
Uncertainty： ：± 0.9dB			



Low Band Edge

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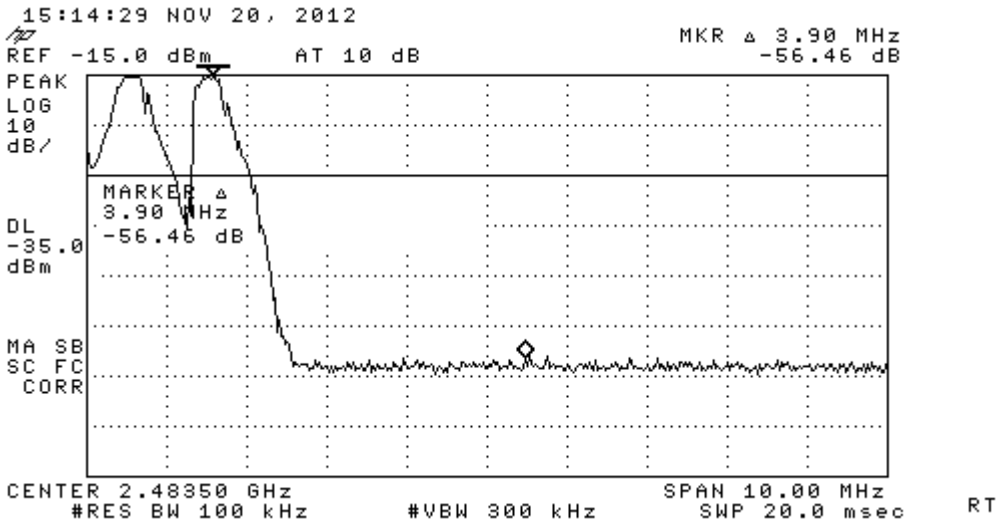

High Band Edge

4.7. Radiated Emission Measurement

4.4.1. Required and Limits

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

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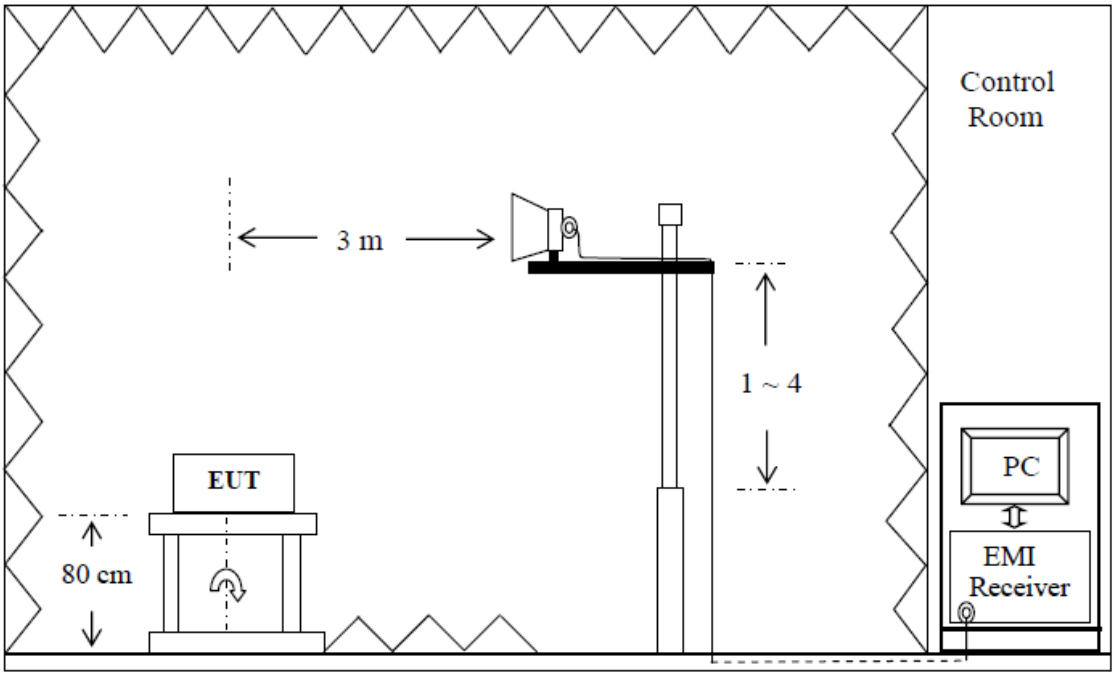
4.4.2. Test Configuration and Procedure



note： 1. 30~1000MHz use Broadband antenna

2. 1GHz~3.5GHz use Horn antenna

1. Use the following spectrum analyzer settings:

   Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f≥1 GHz, 100 kHz for f < 1 GHz; VBW≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

2. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level..

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4.4.3. Test Results

Emission frequency： 2402 MHz

Har-monic	Frequ-ency (MHz)	Reading Vaule (dBμV)		Calibra-tion Factor (dB)	Measure @3m (dBμV/m)		Limit (dBμV/m)	Margin (dB)		Pass /Fail
		Hori-zontal	Vertical		Hori-zontal	Vertical		Hori-zontal	Vertical	
2	4804	---	---	---	---	---	---	---	---	---
3	7206	---	---	---	---	---	---	---	---	---
4	9608	---	---	---	---	---	---	---	---	---
5	12010	---	---	---	---	---	---	---	---	---
6	14412	---	---	---	---	---	---	---	---	---
7	16814	---	---	---	---	---	---	---	---	---
8	19216	---	---	---	---	---	---	---	---	---
9	21618	---	---	---	---	---	---	---	---	---
10	24020	---	---	---	---	---	---	---	---	---

Outside band

Frequ-ency (MHz)	Polarity (H/V)	Reading Vaule (dBμV)	Calibra-tion Factor (dB)	Measure @3m (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pass /Fail
204.9	H	20.0	11.9	31.9	43.5	-11.6	Pass
218.6	H	21.3	12.5	33.8	46.0	-12.2	Pass
296.3	H	23.1	14.9	38.0	46.0	-8.0	Pass
321.6	H	18.6	15.7	34.3	46.0	-11.7	Pass
325.5	H	19.0	15.8	34.8	46.0	-11.2	Pass
329.4	H	19.1	15.9	35.0	46.0	-11.0	Pass
31.9	V	14.7	20.2	34.9	40.0	-5.1	Pass
53.3	V	21.0	8.5	29.5	40.0	-10.5	Pass
195.2	V	22.0	11.5	33.5	43.5	-10.0	Pass
199.1	V	25.9	11.7	37.6	43.5	-5.9	Pass
603.4	V	15.1	22.4	37.5	46.0	-8.5	Pass
922.2	V	15.9	25.9	41.8	46.0	-4.2	Pass
Uncertainty：±4.3dB							

note：1. measure=reading value + calibration factor
2. calibration factor=antenna factor +cable loss(below 3.5GHz)
3. calibration factor= antenna factor +cable loss-preamp gain(above 3.5GHz)
4. margin=measure - limit。

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Emission frequency： 2441 MHz

Har-monic	Frequ-ency (MHz)	Reading Vaule (dBμV)		Calibra-tion Factor (dB)	Measure @3m (dBμV/m)		Limit (dBμV/m)	Margin (dB)		Pass /Fail
		Hori-zontal	Vertica l		Hori-zontal	Vertica l		Hori-zontal	Vertica l	
2	4882	---	---	---	---	---	---	---	---	---
3	7323	---	---	---	---	---	---	---	---	---
4	9764	---	---	---	---	---	---	---	---	---
5	12205	---	---	---	---	---	---	---	---	---
6	14646	---	---	---	---	---	---	---	---	---
7	17087	---	---	---	---	---	---	---	---	---
8	19528	---	---	---	---	---	---	---	---	---
9	21969	---	---	---	---	---	---	---	---	---
10	24410	---	---	---	---	---	---	---	---	---

