EMC
TEST REPORT

Report No. : TS09070079-EME
Model No. : TTD-52R
Issued Date : Oct. 9, 2009

Applicant:	**Tranwo Technology Corp.** **6F., No. 49, Guangming 6th Rd., Jubei City, Hsinchu, Taiwan**
Test Method/ Standard:	**FCC Part 15 Subpart C Section §15.205、§15.207、§15.209、§15.247, DA 00-705 and ANSI C63.4/2003.**
Test By:	**Intertek Testing Services Taiwan Ltd.** **No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan**

The test report was prepared by:	Sign on File Sammi Liu/ Assistant
These measurements were taken by:	Sign on File Rex Laio/ Engineer
The test report was reviewed by:	Leon Cheng **Name** Leon Cheng **Title** Engineer

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Summary of Tests

2.4GHz Digital Wireless USB Camera-Model: TTD-52R
FCC ID: O6LTTD-52R

Test	Reference	Results
20dB Bandwidth test	15.247(a)(1)	Pass
Carrier Frequency Separation test	15.247(a)(1)	Pass
Number of hopping frequencies test	15.247(a)(1)	Pass
Time of Occupancy (dwell time) test	15.247(a)(1)	Pass
Maximum Output Power test	15.247(b)	Pass
RF Antenna Conducted Spurious test	15.247(d)	Pass
Radiated Spurious Emission test	15.205, 15.209	Pass
Emission on the Band Edge test	15.247(d)	Pass
AC Power Line Conducted Emission test	15.207	Pass

1. General information

1.1 Identification of the EUT

Product:	2.4GHz Digital Wireless USB Camera
Model No.:	TTD-52R
FCC ID:	O6LTTD-52R
Rated Power:	DC 5 V from Notebook PC
Operating Frequency:	2408.625 MHz ~ 2469.375 MHz
Channel Number:	18 Channel
Type of Modulation:	GFSK, FHSS
Power Cord:	N/A
Data Cable:	N/A
Sample receiving date:	Jul.10, 2009
Testing date:	Jul.10, 2009 ~ Oct. 09, 2009
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is a 2.4GHz Digital Wireless USB Camera, and was defined as information technology equipment.

Channel Table

Channel	TX Freq	Channel	TX Freq
0	2408.625 MHz	3	2440.125 MHz
6	2412.000 MHz	9	2444.625 MHz
12	2415.375 MHz	15	2448.000 MHz
1	2418.750 MHz	14	2451.375 MHz
7	2423.250 MHz	10	2454.750 MHz
13	2426.625 MHz	16	2458.125 MHz
2	2430.000 MHz	5	2462.625 MHz
8	2433.375 MHz	11	2466.000 MHz
14	2436.750 MHz	17	2469.375 MHz

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 2 dBi max
Antenna Type : Monopole antenna
Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.
Notebook PC	DELL	Latitude D610	3YWZK1S
Printer	HP	DeskJet 400	SG5CQ170C0
Modem	Dynalink	V1456VQE	00V230A00051494
Wireless Camera	Tranwo	TTD-47T	N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section §15.205、§15.207、§15.209、§15.247, DA 00-705 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied DC 5 V from Notebook PC (Test voltage: 120 Vac, 60 Hz) and it was run in TX mode that was controlled by “RF Engineer tools” program.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9168
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981
Pre-Amplifier	MITEQ	26GHz~40GHz	828825
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2487A/ MA2491A
Controller	HDGmbH	N/A	HD 100
Antenna Tower	HDGmbH	N/A	MA 240
Turn Table	HDGmbH	N/A	DS 420S
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5

Note: The above equipments are within the valid calibration period.

3. 20dB Bandwidth test

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1023	hPa

3.2 Test setup & procedure

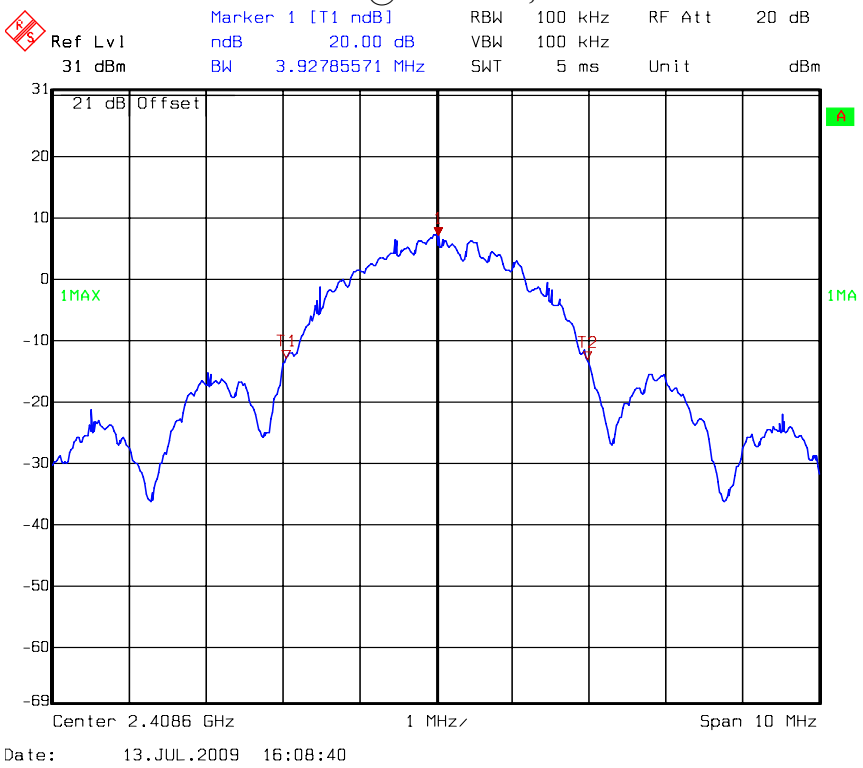
The test procedure was according to FCC measurement guidelines DA 00-705.
The 20dB bandwidth per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100 kHz, the video bandwidth≧RBW, and the SPAN may equal to approximately 2 to 3 times the 20dB bandwidth. The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

3.3 Measured data of modulated bandwidth test results

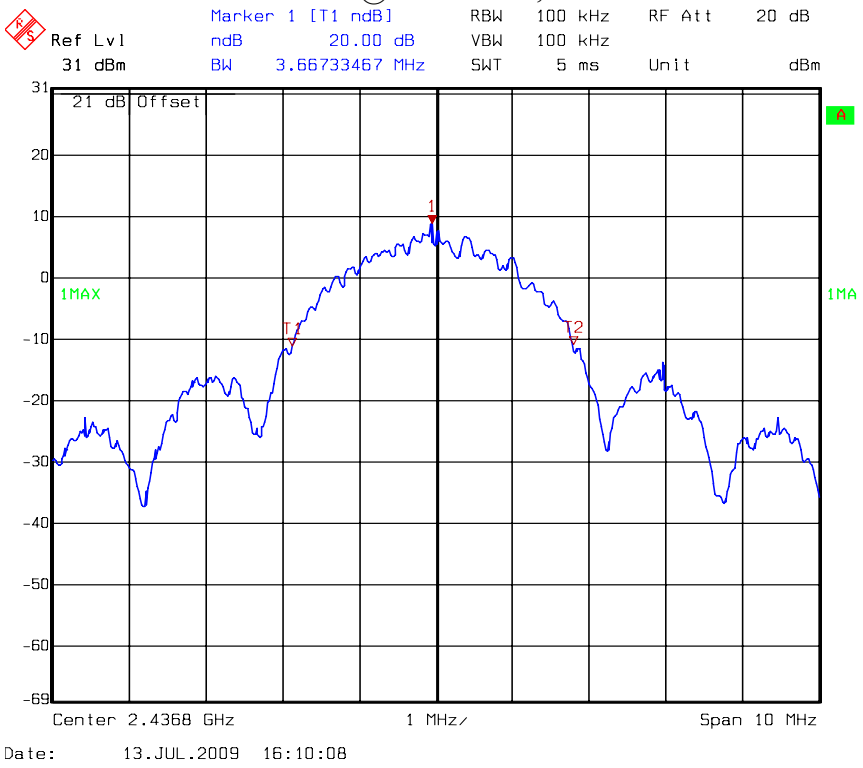
Channel	Frequency (MHz)	Bandwidth (kHz)
0	2408.600	3927.856
14	2436.800	3667.335
17	2469.400	3947.896

Please see the plot below.

