


 Dates of Tests: Feb 10~18, 2011  
 Test Report S/N: LR500111102D  
 Test Site : LTA Co., Ltd.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**Y6V-R01B**

APPLICANT

**LAONEX CO., LTD.**

<b>Equipment Class</b>	:	<b>Digital Transmission System (DTS)</b>
<b>Manufacturing Description</b>	:	<b>AirKIT Wireless Keyboard &amp; Mouse</b>
<b>Manufacturer</b>	:	<b>LAONEX CO., LTD.</b>
<b>Model name</b>	:	<b>Y6V-R01B</b>
<b>Test Device Serial No.:</b>	:	<b>Identical prototype</b>
<b>Rule Part(s)</b>	:	<b>FCC Part 15.247 Subpart C ; ANSI C-63.4-2003</b>
<b>Frequency Range</b>	:	<b>2418MHz ~ 2478MHz</b>
<b>Max. Output Power</b>	:	<b>Max 2.55dBm – Conducted</b>
<b>Data of issue</b>	:	<b>February 21, 2011</b>

This test report is issued under the authority of:

The test was supervised by:

Hyun-Chae You, Manager

Il-Shin kim, Test Engineer

**This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.**

NVLAP LAB Code.: 200723-0

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## 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](mailto: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	2011-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-09-01	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

## 2. Information's about test item

### 2-1 Applicant & Manufacturer

Company name : LAONEX CO., LTD.  
 Address : Digital Empire Bldg., C-206, 980-3, Yeongtong-Dong,  
                   Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, korea  
 Tel / Fax : TEL No : +82-70-7759-5164 FAX No : +82-505-953-5164

### 2-2 Equipment Under Test (EUT)

Trade name : AirKIT Wireless Keyboard & Mouse  
 FCC ID : Y6V-R01B  
 Model name : R01B  
 Serial number : Identical prototype  
 Date of receipt : February 10, 2011  
 EUT condition : Pre-production, not damaged  
 Antenna type : PCB antenna with Max. 0.681dBi gain  
 Frequency Range : 2418MHz ~ 2478MHz  
 RF output power : Max 2.55dBm - Conducted  
 Number of channels : 5  
 Type of Modulation : GFSK  
 Channel spacing : 15MHz  
 Power Source : 3.7Vdc by Battery  
 Firmware version : -

### 2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2418	2448	2478

### 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
NOTEBOOK	VOSTRO 1015	G4YRDN1	DELL
PRINTER	EPSON STYLUS C59	JF5Y020825	EPSON

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500kHz	Conducted	C
15.247(b)	Transmitter Peak Output Power	< 1Watt		C
15.247(d)	Transmitter Power Spectral Density	< 8dBm @ 3kHz		C
15.247(d)	Band Edge & Spurious	> 20 dBc		C
15.209	Field Strength of Harmonics	Emission	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	C
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.

#### → Antenna Requirement

This unit complies with the requirement of §15.203.

The antenna is connected to inside of EUT. And type is PCB antenna.

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003

## 3.2 Technical Characteristics Test

### 3.2.1 6 dB Bandwidth

#### Procedure:

The bandwidth at 6dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

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 6dB 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 6 dB bandwidth of the emission.

#### The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 5 MHz

VBW = 100 kHz (VBW  $\geq$  RBW)

Sweep = auto

Trace = max hold

Detector function = peak

#### Measurement Data:

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2418	0.586	Complies
2448	0.593	Complies
2478	0.593	Complies

- See next pages for actual measured spectrum plots.

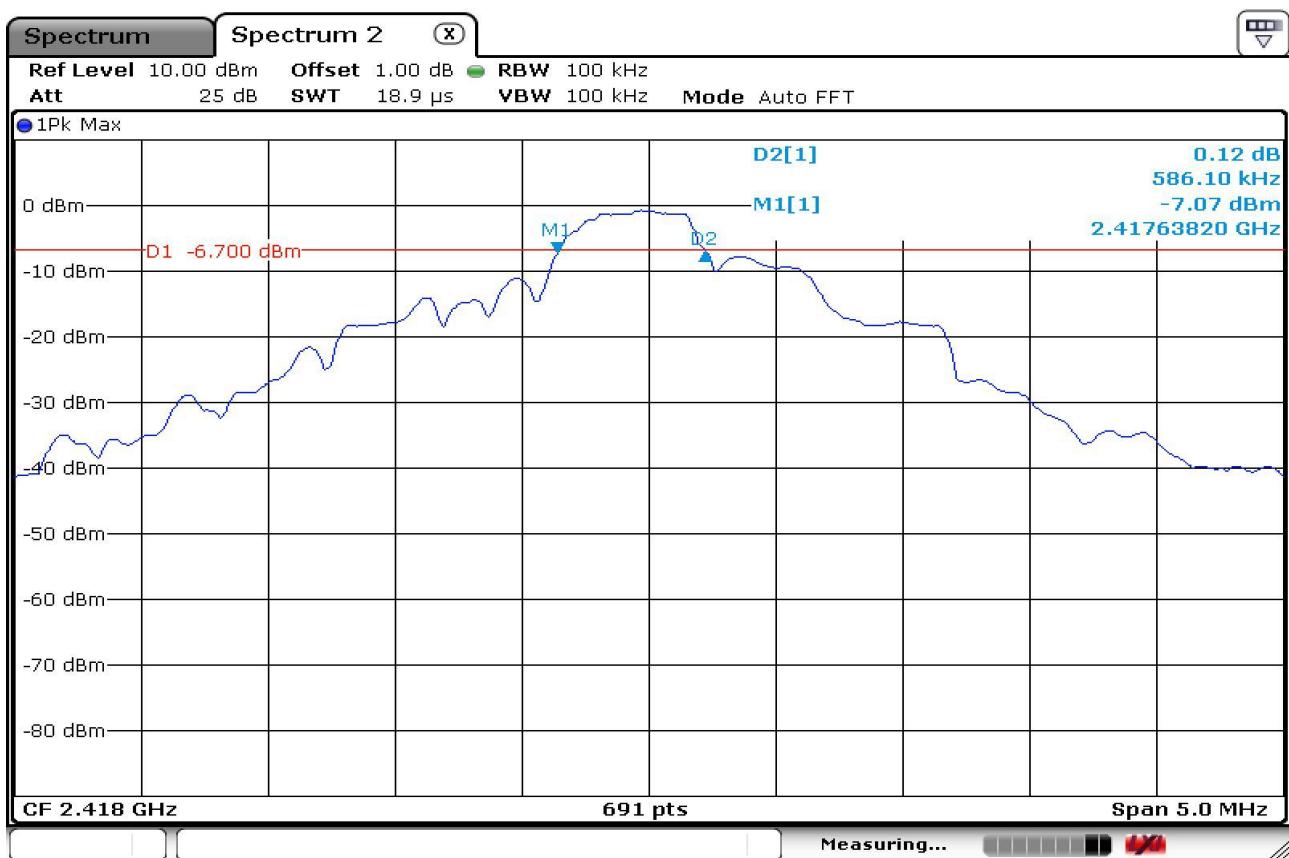
#### Minimum Standard:

6 dB Bandwidth  $>$  500kHz

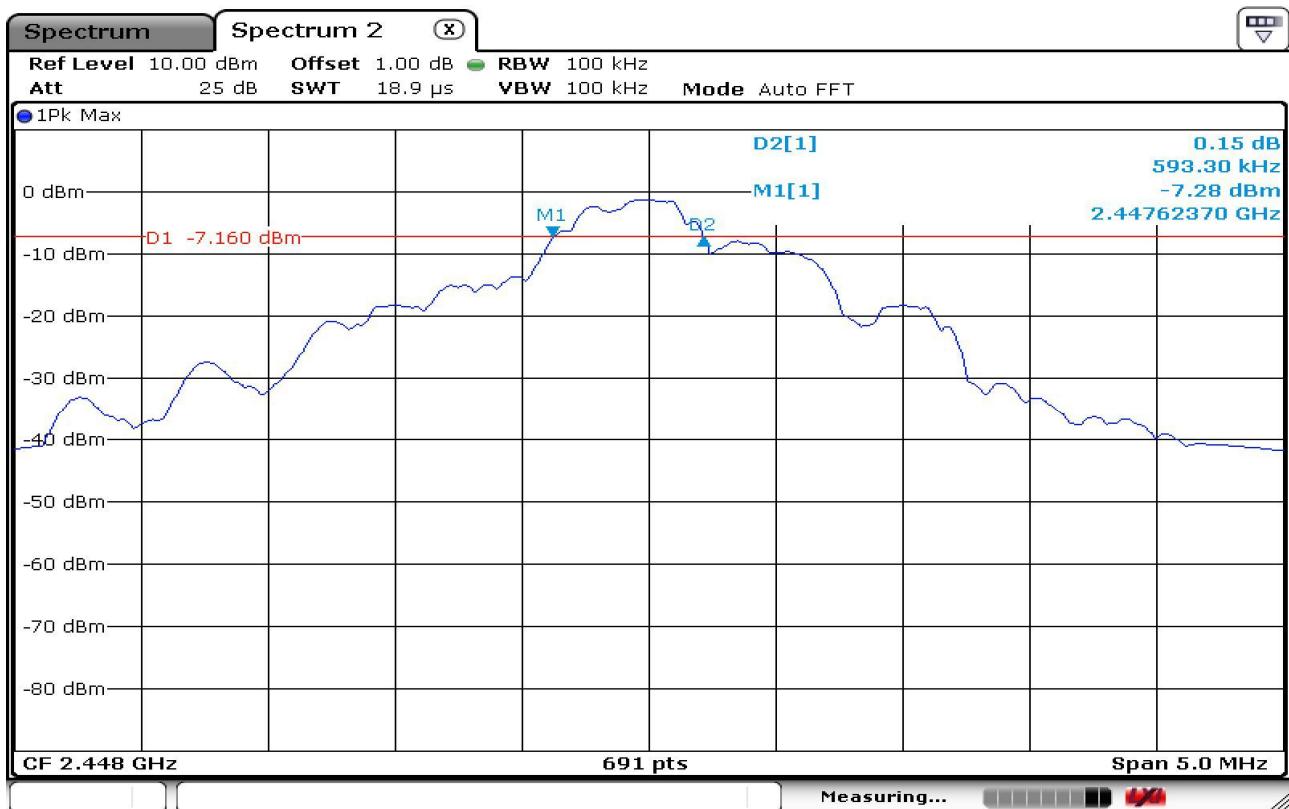
#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

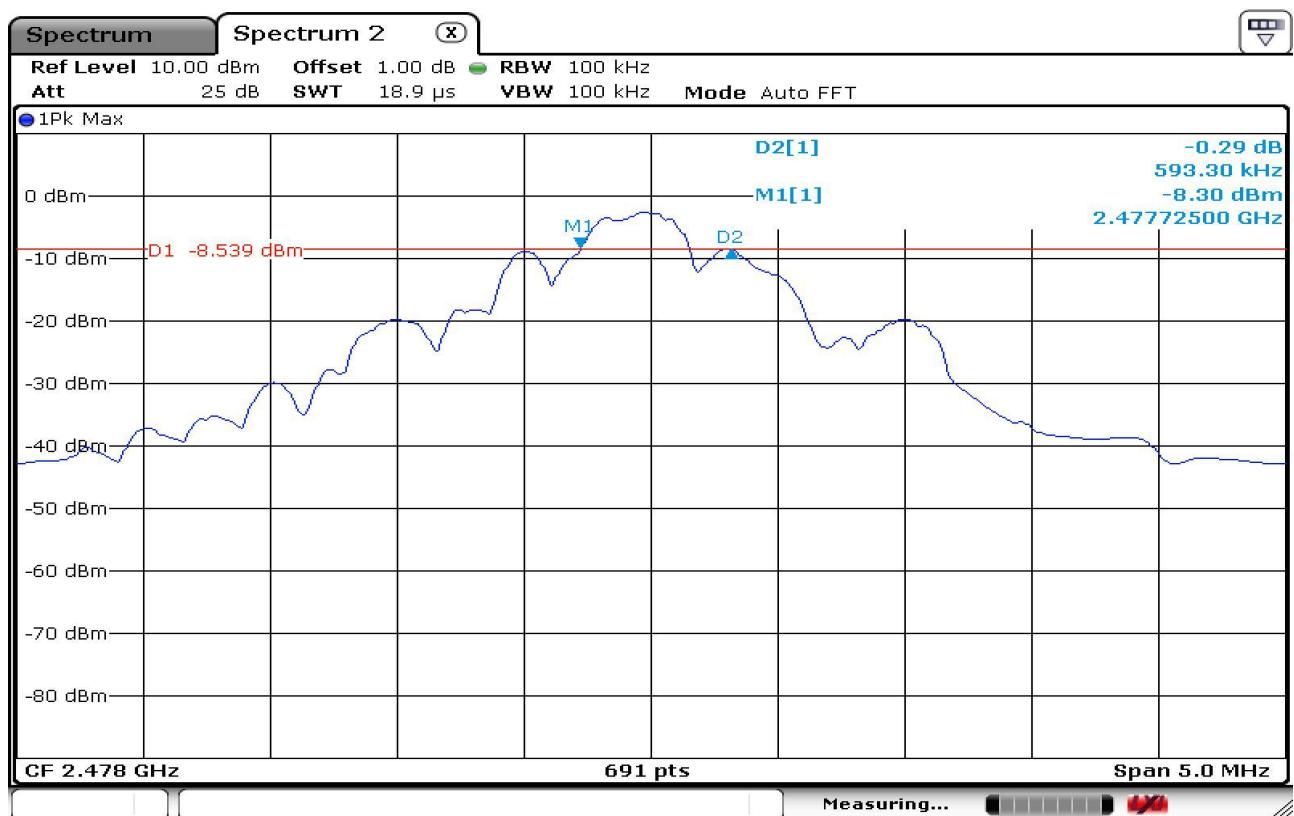
## Low Channel



## Mid Channel



## High Channel



### 3.2.2 Peak Output Power Measurement

#### Procedure:

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1MHz

Span = auto

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

Sweep = auto

Detector function = peak

#### Measurement Data:

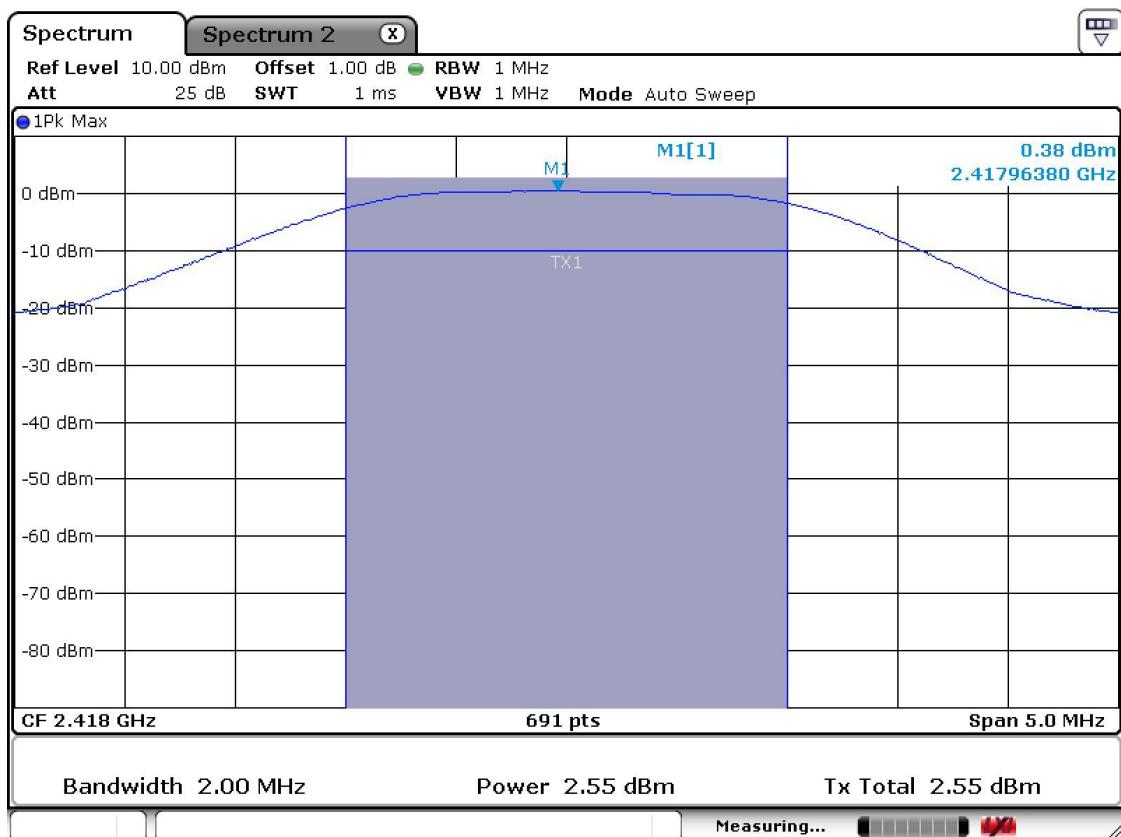
Frequency (MHz)	Test Results		
	dBm	mW	Result
2418	2.55	1.80	Complies
2448	1.38	1.37	Complies
2478	-0.06	0.99	Complies

