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Tel: +82-31-323-6008   Fax: +82-31-323-6010
http://www.ltalab.com

Laboratory for Test & Approval Co.,Ltd.

Dates of Tests: March 18~May 06, 2013
Test Report S/N: LR500111305A
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID   **SNL- 36204410**

APPLICANT   **SJ INCORPORATED**

Equipment Class	:	**Part 15 Spread Spectrum Transmitter (DSS)**
Manufacturing Description	:	**Frequency hopping Module**
Manufacturer	:	**SJ INCORPORATED**
Model name	:	**TM02**
Test Device Serial No.:	:	**Identical prototype**
Rule Part(s)	:	**FCC Part 15.247 Subpart C; ANSI C-63.4-2003**
Frequency Range	:	**2404.056 ~ 2474.044MHz**
RF power	:	**Max 18.88 dBm – Conducted**
Data of issue	:	**May 06, 2013**

This test report is issued under the authority of: The test was supervised by:

Kyu-Hyun Lee, Manager   Jung-Moo Her, Test Engineer

NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. General information's

1-1 Test Performed

Company name	:	LTA Co., Ltd.
Address	:	243, Jubug-ri,Yangji-Myeon,Youngin-Si, Kyunggi-Do, Korea. 449-822
Web site	:	http://www.ltalab.com
E-mail	:	chahn@ltalab.com
Telephone	:	+82-31-323-6008
Facsimile		+82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2013-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	updating	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	updating	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
VCCI	JAPAN	G-563	2015-05-28	VCCI registration
IC	CANADA	5799A-1	2015-06-21	IC filing

2. Information's about test item

2-1 Client

Company name	:	SJ INCORPORATED
Address	:	8th F, 202 Dong, Chunui Techno-Park 2, 202, Chunui-Dong, Wonmi-Gu, Bucheon-Shi, Kyungki-Do, South Korea, 420-857
Telephone / Facsimile	:	+82-32-623-0728/+82-32-623-0732

2-2 Manufacturer

Company name	:	SJ INCORPORATED
Address(Factory in Korea)	:	8th F, 202 Dong, Chunui Techno-Park 2, 202, Chunui-Dong, Wonmi-Gu, Bucheon-Shi, Kyungki-Do, South Korea, 420-857
Address(Factory in China)		F6, 1 BLDG, A AREA, YINTIANXIFA INDUSTRIAL AREA, XIXIANG TOWN, BAOAN DISTRICT SHENZHEN, GUANGDONG PROVINCE, CHINA
Telephone / Facsimile	:	+82-32-623-0728/+82-32-623-0732

2-3 Equipment Under Test (EUT)

Model name	:	TM02
Serial number	:	Identical prototype
Date of receipt	:	March 15, 2013
EUT condition	:	Pre-production, not damaged
Antenna type	:	KMAP2440S2522T1: 2.4GHz Patch Antenna, 0dBi KMAP2440S2525T1: 2.4GHz Patch Antenna, 0.5dBi WPC.25A.07.0150C: 2.4GHz Patch Antenna, 0.5dBi C329-RF-001: 2.4GHz Dipole Antenna, 1.2dBi AT000067: 2.4GHz Dipole Antenna, 1.2dBi
Frequency Range	:	2404.056 ~ 2474.044MHz
RF output power	:	Max. 18.88 dBm - Conducted
Number of channels	:	70
Channel spacing	:	1MHz
Channel Access Protocol	:	Frequency Hopping Spread Spectrum (FHSS)
Power Source	:	DC 3.3V
Firmware Version	:	V1.0.0

2-4 Tested frequency

Bluetooth	LOW	MID	HIGH
Frequency (MHz)	2404.056	2438.550	2474.044

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	Number of Hopping Frequencies	> 15 hops		C
15.247(a)	20 dB Bandwidth 99% Bandwidth	> 1.5 MHz		C
15.247(a)	Dwell Time	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 250 mWatt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.249 / 15.209	Field Strength of Harmonics	< 54 dBuV (at 3m)	Radiated	C
15.109	Field Strength	-		C
15.207 /15.107	AC Conducted Emissions	EN 55022	Line Conducted	N/A
15.203	Antenna requirement	-	-	C

Note 1: C=Complies   NC=Not Complies   NT=Not Tested   NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

Note 1: Antenna Requirement

→ The **SJ INCORPORATED**   FCC ID:**SNL-36204410** unit complies with the

requirement of §15.203.

The antenna type is patch antenna, dipole antenna.

Note 2: The sample was tested according to the following specification:
FCC Parts 15.247; ANSI C-63.4-2003

Note 3: TEST METHODOLOGY
The measurement procedure described in the American National Standard for Testing Unlicensed
Wireless Devices(ANSI C63.10-2009) and FCC Public Notice DA 00-705 dated March 30, 2000 entitled
"**Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems**" were used
in the measurement of the **SJ INCORPORATED   FCC ID: SNL- 36204410**

3.2 Information about the FHSS characteristics:

3.2.1 Pseudorandom Frequency Hopping Sequence

The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage, and the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones. Number of shift register stages: 9
Length of pseudo-random sequence: 29-1 = 511 bits
Longest sequence of zeros: 8 (non-inverted signal)

Number	Channel	Frequency	Number	Channel	Frequency
[0]	51	2455.772	[35]	43	2447.660
[1]	63	2467.940	[36]	67	2471.997
[2]	1	2405.070	[37]	13	2417.239
[3]	20	2424.337	[38]	17	2421.295
[4]	36	2440.562	[39]	31	2435.491
[5]	46	2450.702	[40]	47	2451.716
[6]	64	2468.955	[41]	60	2464.898
[7]	12	2416.225	[42]	9	2413.182
[8]	23	2427.379	[43]	22	2426.365
[9]	39	2443.604	[44]	33	2437.519
[10]	53	2457.800	[45]	45	2449.688
[11]	56	2460.842	[46]	69	2474.044
[12]	7	2411.154	[47]	6	2410.140
[13]	25	2429.407	[48]	19	2423.323
[14]	34	2438.550	[49]	32	2436.505
[15]	55	2459.828	[50]	48	2452.730
[16]	61	2465.912	[51]	58	2462.870
[17]	10	2414.197	[52]	3	2407.098
[18]	18	2422.309	[53]	27	2431.435
[19]	41	2445.632	[54]	28	2432.449
[20]	49	2453.744	[55]	50	2454.758
[21]	59	2463.884	[56]	57	2461.856
[22]	4	2408.112	[57]	11	2415.210
[23]	15	2419.267	[58]	26	2430.421
[24]	40	2444.618	[59]	30	2434.477
[25]	54	2458.814	[60]	52	2456.786
[26]	66	2470.983	[61]	62	2466.927
[27]	8	2412.169	[62]	0	2404.056
[28]	21	2425.351	[63]	16	2420.281
[29]	38	2442.590	[64]	29	2433.463
[30]	44	2448.674	[65]	42	2446.646
[31]	65	2469.969	[66]	68	2473.011
[32]	2	2406.084	[67]	5	2409.126
[33]	14	2418.253	[68]	24	2428.393
[34]	37	2441.575	[69]	35	2439.547

3.2.2 Equal Hopping Frequency Use

All units participating in the piconet are time and hop-synchronized to the channel.

3.2.3 System Receiver Input Bandwidth

Each channel bandwidth is 1MHz

3.2.4 Equipment Description

15.247(a)(1):
The hopping sequence must be pseudorandom   all Channels are used equally on average   the receiver input bandwidth is approximately equal to the transmit bandwidth   the receiver hops in sequence with the transmitted signal

15.247(g):
The system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information)

15.247(h):
The system does not coordinate its channel selection/hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

3.3 Transmitter requirements

3.3.1 Carrier Frequency Separation

Procedure:

The test follows DA000705. The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 30 kHz	Sweep = auto
VBW = 30 kHz	Detector function = peak
Trace = max hold	

Measurement Data:

Test Results	
Carrier Frequency Separation (MHz)	**Result**
1.011	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of 20dB bandwidth of the hopping channel, whichever is greater.
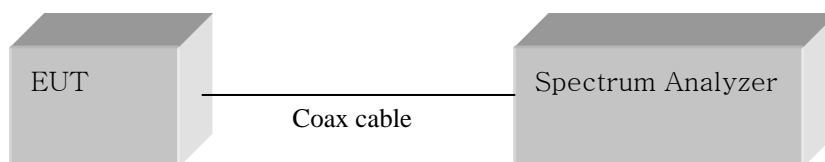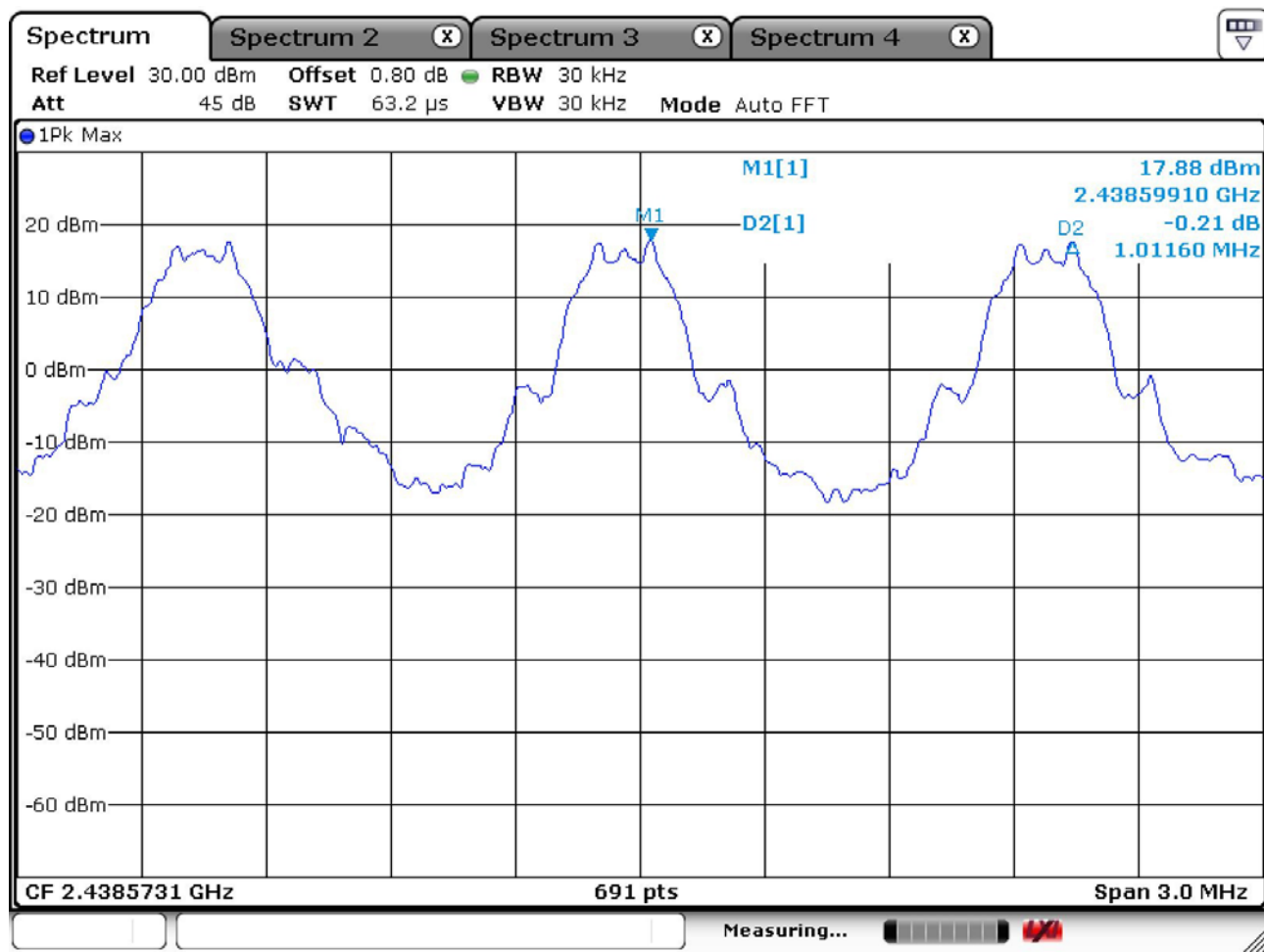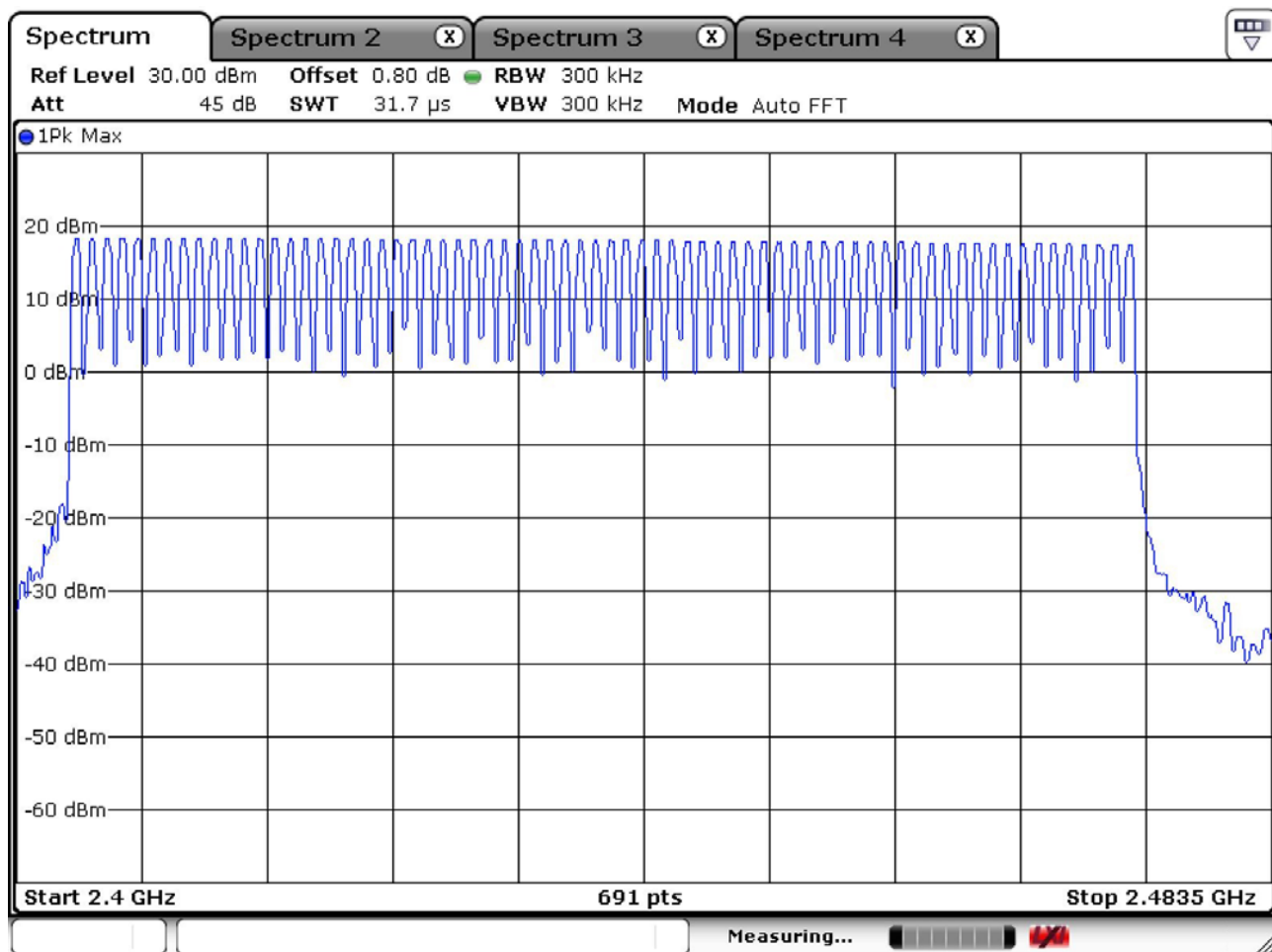
Measurement Setup

EUT —— Coax cable —— Spectrum Analyzer

Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation

```
Spectrum    Spectrum 2  (x)  Spectrum 3  (x)  Spectrum 4  (x)

Ref Level 30.00 dBm   Offset 0.80 dB ●  RBW 30 kHz
Att        45 dB      SWT   63.2 µs     VBW 30 kHz    Mode Auto FFT

● 1Pk Max
                                    M1[1]              17.88 dBm
                                                    2.43859910 GHz
 20 dBm                         M1    D2[1]              -0.21 dB
                                                      1.01160 MHz
 10 dBm

  0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

CF 2.4385731 GHz              691 pts            Span 3.0 MHz

                             Measuring...
```

3.3.2 Number of Hopping Frequencies

Procedure:

The test follows DA000705. The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

To get higher resolution, four frequency ranges within the 2400 ~ 2483.5 MHz FH band were examined.

The spectrum analyzer is set to:

Frequency range Start = 2400.0MHz,	Stop = 2483.5 MHz
RBW = 300 kHz	Sweep = auto
VBW = 300 kHz (VBW $\geq$ RBW)	Detector function = peak
Trace = max hold	

Measurement Data :   Complies

Total number of Hopping Channels	70

- See next pages for actual measured spectrum plots.

Minimum Standard:

At least 15 hopes

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Number of Hopping Frequencies

3.3.3 20 dB Bandwidth

Procedure:

The bandwidth at 20 dB below the highest in band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 5 MHz (approximately 2 or 3 times of the 20 dB bandwidth)

RBW = 30 kHz   Sweep = auto

VBW = 30 kHz (VBW $\geq$ RBW)   Detector function = peak

Trace = max hold

Measurement Data :