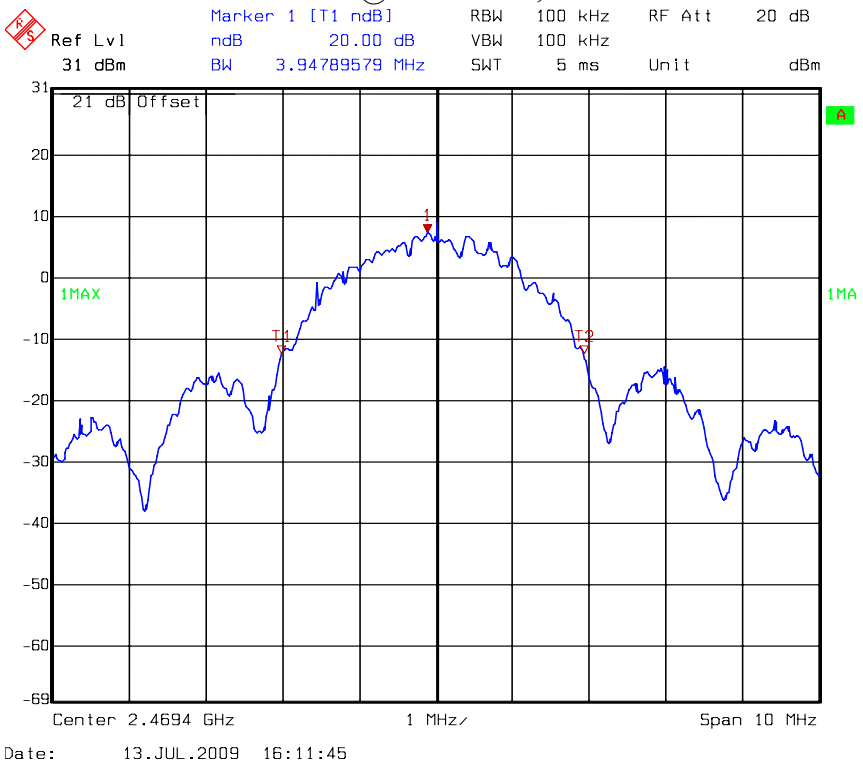
20 dB Bandwidth @ channel 0, 2408.600 MHz



20 dB Bandwidth @ channel 14, 2436.800 MHz



20 dB Bandwidth @ channel 17, 2469.400 MHz



4. Carrier Frequency Separation test

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1023	hPa

4.2 Test setup & procedure

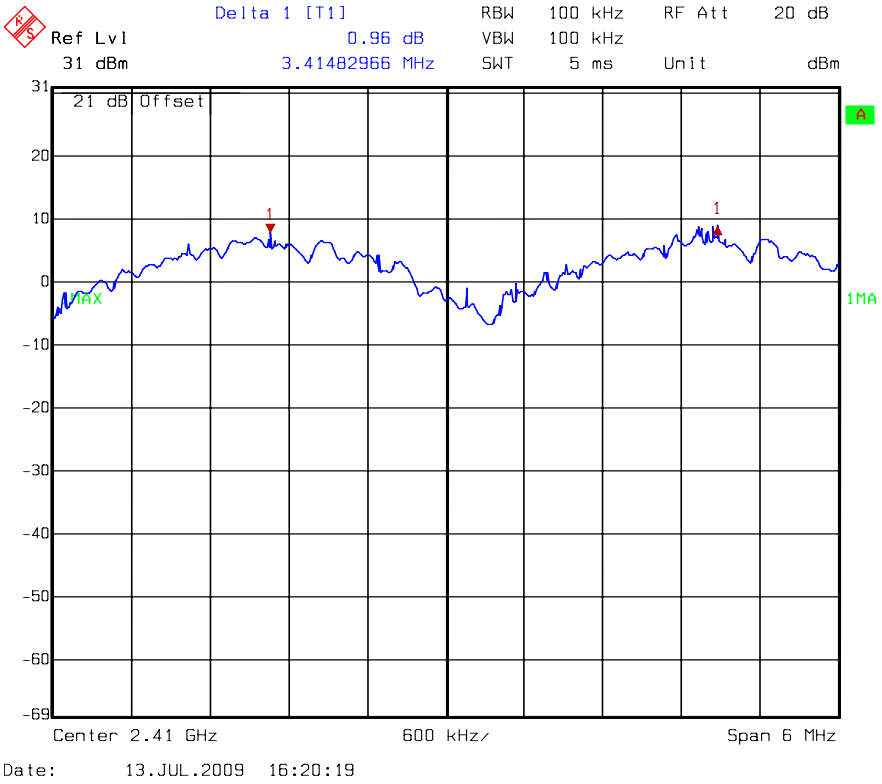
The test procedure was according to FCC measurement guidelines DA 00-705.
The carrier frequency separation per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at ≧1% of the span, the video bandwidth≧RBW, and the SPAN was wide enough to capture the peaks of two adjacent channels. The carrier frequency separation result is in the following Table.

4.3 Measured data of Carrier Frequency Separation test result

Frequency (MHz)	Measurement Frequency separation (kHz)
2408.6	3415
2412.0	

Please see the plot below.

Carrier Frequency Separation test



5. Number of hopping frequencies test

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1023	hPa

5.2 Test setup & procedure

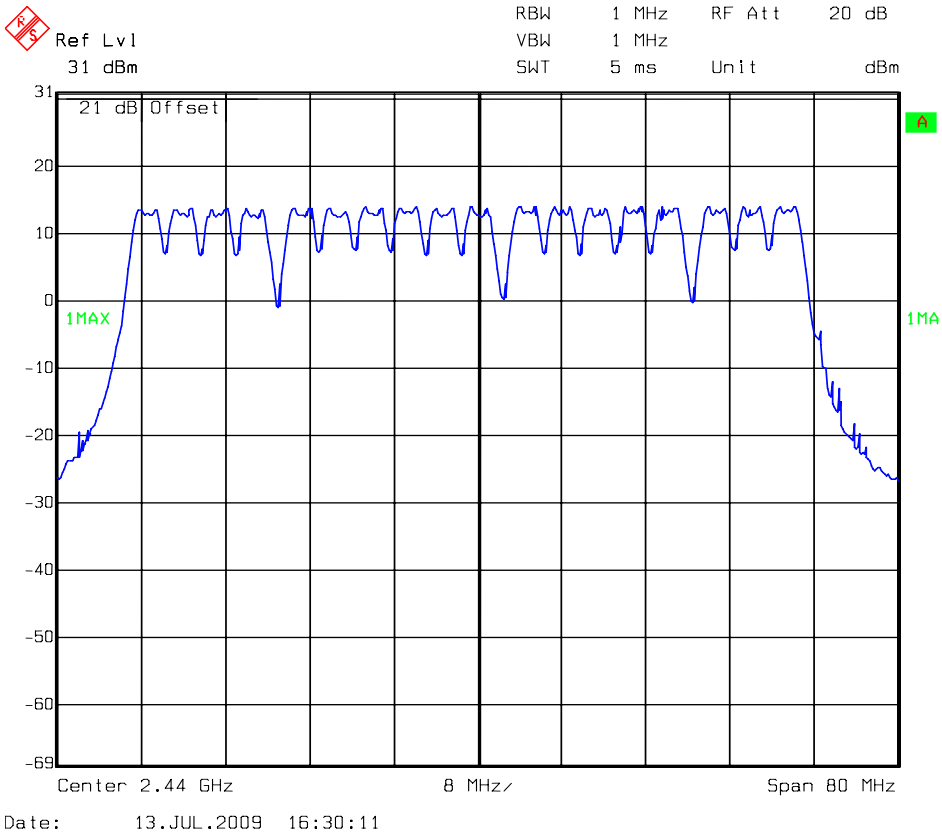
The test procedure was according to FCC measurement guidelines DA 00-705.
The number of hopping frequencies per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at ≧1% of the span, the video bandwidth≧RBW, and the SPAN was the frequency band of operation. The carrier frequency separation result is in the following Table.

5.3 Measured data of number of hopping frequencies test result

Frequency Range (MHz)	Total hopping channels
2400 ~ 2483.5	18

Please see the plot below.

Number of hopping frequencies test



6. Time of Occupancy (dwell time) test

6.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1023	hPa

6.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705.
The time of occupancy (dwell time) per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth≧RBW, and the zero span function of spectrum analyzer was enable. The EUT has its hopping function enable.

Total sweep time=0.4*18ch=7.2 seconds

We determined to reduce the sweep time to 720ms,

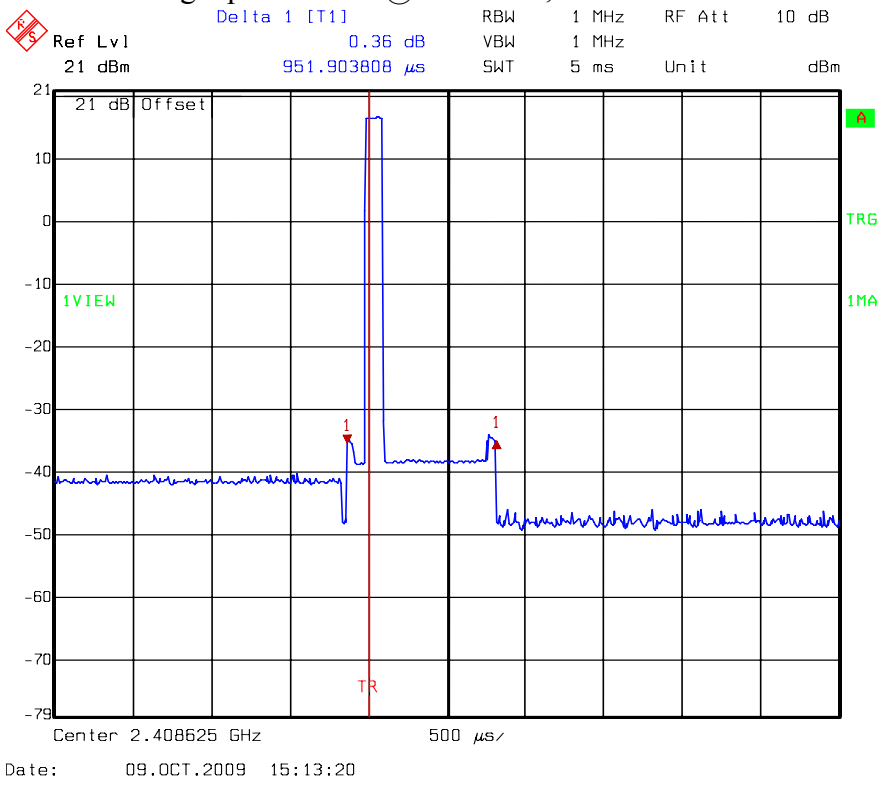
Count the number of hops and multiply by 10, the total number of hops will be multiplied by

the measured time of one pulse.

