

## ***FCC 15.247 DTS***

### ***2.4 GHz Report***

***for***

**FUTABA Corporation**

**1080 Yabutsuka Chosei-son Chosei-gun  
Chiba, 299-4395 Japan.**

**Brand : Futaba**  
**Product Name : Radio Control**  
**Model Name : R7006SB**  
**FCC ID : AZPR7006SB-24G**

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APPENDIX A TEST PHOTOGRAPHS

## TEST REPORT CERTIFICATION

Applicant : FUTABA Corporation  
Manufacture : FUTABA Corporation  
Product Name : Radio Control  
Model No. : R7006SB  
Serial No. : N/A  
Brand : Futaba  
Power Supply : DC 3.5 ~ 8.4V

Applicable Standards:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2014  
ANSI C63.10:2013  
KDB 558074 D01 DTS Meas Guidance v03r03

**AUDIX Technology Corp.** tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. **AUDIX Technology Corp.** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Test: 2015. 12. 11 ~ 14

Date of Report: 2015. 12. 21

Producer: Sabrina Wang  
(Sabrina Wang/Administrator)

Signatory: Ben Cheng  
(Ben Cheng/Manager)

## 1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2015. 12. 21	Original Report.	EM-F150815

## 2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	N/A, Note
15.247(d)/15.209	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)(3)	Maximum Peak Output Power	PASS
15.247(d)/15.205	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	Peak Power Spectral Density	PASS
15.203	Antenna Requirement	PASS
Note: The EUT only employs battery power for operation, so it is unnecessary to test.		

### 3. GENERAL INFORMATION

#### 3.1. Description of EUT

Product	Radio Control
Model Number	R7006SB
Serial Number	N/A
Brand Name	Futaba
Applicant	FUTABA Corporation 1080 YabutsukaChosei-son Chosei-gun Chiba, 299-4395 Japan.
Manufacture	FUTABA Corporation 1080 YabutsukaChosei-son Chosei-gun Chiba, 299-4395 Japan.
RF Features	2.4GHz
Transmit Type	1T1R
Date of Receipt of Sample	2015. 11. 20

#### 3.2. Antenna Information

Manufacture	Antenna Type	Frequency	Max Gain (dBi)
---	1/4λ Antenna	2.4GHz	ANT A: -5.16
			ANT B: -5.16

#### 3.3. EUT Specifications Assessed in Current Report

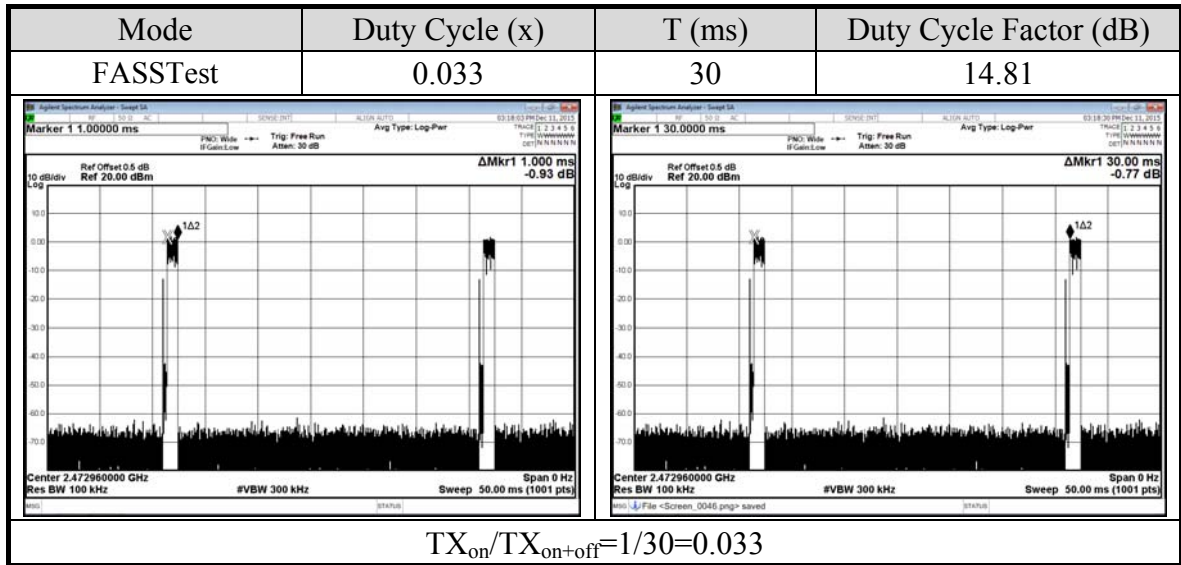
Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (kbps)
2405.376-2472.960	23	FASSTest	136
2405.376-2477.056	36	FASST (Receiving Only)	136

Modulation: FASSTest			
Channel List			
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
0	2405.376	12	2442.240
1	2408.448	13	2445.312
2	2411.520	14	2448.384
3	2414.592	15	2451.456
4	2417.664	16	2454.528
5	2420.736	17	2457.600
6	2423.808	18	2460.672
7	2426.880	19	2463.744
8	2429.952	20	2466.816
9	2433.024	21	2469.888
10	2436.096	22	2472.960
11	2439.168		

Modulation: FASST			
Channel List			
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
2	2405.376	38	2442.240
4	2407.424	40	2444.288
6	2409.472	42	2446.336
8	2411.520	44	2448.384
10	2413.568	46	2450.432
12	2415.616	48	2452.480
14	2417.664	50	2454.528
16	2419.712	52	2456.576
18	2421.760	54	2458.624
20	2423.808	56	2460.672
22	2425.856	58	2462.720
24	2427.904	60	2464.768
26	2429.952	62	2466.816
28	2432.000	64	2468.864
30	2434.048	66	2470.912
32	2436.096	68	2472.960
34	2438.144	70	2475.008
36	2440.192	72	2477.056



### 3.4. Test Configuration



Note: When duty cycle is less than 98% (0.98) that duty cycle factor  $10\log(1/x)$  is needed to add in conducted test items measured in average detector.

ANT A		ANT B	
Test Frequency (MHz)	Output Power (dBm)	Test Frequency (MHz)	Output Power (dBm)
2405.376	13.002	2405.376	12.955
2439.168	13.111	2439.168	13.069
2472.960	13.004	2472.960	12.985

Note: This device has 2 antennas for diversity, they cannot transmit simultaneously. The powers of both antennas are listed as follow table. We assessed ANT A has worse power, thus Radiated Test Case test items presented in this report were test in ANT A.

	Item	Modulation	Test Channel
Radiated Test Case	Radiated Band Edge <sup>Note1</sup>	FASSTest	0/22
	Radiated Spurious Emission <sup>Note1</sup>	FASSTest	0/11/22
Conducted Test Case	6dB Bandwidth	FASSTest	0/11/22
	Peak Power Spectral Density	FASSTest	0/11/22
	Peak Output Power	FASSTest	0/11/22
	Band Edge	FASSTest	0/22
	Spurious Emission	FASSTest	0/11/22

Note 1:

- Mobile Device
- Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow:
  - Lie
  - Side
  - Stand

### 3.5. Tested Supporting System List

#### 3.5.1. Support Peripheral Units

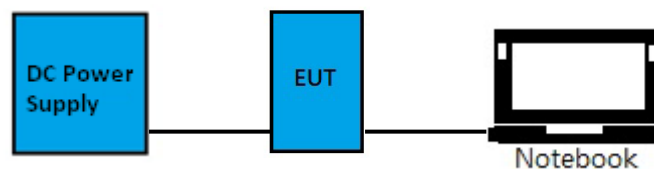
No.	Product	Brand	Model No.	Serial No.	Approval
1	Notebook PC	ASUS	X5502E	N/A	FCC ID: PPD-AR5B225
2	DC Power Supply	TOP WARD	3303A	N/A	N/A
3	Sever*4	FUTABA	S3003	N/A	FCC DoC Approved

#### 3.5.2. Cable Lists

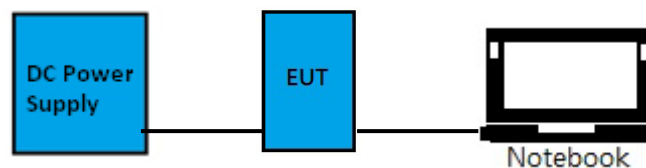
No.	Cable Description Of The Above Support Units
1	USB JIG Cable: Unshielded, Detachable, 0.3m Adapter: Enerironix, M/N EXA1208UH, DC Power Cord: Unshielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.0m
2	DC Power Cord*2: Unshielded, Detachable, 1.0m AC Power Cord: Unshielded, Undetachable, 1.8m
3	Data Cable *4: Unshielded, Detachable, 0.4m

### 3.6. Setup Configuration

#### 3.6.1. EUT Configuration for Power Line Emission



#### 3.6.2. EUT Configuration for Conducted Test Items



### 3.7. Operating Condition of EUT

Test program “Futaba Term” is used for enabling EUT RF function under continues transmitting and choosing data rate/ channel.