Outside band

Frequ-ency (MHz)	Polarity (H/V)	Reading Vaule (dBμV)	Calibra-tion Factor (dB)	Measure @3m (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pass /Fail
199.1	H	23.6	11.7	35.3	43.5	-8.2	Pass
265.2	H	18.4	14.2	32.6	46.0	-13.4	Pass
302.1	H	20.6	15.1	35.7	46.0	-10.3	Pass
321.6	H	17.9	15.7	33.6	46.0	-12.4	Pass
325.5	H	18.2	15.8	34.0	46.0	-12.0	Pass
333.2	H	16.8	16.1	32.9	46.0	-13.1	Pass
31.9	V	14.2	20.2	34.4	40.0	-5.6	Pass
72.8	V	19.8	8.2	28.0	40.0	-12.0	Pass
86.4	V	17.6	8.1	25.7	40.0	-14.3	Pass
199.1	V	21.6	11.7	33.3	43.5	-10.2	Pass
208.8	V	17.7	12.0	29.7	43.5	-13.8	Pass
632.6	V	15.6	22.8	38.4	46.0	-7.6	Pass
Uncertainty：±4.3dB							

note：1. measure=reading value + calibration factor
2. calibration factor=antenna factor +cable loss(below 3.5GHz)
3. calibration factor= antenna factor +cable loss-preamp gain(above 3.5GHz)
4. margin=measure - limit。

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Emission frequency： 2480 MHz

Har-monic	Frequ-ency (MHz)	Reading Vaule (dBμV)		Calibra-tion Factor (dB)	Measure @3m (dBμV/m)		Limit (dBμV/m)	Margin (dB)		Pass /Fail
		Hori-zontal	Vertica l		Hori-zontal	Vertica l		Hori-zontal	Vertica l	
2	4960	---	---	---	---	---	---	---	---	---
3	7440	---	---	---	---	---	---	---	---	---
4	9920	---	---	---	---	---	---	---	---	---
5	12400	---	---	---	---	---	---	---	---	---
6	14880	---	---	---	---	---	---	---	---	---
7	17360	---	---	---	---	---	---	---	---	---
8	19840	---	---	---	---	---	---	---	---	---
9	22320	---	---	---	---	---	---	---	---	---
10	24800	---	---	---	---	---	---	---	---	---

Outside band

Frequ-ency (MHz)	Polarity (H/V)	Reading Vaule (dBμV)	Calibra-tion Factor (dB)	Measure @3m (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pass /Fail
195.2	H	19.9	11.5	31.4	43.5	-12.1	Pass
199.1	H	22.5	11.7	34.2	43.5	-9.3	Pass
214.7	H	20.3	12.3	32.6	43.5	-10.9	Pass
296.3	H	20.4	14.9	35.3	46.0	-10.7	Pass
325.5	H	18.1	15.8	33.9	46.0	-12.1	Pass
965.0	H	16.1	26.2	42.3	54.0	-11.7	Pass
31.9	V	14.2	20.2	34.4	40.0	-5.6	Pass
72.8	V	19.1	8.2	27.3	40.0	-12.7	Pass
107.8	V	20.4	9.1	29.5	43.5	-14.0	Pass
195.2	V	18.3	11.5	29.8	43.5	-13.7	Pass
212.7	V	18.1	12.2	30.3	43.5	-13.2	Pass
860.0	V	15.6	25.2	40.8	46.0	-5.2	Pass
Uncertainty：±4.3dB							

note：1. measure=reading value + calibration factor
2. calibration factor=antenna factor +cable loss(below 3.5GHz)
3. calibration factor= antenna factor +cable loss-preamp gain(above 3.5GHz)
4. margin=measure - limit。

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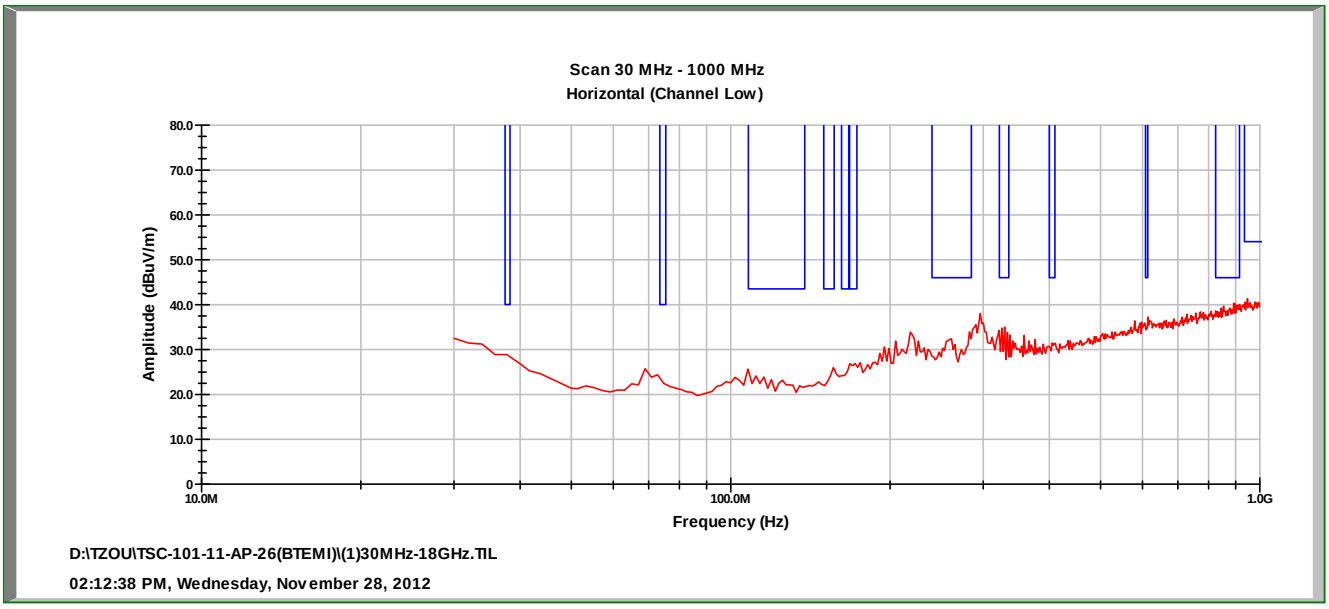

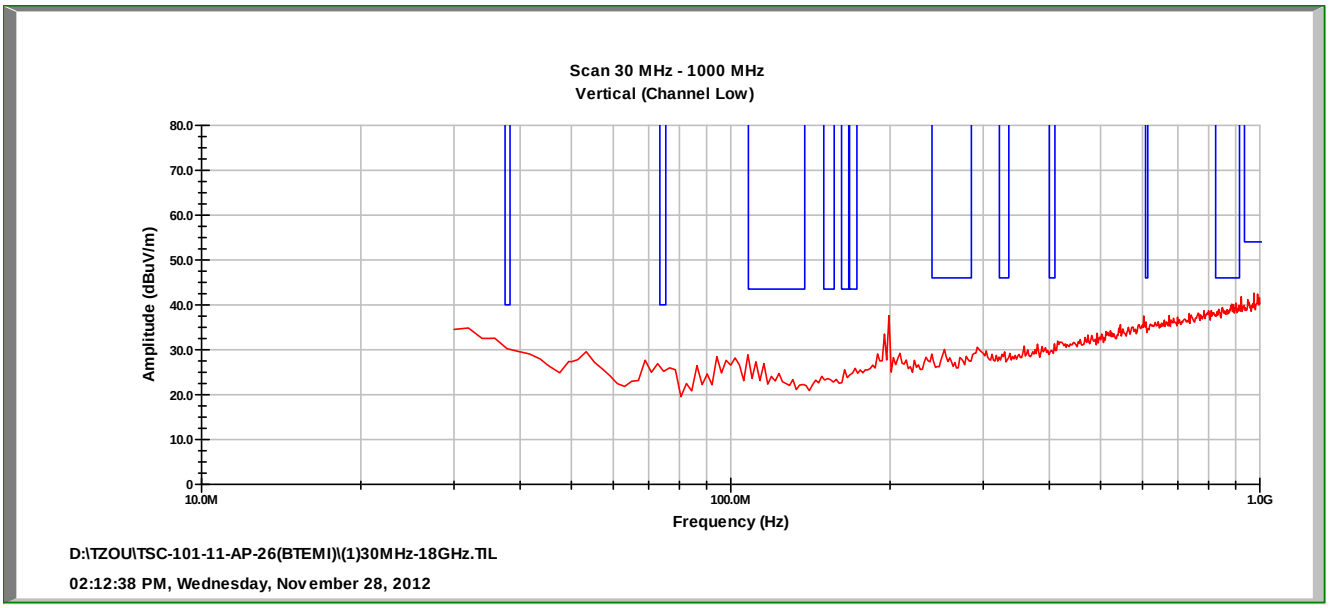

Below 1GHz radiated emission(emission frequency2402MHz)