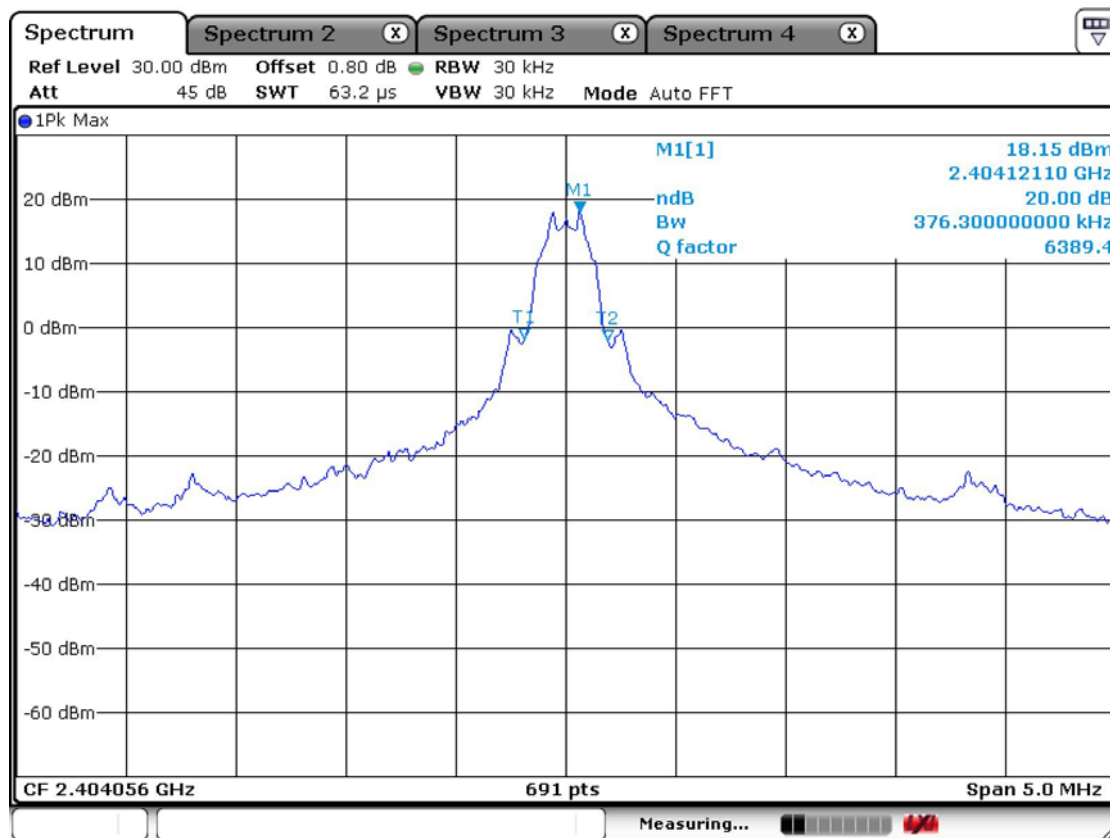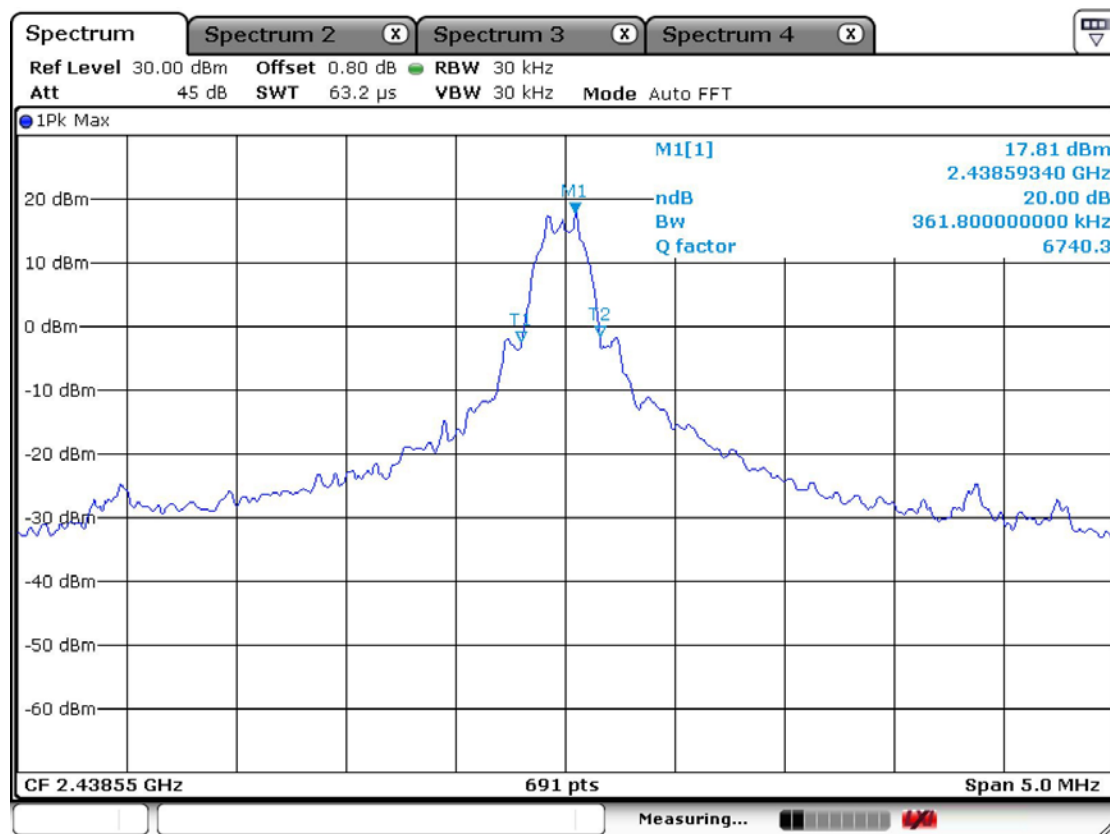| Frequency (MHz)	Channel No.	Test Results(MHz)
		20dB Bandwidth
2404.056	0	0.376
2438.550	34	0.361
2474.044	69	0.369

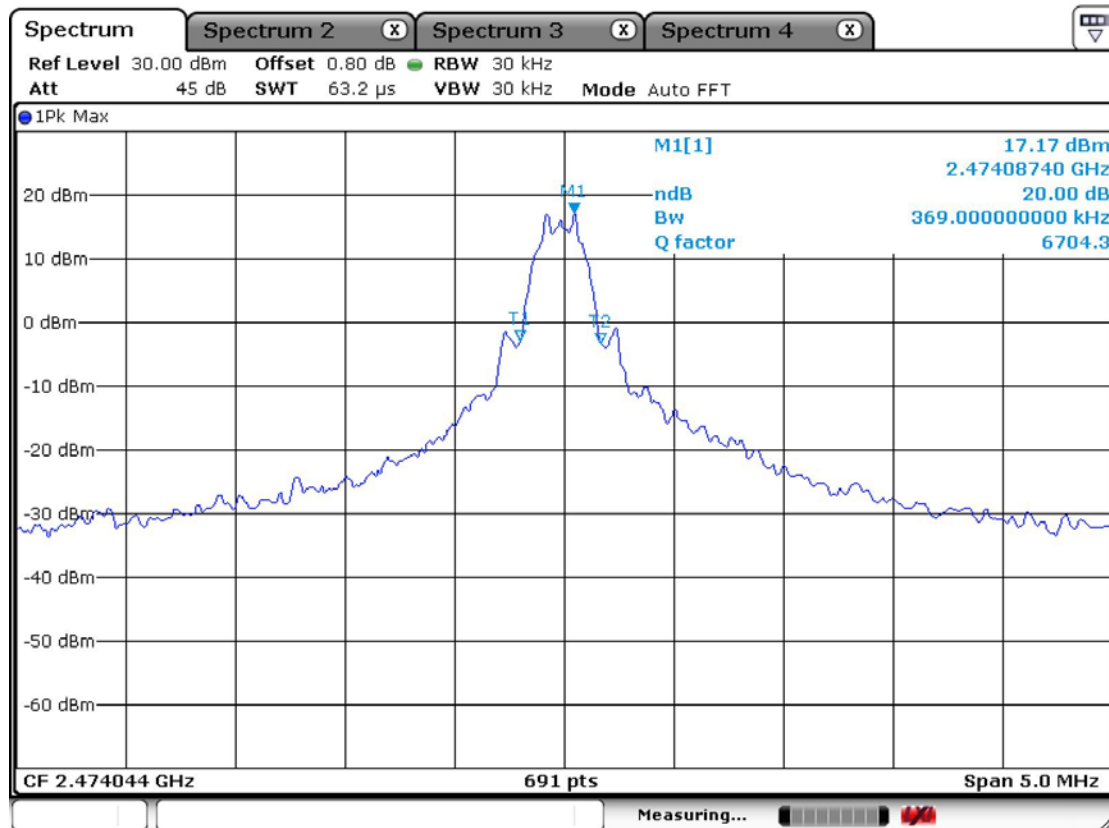- See next pages for actual measured spectrum plots.

Minimum Standard:

N/A

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Channel 1 of basic mode
20 dB Bandwidth

Channel 2 of basic mode
20 dB Bandwidth

Channel 3 of basic mode
20 dB Bandwidth

3.3.4 Time of Occupancy (Dwell Time)

Procedure:

The test follows DA000705. The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to :

Center frequency = 2438 .550MHz   Span = zero

RBW = 1 MHz   VBW = 1 MHz (VBW $\geq$ RBW)

Trace = single sweep   Detector function = peak

Measurement Data:

Number of transmission in a 28s (70 Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
4(Times / 3sec) *9.33=37.32	3.768	140.62	400