Number of hops in 720ms=7 , total number of hops in 7.2s=7(10)=70
Single pulse width=0.000951s, time of occupancy=70*(0.000951)=0.066sec <0.4sec

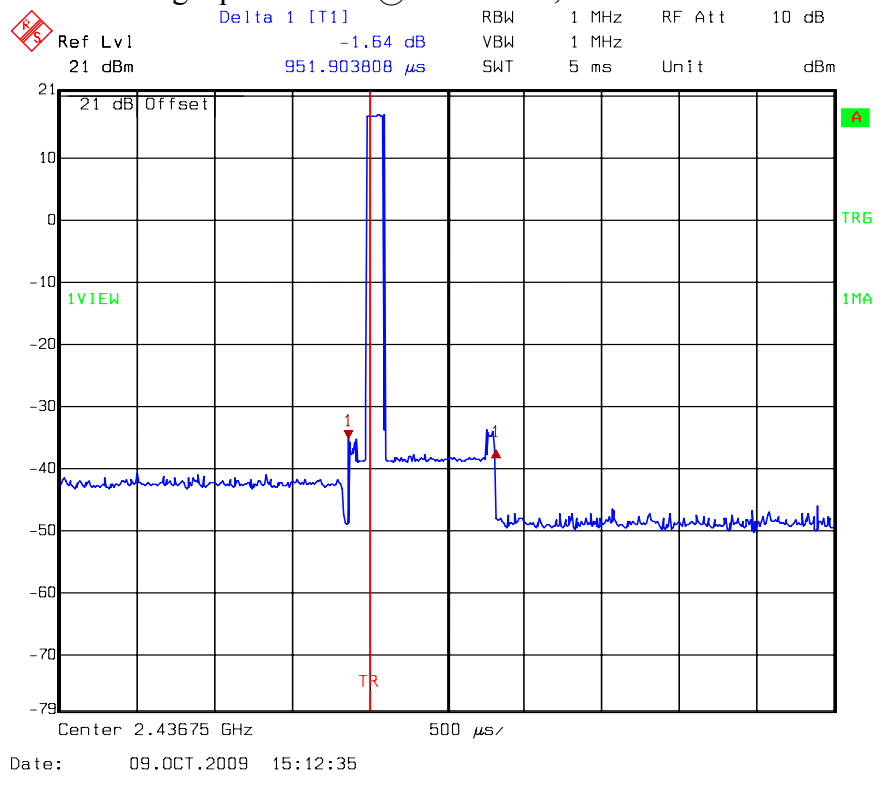
Please see the plot below.

Single pulse width @ channel 0, 2408.625 MHz



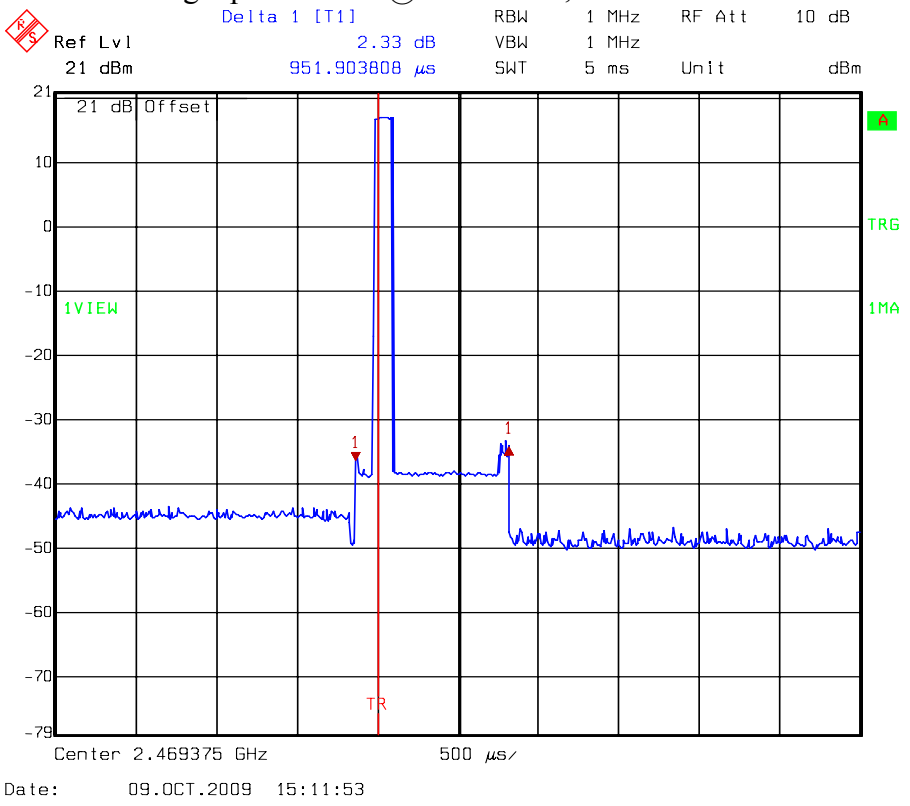
Date: 09.OCT.2009 15:13:20

Single pulse width @ channel 14, 2436.750 MHz

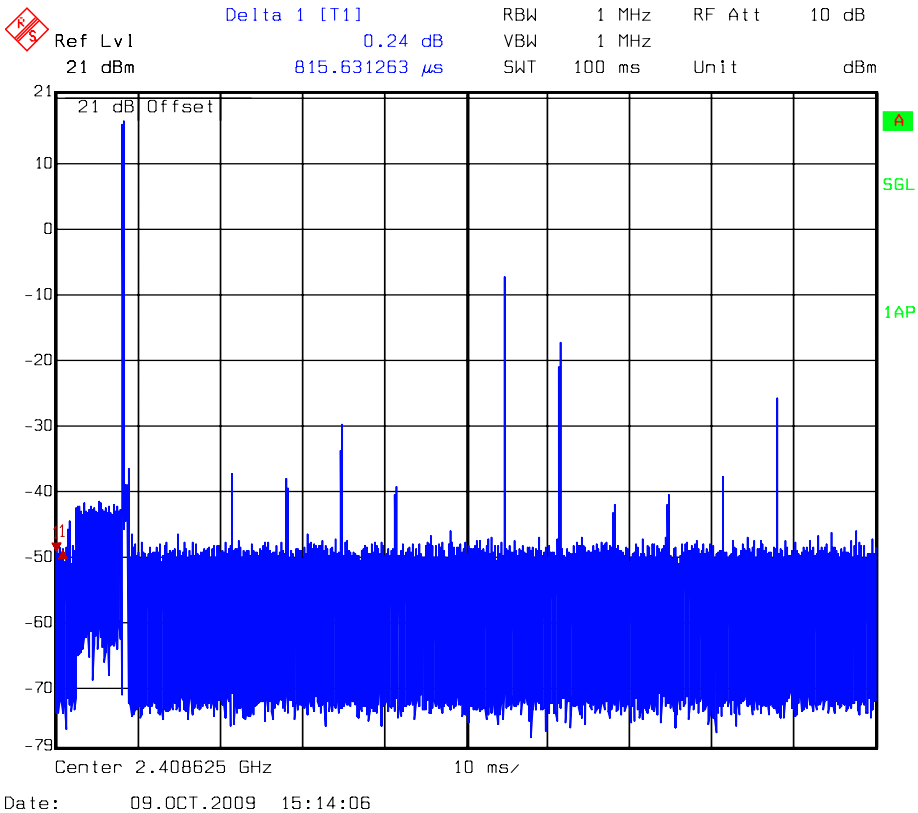


Date: 09.OCT.2009 15:12:35

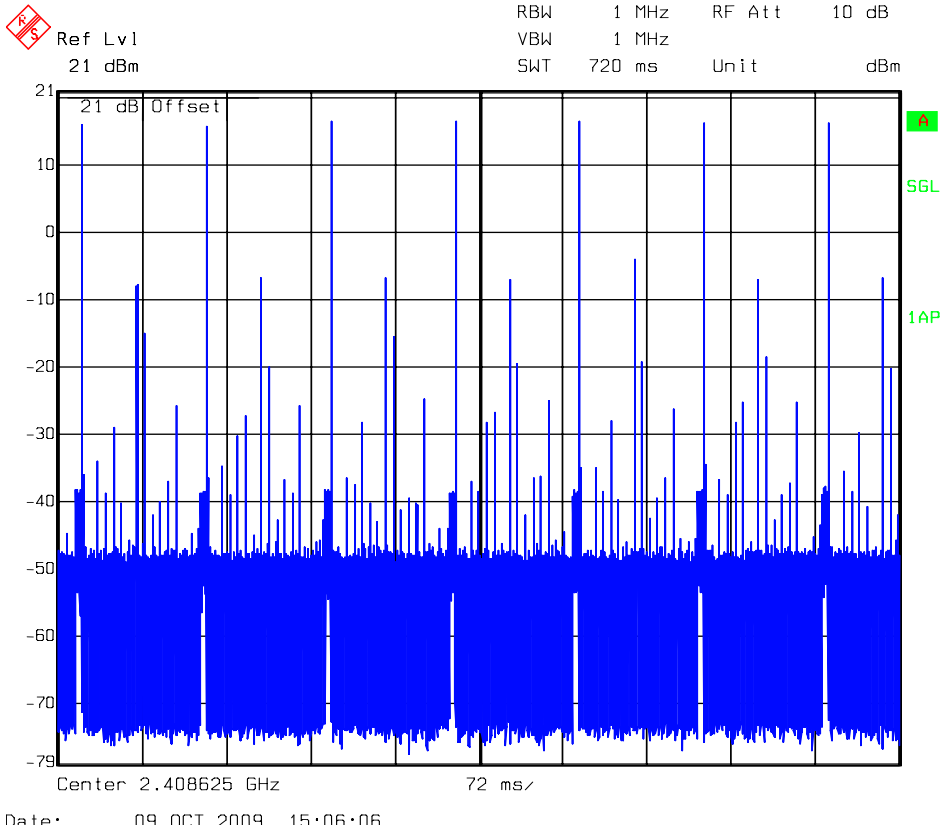
Single pulse width @ channel 17, 2469.375 MHz