### 3.8. Description of Test Facility

Test Firm Name	:	<b>AUDIX Technology Corporation</b> <b>EMC Department</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	<b>Semi-Anechoic Chamber</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan  <b>Fully Anechoic Chamber</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

### 3.9. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~300MHz	± 3.64dB
	300MHz~1000MHz	± 4.70dB
	Above 1GHz	± 2.94dB

Remark : Uncertainty =  $k_{uc}(y)$ 

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

## 4. MEASUREMENT EQUIPMENT LIST

### 4.1. Radiated Emission Measurement

#### 4.1.1. Frequency Range 30MHz~1000MHz (Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2015. 09. 14	1 Year
2	Test Receiver	R & S	ESCS30	100338	2015. 06. 24	1 Year
3	Amplifier	HP	8447D	2944A06305	2015. 02. 12	1 Year
4	Bilog Antenna	CHASE	CBL6112D	33821	2015. 02. 27	1 Year

#### 4.1.2. Frequency Range Above 1000MHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
2.	Amplifier	Sonoma	310N	187161	2015. 06. 17	1 Year
3.	Horn Antenna	ETS-Lindgren	3117	00135902	2015. 03. 06	1 Year
4.	2.4GHz Notch Filter	K&L	7NSL10-2441.5 E130.5-00	1	2015. 07. 22	1 Year
5.	3G High Pass Filter	Microwave Circuits	H3G018G1	484796	2015. 08. 24	1 Year

### 4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2015. 06. 10	1 Year

## **5. CONDUCTED EMISSION MEASUREMENT**

**【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】**

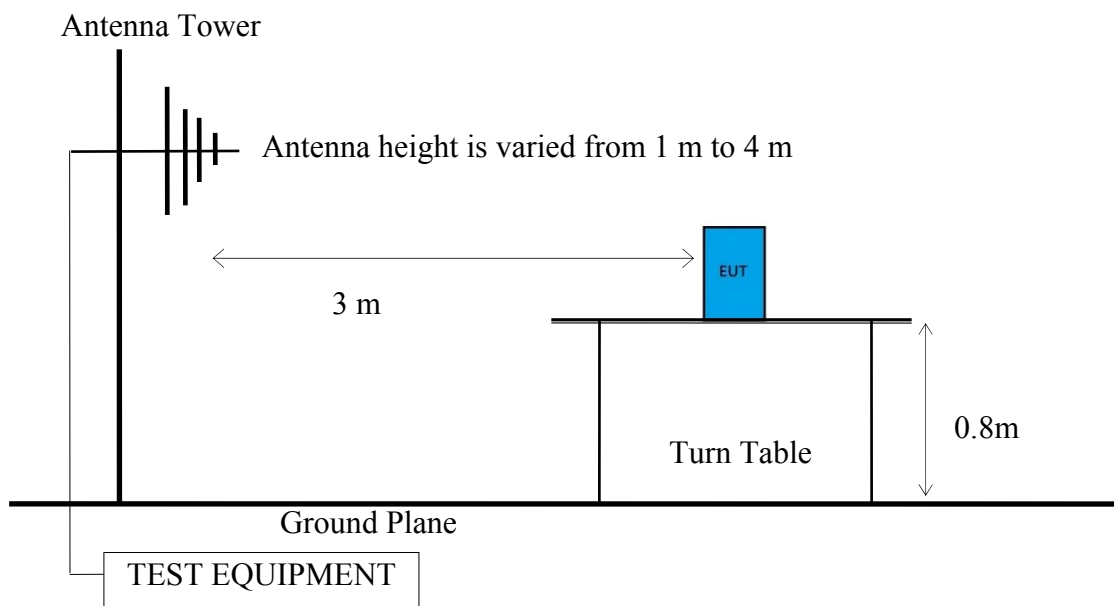
## 6. RADIATED EMISSION MEASUREMENT

### 6.1. Block Diagram of Test Setup

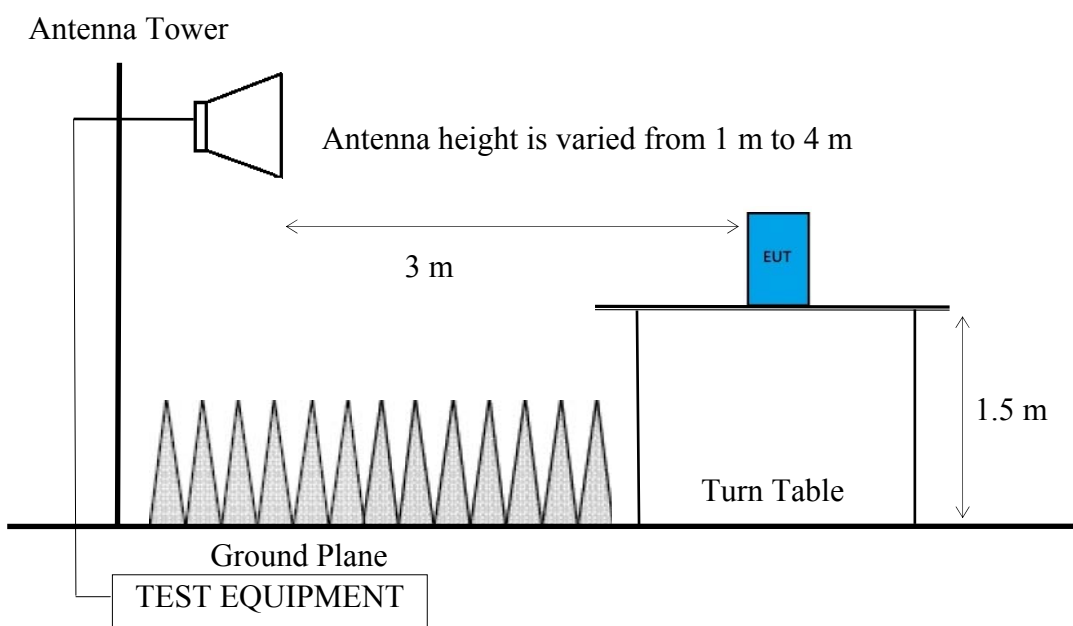
#### 6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.6

#### 6.1.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000 MHz



#### 6.1.3. Fully Anechoic Chamber (3m) Setup Diagram for above 1GHz



## 6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

Remark : (1)  $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

## 6.3. Test Procedure

The EUT setup on the turn table which has 1.5m height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1 GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW  $\geq 3 \times$  RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

Frequency above 1GHz to 10th harmonic:

**Peak Detector:**

- (1) RBW = 1MHz
- (2) VBW  $\geq 3 \times$  RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (7) When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average for finally measurement.

**Average Measurement:**

**Option 1:**

- (1) RBW = 1 MHz
- (2) VBW = 1/T
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.

**Option 2:**

Average Emission Level = Peak Emission Level + D.C.C.F.

#### 6.4. Measurement Result Explanation

- Peak Emission Level = Antenna Factor + Cable Loss + Meter Reading
- Average Emission Level = Antenna Factor + Cable Loss + Meter Reading
- Average Emission Level = Peak Emission Level + DCCF  
 Duty Cycle Correction Factor (DCCF) =  $20 \log (TX_{on}/TX_{on+off})$  presented in section 3.4
- EPR = Peak Emission Level - 95.2dB - 2.14dBi

#### 6.5. Test Results

**PASSED.**

Test Date	2015/12/11	Temp./Hum.	20°C/46%
Test Voltage	DC 6V		



6.5.1. Emissions within Restricted Frequency Bands

6.5.1.1. Frequency Below 1 GHz

Modulation	FASSTest	Frequency	TX 2405.376MHz
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
172.59	9.40	3.78	12.48	25.66	43.50	17.84	Peak
278.32	12.82	4.52	12.11	29.45	46.00	16.55	Peak
392.78	15.38	5.59	11.40	32.37	46.00	13.63	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
65.89	6.48	2.83	9.38	18.69	40.00	21.31	Peak
115.36	12.00	3.34	11.42	26.76	43.50	16.74	Peak
580.96	18.08	6.49	3.93	28.50	46.00	17.50	Peak

Modulation	FASSTest	Frequency	TX 2439.168MHz
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#### Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
172.59	9.40	3.78	12.43	25.61	43.50	17.89	Peak
278.32	12.82	4.52	12.14	29.48	46.00	16.52	Peak
392.78	15.38	5.59	11.86	32.83	46.00	13.17	Peak

#### Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
115.36	12.00	3.34	11.25	26.59	43.50	16.91	Peak
297.72	13.09	4.64	4.21	21.94	46.00	24.06	Peak
580.96	18.08	6.49	3.18	27.75	46.00	18.25	Peak