- See next pages for actual measured spectrum plots.

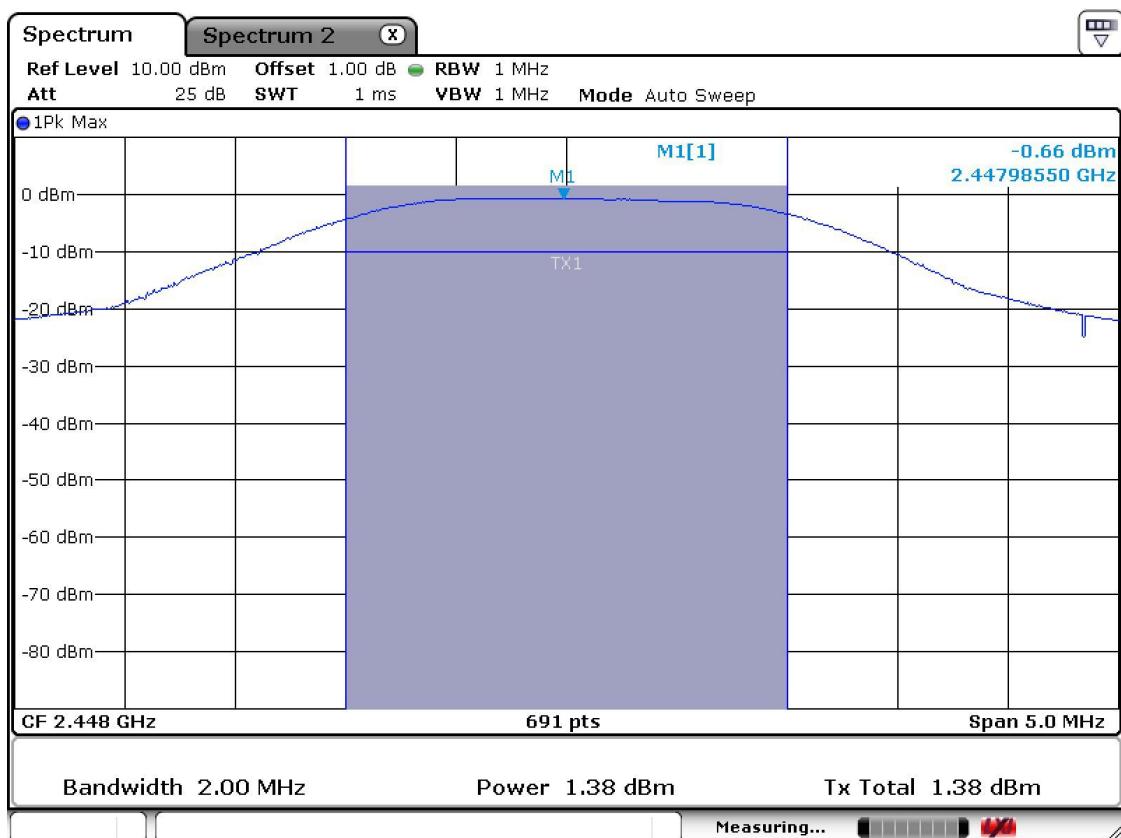
#### Minimum Standard:

Peak output power	< 1W
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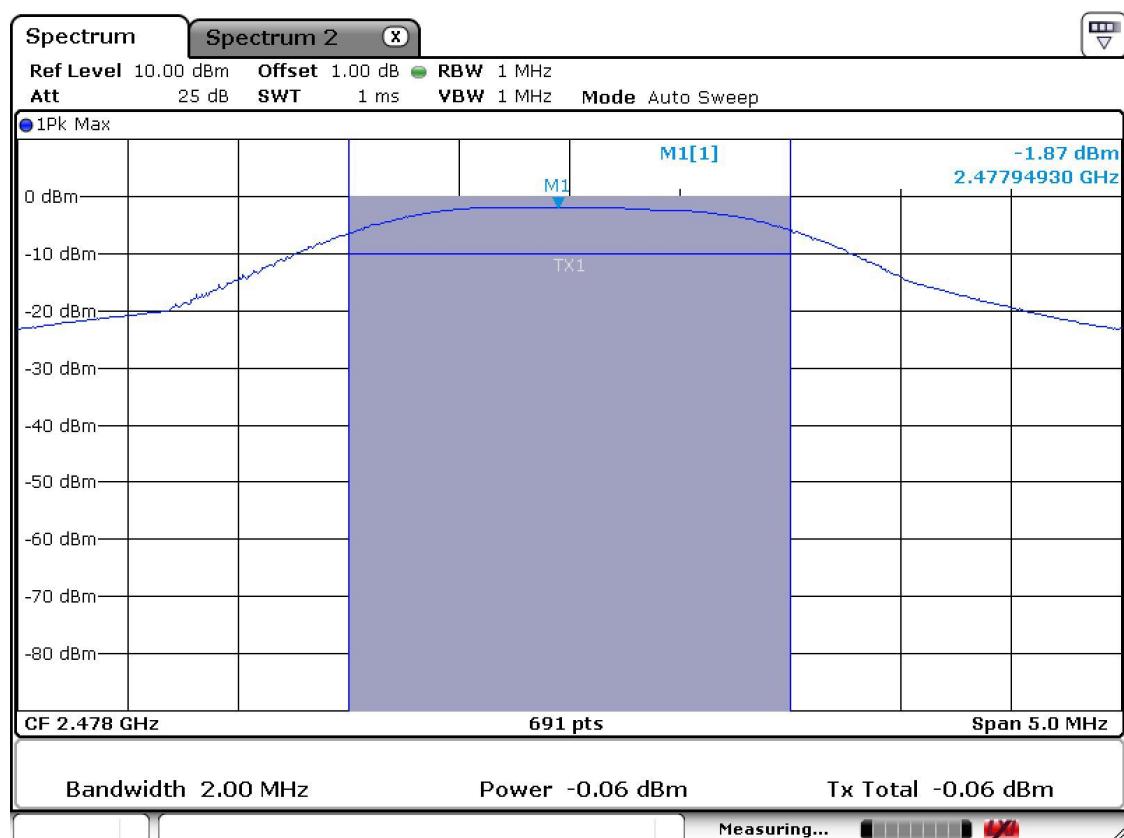
## Low Channel



## Mid Channel



## High Channel



### 3.2.3 Power Spectral Density

#### Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

#### The spectrum analyzer is set to:

RBW = 3 kHz	Span = 300 kHz
VBW = 10 kHz	Sweep = 100 sec
Detector function = peak	Trace = max hold