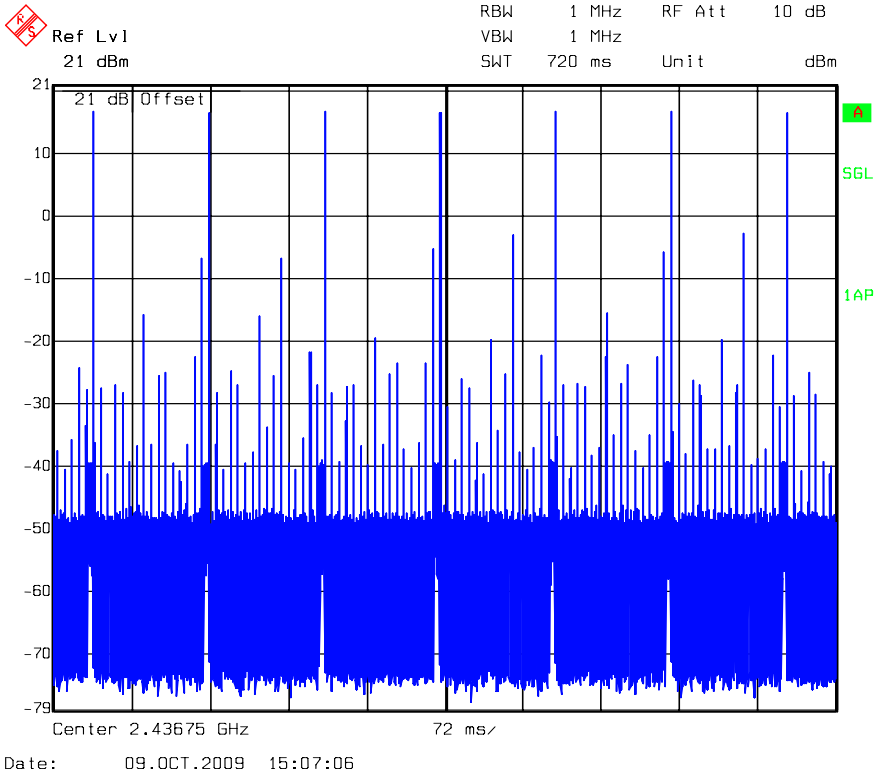
Dwell time test



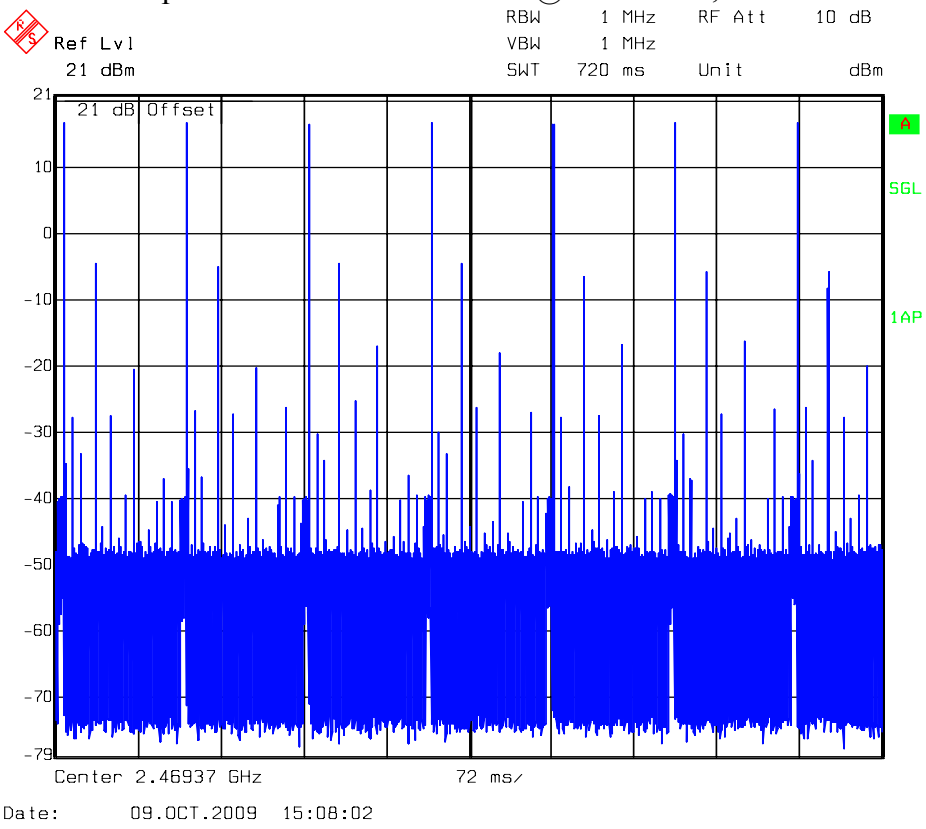
Number of pulses observed in 720ms=7 @ channel 0, 2408.625 MHz



Number of pulses observed in 720ms=7 @ channel 14, 2436.750 MHz



Number of pulses observed in 720ms=7 @ channel 17, 2469.375 MHz



7. Maximum Output Power test

7.1 Operating environment

Temperature: 25 ℃
Relative Humidity: 50 %
Atmospheric Pressure: 1022 hPa

7.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705.
The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (1.0 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

7.3 Measured data of Maximum Output Power test results

Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (dBm)
			(dBm)	(mW)	
2408.6	1.0	13.45	14.45	27.86	21
2436.8	1.0	13.50	14.50	28.18	21
2469.4	1.0	13.75	14.75	29.85	21

Remark: Conducted Peak Output Power = Reading + C.L.

8. RF Antenna Conducted Spurious test

8.1 Operating environment

Temperature:	25	℃
Relative Humidity:	58	%

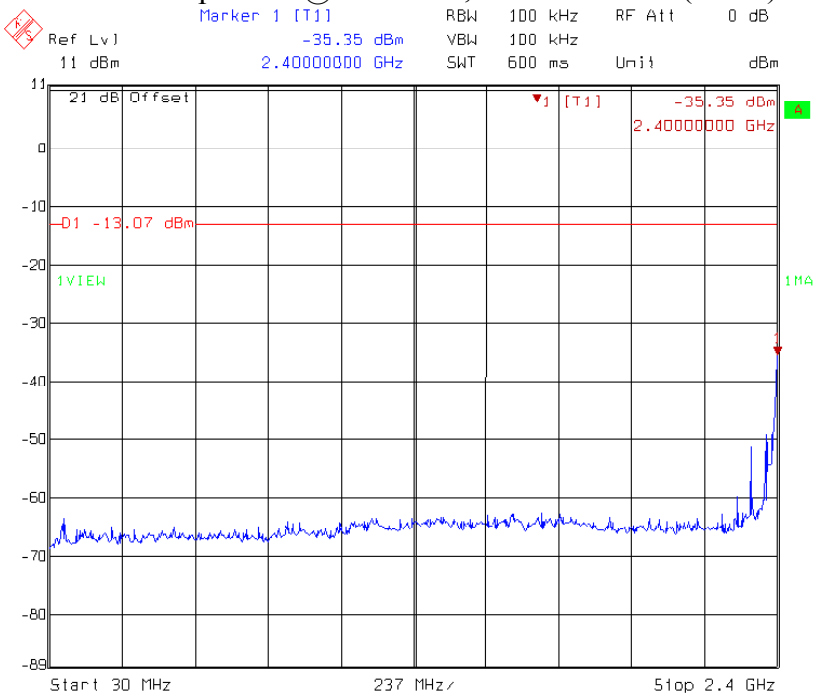
8.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705.
The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.
Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

8.3 Measured data of the highest RF Antenna Conducted Spurious test result

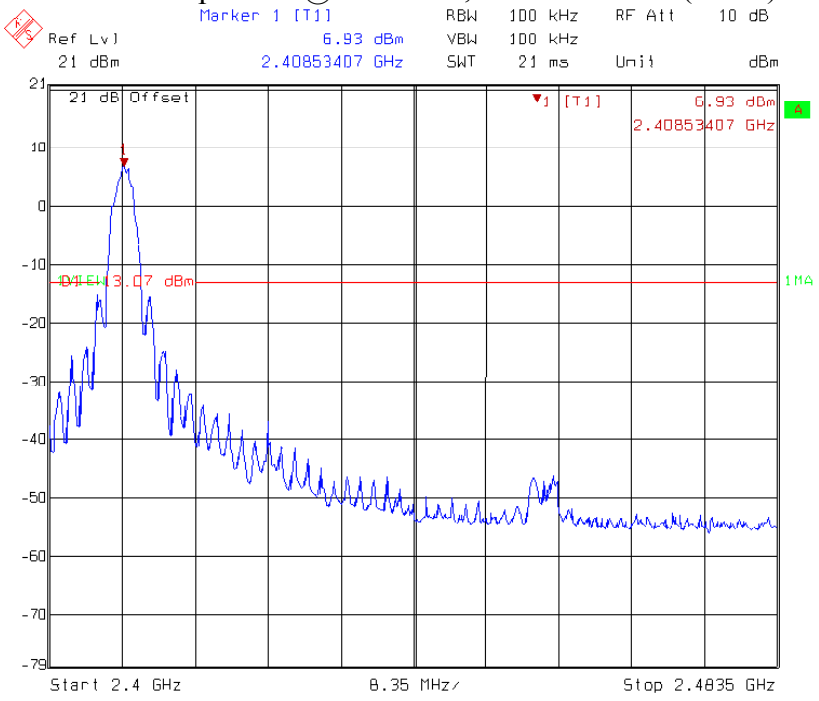
The test results please see the plot below.

conducted spurious @ channel 0, 2408.625 MHz (1 of 3)