Modulation	FASSTest	Frequency	TX 2472.960MHz
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#### Antenna at Horizontal Polarization

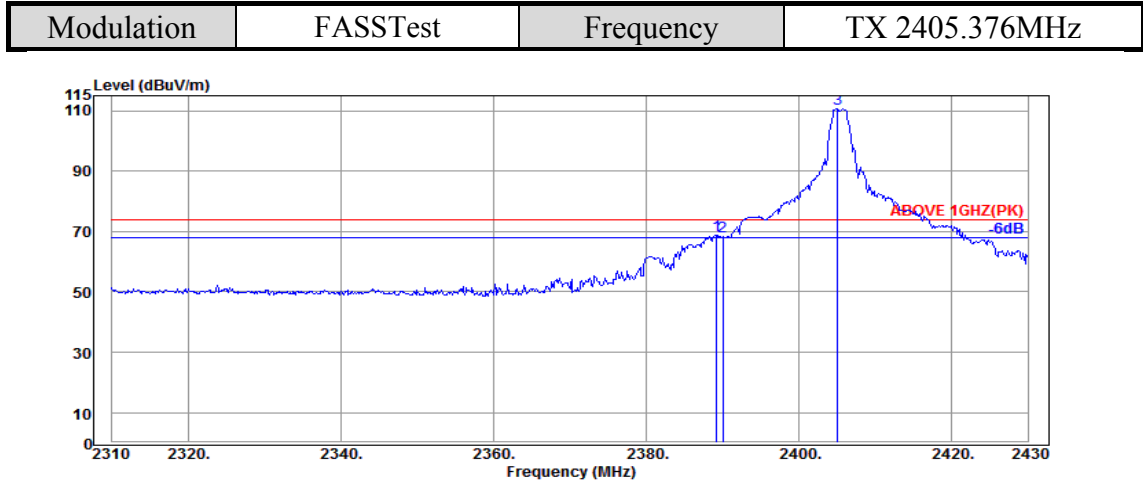
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
172.59	9.40	3.78	12.49	25.67	43.50	17.83	Peak
278.32	12.82	4.52	12.75	30.09	46.00	15.91	Peak
392.78	15.38	5.59	12.96	33.93	46.00	12.07	Peak

#### Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
115.36	12.00	3.34	11.67	27.01	43.50	16.49	Peak
209.45	9.91	4.05	12.90	26.86	43.50	16.64	Peak
415.09	15.78	5.78	4.13	25.69	46.00	20.31	Peak

6.5.1.2. Frequency Above 1 GHz to 10<sup>th</sup> harmonics

**Band Edge:**



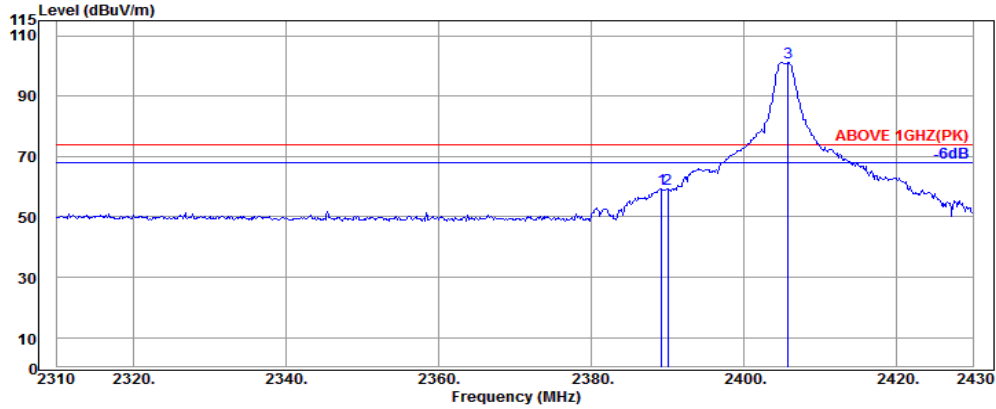
**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.20	32.16	5.72	30.87	68.75	74.00	5.25	Peak
2390.04	32.16	5.72	30.41	68.29	74.00	5.71	Peak
2405.04	32.18	5.74	72.61	110.53	---	---	Peak

**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
2389.20	68.75	-29.54	39.21	54.00	14.79	Average
2390.04	68.29	-29.54	38.75	54.00	15.25	Average

Modulation	FASSTest	Frequency	TX 2405.376MHz
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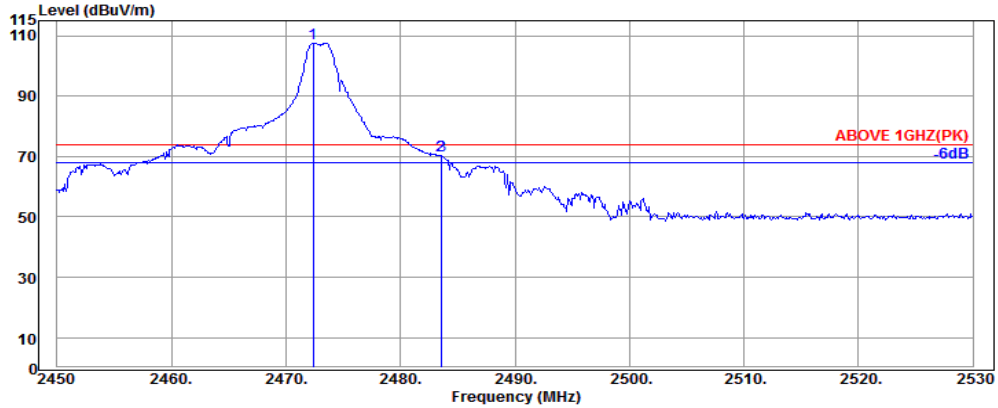
**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.20	32.16	5.72	21.46	59.34	74.00	14.66	Peak
2390.04	32.16	5.72	21.40	59.28	74.00	14.72	Peak
2405.76	32.18	5.74	63.17	101.09	---	---	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
2389.20	59.34	-29.54	29.80	54.00	24.20	Average
2390.04	59.28	-29.54	29.74	54.00	24.26	Average

Modulation	FASSTest	Frequency	TX 2472.960MHz
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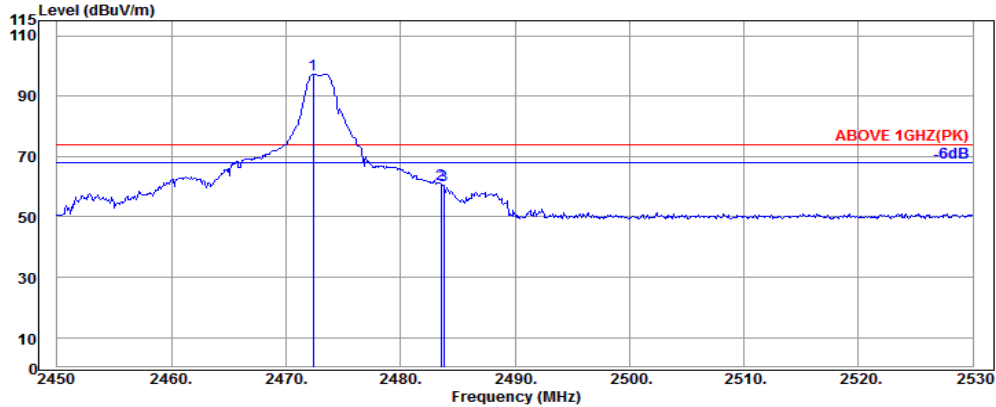
**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2472.40	32.28	5.82	69.54	107.64	---	---	Peak
2483.52	32.28	5.82	32.20	70.30	74.00	3.70	Peak
2483.60	32.28	5.82	32.12	70.22	74.00	3.78	Peak

**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
2483.52	70.30	-29.54	40.76	54.00	13.24	Average
2483.60	70.22	-29.54	40.68	54.00	13.32	Average

Modulation	FASSTest	Frequency	TX 2472.960MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2472.40	32.28	5.82	59.30	97.40	---	---	Peak
2483.52	32.28	5.82	22.71	60.81	74.00	13.19	Peak
2483.76	32.28	5.82	22.43	60.53	74.00	13.47	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
2483.52	60.81	-29.54	31.27	54.00	22.73	Average
2483.76	60.53	-29.54	30.99	54.00	23.01	Average

6.5.2. Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Modulation	FASSTest	Frequency	TX 2405.376MHz
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
3210.00	32.86	6.48	11.95	51.29	74.00	22.71	Peak
4810.00	34.22	7.86	22.66	64.74	74.00	9.26	Peak
7215.00	35.80	9.32	14.48	59.60	74.00	14.40	Peak
9620.00	36.84	11.33	7.75	55.92	74.00	18.08	Peak
14430.00	39.59	15.55	2.95	58.09	74.00	15.91	Peak