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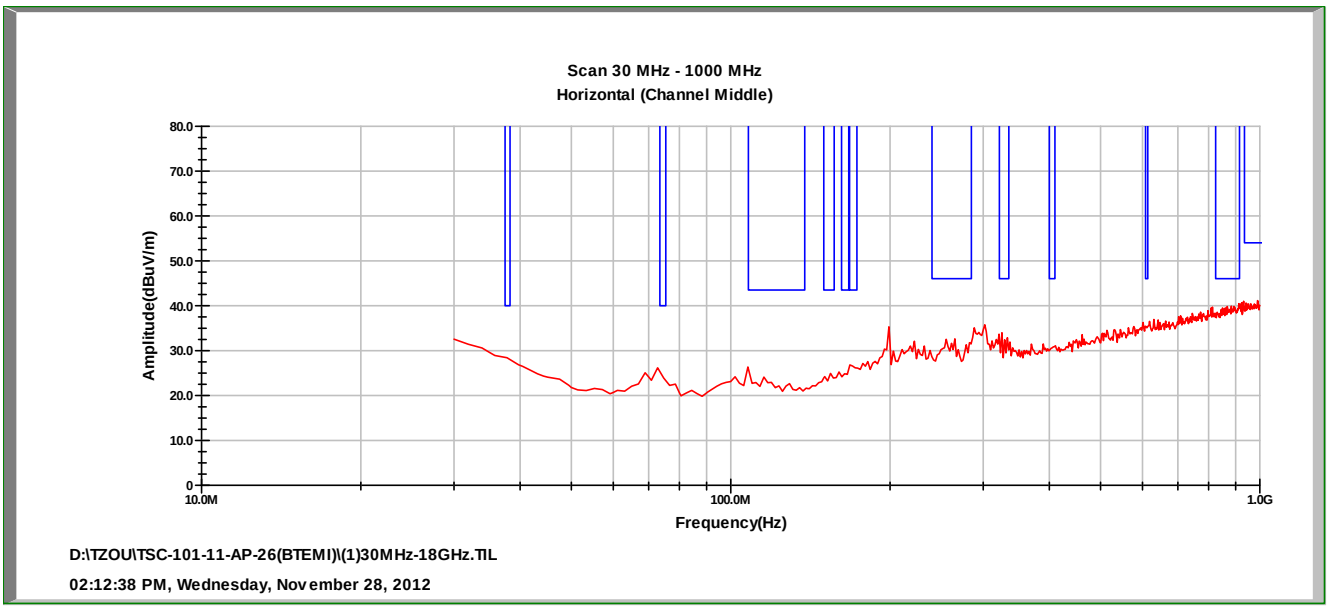

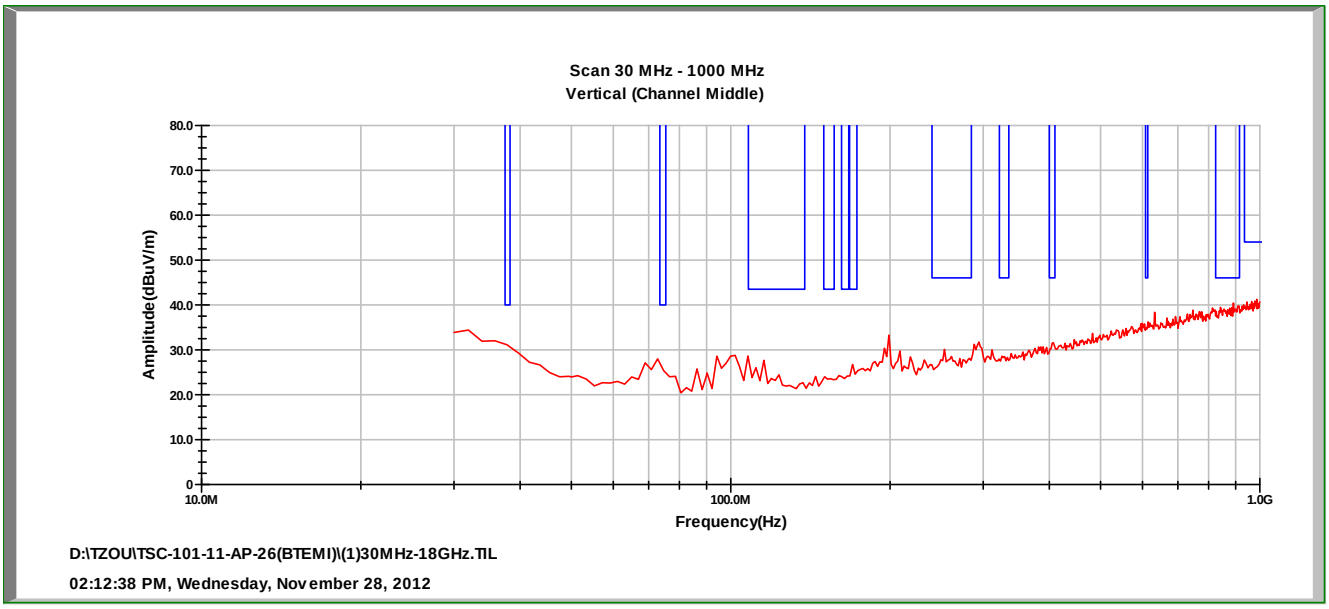

Below 1GHz radiated emission(emission frequency2441MHz)

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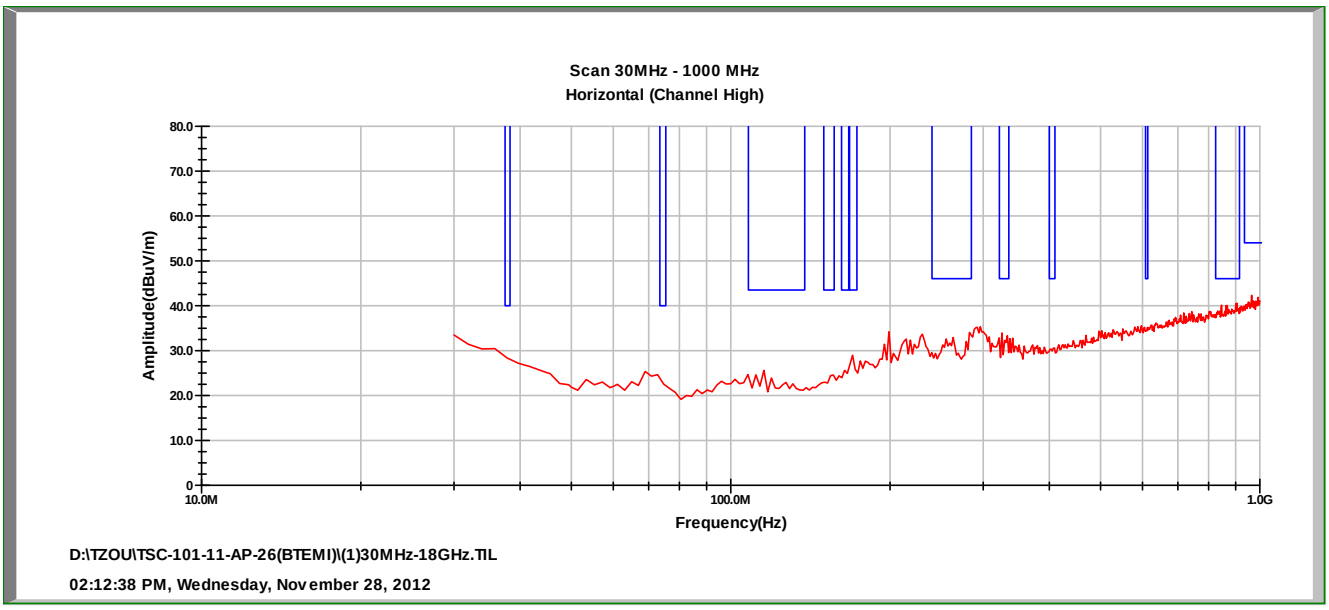