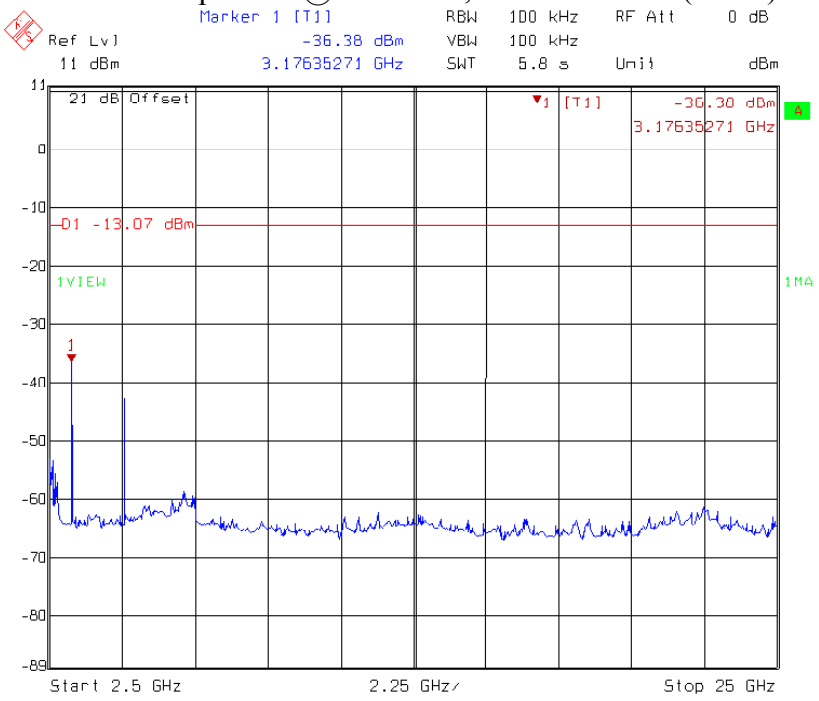
Title: Conductive Spurious
Comment A: 30MHz~2400MHz
Date: 13.JUL.2009 16:36:48

conducted spurious @ channel 0, 2408.625 MHz (2 of 3)



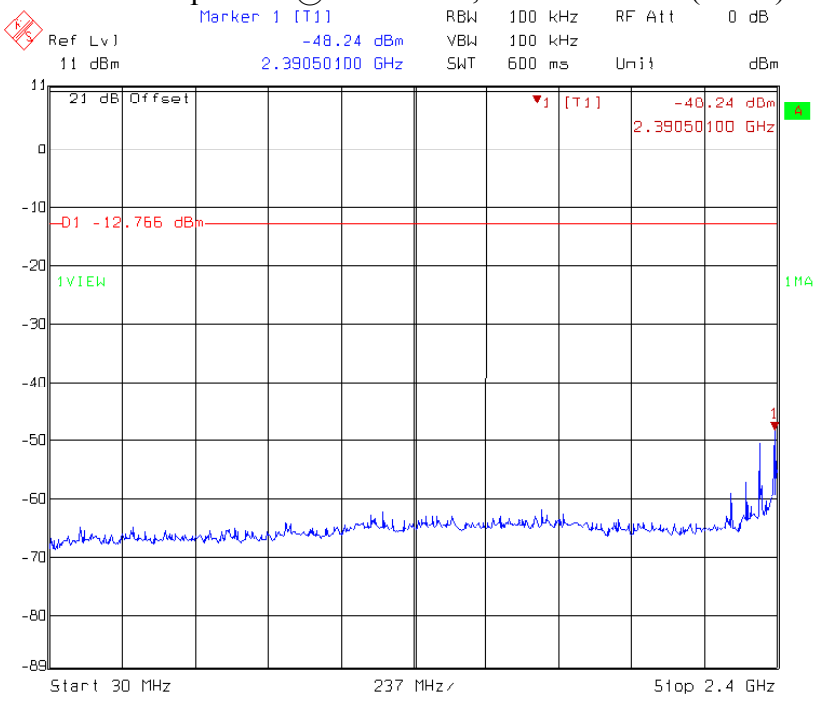
Title: Conductive Spurious
Comment A: 2400MHz~2483.5MHz
Date: 13.JUL.2009 16:36:27

conducted spurious @ channel 0, 2408.625 MHz (3 of 3)



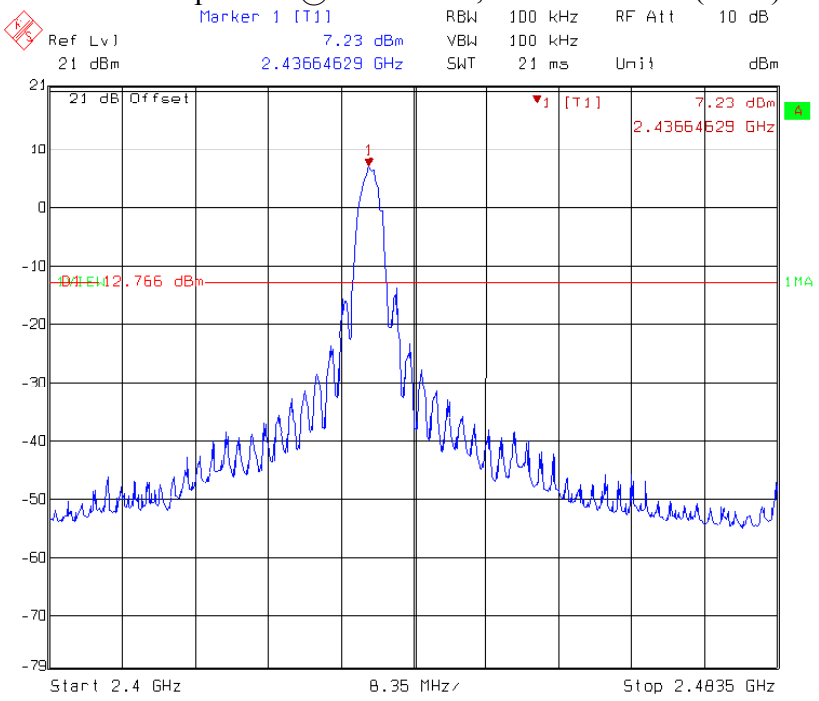
Title: Conductive Spurious
Comment A: 2483.5MHz~25GHz
Date: 13.JUL.2009 16:37:14

conducted spurious @ channel 14, 2436.750 MHz (1 of 3)



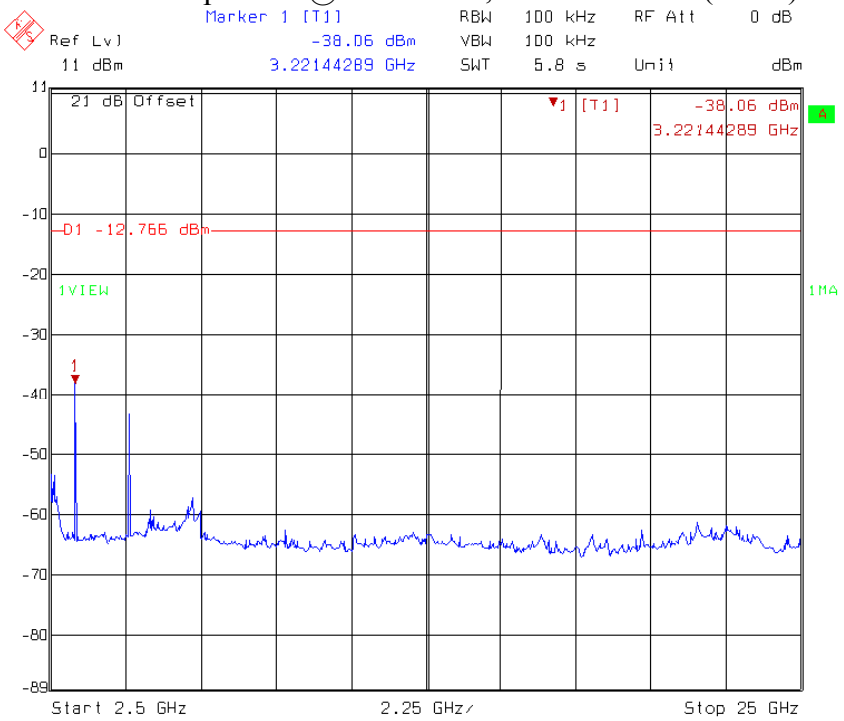
Title: Conductive Spurious
Comment A: 30MHz~2400MHz
Date: 13.JUL.2009 16:41:23

conducted spurious @ channel 14, 2436.750 MHz (2of 3)



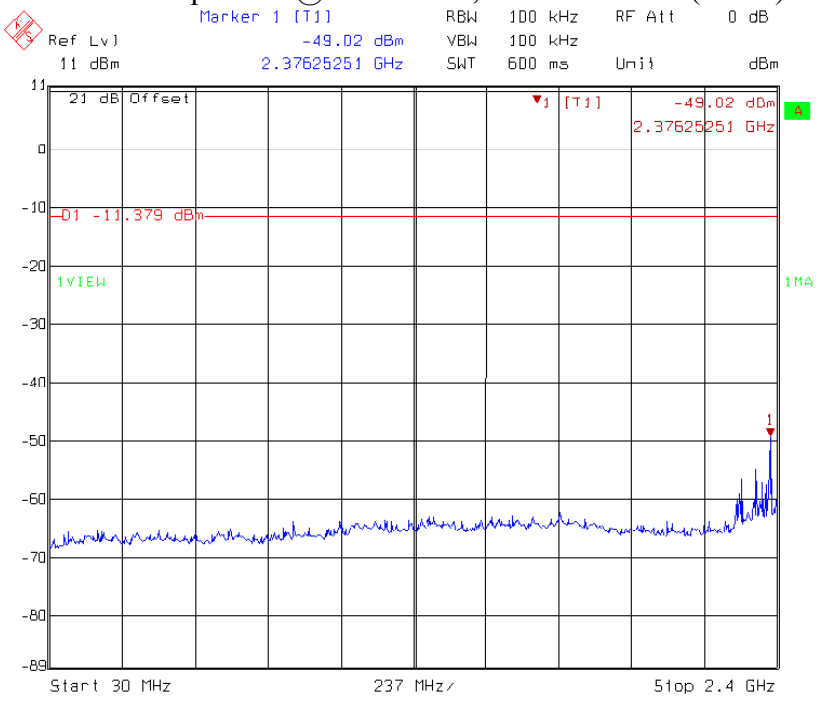
Title: Conductive Spurious
Comment A: 2400MHz~2483.5MHz
Date: 13.JUL.2009 16:41:03

conducted spurious @ channel 14, 2436.750 MHz (3 of 3)