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
3210.00	51.29	-29.54	21.75	54.00	32.25	Average
4810.00	64.74	-29.54	35.20	54.00	18.80	Average
7215.00	59.60	-29.54	30.06	54.00	23.94	Average
9620.00	55.92	-29.54	26.38	54.00	27.62	Average
14430.00	58.09	-29.54	28.55	54.00	25.45	Average



Modulation	FASSTest	Frequency	TX 2405.376MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
3210.00	32.86	6.48	6.93	46.27	74.00	27.73	Peak
4810.00	34.22	7.86	20.31	62.39	74.00	11.61	Peak
7215.00	35.80	9.32	11.49	56.61	74.00	17.39	Peak
9620.00	36.84	11.33	10.69	58.86	74.00	15.14	Peak
14430.00	39.59	15.55	4.57	59.71	74.00	14.29	Peak

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
3210.00	46.27	-29.54	16.73	54.00	37.27	Average
4810.00	62.39	-29.54	32.85	54.00	21.15	Average
7215.00	56.61	-29.54	27.07	54.00	26.93	Average
9620.00	58.86	-29.54	29.32	54.00	24.68	Average
14430.00	59.71	-29.54	30.17	54.00	23.83	Average

Modulation	FASSTest	Frequency	TX 2439.168MHz
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4885.00	34.26	8.47	21.66	64.39	74.00	9.61	Peak
7315.00	35.80	9.82	4.42	50.04	74.00	23.96	Peak
9770.00	37.03	11.46	6.30	54.79	74.00	19.21	Peak
12200.00	39.02	12.69	1.68	53.39	74.00	20.61	Peak

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4885.00	64.39	-29.54	34.85	54.00	19.15	Average
7315.00	50.04	-29.54	20.50	54.00	33.50	Average
9770.00	54.79	-29.54	25.25	54.00	28.75	Average
12200.00	53.39	-29.54	23.85	54.00	30.15	Average

Modulation	FASSTest	Frequency	TX 2439.168MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4885.00	34.26	8.47	19.06	61.79	74.00	12.21	Peak
7315.00	35.80	9.82	3.69	49.31	74.00	24.69	Peak
9750.00	37.01	11.39	7.99	56.39	74.00	17.61	Peak
12200.00	39.02	12.69	1.68	53.39	74.00	20.61	Peak

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4885.00	61.79	-29.54	32.25	54.00	21.75	Average
7315.00	49.31	-29.54	19.77	54.00	34.23	Average
9750.00	56.39	-29.54	26.85	54.00	27.15	Average
12200.00	53.39	-29.54	23.85	54.00	30.15	Average

Modulation	FASSTest	Frequency	TX 2472.960MHz
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4950.00	34.28	8.62	23.17	66.07	74.00	7.93	Peak
9900.00	37.20	12.11	10.51	59.82	74.00	14.18	Peak

Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4950.00	66.07	-29.54	36.53	54.00	17.47	Average
9900.00	59.82	-29.54	30.28	54.00	23.72	Average

Modulation	FASSTest	Frequency	TX 2472.960MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4940.00	34.28	8.62	23.91	66.81	74.00	7.19	Peak
9900.00	37.20	12.11	14.69	64.00	74.00	10.00	Peak
12370.00	39.13	12.76	8.05	59.94	74.00	14.06	Peak

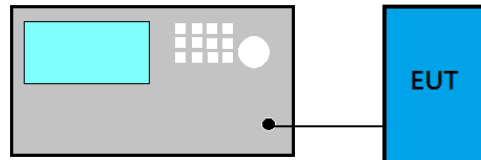
Emission Frequency (MHz)	Peak Emission Level (dB/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4940.00	66.81	-29.54	37.27	54.00	16.73	Average
9900.00	64.00	-29.54	34.46	54.00	19.54	Average
12370.00	59.94	-29.54	30.40	54.00	23.60	Average

**6.5.3. Emissions in Non-restricted Frequency Bands**

Pursuant to KDB 558074 D01 v03r03 that emission levels below the 15.209 general radiated emissions limits is not required.

## 7. 6dB BANDWIDTH MEASUREMENT

### 7.1. Block Diagram of Test Setup



### 7.2. Specification Limits

The minimum 6dB bandwidth shall be at least 500kHz.

### 7.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r03:

■ Option 2

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

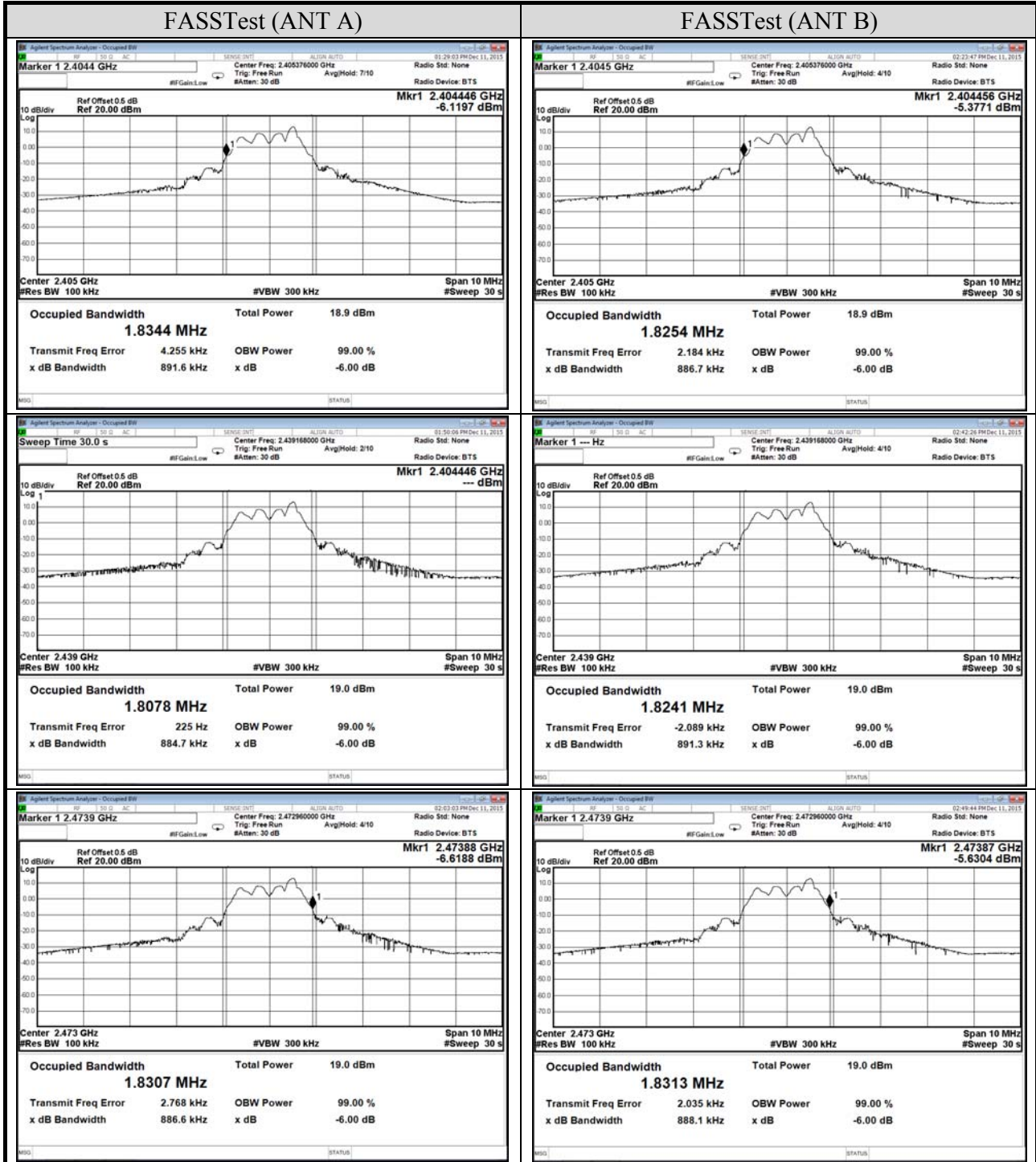
### 7.4. Test Results

Test Date	2015/12/11	Temp./Hum.	20°C/55%
Cable Loss	0.5dB	Test Voltage	DC 6V

#### 7.4.1. 6dB Bandwidth Result

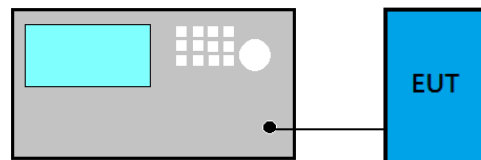
Modulation Type	Centre Frequency (MHz)	6 dB Bandwidth (MHz)
FASSTest (ANT A)	2405.376	0.8916
	2439.168	0.8847
	2472.960	0.8866
FASSTest (ANT B)	2405.376	0.8867
	2439.168	0.8913
	2472.960	0.8881

7.4.2. Measurement Plots



## 8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 8.1. Block Diagram of Test Setup



### 8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm)

### 8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r03:

**PKPM1 Peak power meter method:**

EUT is connected to power sensor and record the maximum output power.