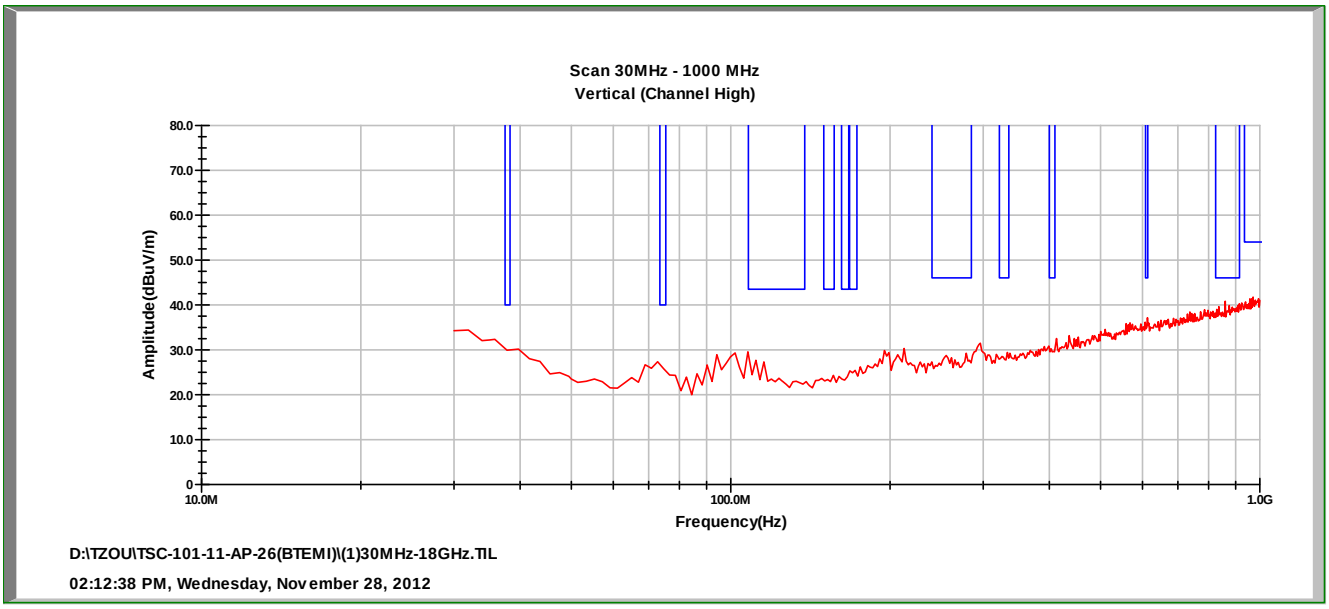

Below 1GHz radiated emission(emission frequency2480MHz)

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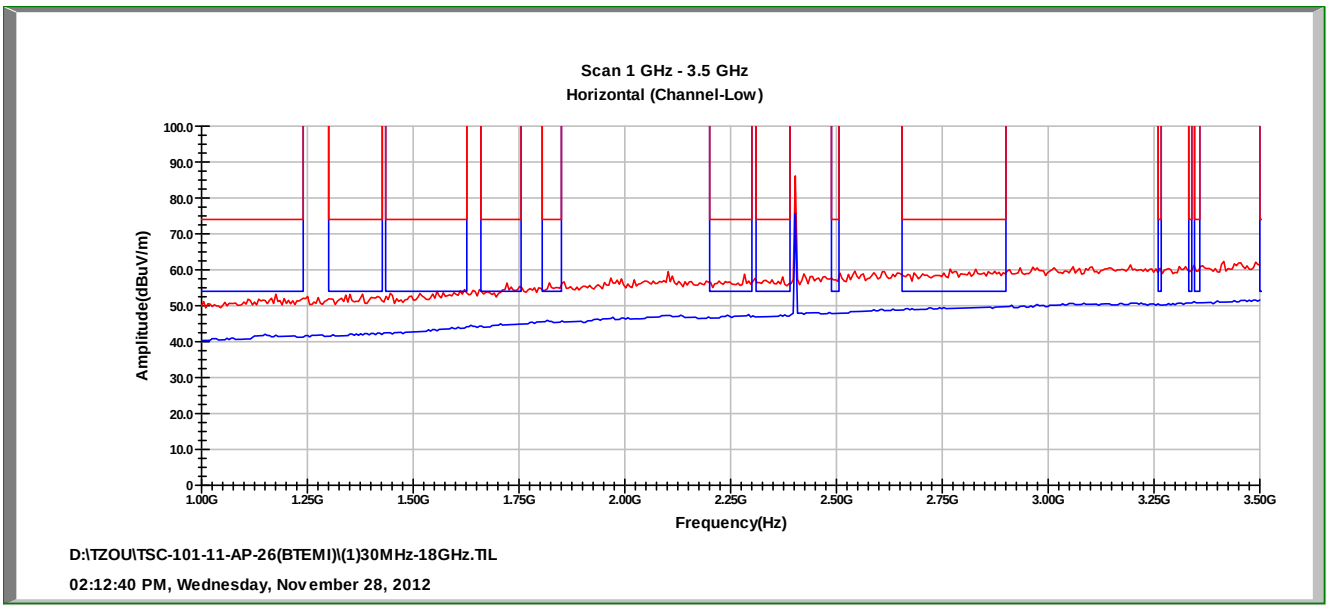

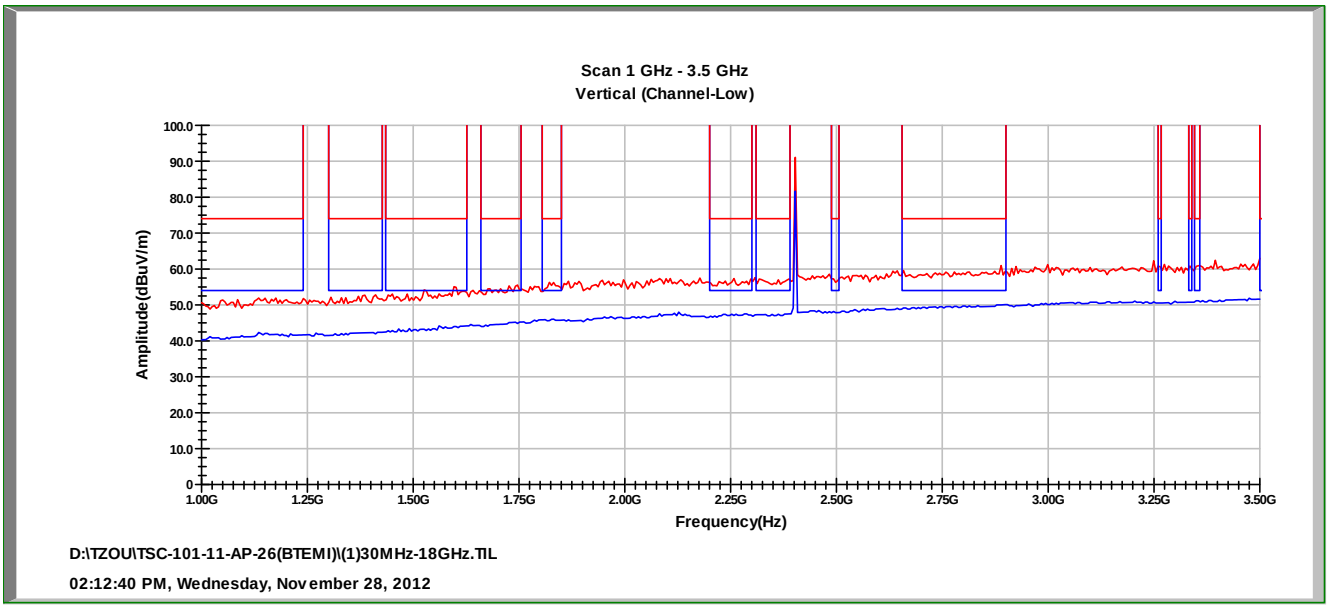

1~3.5GHz radiated emission(emission frequency2402MHz)