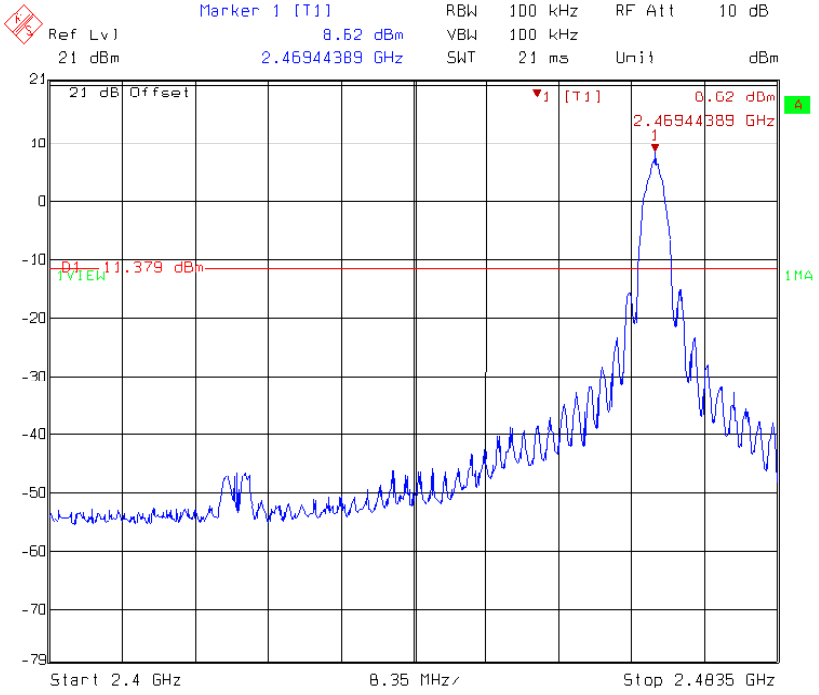
Title: Conductive Spurious
Comment A: 2483.5MHz~25GHz
Date: 13.JUL.2009 16:41:50

conducted spurious @ channel 17, 2469.375 MHz (1 of 3)



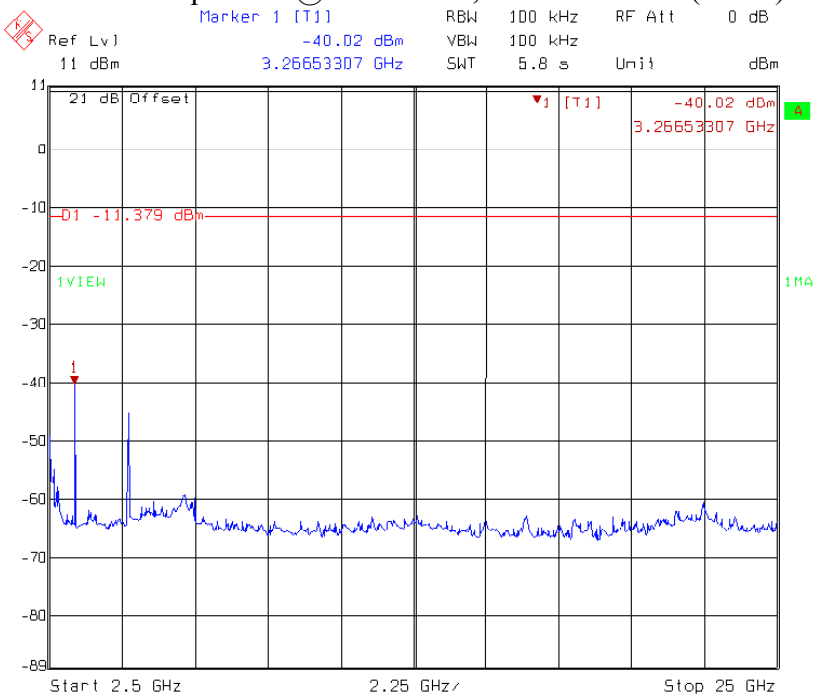
Title: Conductive Spurious
Comment A: 30MHz~2400MHz
Date: 13.JUL.2009 16:47:00

conducted spurious @ channel 17, 2469.375 MHz (2 of 3)



Title: Conductive Spurious
Comment A: 2400MHz~2483.5MHz
Date: 13.JUL.2009 16:46:40

conducted spurious @ channel 17, 2469.375 MHz (3 of 3)



9. Radiated Emission test

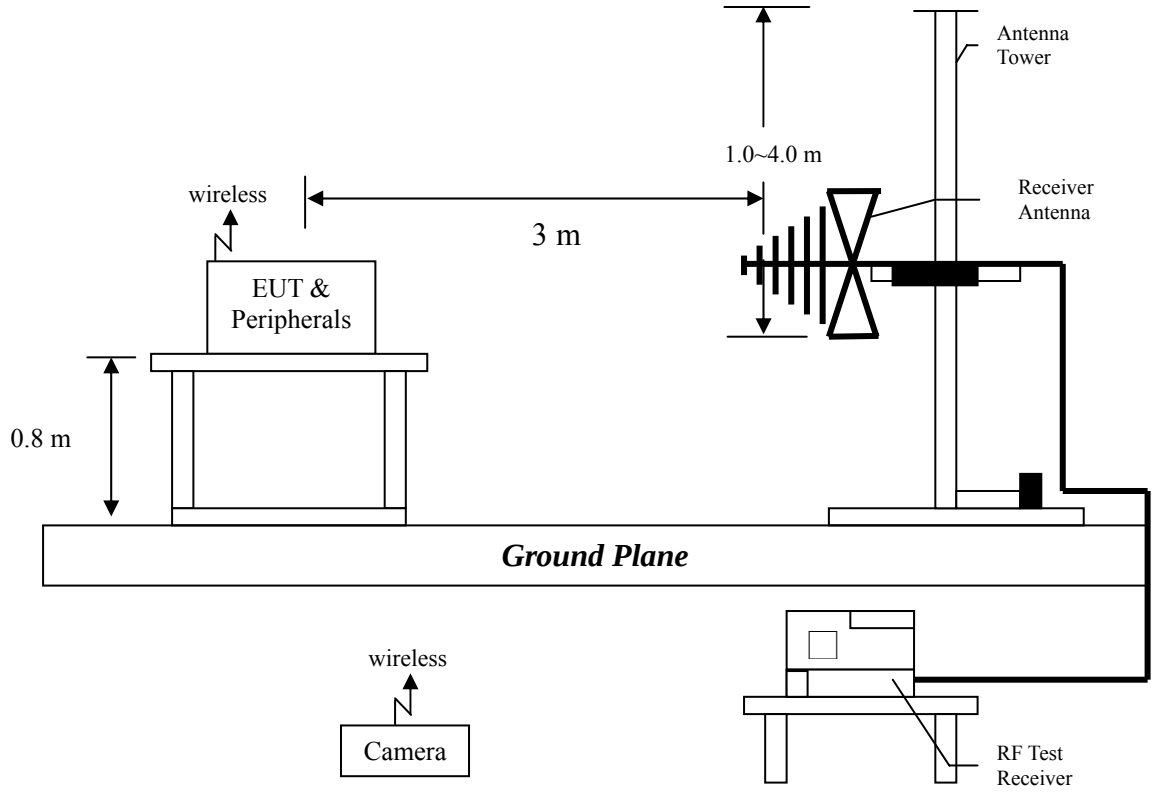
9.1 Operating environment

Temperature:	23	℃
Relative Humidity:	53	%
Atmospheric Pressure:	1023	hPa

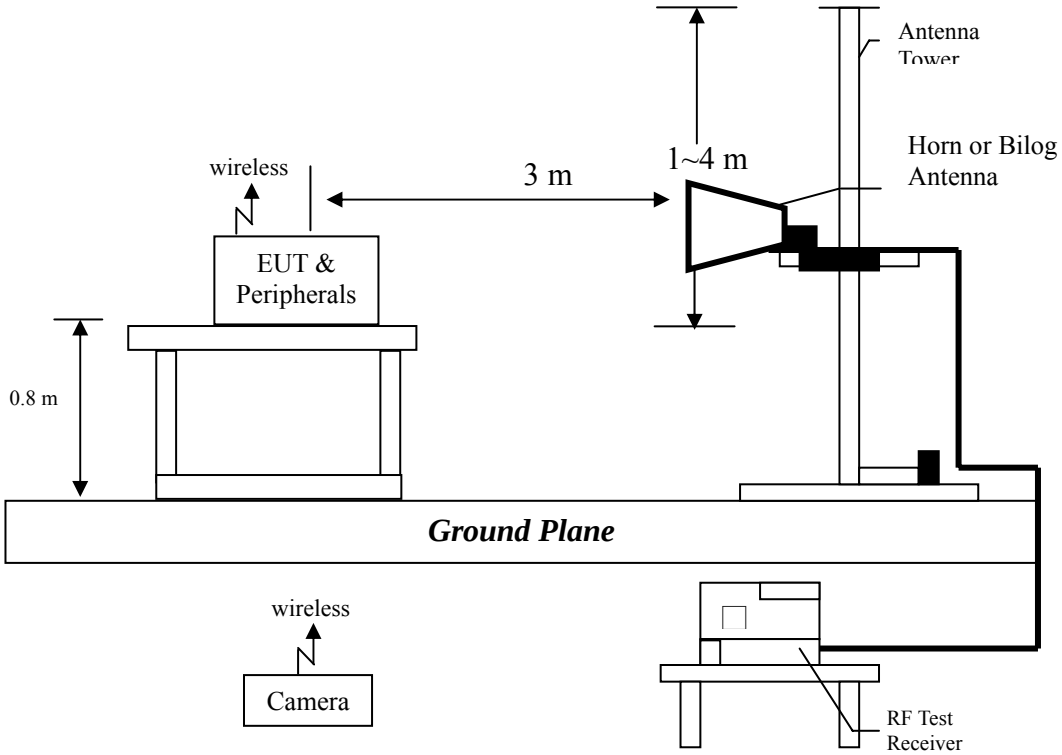
9.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705 and ANSI C63.4/2003**.**
The Diagram below shows the test setup, which is utilized to make these measurements.