**Method AVGPM (Measurement using an RF average power meter):**

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.5 is < 98%.

**Method  $RBW \geq DTS\ BW$**

- (1) Set span to at least 3 times the OBW
- (2) Set  $RBW \geq OBW$
- (3) Set the video bandwidth (VBW)  $\geq 3 \times RBW$ .
- (4) Detector = Peak
- (5) Trace mode = max hold
- (6) Sweep = auto couple.
- (7) To find the peak amplitude level.



## 8.4. Test Results

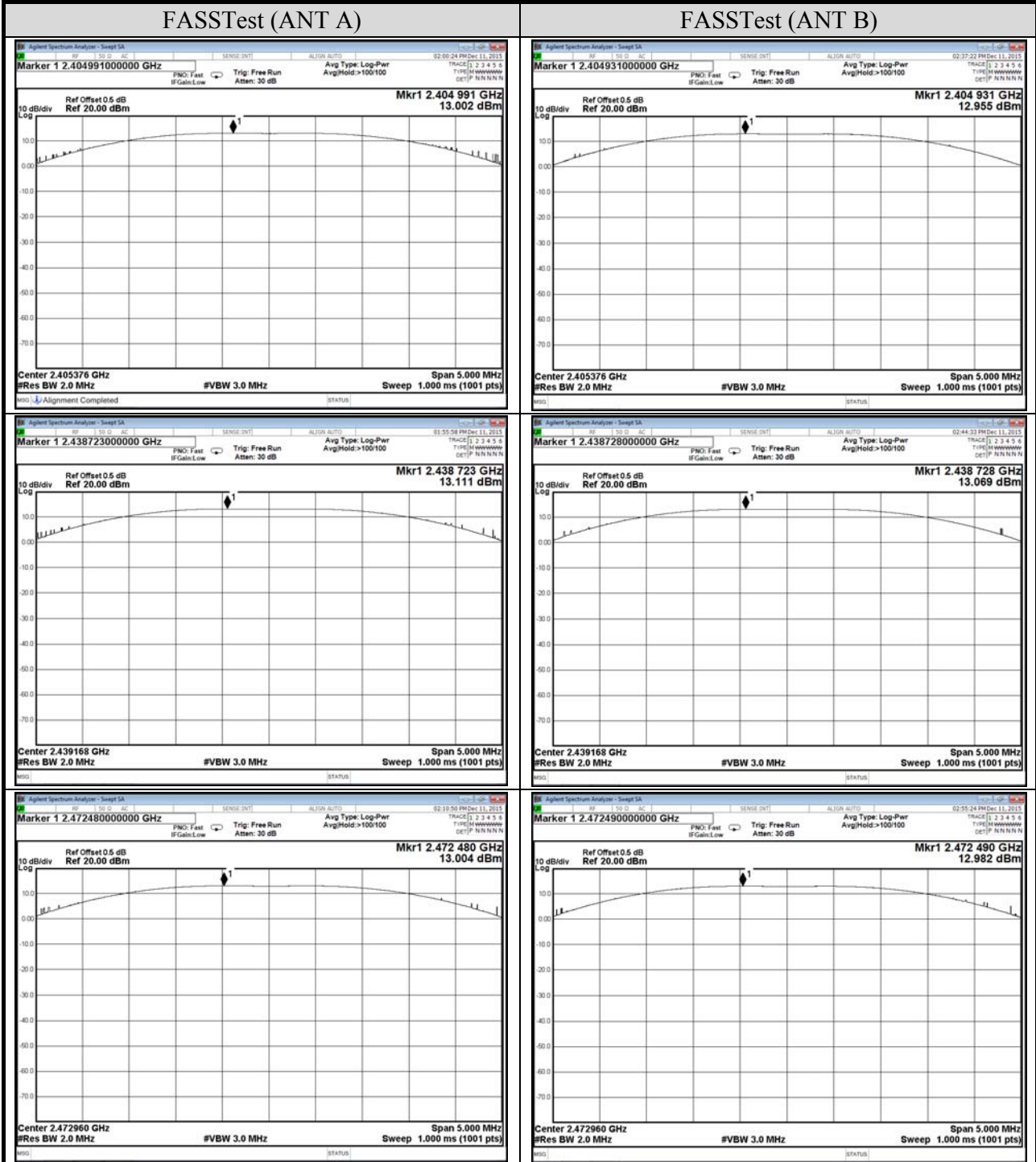
Test Date	2015/12/11	Temp./Hum.	20°C/55%
Cable Loss	0.5dB	Test Voltage	DC 6V

### 8.4.1. Peak Output Power

Modulation Type	Centre Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	
FASSTest (ANT A)	2405.376	13.002	0.019962	< 30 dBm (1 W)
	2439.168	13.111	0.020469	
	2472.960	13.004	0.019971	
FASSTest (ANT B)	2405.376	12.955	0.019747	< 30 dBm (1 W)
	2439.168	13.069	0.020272	
	2472.960	12.985	0.019884	

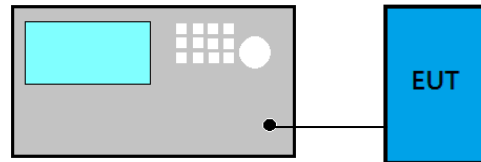
Note: The results have been included cable loss.

8.4.2. Peak Measurement Plots



## 9. EMISSION LIMITATIONS MEASUREMENT

### 9.1. Block Diagram of Test Setup



### 9.2. Specification Limits

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).

### 9.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r03:

#### ■ Reference Level

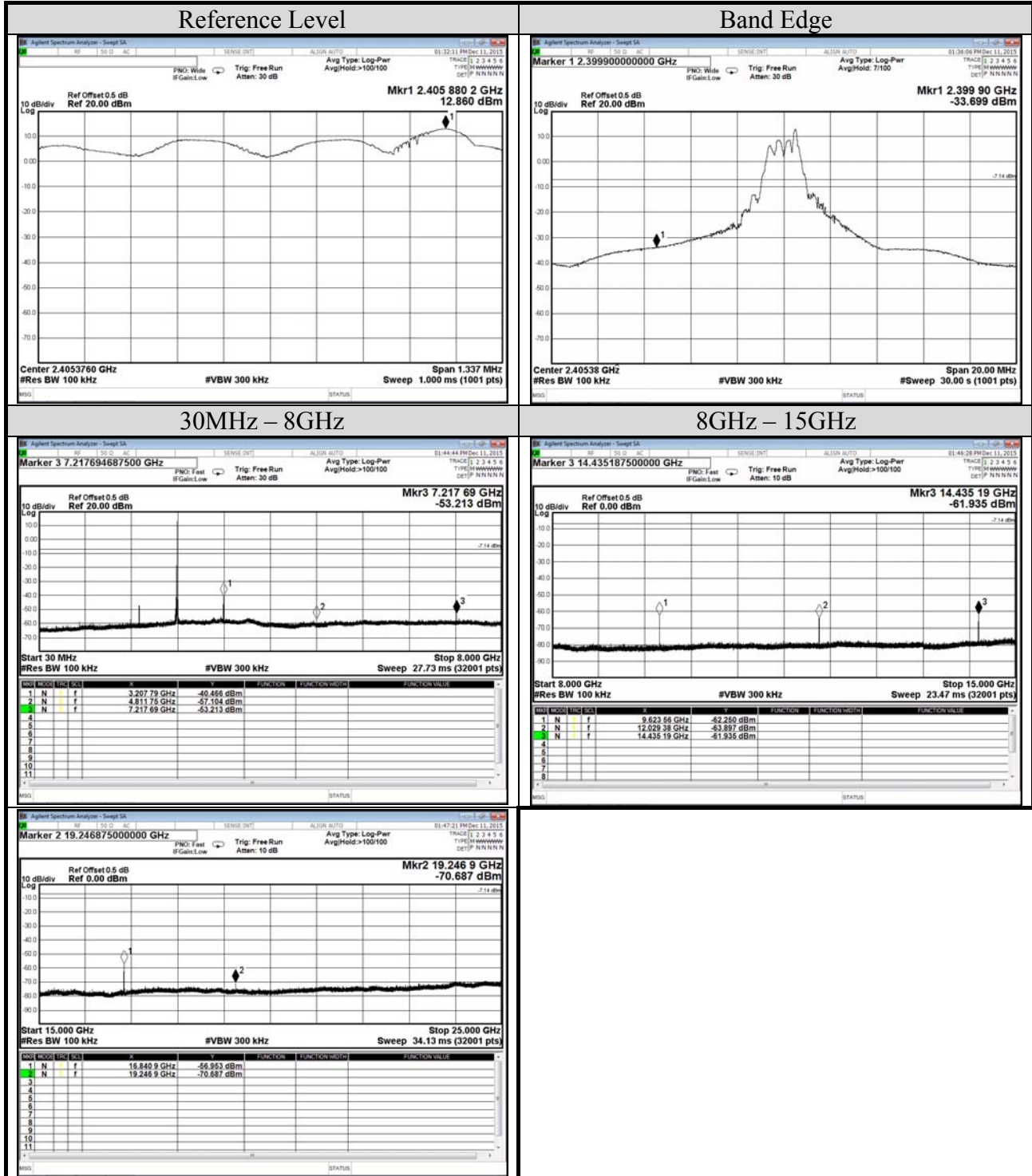
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW  $\geq 3 \times$  RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max PSD as reference level.