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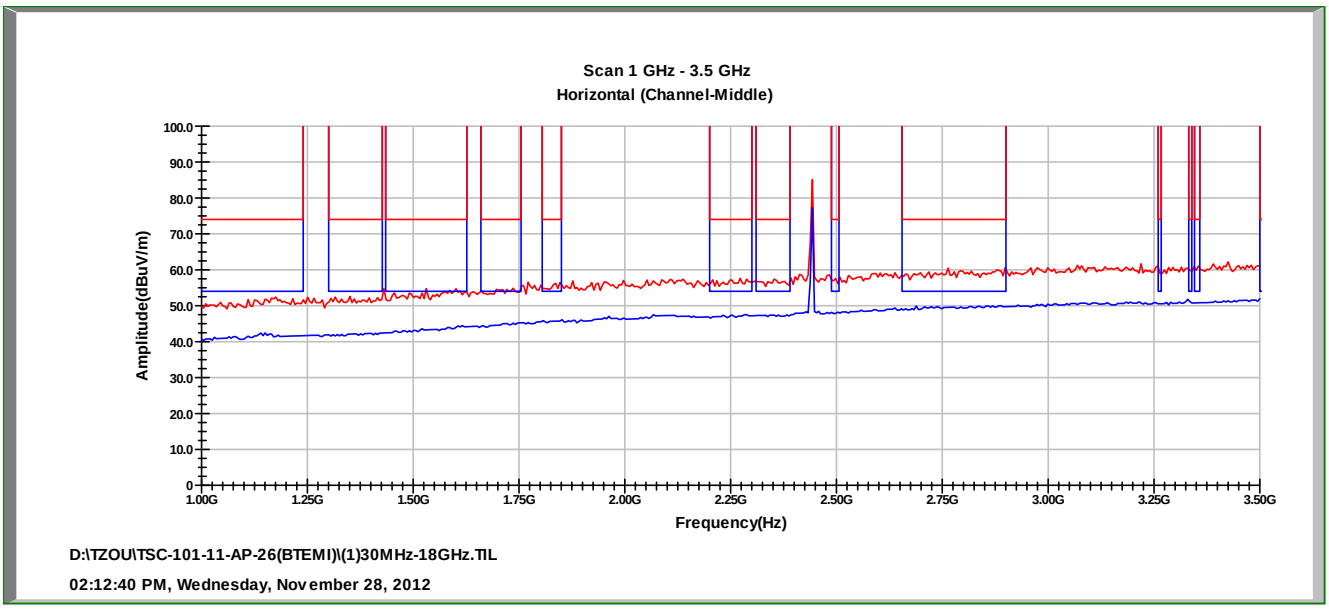

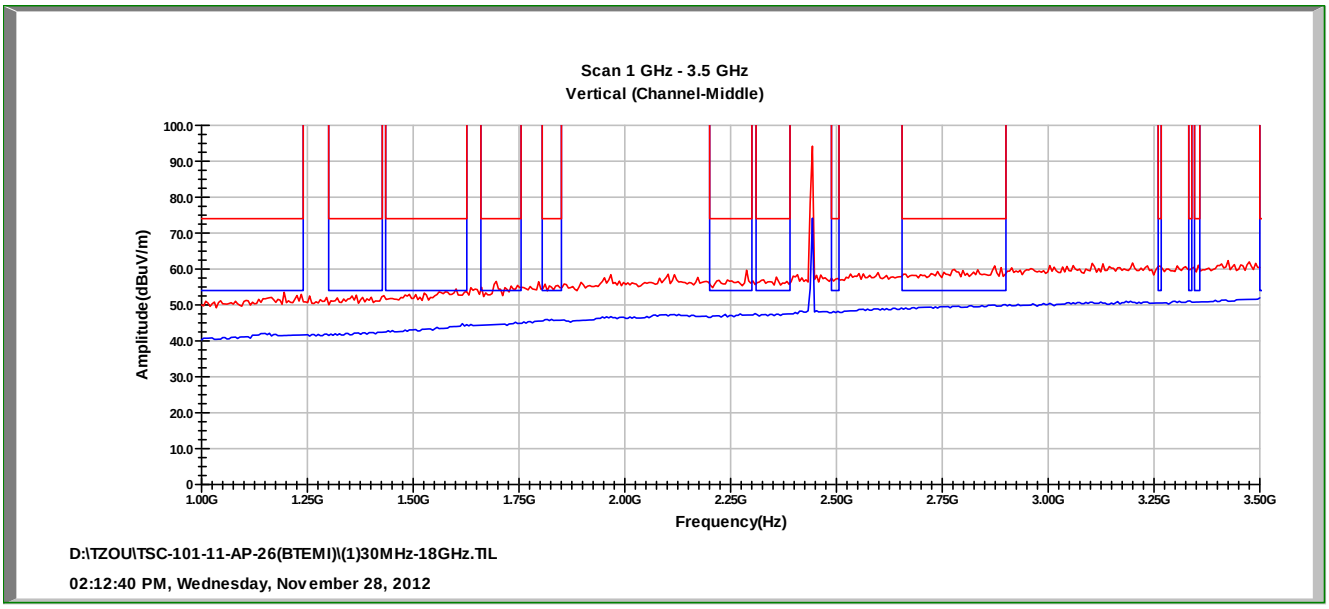

1~3.5GHz radiated emission(emission frequency2441MHz)

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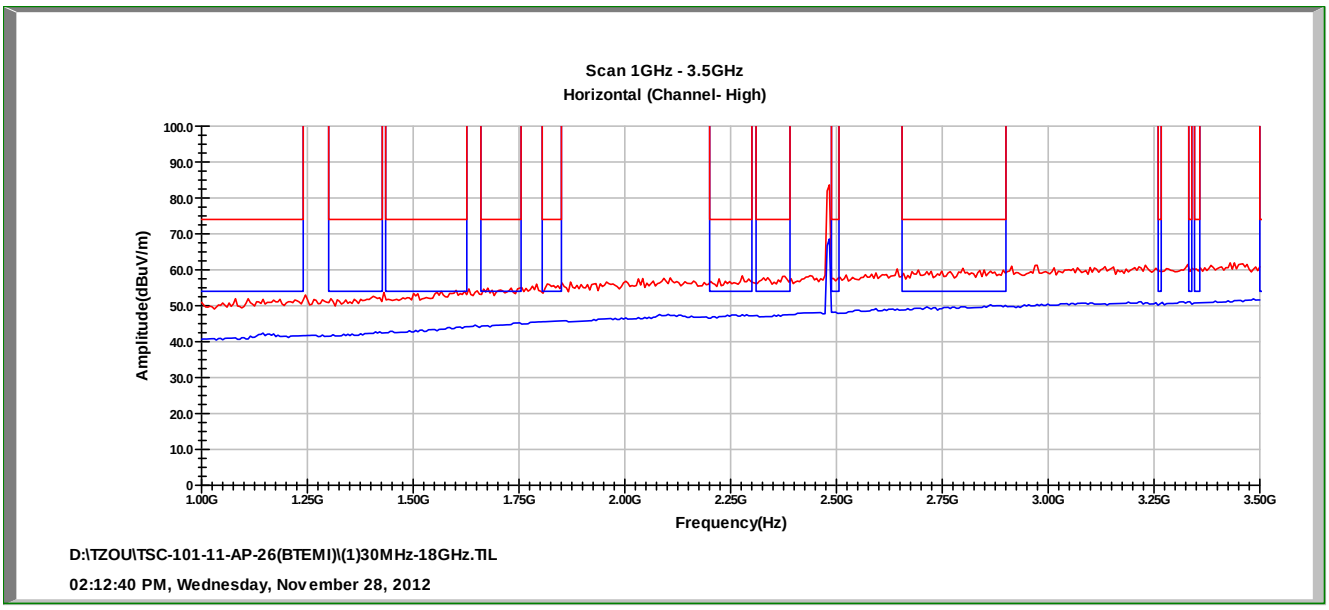