#### Measurement Data:

Frequency (MHz)	Test Results	
	dBm	Result
2418	-0.18	Complies
2448	-1.06	Complies
2478	-2.27	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

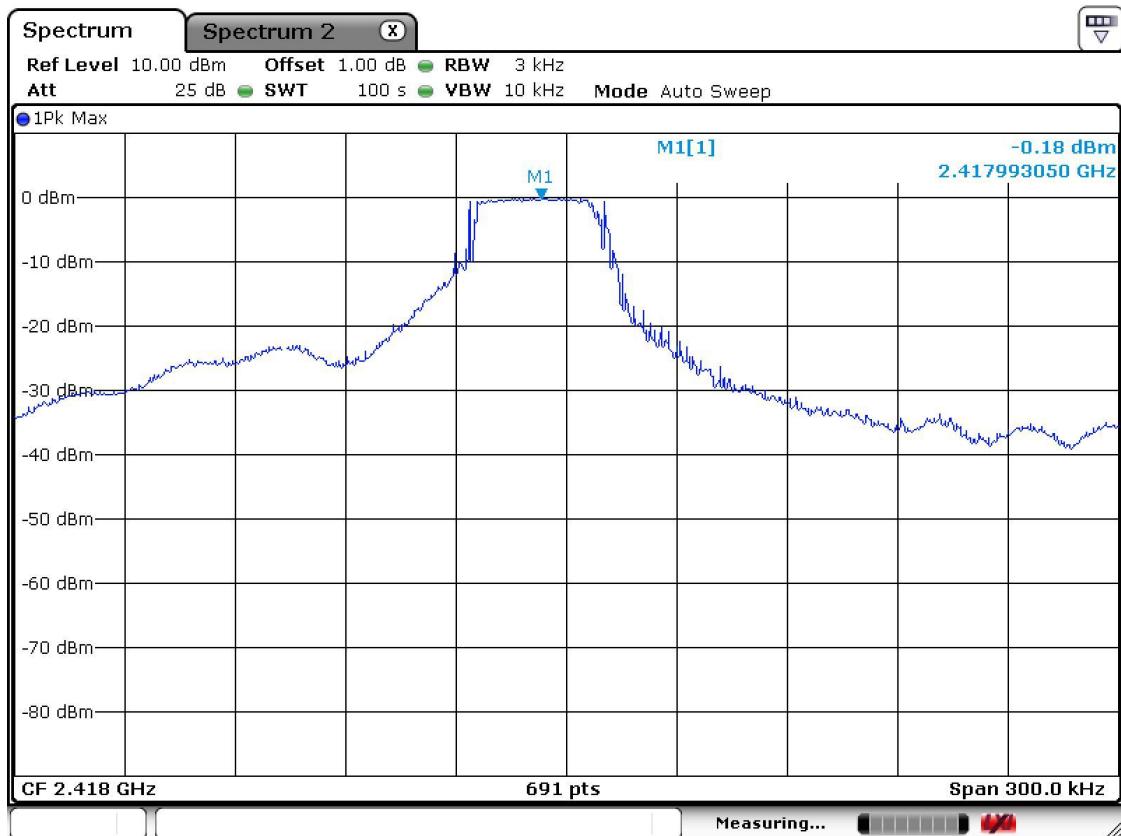
Power Spectral Density	< 8dBm @ 3kHz BW
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#### Measurement Setup

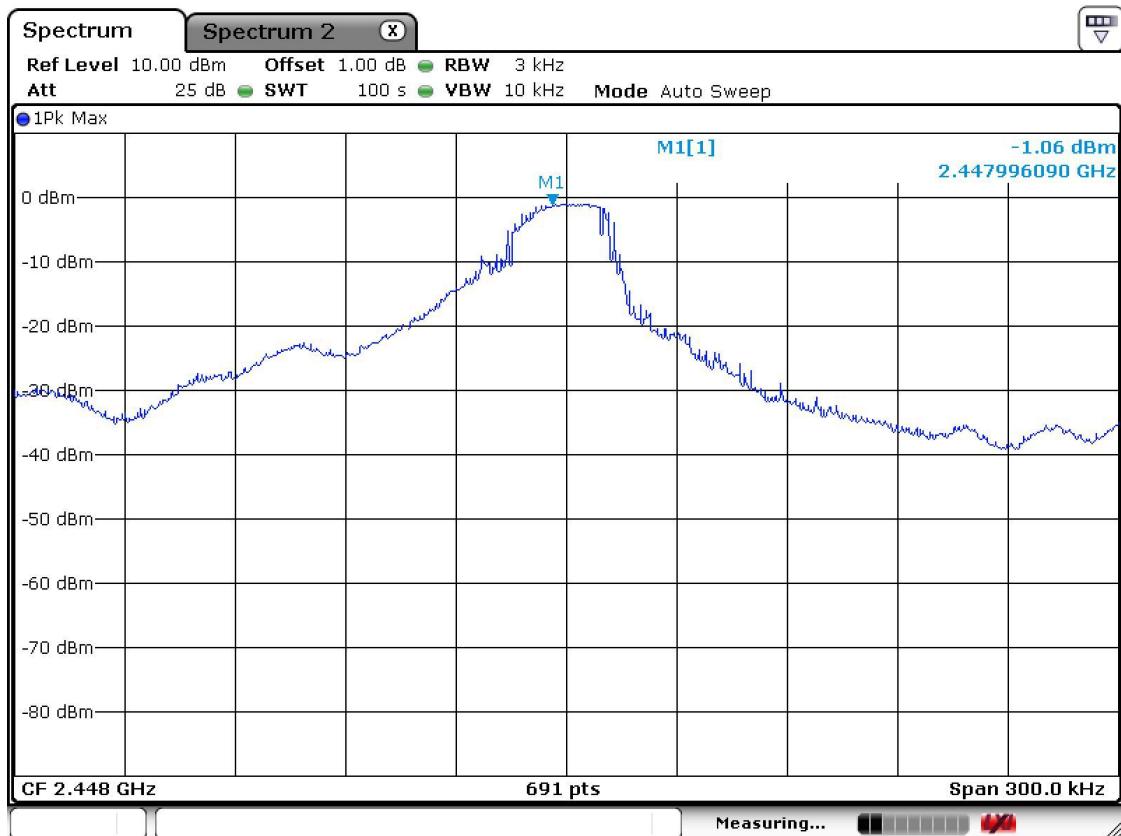
Same as the Chapter 3.2.1 (Figure 1)