#### ■ Emission Level Measurement

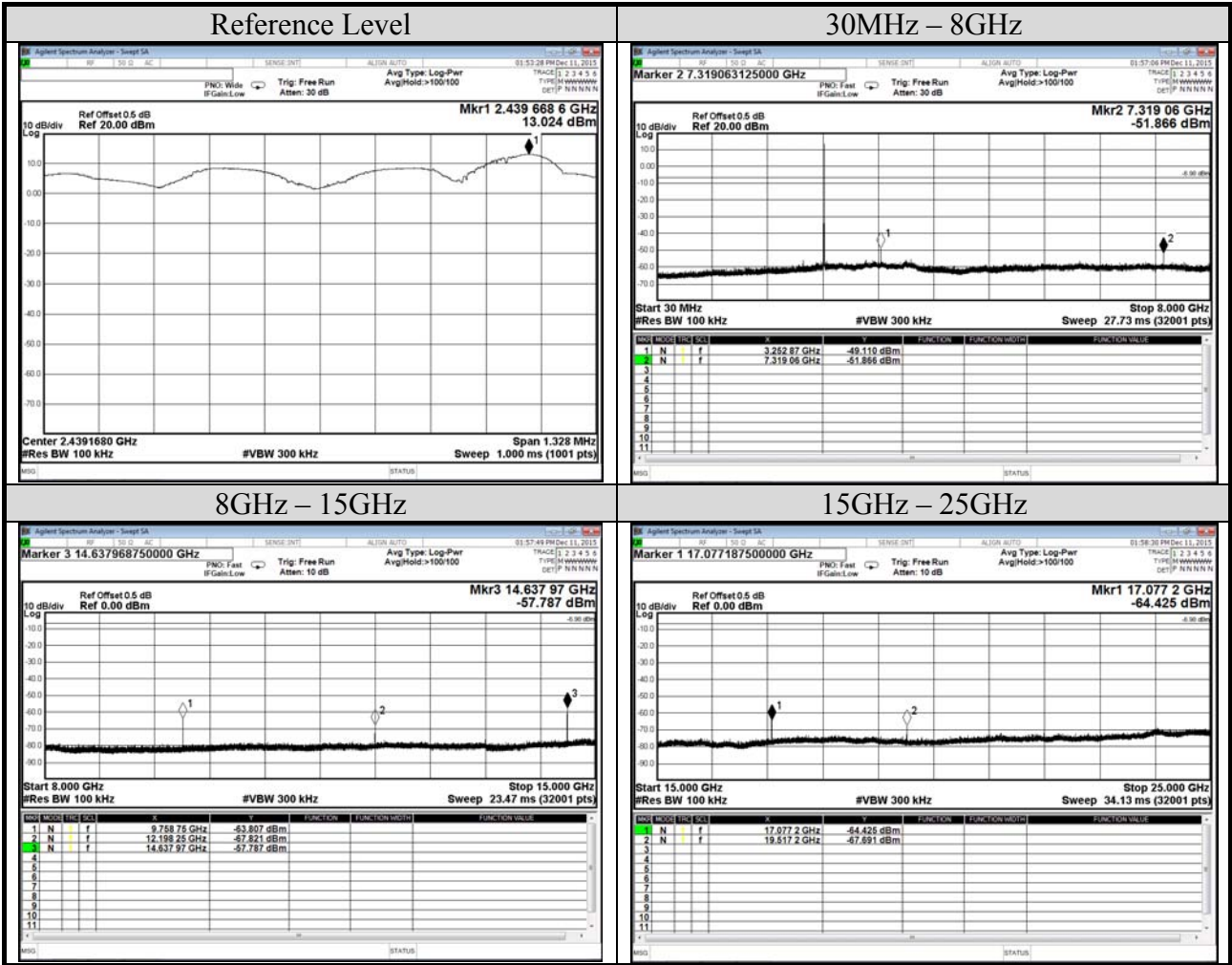
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW  $\geq 3 \times$  RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max level.

### 9.4. Test Results

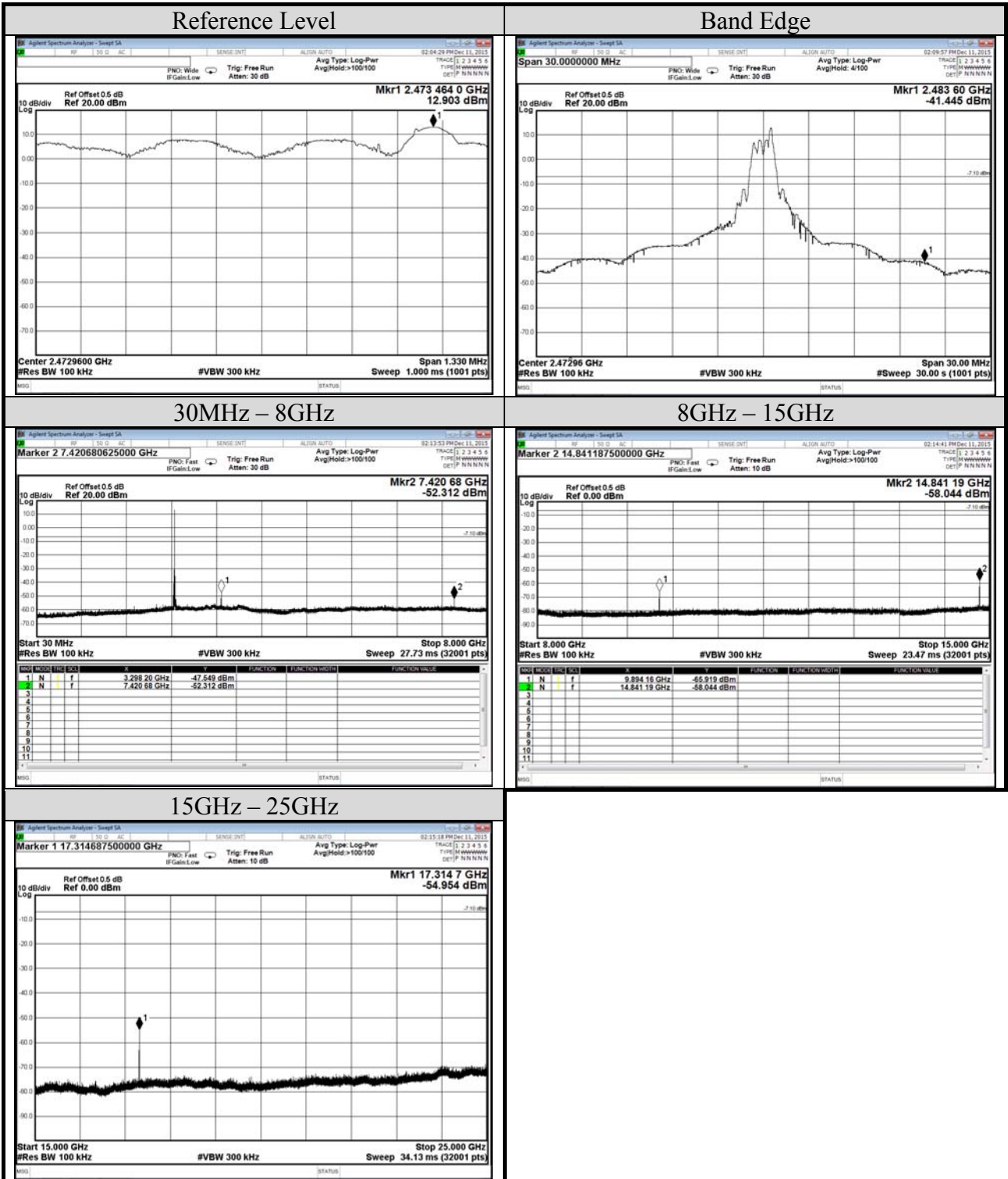
Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT A)	Frequency	TX 2405.376MHz
Cable Loss	0.5dB	Test Voltage	DC 6V



Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT A)	Frequency	TX 2439.168MHz
Cable Loss	0.5dB	Test Voltage	DC 6V



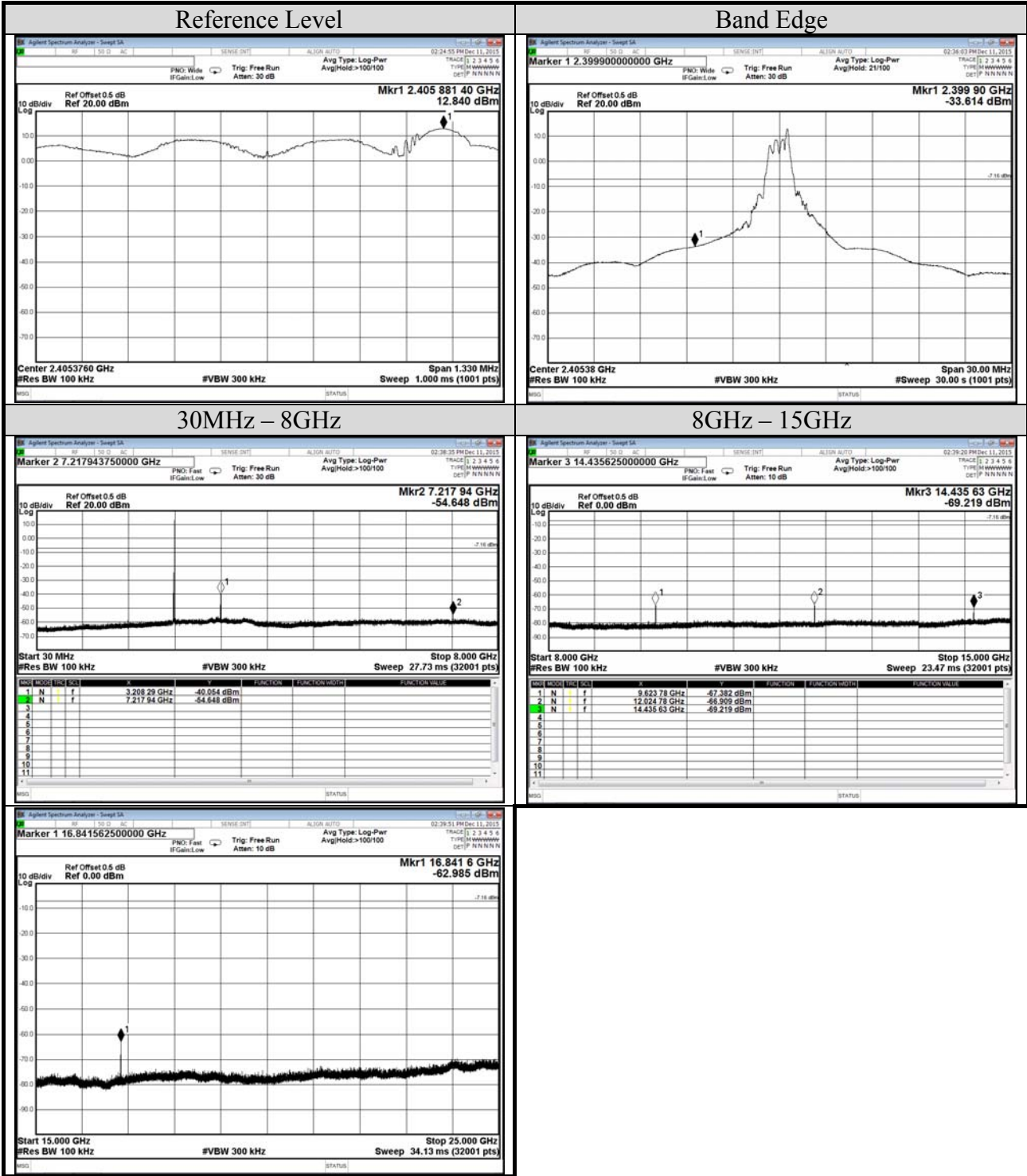
Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT A)	Frequency	TX 2472.960MHz
Cable Loss	0.5dB	Test Voltage	DC 6V



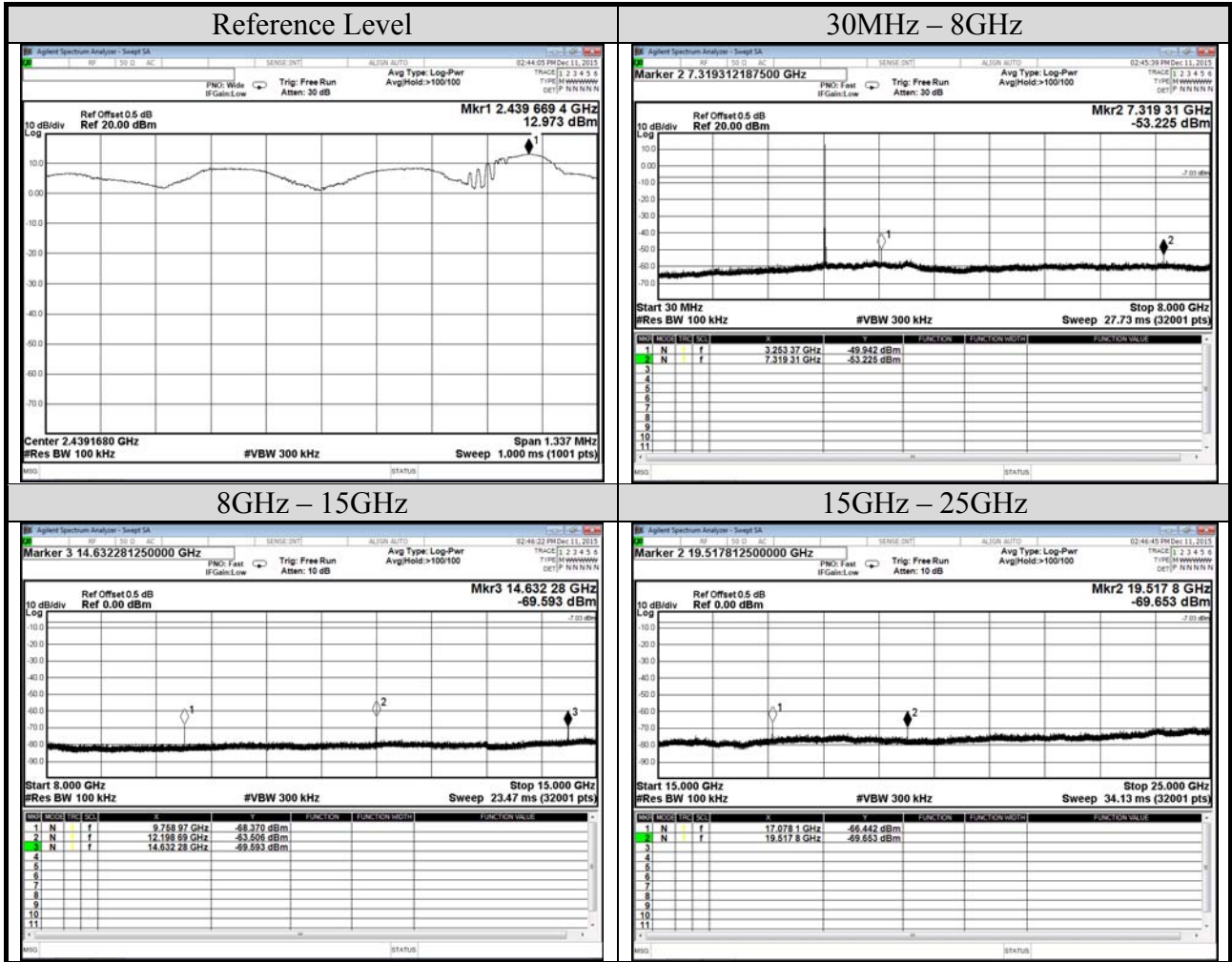
**AUDIX Technology Corp.**  
 No. 53-11, Dingfu, Linkou, Dist.,  
 New Taipei City 244, Taiwan

**Tel: +886 2 26099301**  
**Fax: +886 2 26099303**

Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT B)	Frequency	TX 2405.376MHz
Cable Loss	0.5dB	Test Voltage	DC 6V