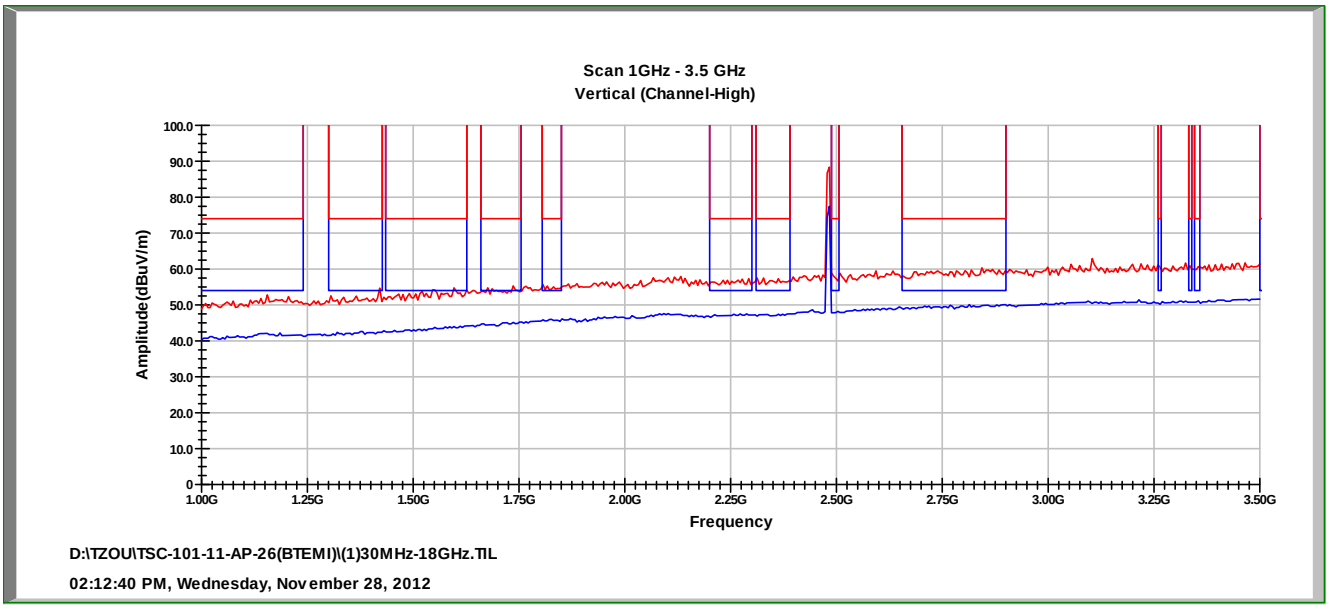

1~3.5GHz radiated emission(emission frequency2480MHz)

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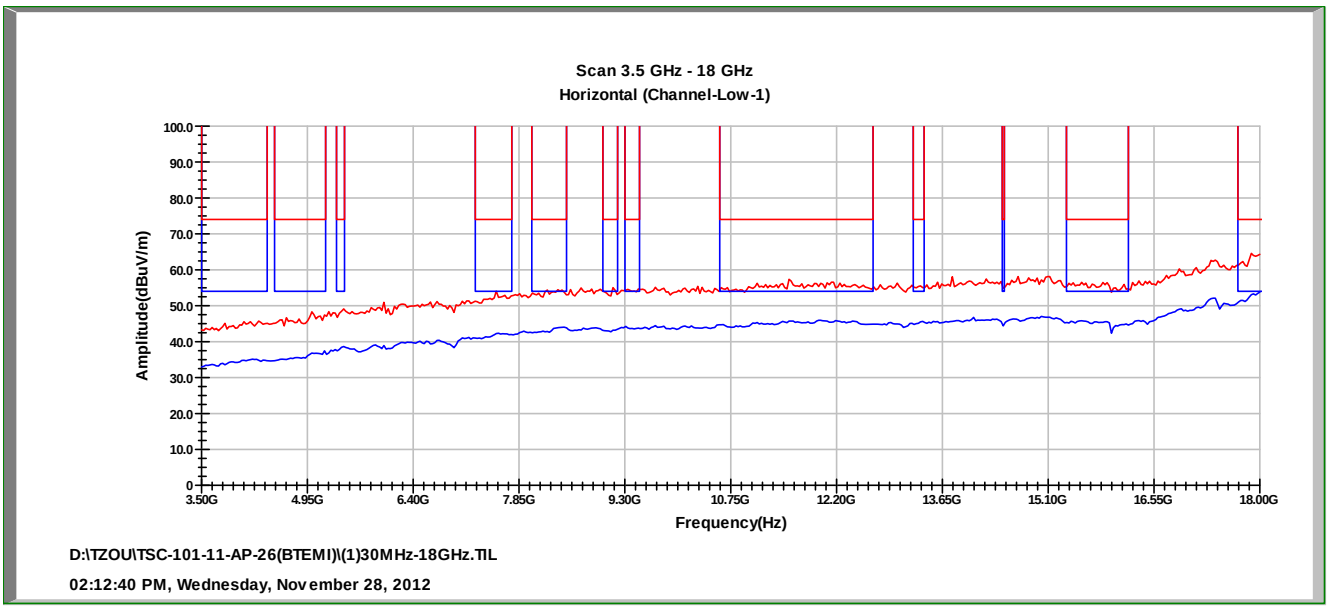

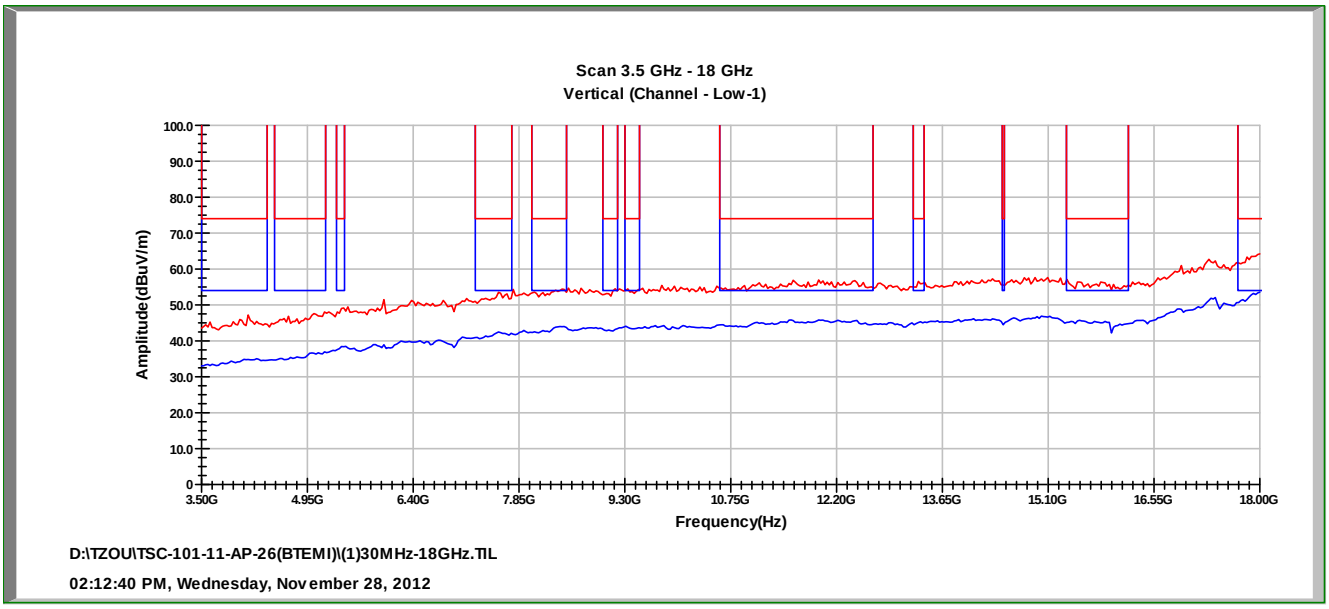

3.5~18GHz radiated emission(emission frequency2402MHz)