- See next pages for actual measured spectrum plots.
- dwell time = {(number of hopping per second / number of slot) x duration time per channel} x 0.4 ms
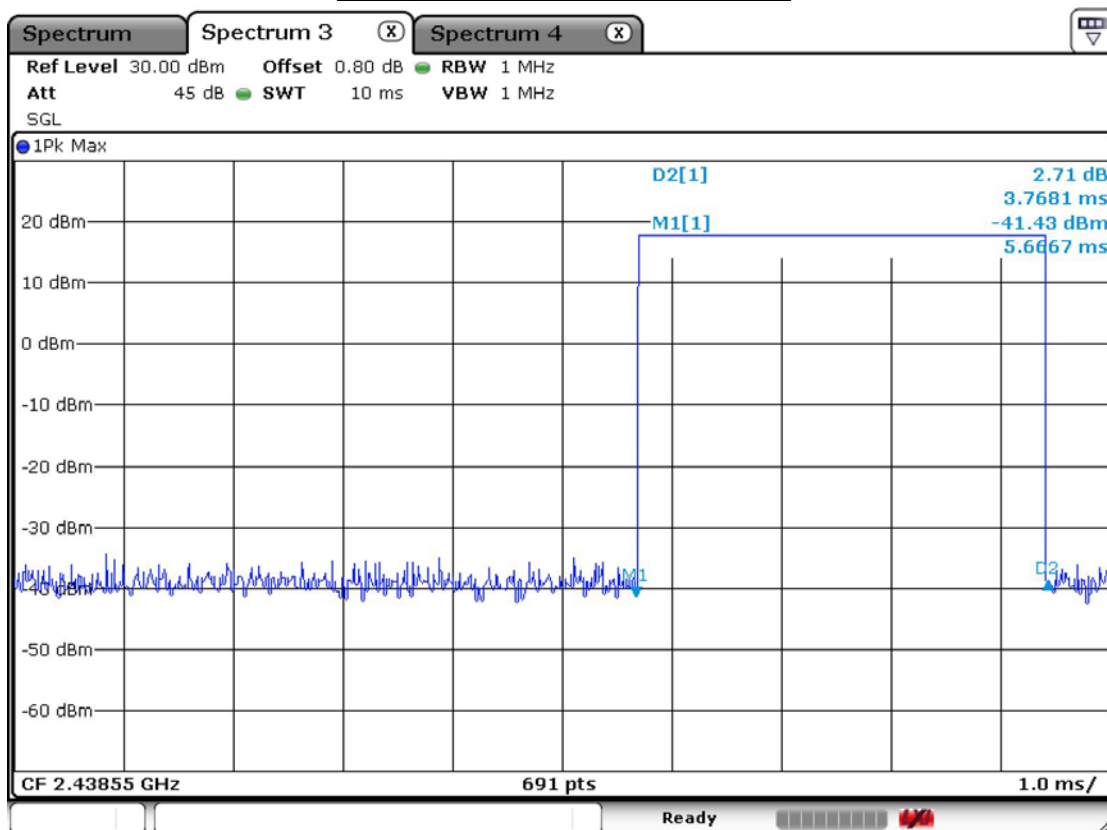
Minimum Standard:

0.4 seconds within a 30 second period per any frequency

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Time of Occupancy for PACKET
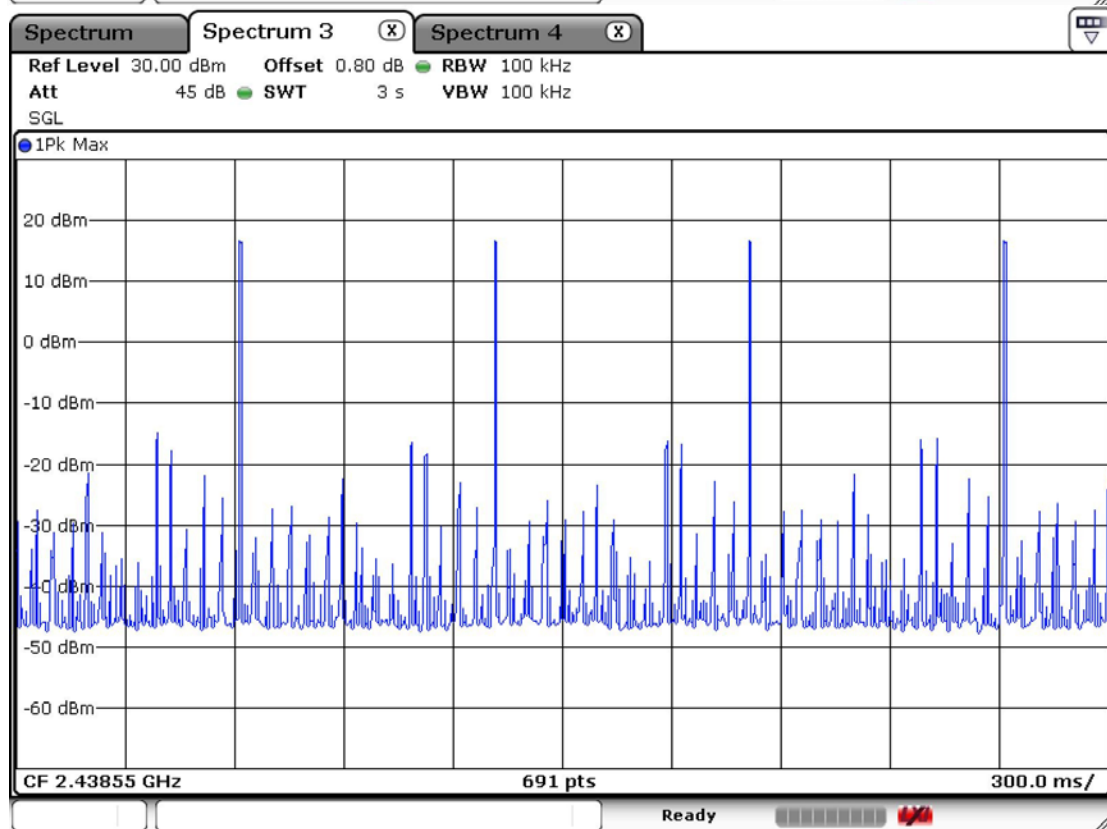
3.3.5 Transmitter Output Power

Procedure:

The test follows DA000705. The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission.　The indicated level is the peak output power.

The spectrum analyzer is set to :

Center frequency = the highest, middle and the lowest channels

Span = 10 MHz (approximately 5 times of the 20 dB bandwidth)

RBW = 3 MHz (greater than the 20dB bandwidth of the emission being measured)

VBW = 3 MHz (VBW $\geq$ RBW)　　　　　　　Detector function = peak

Trace = max hold　　　　　　　　　　　　　Sweep = auto

Measurement Data :

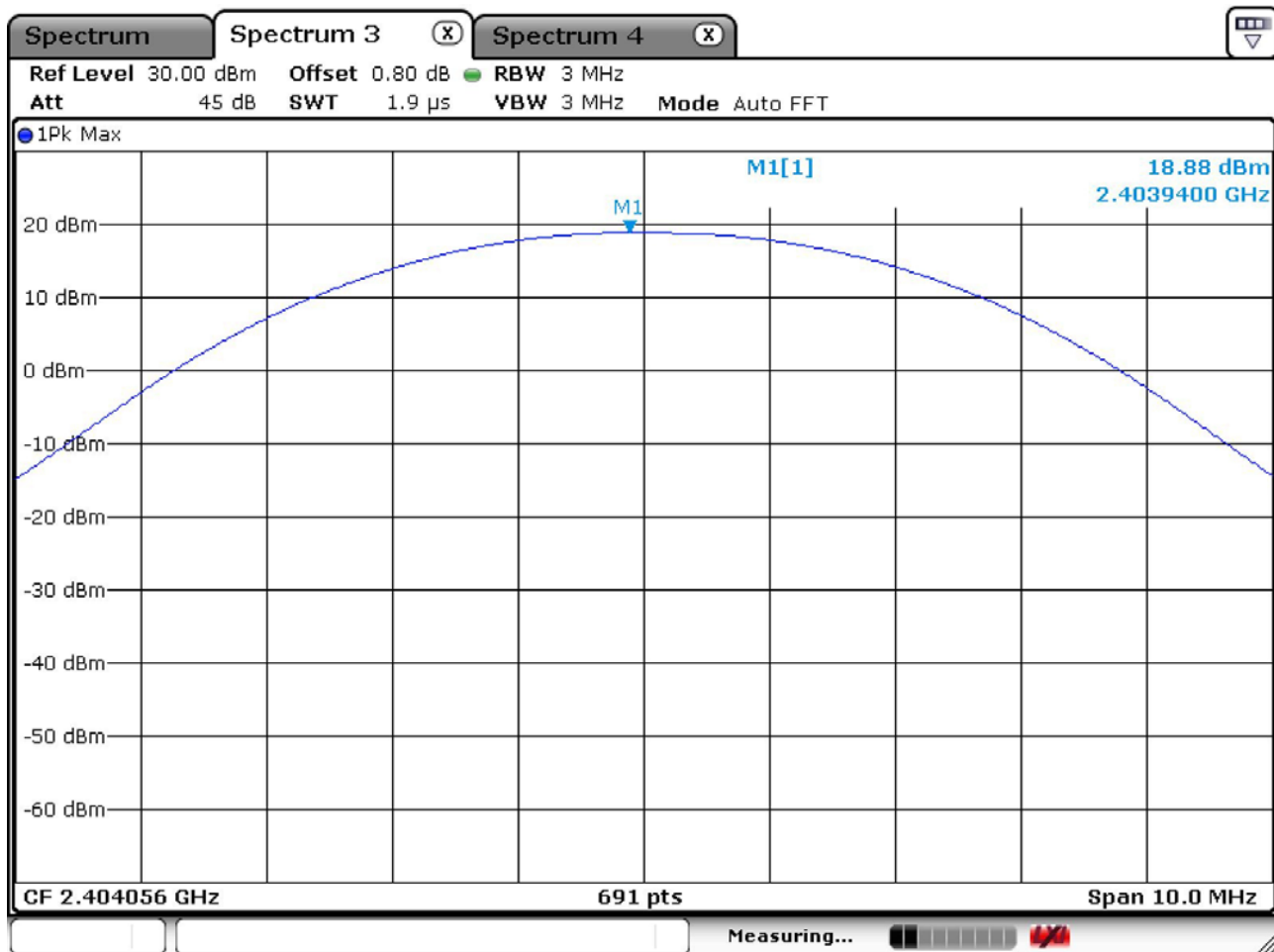| Frequency (MHz)	Ch.	Test Results		
		dBm	mW	Result
2404.056	0	18.88	77.27	Complies
2438.550	34	18.40	69.18	Complies
2474.044	69	17.65	58.21	Complies