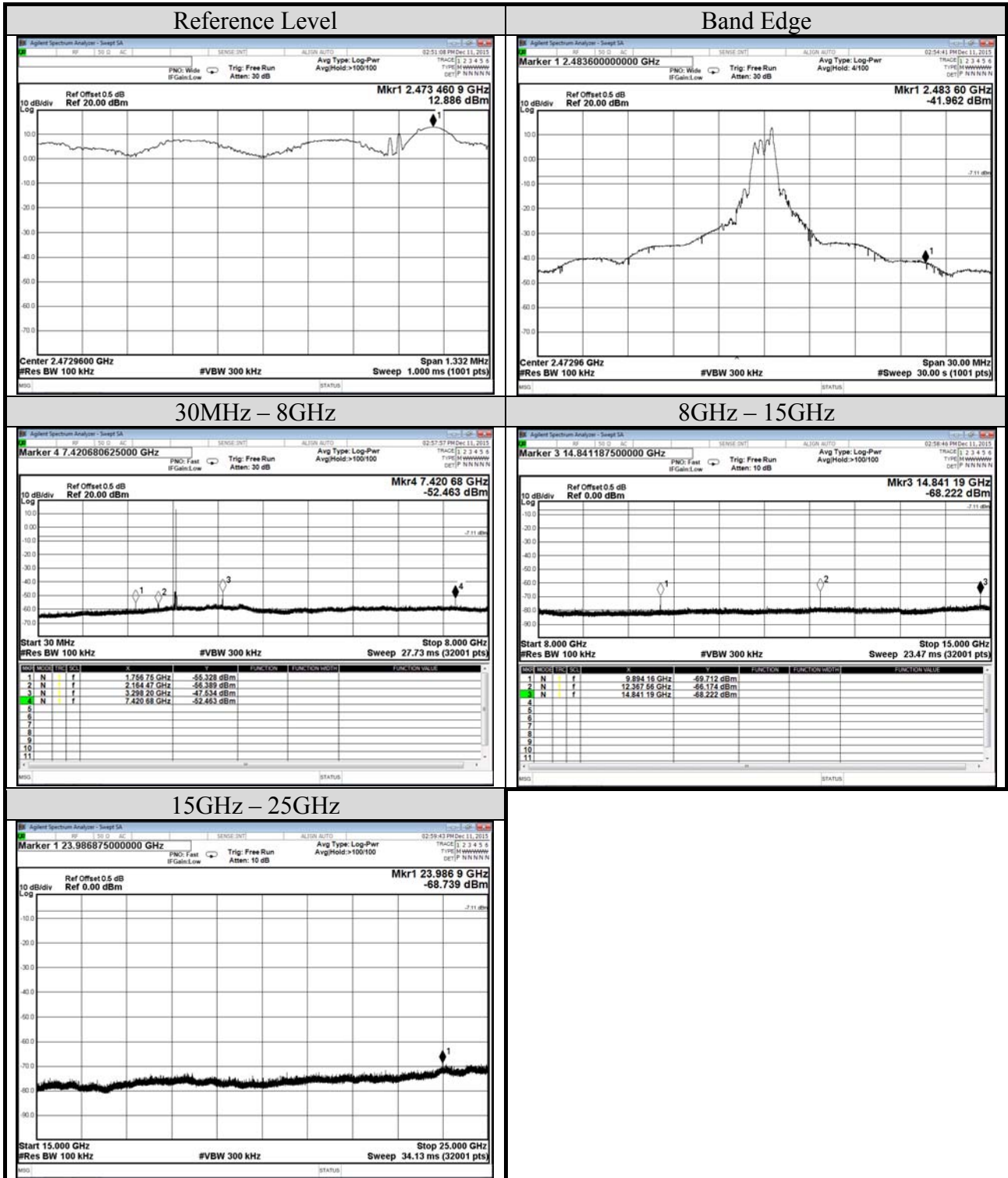


Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT B)	Frequency	TX 2439.168MHz
Cable Loss	0.5dB	Test Voltage	DC 6V



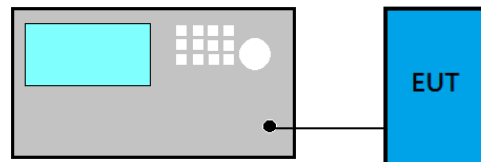


Test Date	2015/12/11	Temp./Hum.	20°C/55%
Modulation	FASSTest (ANT B)	Frequency	TX 2472.960MHz
Cable Loss	0.5dB	Test Voltage	DC 6V



## 10. POWER SPECTRAL DENSITY

### 10.1. Block Diagram of Test Setup



### 10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

### 10.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r03:

#### ■ Method PKPSD (peak PSD)

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- (4) Set the VBW  $\geq 3 \times \text{RBW}$ .
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize.
- (9) Use the peak marker function to determine the maximum amplitude level.
- (10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

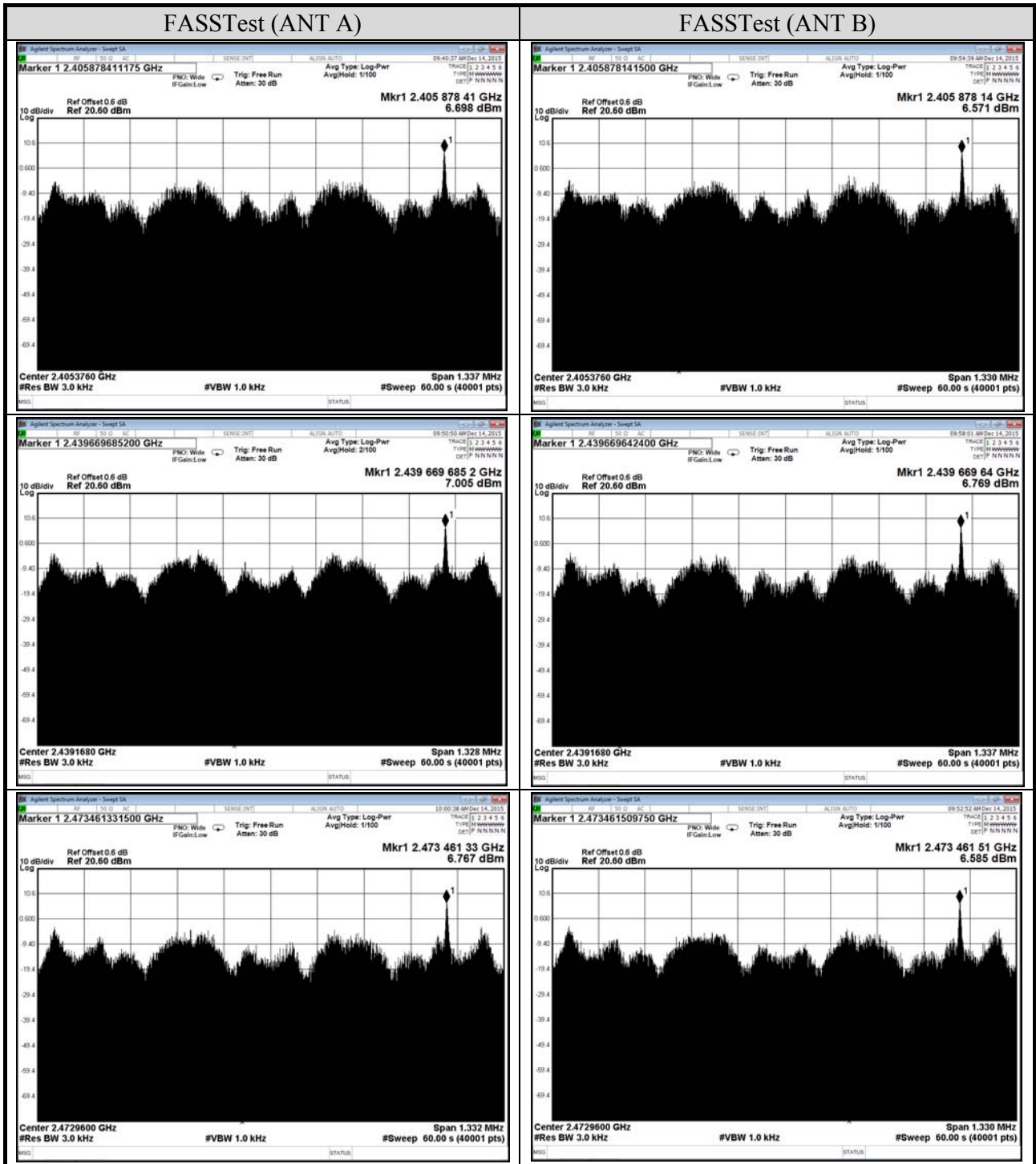
#### ■ Method AVGPSD-2

(RMS detection across on and off times of the EUT with max hold)

- (1) Using peak PSD procedure step 1 to step 4.
- (2) Detector = RMS detector
- (3) Sweep time = auto couple
- (4) Trace mode = max hold
- (5) Use the peak marker function to determine the maximum amplitude level.

### 10.4. Test Results

Test Date	2015/12/11	Temp./Hum.	20°C/55%
Cable Loss	0.5dB	Test Voltage	DC 6V



## **11.DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**