The frequency spectrum from 30MHz to 1000MHz was investigated.



The frequency spectrum from over 1GHz was investigated.



Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.
The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meter reading using inverse scaling with distance.

The EUT configuration please refer to the "Spurious set-up photo.pdf".

9.3 Emission limits

The spurious Emission shall test through the 10th harmonic. 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 §15.209(a).

Frequency (MHz)	Limits (dBμV/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

   Uncertainty was calculated in accordance with NAMAS NIS 81.
   Expanded uncertainty (k=2) of radiated emission measurement is 4.98 dB.

9.4 Radiated spurious emission test data

9.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 2408.625 MHz, 2436.750 MHz and 2469.375 MHz continuously transmitting mode. The worst case occurred at 2408.625 MHz.

EUT : TTD-52R
Worst Case : TX channel 0, 2408.625 MHz

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	42.610	QP	12.38	21.79	34.16	40.00	-5.84
V	44.550	QP	12.38	23.60	35.97	40.00	-4.03
V	53.280	QP	12.90	23.34	36.23	40.00	-3.77
V	153.190	QP	15.83	22.59	38.42	43.50	-5.08
V	159.010	QP	15.83	22.73	38.56	43.50	-4.94
V	166.770	QP	15.70	23.50	39.20	43.50	-4.30
H	142.520	QP	13.24	20.75	33.98	43.50	-9.52
H	158.040	QP	13.60	22.12	35.72	43.50	-7.78
H	165.800	QP	13.84	26.74	40.57	43.50	-2.93
H	176.470	QP	13.48	21.27	34.74	43.50	-8.76
H	749.740	QP	22.95	12.76	35.71	46.00	-10.29
H	874.870	QP	24.12	11.23	35.34	46.00	-10.66

Remark:
1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

9.4.2 Measurement results: frequency above 1GHz

EUT : TTD-52R
Test Condition : Tx at channel 0, 2408.625 MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Duty cycle correction factor (dB)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
2360.00	PK	V	32.43	27.32	0.00	59.75	74.00	-14.25
2360.00	AV	V	32.43	27.32	-40.43	19.32	54.00	-34.68
2456.00	PK	V	32.79	29.24	0.00	62.03	74.00	-11.97
2456.00	AV	V	32.79	29.24	-40.43	21.60	54.00	-32.40
3210.00	PK	V	-7.34	67.65	0.00	60.31	74.00	-13.69
3210.00	AV	V	-7.34	67.65	-40.43	19.88	54.00	-34.12
4816.00	PK	V	-3.93	67.59	0.00	63.66	74.00	-10.34
4816.00	AV	V	-3.93	67.59	-40.43	23.23	54.00	-30.77
7224.00	PK	V	1.07	54.62	0.00	55.69	74.00	-18.31
7224.00	AV	V	1.07	54.62	-40.43	15.26	54.00	-38.74
9632.00	PK	V	8.74	53.68	0.00	62.42	74.00	-11.58
9632.00	AV	V	8.74	53.68	-40.43	21.99	54.00	-32.01
12040.00	PK	V	11.66	44.03	0.00	55.69	74.00	-18.31
12040.00	AV	V	11.66	44.03	-40.43	15.26	54.00	-38.74
3210.00	PK	H	-7.34	61.92	0.00	54.58	74.00	-19.42
3210.00	AV	H	-7.34	61.92	-40.43	14.15	54.00	-39.85
4816.00	PK	H	-3.93	63.30	0.00	59.37	74.00	-14.63
4816.00	AV	H	-3.93	63.30	-40.43	18.94	54.00	-35.06
9632.00	PK	H	8.74	50.81	0.00	59.55	74.00	-14.45
9632.00	AV	H	8.74	50.81	-40.43	19.12	54.00	-34.88

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.
4. Duty cycle correction factor = 20log (dwell time/100ms)
   = 20log (0.951ms/100ms) = -40.43
   Please see dwell time test in page 18 of this report.

EUT : TTD-52R
Test Condition : Tx at channel 14, 2436.750 MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Duty cycle correction factor (dB)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3240.00	PK	V	-7.29	67.35	0.00	60.06	74.00	-13.94
3240.00	AV	V	-7.29	67.35	-40.43	19.63	54.00	-34.37
4872.00	PK	V	-3.86	65.59	0.00	61.73	74.00	-12.27
4872.00	AV	V	-3.86	65.59	-40.43	21.30	54.00	-32.70
7308.00	PK	V	1.24	58.39	0.00	59.63	74.00	-14.37
7308.00	AV	V	1.24	58.39	-40.43	19.20	54.00	-34.80
9744.00	PK	V	9.02	53.63	0.00	62.65	74.00	-11.35
9744.00	AV	V	9.02	53.63	-40.43	22.22	54.00	-31.78
12180.00	PK	V	11.37	40.79	0.00	52.16	74.00	-21.84
12180.00	AV	V	11.37	40.79	-40.43	11.73	54.00	-42.27
3240.00	PK	H	-7.29	60.88	0.00	53.59	74.00	-20.41
3240.00	AV	H	-7.29	60.88	-40.43	13.16	54.00	-40.84
4872.00	PK	H	-3.86	63.15	0.00	59.29	74.00	-14.71
4872.00	AV	H	-3.86	63.15	-40.43	18.86	54.00	-35.14
7308.00	PK	H	1.32	47.38	0.00	48.70	74.00	-25.30
7308.00	AV	H	1.32	47.38	-40.43	8.27	54.00	-45.73
9744.00	PK	H	9.02	50.74	0.00	59.76	74.00	-14.24
9744.00	AV	H	9.02	50.74	-40.43	19.33	54.00	-34.67

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.
4. Duty cycle correction factor = 20log (dwell time/100ms)
   = 20log (0.951ms/100ms) = -40.43
   Please see dwell time test in page 18 of this report.

EUT : TTD-52R
Test Condition : Tx at channel 17, 2469.375 MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Duty cycle correction factor (dB)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
3270.00	PK	V	-7.24	69.01	0.00	61.77	74.00	-12.23
3270.00	AV	V	-7.24	69.01	-40.43	21.34	54.00	-32.66
4938.00	PK	V	-3.79	65.77	0.00	61.98	74.00	-12.02
4938.00	AV	V	-3.79	65.77	-40.43	21.55	54.00	-32.45
7407.00	PK	V	1.57	61.59	0.00	63.16	74.00	-10.84
7407.00	AV	V	1.57	61.59	-40.43	22.73	54.00	-31.27
9876.00	PK	V	9.31	46.65	0.00	55.96	74.00	-18.04
9876.00	AV	V	9.31	46.65	-40.43	15.53	54.00	-38.47
3270.00	PK	V	-7.24	69.01	0.00	61.77	74.00	-12.23
3270.00	AV	V	-7.24	69.01	-40.43	21.34	54.00	-32.66
4938.00	PK	H	-3.79	65.77	0.00	61.98	74.00	-12.02
4938.00	AV	H	-3.79	65.77	-40.43	21.55	54.00	-32.45
7407.00	PK	H	1.57	61.59	0.00	63.16	74.00	-10.84
7407.00	AV	H	1.57	61.59	-40.43	22.73	54.00	-31.27
9876.00	PK	H	9.31	46.65	0.00	55.96	74.00	-18.04
9876.00	AV	H	9.31	46.65	-40.43	15.53	54.00	-38.47

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1GHz to 25GHz.The data value listed above which is higher than the noise floor, the others please refer to noise floor level.
4. Duty cycle correction factor = 20log (dwell time/100ms)
   = 20log (0.951ms/100ms) = -40.43
   Please see dwell time test in page 18 of this report.

10. Emission on the band edge §FCC 15.247(d)

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

10.1 Test setup & procedure

Please refer to the clause 9.2 of this report.

Please see the plot below.