## Power Density Measurement

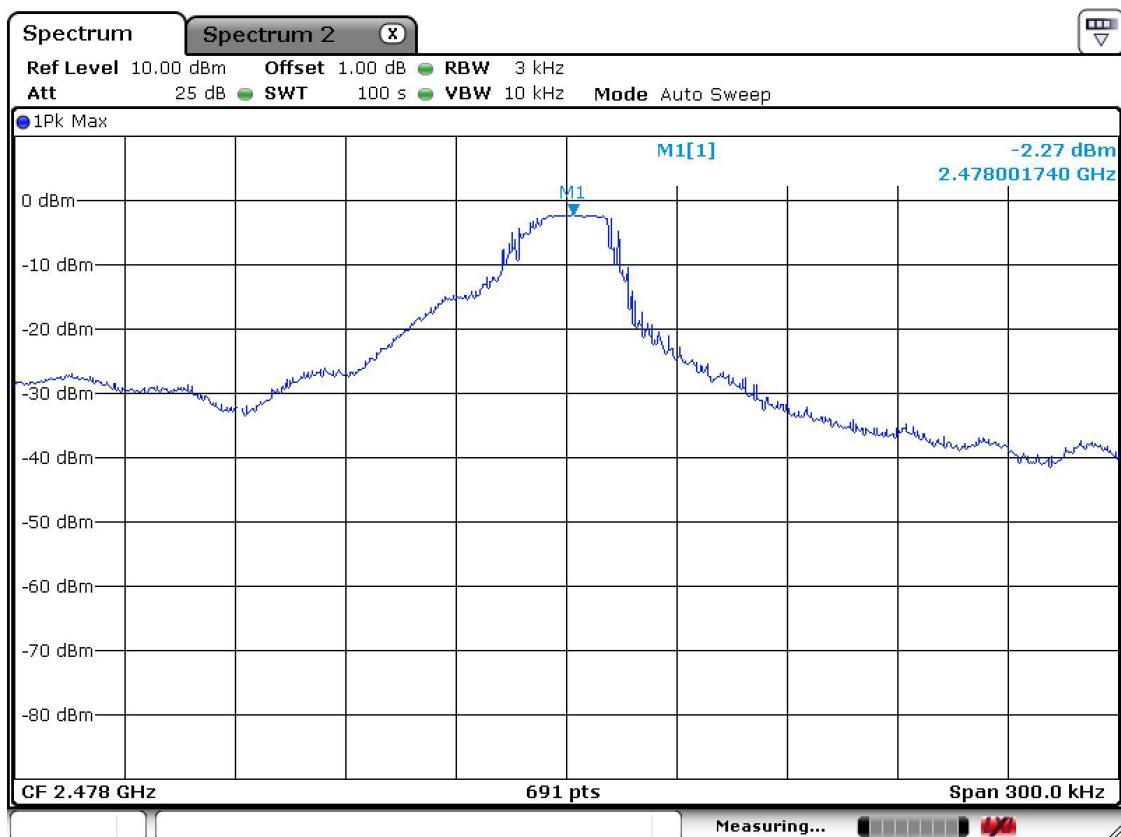
### Low Channel



### Mid Channel



## High Channel



### 3.2.4 Band - edge & Spurious

### 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 is operating in transmission mode at the appropriate frequencies.

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

Span = 50 MHz      Detector function = peak

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).

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

PEAK · RBW = VBW = 1MHz Sweep=Auto

Average: RBW = 1MHz VBW = 10Hz Sweep = Auto

Measurement Distance: 3m

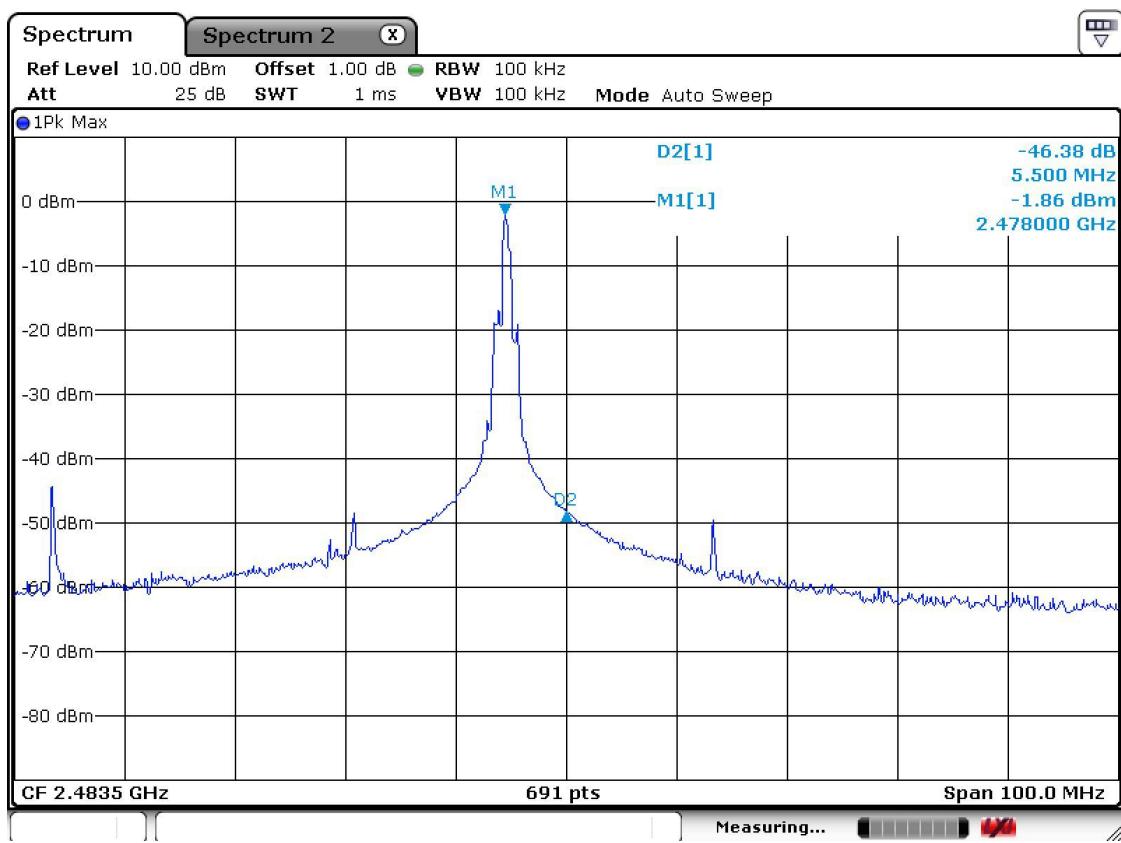
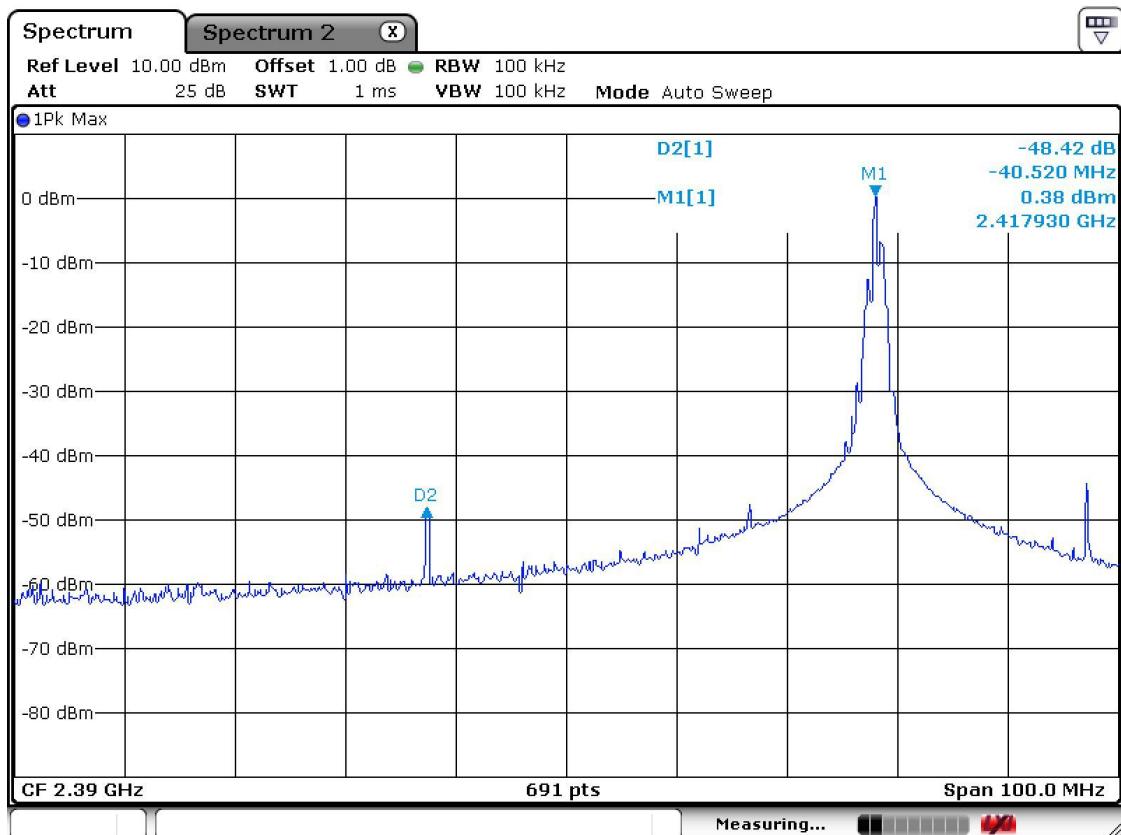
Polarization: Horizontal / Vertical