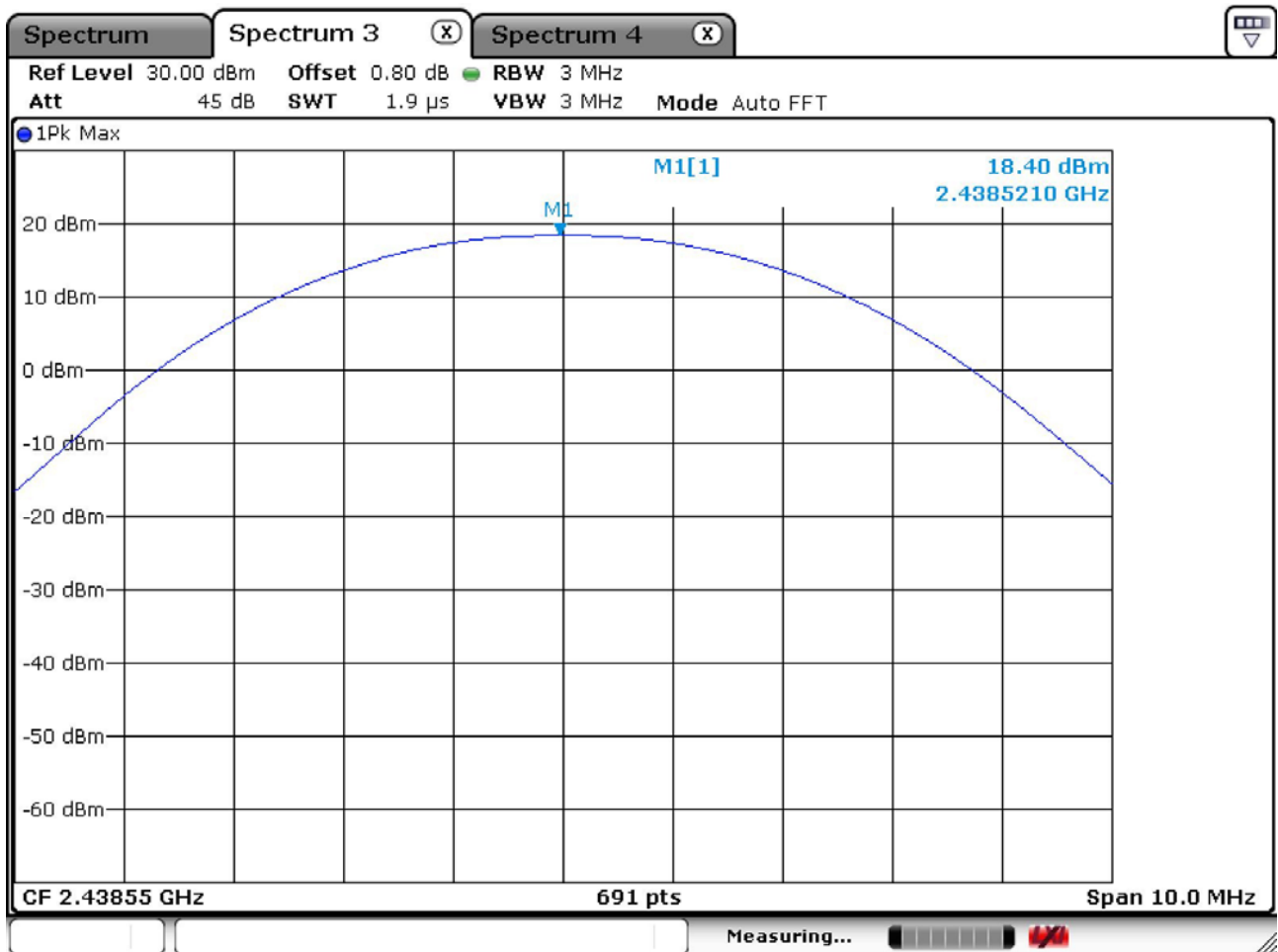- See next pages for actual measured spectrum plots.

Minimum Standard:	< 250 mW

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Channel 1

Spectrum | Spectrum 3 ⊗ | Spectrum 4 ⊗

Ref Level 30.00 dBm   Offset 0.80 dB ● RBW 3 MHz
Att   45 dB   SWT   1.9 μs   VBW 3 MHz   Mode Auto FFT

● 1Pk Max

M1[1]   18.88 dBm
2.4039400 GHz

M1

20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm

CF 2.404056 GHz   691 pts   Span 10.0 MHz

Measuring...

Channel 2

Channel 3
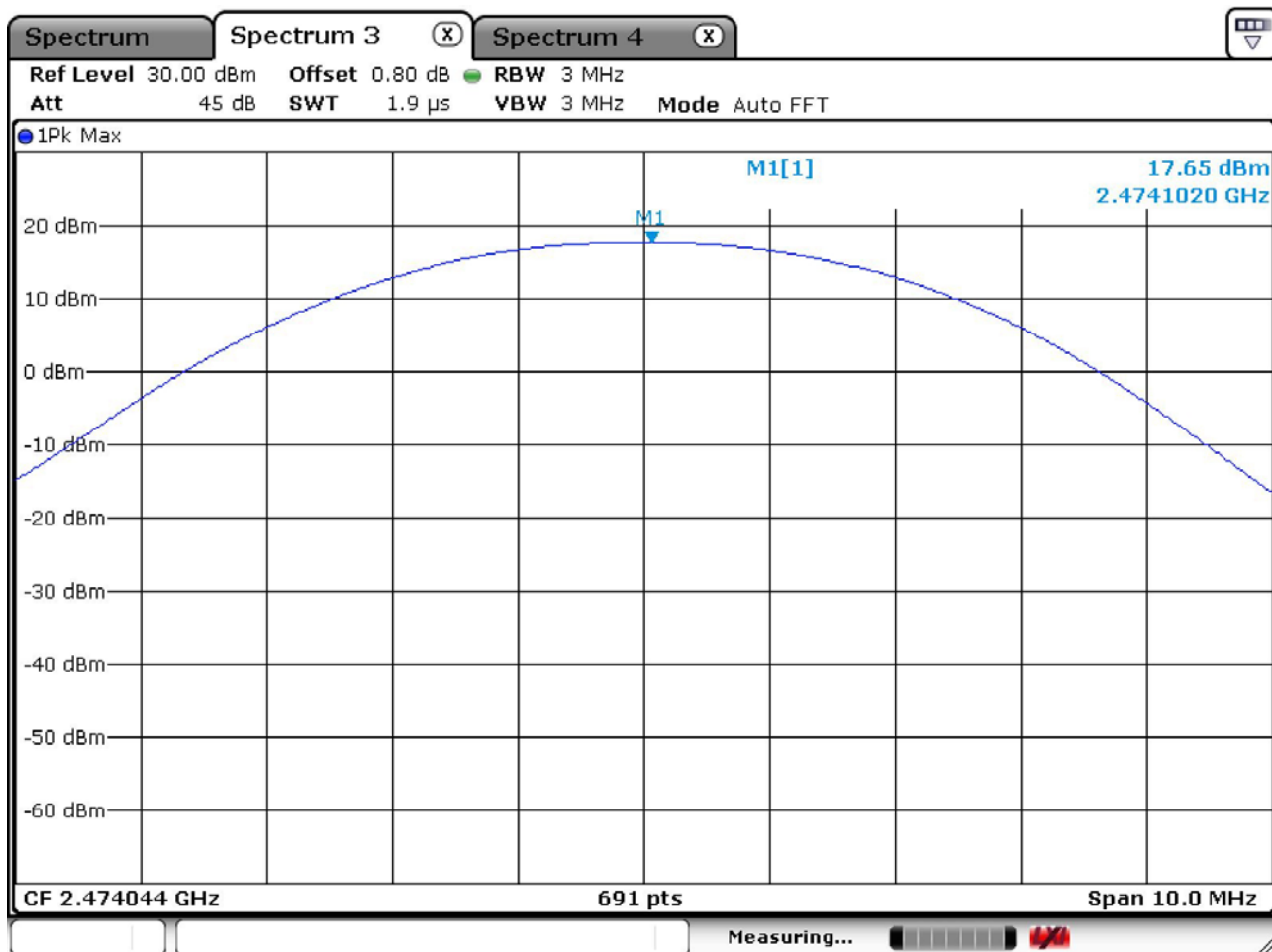
3.3.6 Band Edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