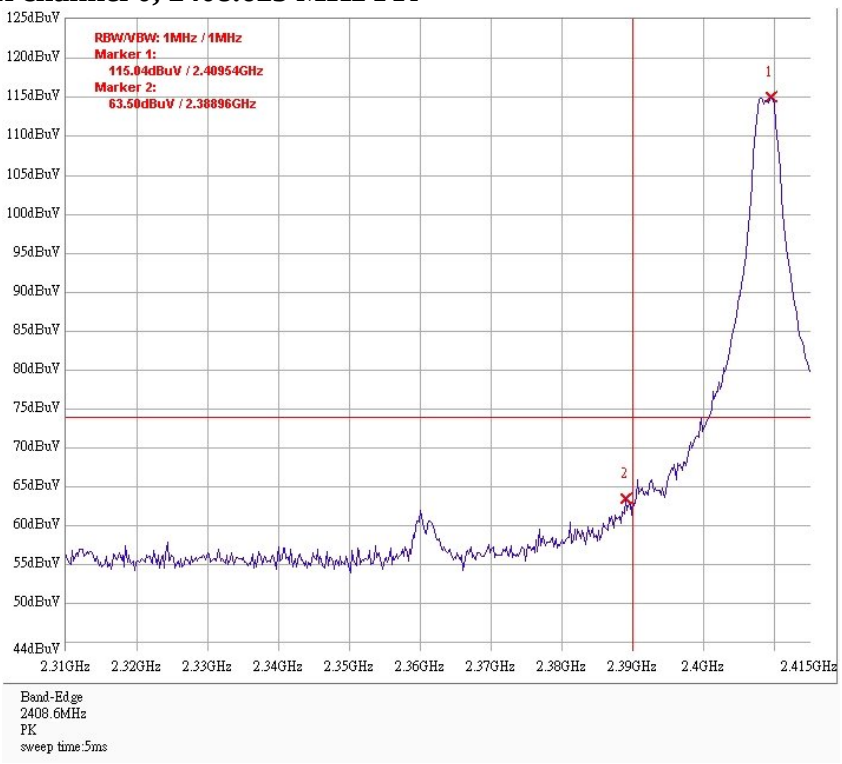
10.2 Test Result

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
0 (lowest)	2310-2390	PK	63.50	74	-10.50
		AV	23.07	54	-30.93
17 (highest)	2483.5-2500	PK	67.54	74	-6.46
		AV	27.11	54	-26.89

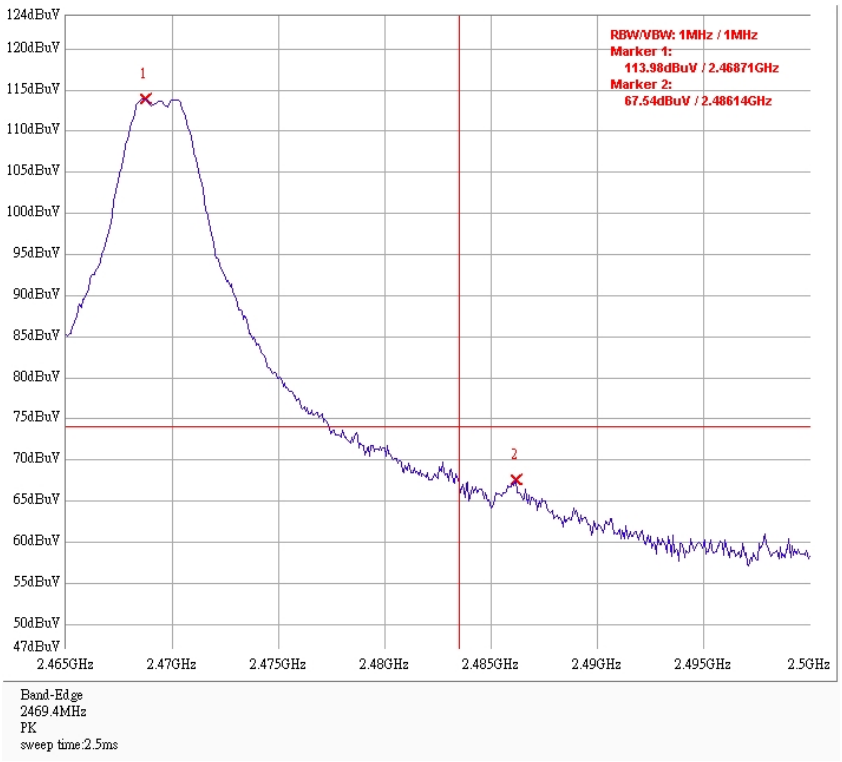
Note:Duty cycle correction factor=-40.43

10.2.1 Band-edge

Test Mode: Tx channel 0, 2408.625 MHz PK



Test Mode: Tx channel 17, 2469.375 MHz PK

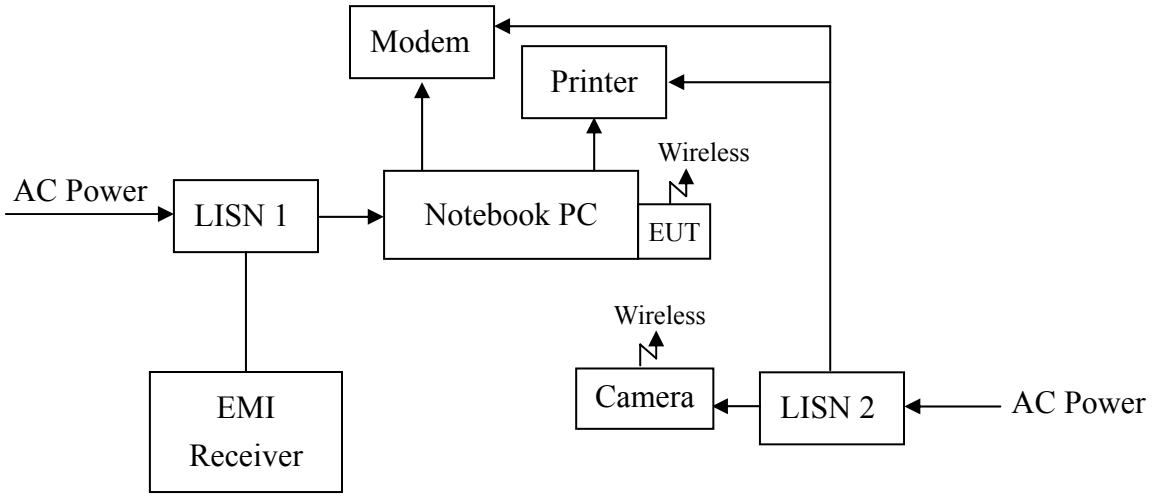


11. Power Line Conducted Emission test §FCC 15.207

11.1 Operating environment

Temperature:	25	℃
Relative Humidity:	60	%
Atmospheric Pressure	1023	hPa

11.2 Test setup & procedure



The test procedure was according to ANSI C63.4/2003**.**

The EUT are connected to the main power through a line impedance stabilization network (LISN). 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 (Line and Neutral) of AC 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 C63.4/2003 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

11.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

11.4 Uncertainty of Conducted Emission

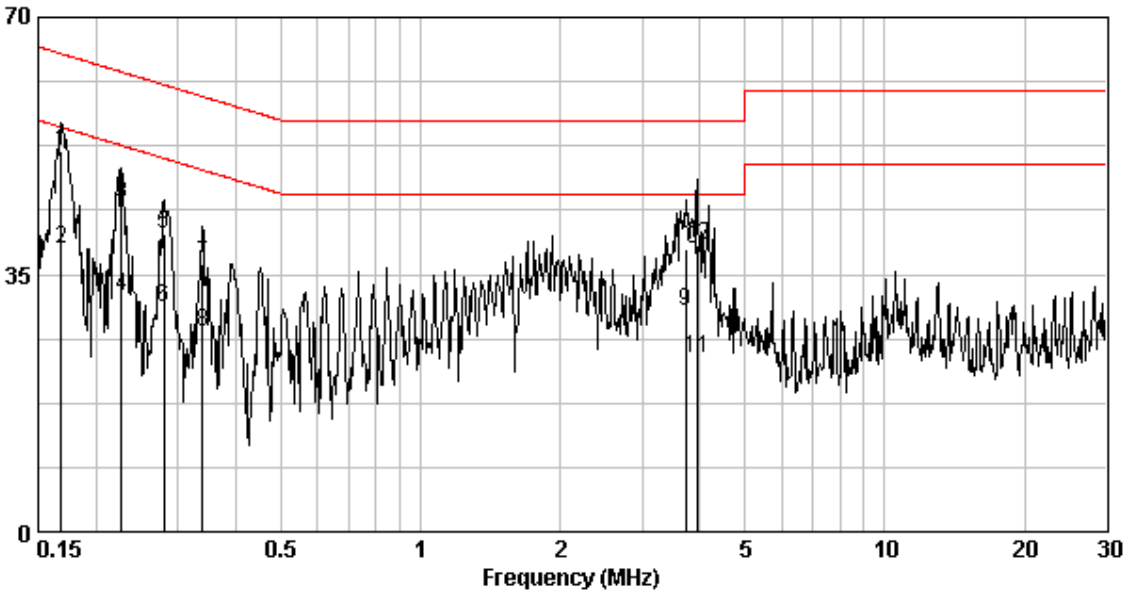
Expanded uncertainty (k=2) of conducted emission measurement is ±2.6 dB.

11.5 Power Line Conducted Emission test data

Phase : Line
EUT : TTD-52R
Test Condition : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.17	0.81	51.68	65.03	38.55	55.03	-13.36	-16.49
0.23	0.68	44.67	62.57	31.93	52.57	-17.90	-20.64
0.28	0.47	40.41	60.81	30.42	50.81	-20.40	-20.39
0.34	0.28	36.54	59.22	27.22	49.22	-22.69	-22.01
3.72	0.27	38.46	56.00	29.92	46.00	-17.54	-16.08
3.94	0.29	39.01	56.00	23.58	46.00	-16.99	-22.42

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase : Neutral
EUT : TTD-52R
Test Condition : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.17	0.11	50.86	64.99	38.58	54.99	-14.13	-16.41
0.23	0.11	43.13	62.57	32.27	52.57	-19.44	-20.30
0.28	0.11	38.85	60.76	30.23	50.76	-21.92	-20.54
3.35	0.25	31.62	56.00	20.93	46.00	-24.38	-25.07
3.62	0.27	35.24	56.00	23.45	46.00	-20.76	-22.55
3.86	0.28	36.34	56.00	22.44	46.00	-19.66	-23.56

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)