#### 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.

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<b>Minimum Standard:</b>	> 20 dBc
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Band-edge

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

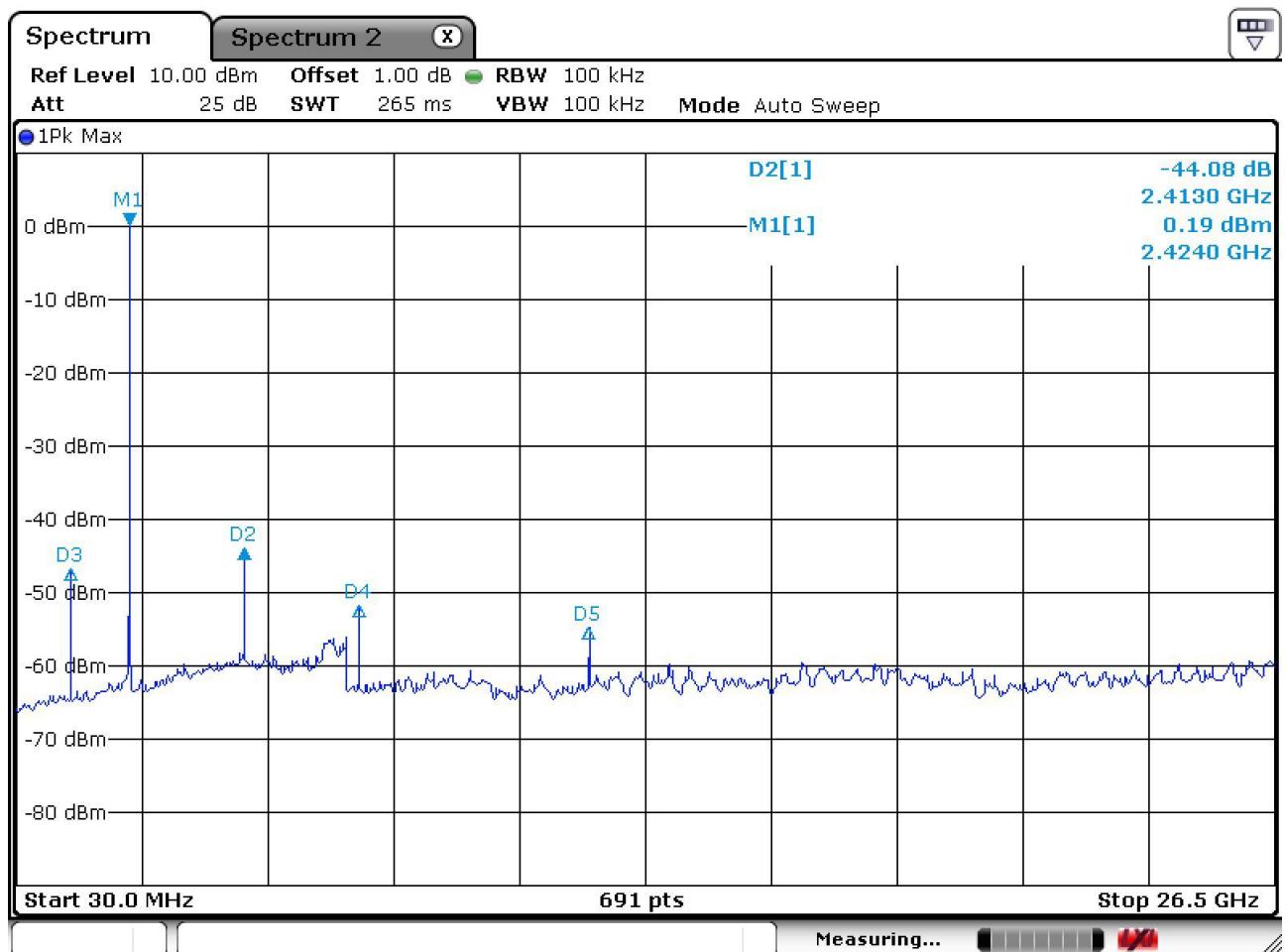
Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Antenna	Amp. Gain	Cable			
2390	36.1 55.8	H	25.4	37.1	4.0	54.0 74.0	28.4 48.1	25.7 26.0

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

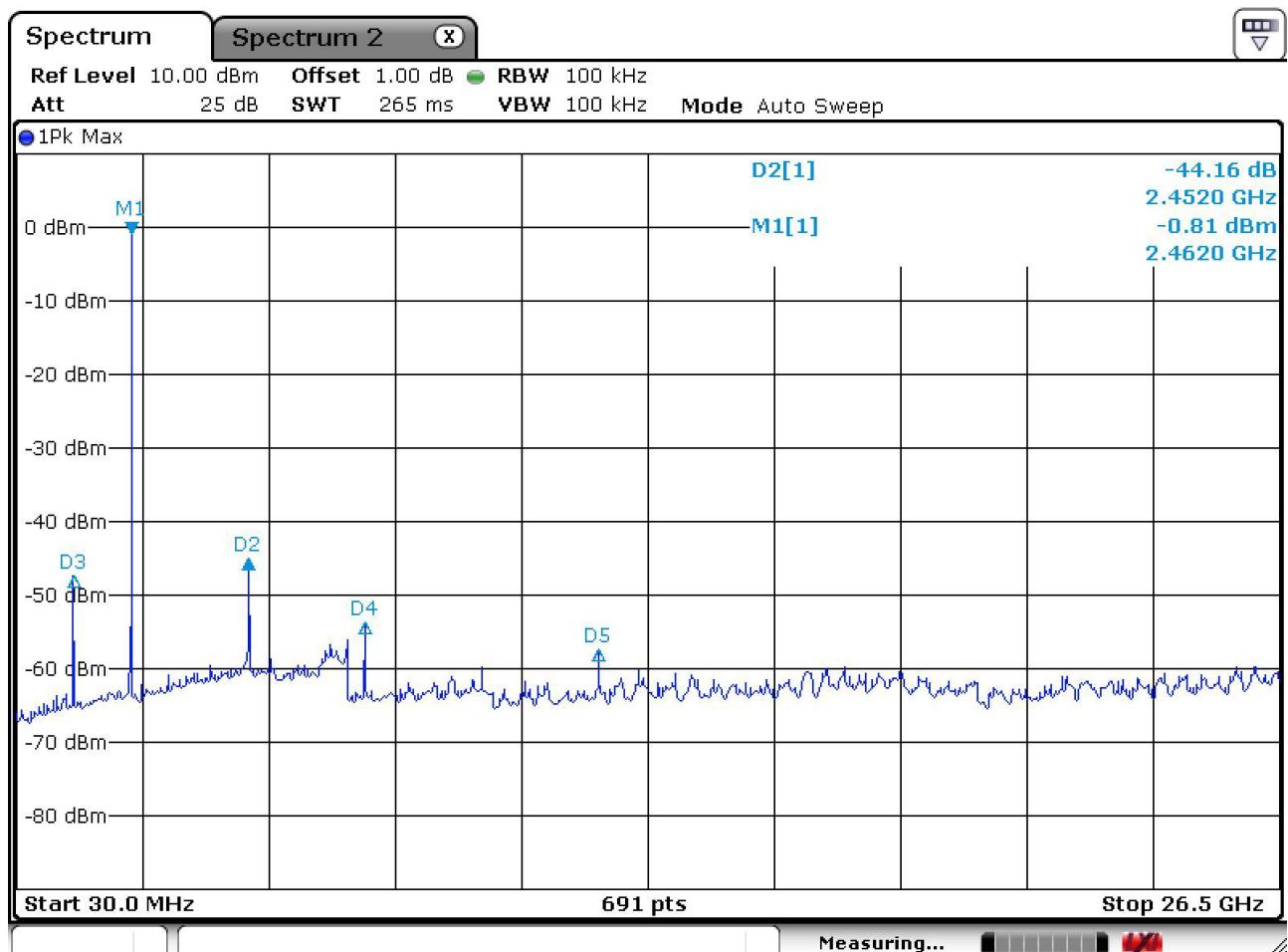
Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor			Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Antenna	Amp. Gain	Cable			
2483.5	34.1 68.4	H	25.4	37.1	4.0	54.0 74.0	26.4 60.7	27.6 13.4