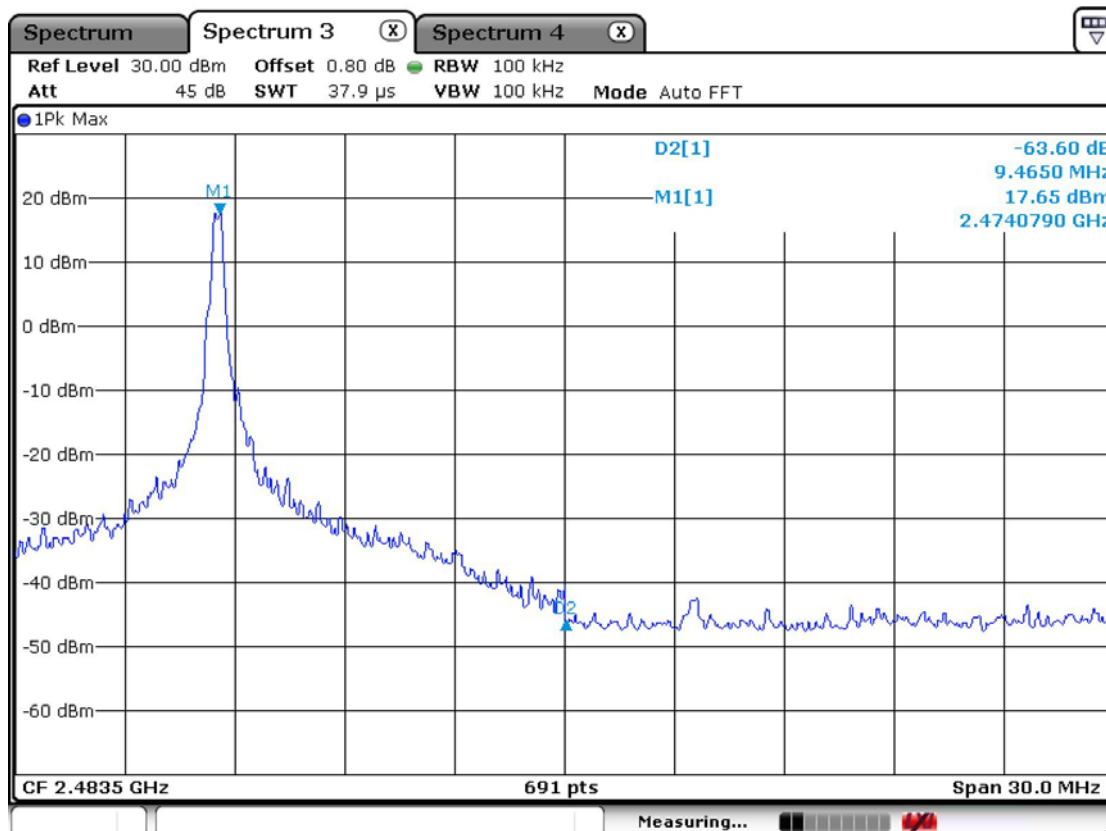|	
RBW = 100 kHz	VBW = 100 kHz
Span = 30MHz	Detector function = peak
Trace = max hold	Sweep = auto

Measurement Data: **Complies**

- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density.   Therefore the applying equipment meets the requirement.

- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc

Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Band – edge

Lower edge
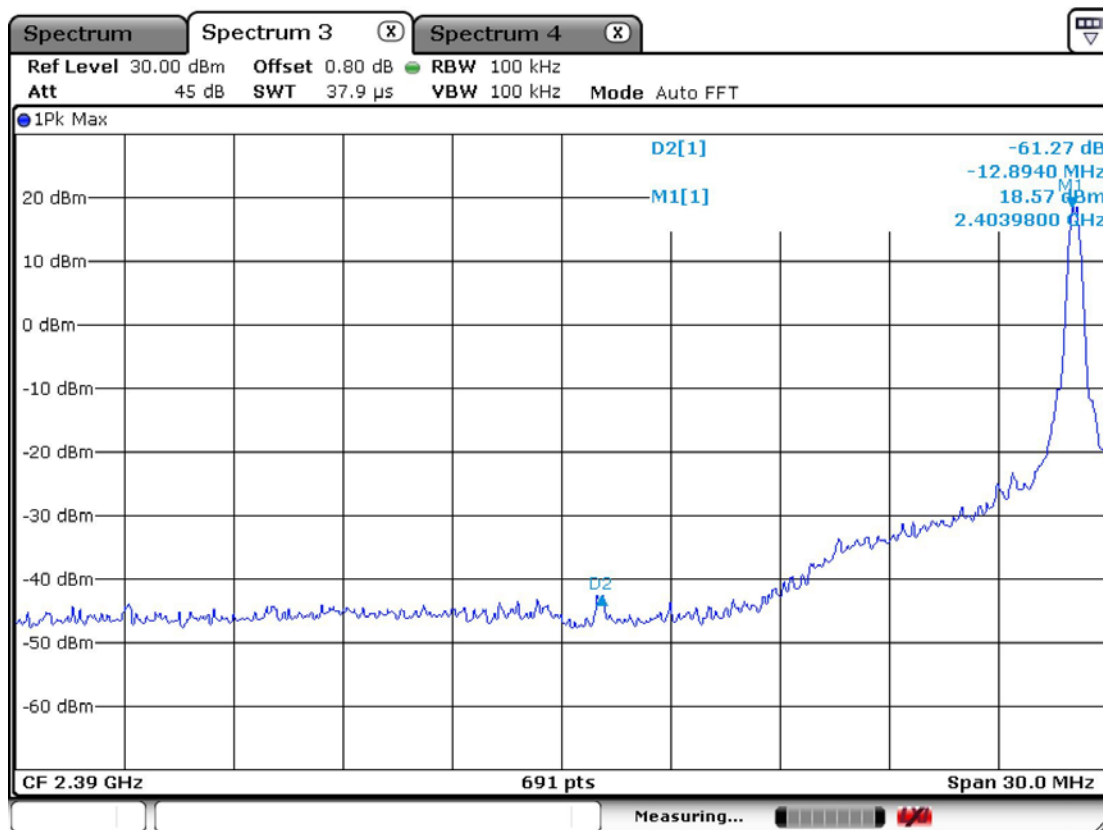
Upper edge

**Band-edges in the restricted band 2310-2390 MHz measurement**

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Cable Loss	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2368.7	20.2	31.5	H	27.9	10.5	54.0	74.0	37.6	48.9	16.4	25.1

**Band-edges in the restricted band 2483.5-2500 MHz measurement**

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor Antenna	Cable Loss	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2493.6	19.4	29.9	H	27.9	10.5	54.0	74.0	36.8	47.3	17.2	26.7

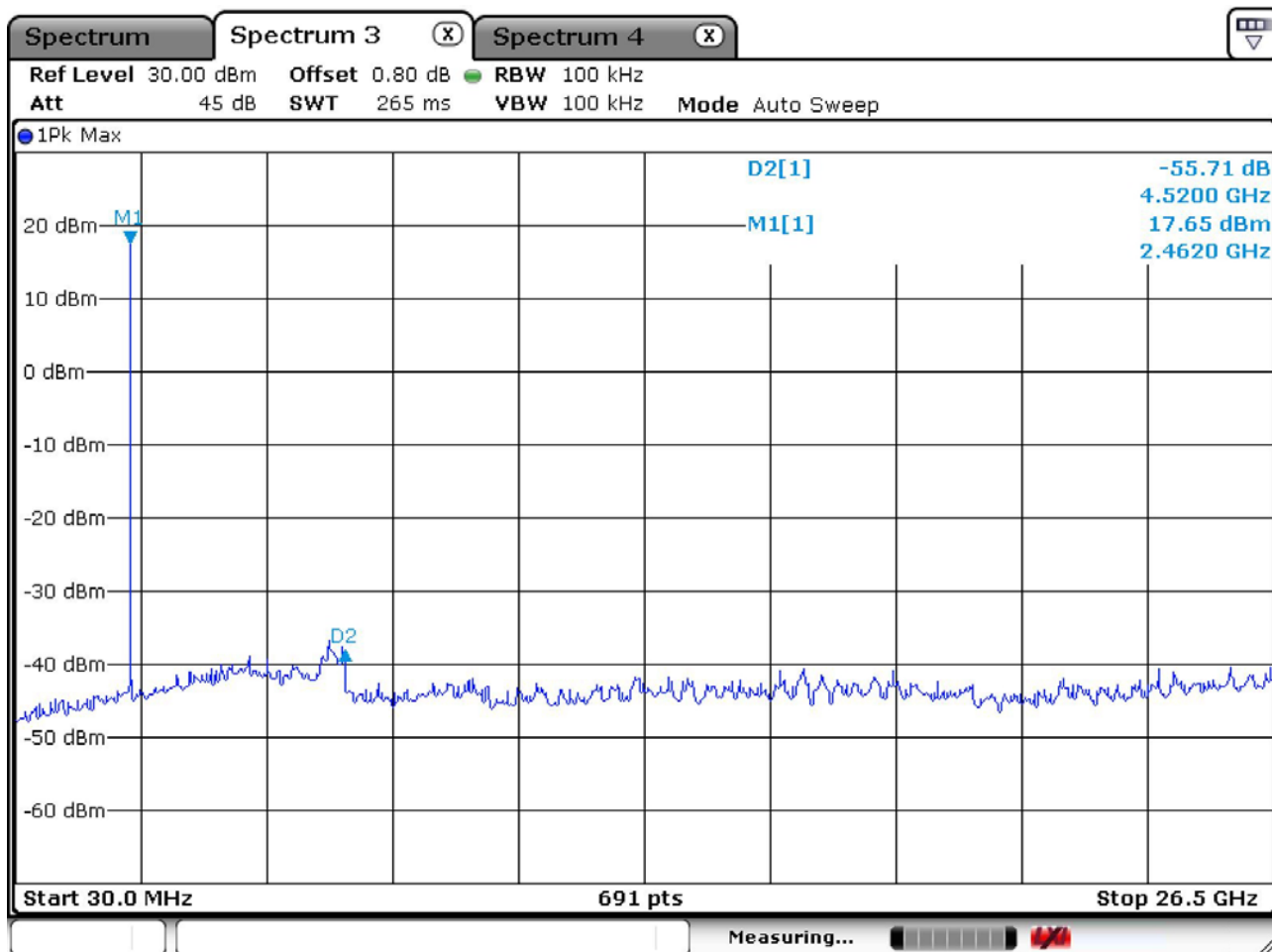**Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented.**