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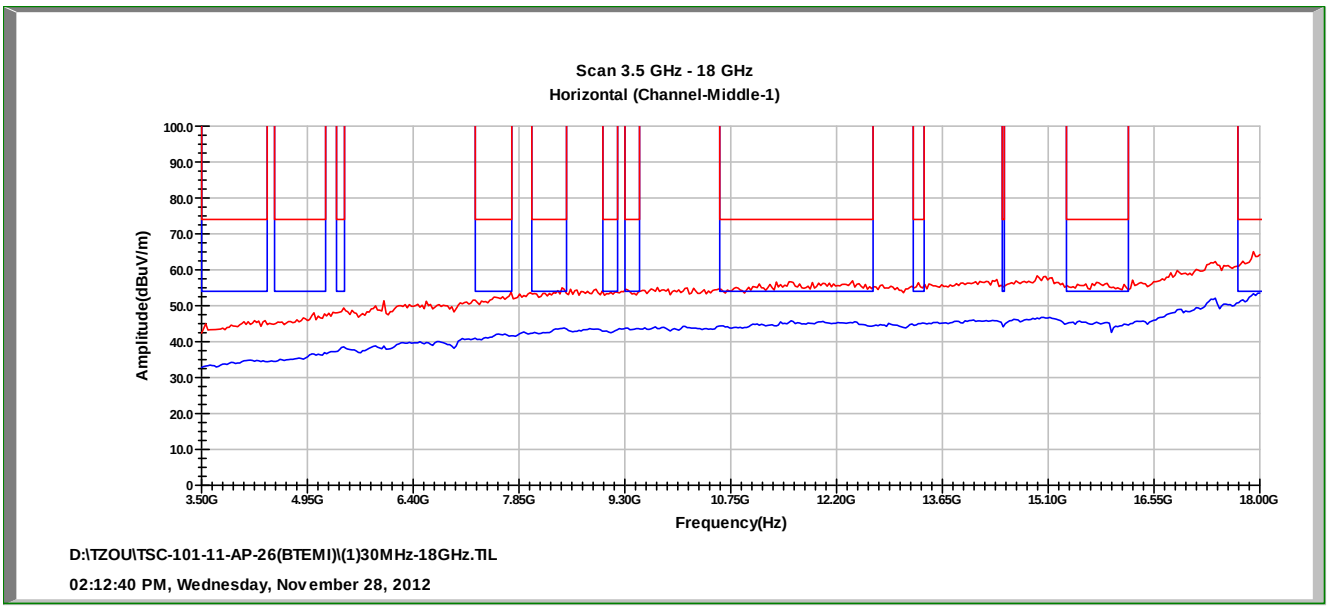

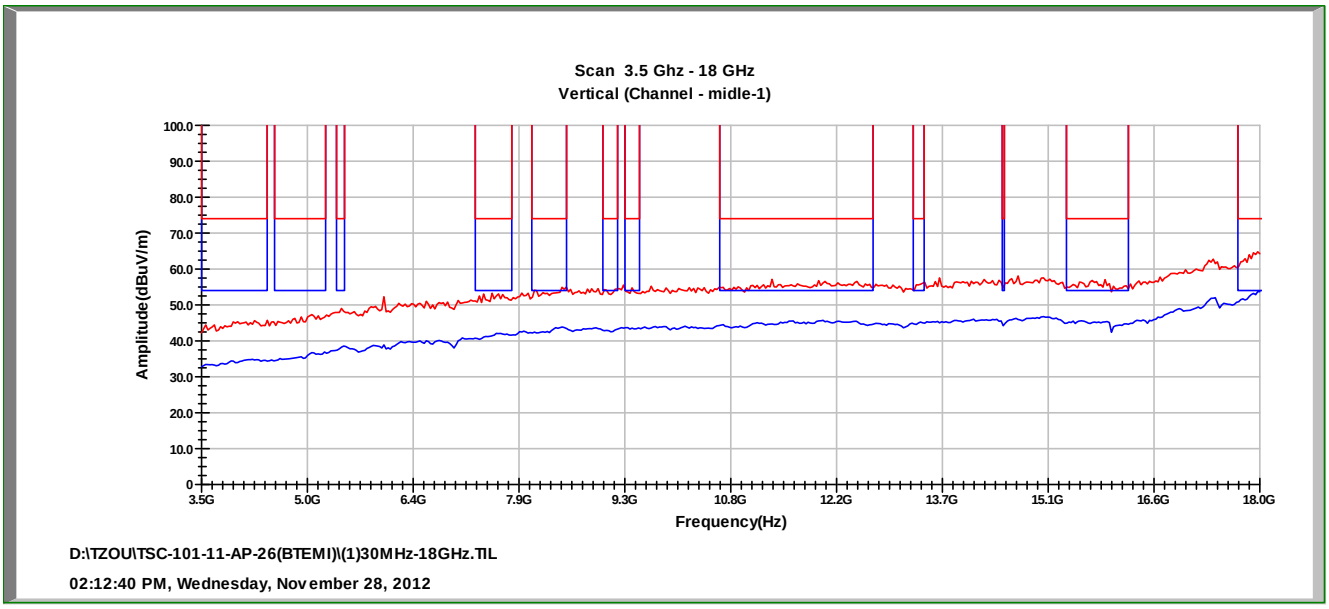

3.5~18GHz radiated emission(emission frequency2441MHz)

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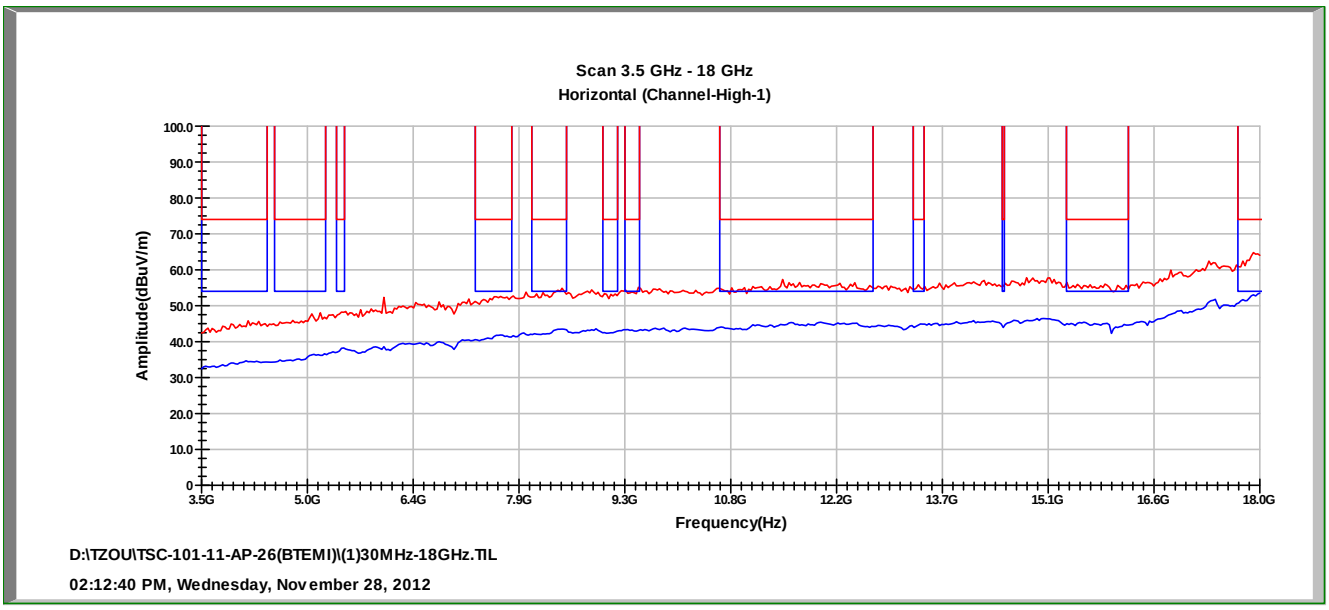