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

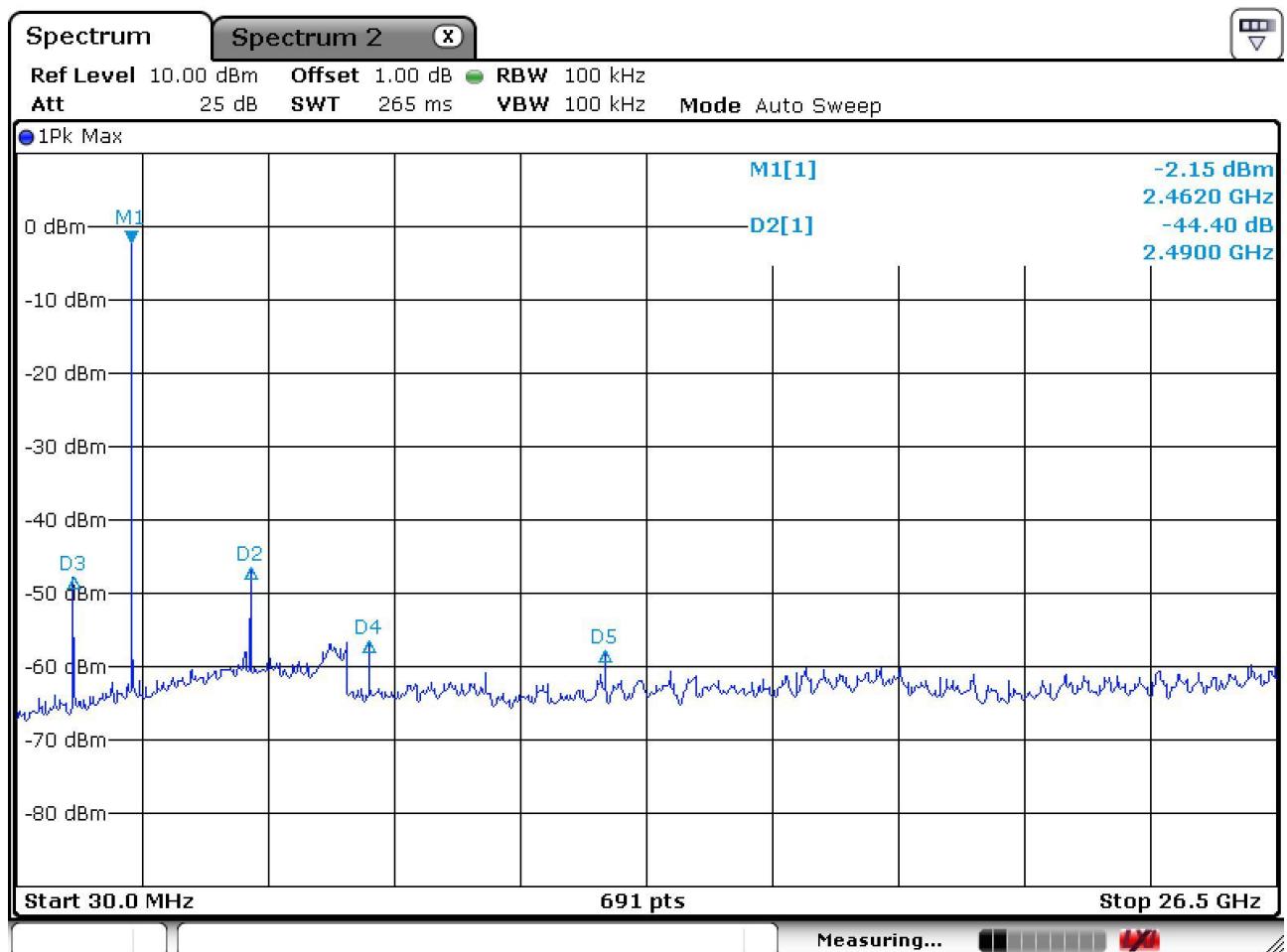
## Low channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

**Mid channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



**High channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



### 3.2.5 Field Strength of Harmonics

### Procedure:

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. In case of the air temperature of the test site is out of the range is 10 to 40°C before the testing proceeds the warm-up time of EUT maintain adequately

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 100 kHz ( 30MHz ~ 1 GHz)

$$\text{VBW} \geq \text{RBW}$$

= 1 MHz (1 GHz  $\sim$  10<sup>th</sup> harmonic )

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

**Measurement Data: Complies**

- See next pages for actual measured data.
  - The warm-up time of the EUT is 20min.

### **Minimum Standard: FCC Part 15.209(a)**

Frequency (MHz)	Limit (uV/m) @ 3m
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]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
				Antenna	Amp. Gain	Cable						
[MHz]	AV / Peak						AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4836.0	36.5	48.1	H	31.4	36.5	5.7	54.0	74.0	37.2	48.8	16.8	25.2
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
				Antenna	Amp. Gain	Cable						
[MHz]	AV / Peak						AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4896.0	36.2	47.6	H	31.4	36.5	5.7	54.0	74.0	36.9	48.3	17.1	25.7
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
				Antenna	Amp. Gain	Cable						
[MHz]	AV / Peak						AV / Peak	AV / Peak	AV / Peak	AV / Peak		
4956.00	36.4	48.6	H	31.4	36.5	5.7	54.0	74.0	37.1	49.3	16.9	24.7
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

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

Radiated Emissions – Wireless+Charging mode

243 Jubug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-3236008,9  
Fax :+82-31-3236010

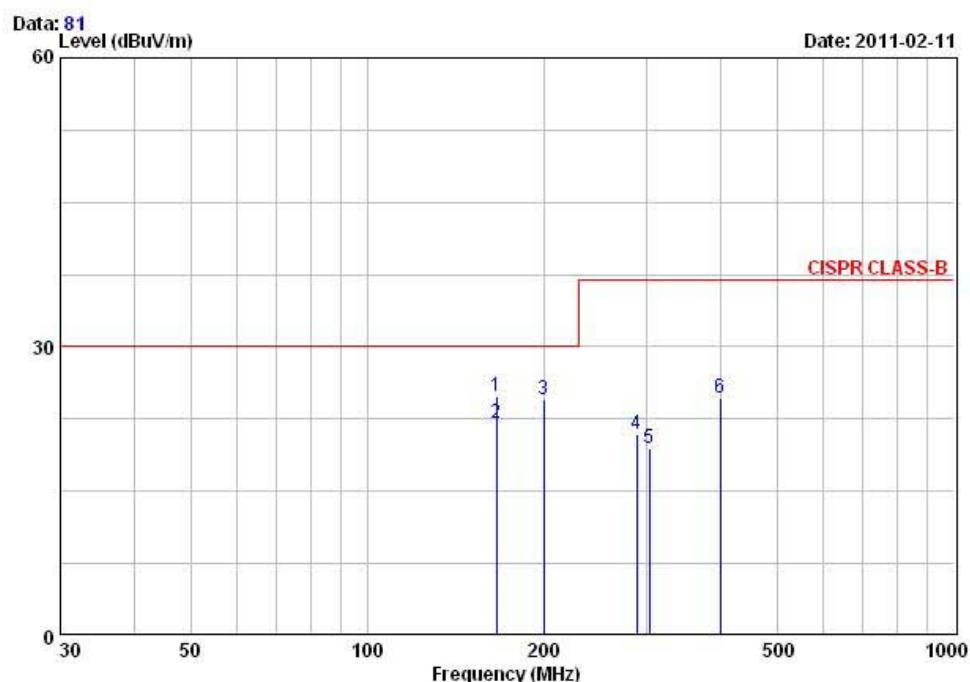
EUT/Model No.:

R01B

TEST MODE: Wireless+Charging mode

Temp Humi : 2 / 33

Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	cm	deg	
1 166.30	34.00	-9.12	24.88	30.00	5.12	115	197	VERTICAL
2 166.35	31.20	-9.13	22.07	30.00	7.93	400	336	HORIZONTAL
3 199.88	36.20	-11.60	24.60	30.00	5.40	400	288	HORIZONTAL
4 287.95	28.60	-7.68	20.92	37.00	16.08	256	341	HORIZONTAL
5 302.38	26.60	-7.21	19.39	37.00	17.61	210	133	HORIZONTAL
6 399.74	30.00	-5.38	24.62	37.00	12.38	150	360	HORIZONTAL

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

### 3.2.6 AC Conducted Emissions

#### Procedure:

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: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 20dB below limit.