Unwanted Emission – Low channel
Frequency Range = 30 MHz ~ 26.5 GHz
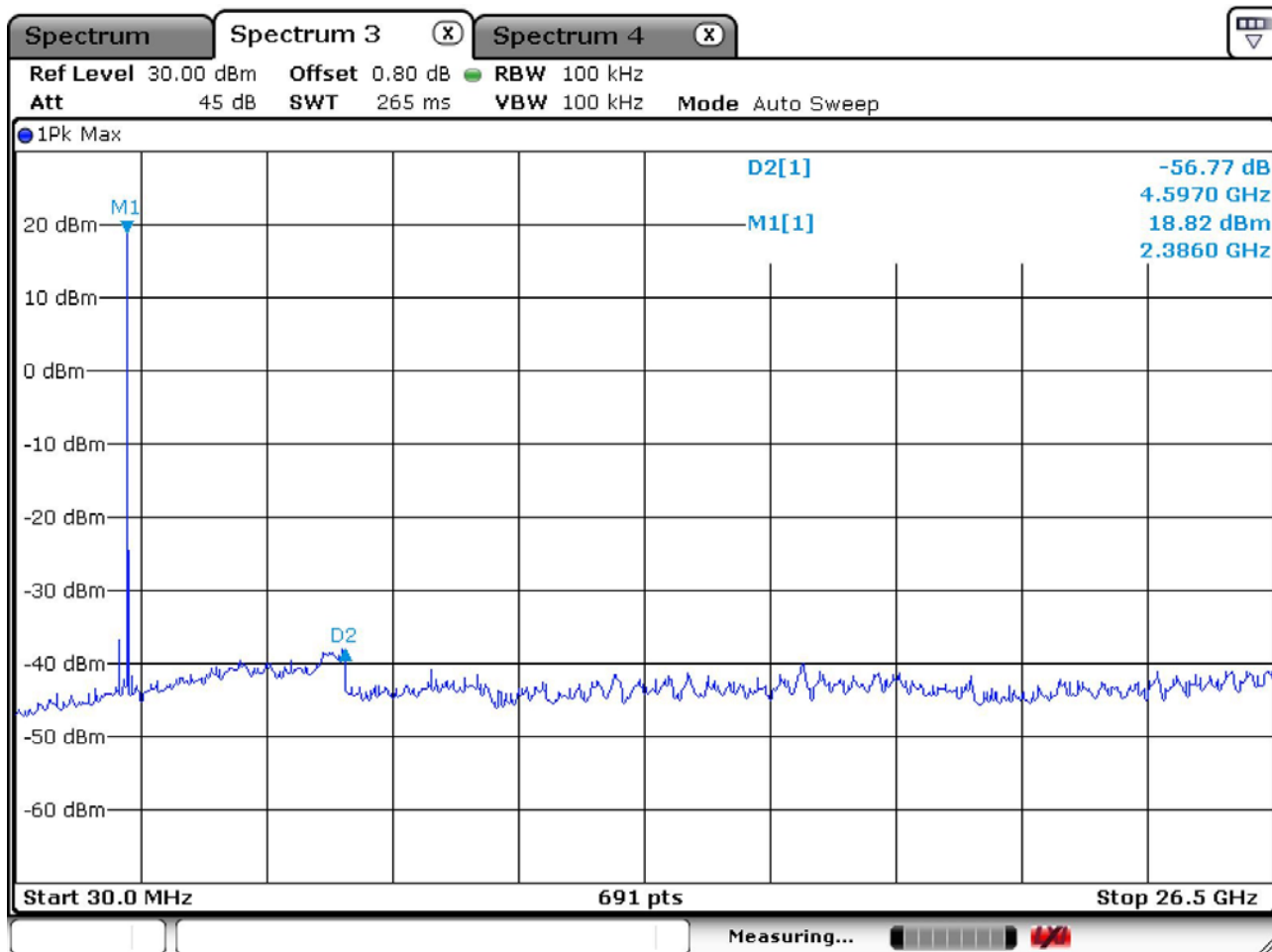
Unwanted Emission – Middle channel
Frequency Range = 30 MHz ~ 26.5 GHz
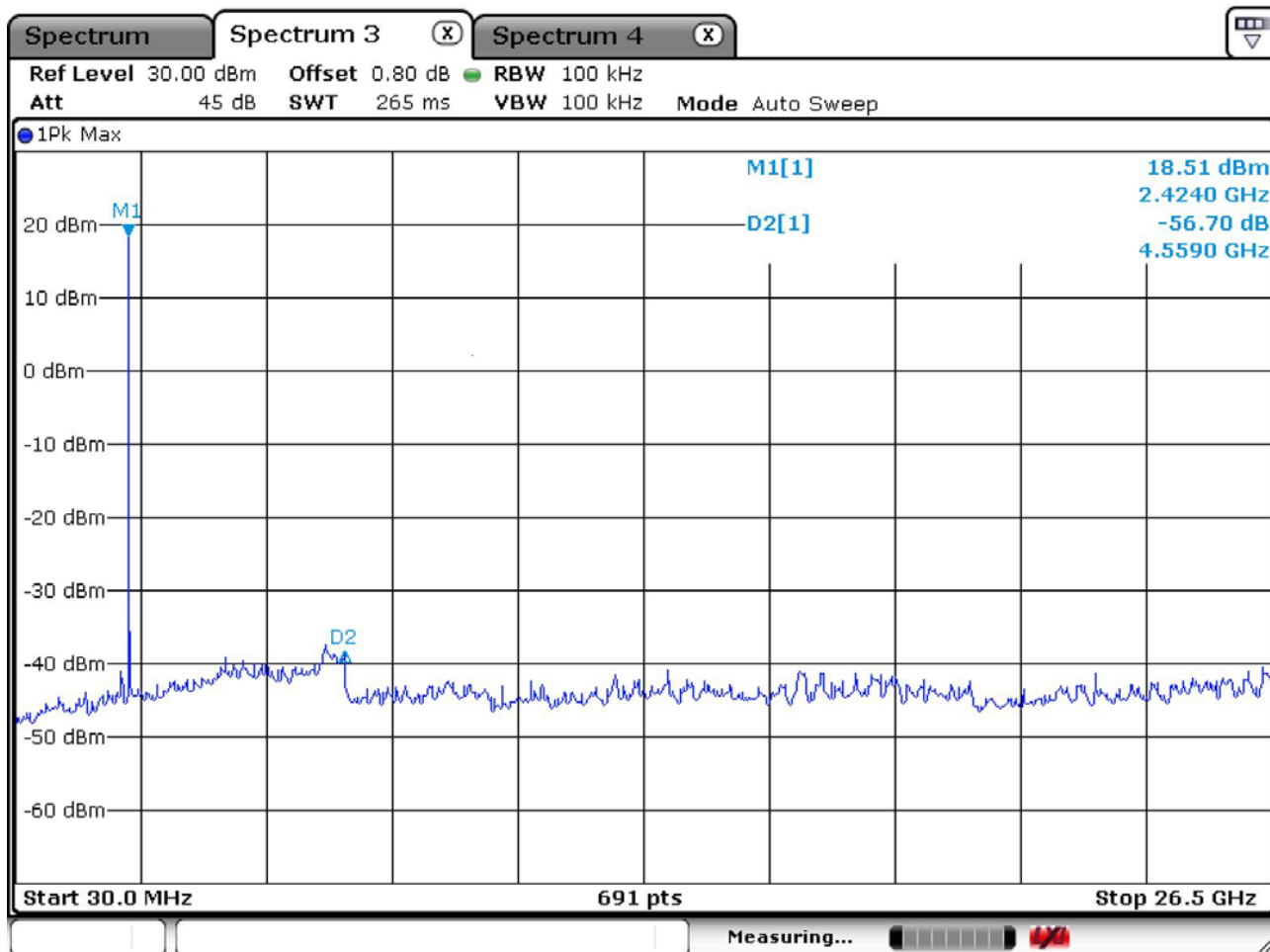
Unwanted Emission – High channel
Frequency Range = 30 MHz ~ 26.5 GHz

3.3.7 Field Strength of Harmonics

Procedure:

Radiated emissions from the EUT were measured according to the dictates of DA000705. The EUT was placed on a 0.8m high wooden table inside a shielded enclosure.   An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements.   For final radiated testing, measurements were performed in OATS.   Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

(a) In the frequency range of 9kHz to 30 MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 9 KHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)   Peak: VBW $\geq$ RBW