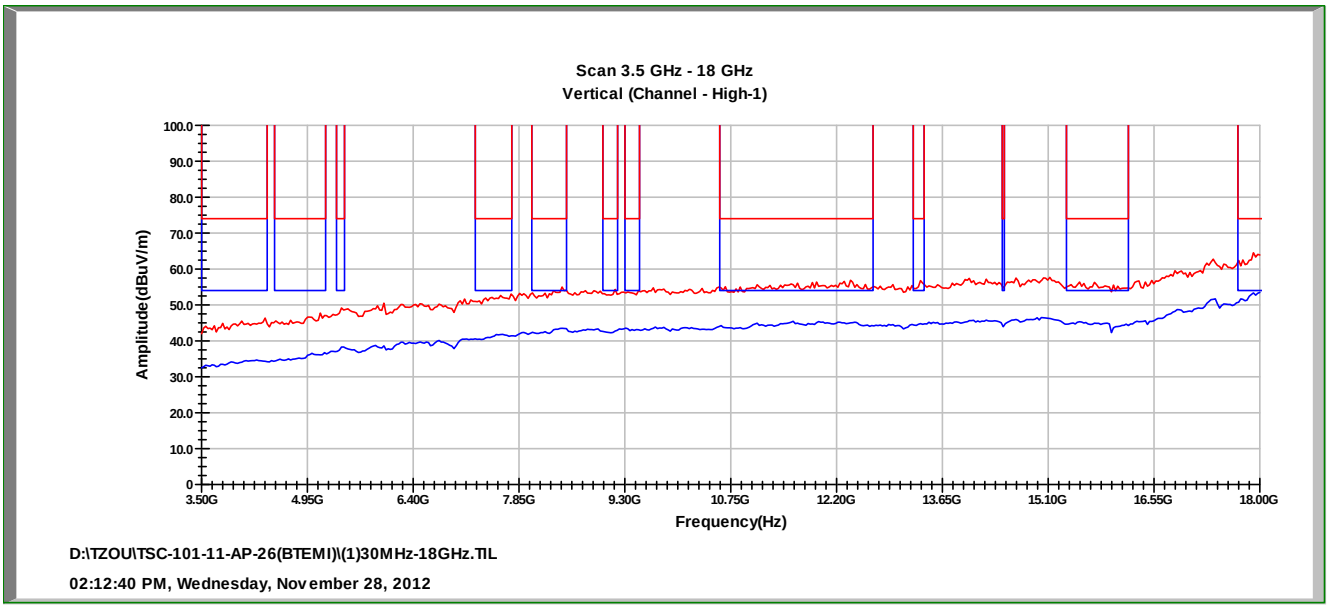

3.5~18GHz radiated emission(emission frequency2480MHz)

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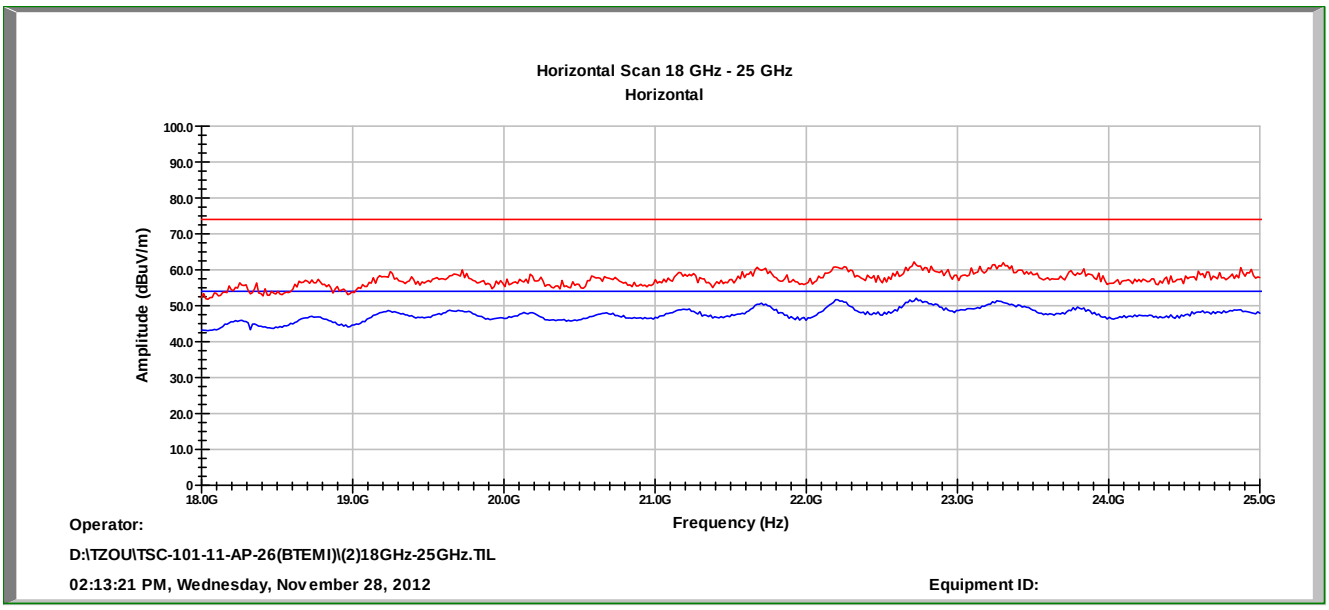

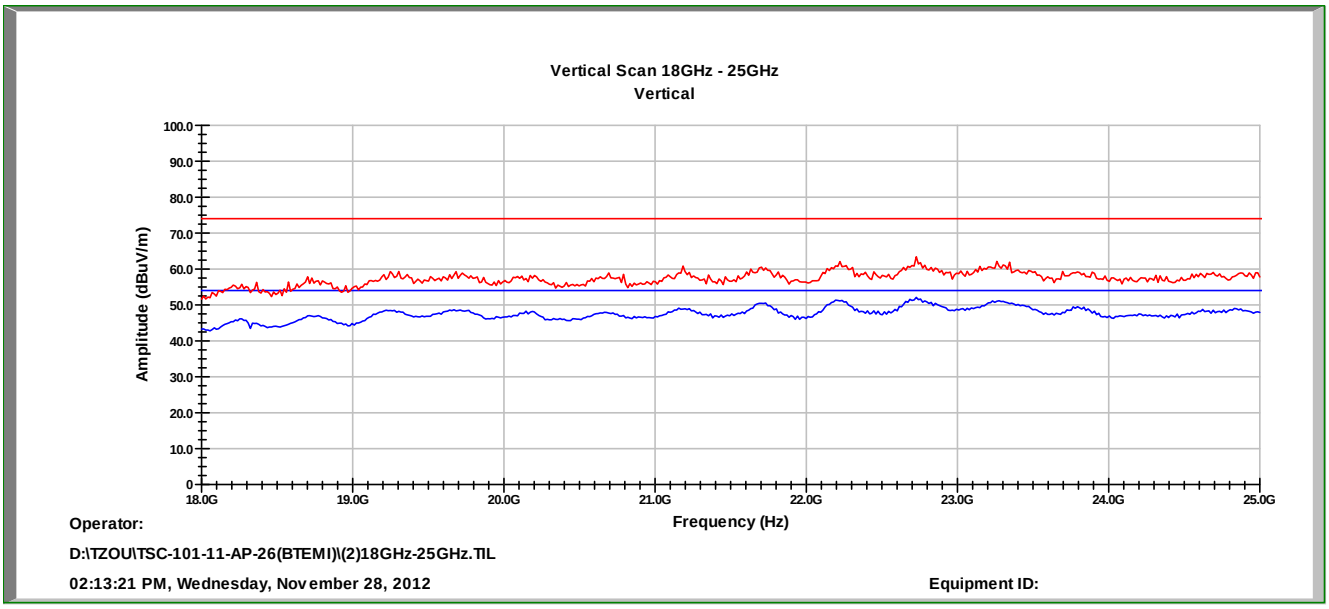

18~25GHz radiated emission(low、mid、high emission frequency)

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4.8. Antenna Requirements

4.4.1. Standard Applicable

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 FCC rule.

4.4.2. Antenna Connected Construction

The antennas type used in this product is Chip Antenna without connector and it is considered to meet antenna requirement.

4.4.3. 3.8.3 ntenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.