     = 1 MHz   (1 GHz ~ 10th harmonic)   Average: VBW=10Hz

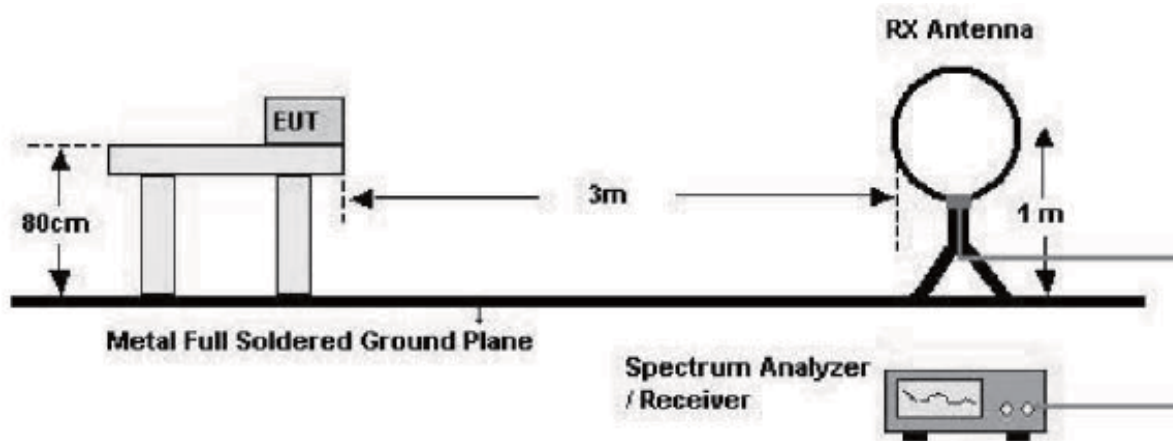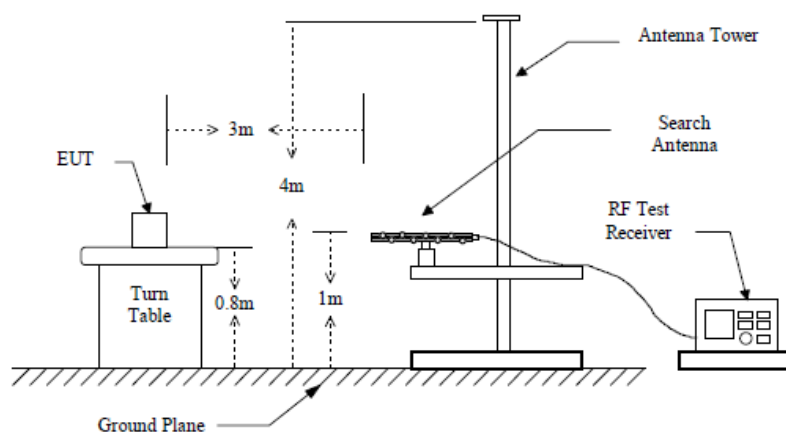Span = 100 MHz   Detector function = peak

Trace = max hold   Sweep = auto
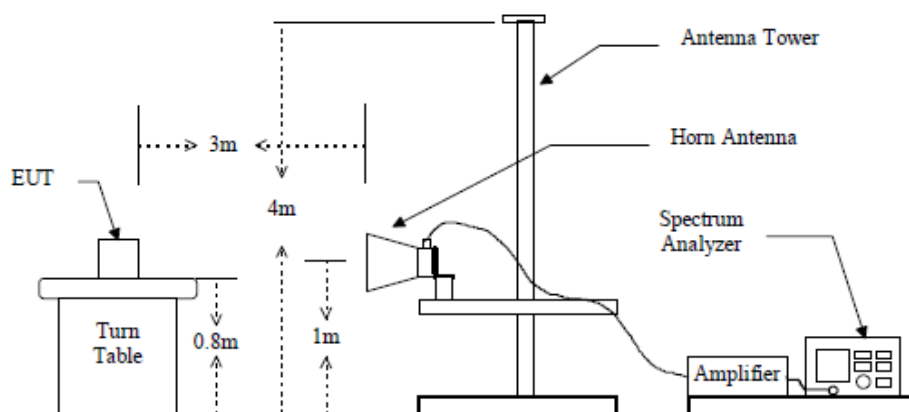
below 30MHz

below 1GHz (30MHz to 1GHz)

above 1GHz

Measurement Data: Complies

- See next pages for actual measured data.

- No other emissions were detected at a level greater than 20dB below limit.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
0.009 ~ 0.490	2400/F(kHz) (@ **300m**)
0.490 ~ 1.705	24000/F(kHz) (@ **30m**)
1.705 ~ 30	30(@ **30m**)
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz.   However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data :

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
	AV	Peak		Antenna	Amp.Gain+Cable	AV	Peak	AV	Peak	AV	Peak
4808.1	36.8	53.3	H	29.8	32.4	54.0	74.0	34.2	50.7	19.8	23.3

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
	AV	Peak		Antenna	Amp.Gain+Cable	AV	Peak	AV	Peak	AV	Peak
4877.5	35.2	52.4	H	29.8	32.4	54.0	74.0	32.6	49.8	21.4	24.2

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV/Peak		Result [dBuV/m] AV/Peak		Margin [dB] AV / Peak	
	AV	Peak		Antenna	Amp.Gain+Cable	AV	Peak	AV	Peak	AV	Peak
4948.4	33.3	52.3	H	29.8	32.4	54.0	74.0	30.7	49.7	23.3	24.3

- No other emissions were detected at a level greater than 20dB below limit.

Measurement Data: (9kHz - 30MHz)

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Correction Factor		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
	AV	Peak		Antenna	Amp.Gain+Cable	AV	Peak	AV	Peak	AV	Peak
-	-	-	-	-	-	-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Radiated Emissions – Wireless mode

LTA
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```
EUT/Model No.: TM02                    TEST MODE: Tx mode
              -------------------------------------------------------
   Temp Humi  : 17 / 47                 Tested by: Ko Gun
              -------------------------------        ----------------
```
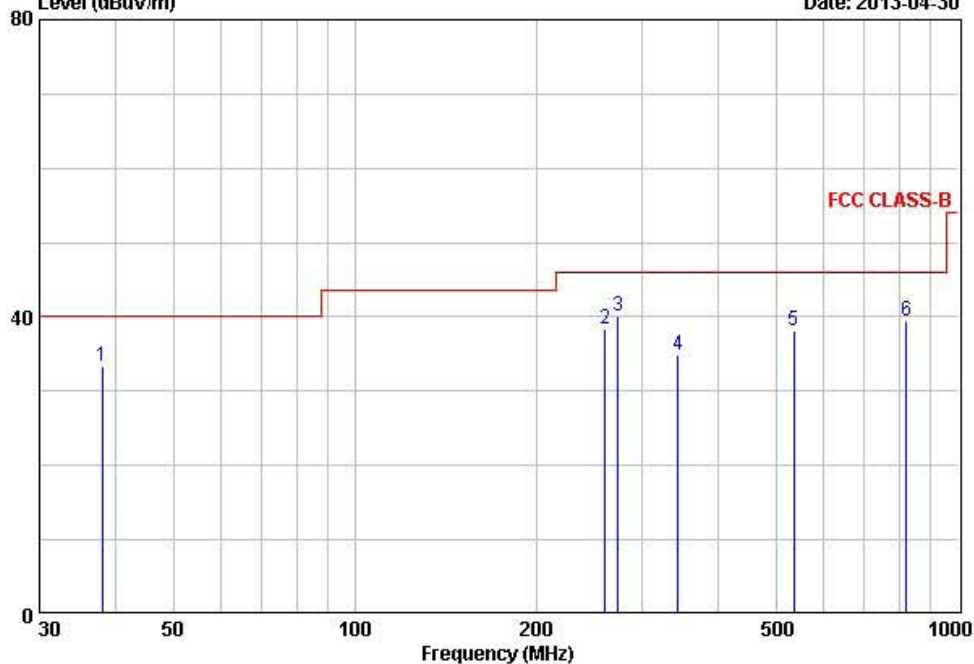


```
Data: 197
      Level (dBuV/m)                                      Date: 2013-04-30
80
                                                           FCC CLASS-B
40
 0 30        50        100           200        500      1000
                         Frequency (MHz)
```

	Freq	Reading	C.F	Result	Limit QP	Margin	Height	Angle	Polarity
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1	38.13	45.80	-12.45	33.35	40.00	6.65	100	44	VERTICAL
2	259.89	45.30	-6.93	38.37	46.00	7.63	390	328	HORIZONTAL
3	273.12	47.80	-7.62	40.18	46.00	5.82	375	169	HORIZONTAL
4	343.59	42.30	-7.37	34.93	46.00	11.07	352	116	HORIZONTAL
5	535.16	39.20	-1.07	38.13	46.00	7.87	258	116	HORIZONTAL
6	821.26	33.40	6.03	39.43	46.00	6.57	351	208	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss – Preamp gain

- 1 -

3.3.8 AC Conducted Emissions

Procedure:

AC power line conducted emissions from the EUT were measured according to the dictates of ANSI C63.4:2003.

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Not Applicable

(This Product is operated by battery.)

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Note: The limits will decrease with the frequency logarithmically within 0.15MHz to 0.5MHz

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Expiration date of Calibration
1	Spectrum Analyzer (~30GHz)	FSV-30	100757	R&S	2014-01-15
2	Spectrum Analyzer (~2.9GHz)	8594E	3649A03649	HP	2014-03-26
3	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	2014-03-25
4	Signal Generator (1~20GHz)	83711B	US34490456	HP	2014-03-25
5	Attenuator (3dB)	8491A	37822	HP	2014-09-22
6	Attenuator (10dB)	8491A	63196	HP	2014-09-22
7	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	2014-03-25
8	EMI Test Receiver (~7GHz)	ESCI7	100722	R&S	2013-09-22
9	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	2014-09-22
10	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2014-03-26
11	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2014-12-21
12	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2014-03-15
13	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2014-03-15
14	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2014-09-20
15	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2013-09-26
16	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
17	Power Divider	11636A	6243	HP	2014-09-22
18	DC Power Supply	6622A	3448A03079	HP	-
19	Frequency Counter	5342A	2826A12411	HP	2014-03-25
20	Power Meter	EPM-441A	GB32481702	HP	2014-03-25
21	Power Sensor	8481A	US41030291	HP	2013-09-22
22	Audio Analyzer	8903B	3729A18901	HP	2013-09-22
23	Modulation Analyzer	8901B	3749A05878	HP	2013-09-22
24	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	2013-09-22
25	Stop Watch	HS-3	601Q09R	CASIO	2014-03-26
26	LISN	ENV216	100408	R&S	2013-09-22
27	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2014-06-27
28	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-
29	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-
30	Active Loop Antenna	FMZB 1519	1519-031	SCHWARZBECK	2014-12-14