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

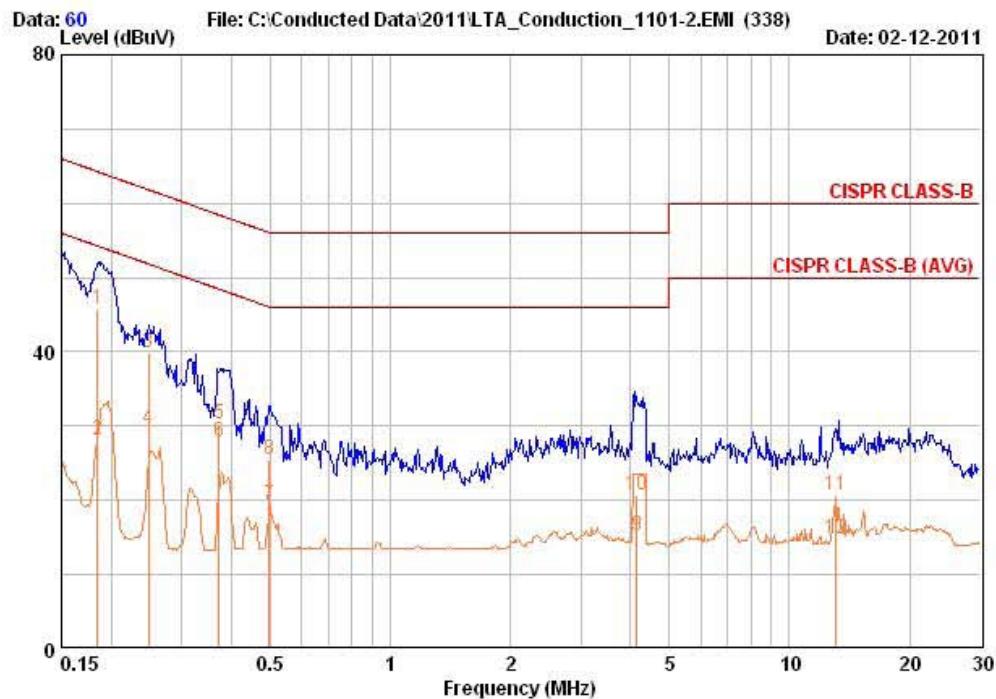
Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

AC Conducted Emissions – Wireless+Charging mode – Line

243 Jibug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010

EUT / Model No. : R01B Phase : LINE  
 Test Mode : Wireless+Charging mode Test Power : 120 / 60  
 Temp./Humid. : 12 / 32 Test Engineer : PARK. H. W



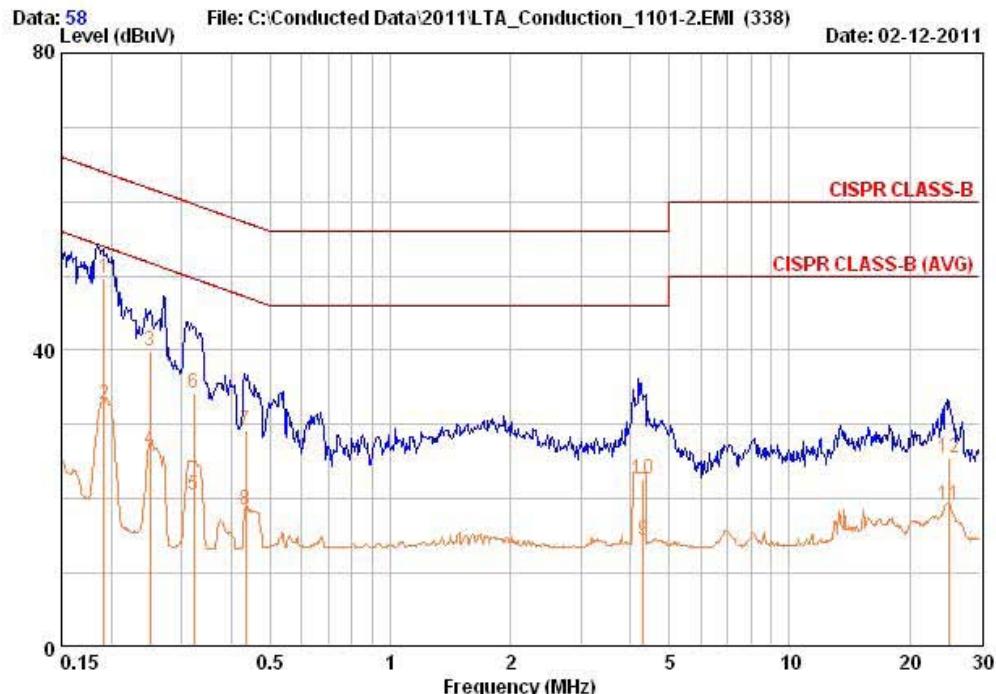
Freq MHz	RD dBuV	RD dBuV	C. F dB	Result dBuV	Result dBuV	Limit dBuV	Limit dBuV	Margin dB	Margin dB
	QP	AV		QP	AV	QP	AV	QP	AV
0.185	36.06	18.56	9.65	45.70	28.20	64.26	54.26	18.56	26.06
0.248	30.25	19.95	9.64	39.89	29.59	61.82	51.82	21.93	22.23
0.372	20.55	18.25	9.66	30.22	27.92	58.46	48.46	28.24	20.54
0.497	15.75	9.75	9.67	25.42	19.42	56.05	46.05	30.63	26.63
4.149	10.93	5.63	9.73	20.66	15.36	56.00	46.00	35.34	30.64
13.039	10.90	4.90	9.89	20.79	14.79	60.00	50.00	39.21	35.21

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – Wireless+Charging mode – Neutral

243 Jibug-ri, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
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Fax. +82-31-3236010

EUT / Model No. : R01B Phase : NEUTRAL  
 Test Mode : Wireless+Charging mode Test Power : 120 / 60  
 Temp./Humi. : 12 / 32 Test Engineer : PARK.H.W



Freq MHz	RD QP dBuV	RD AV dBuV	C. F dB	Result		Limit		Margin	
				QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.192	39.96	23.06	9.64	49.60	32.70	63.95	53.95	14.35	21.25
0.250	30.15	16.95	9.65	39.80	26.60	61.76	51.76	21.96	25.16
0.322	24.56	10.86	9.65	34.21	20.51	59.66	49.66	25.45	29.15
0.434	19.65	8.85	9.66	29.31	18.51	57.18	47.18	27.87	28.67
4.308	12.84	4.64	9.73	22.57	14.37	56.00	46.00	33.43	31.63
25.054	15.37	8.97	10.14	25.51	19.11	60.00	50.00	34.49	30.89

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

## APPENDIX

### TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	1 year	2011-01-24
2	Spectrum Analyzer	8563E	3425A02505	HP	1 year	2010-03-29
3	Spectrum Analyzer	8594E	3710A04074	HP	2 year	2009-10-12
4	Signal Generator	8648C	3623A02597	HP	1 year	2010-03-30
5	Signal Generator	83711B	US34490456	HP	1 year	2010-03-30
6	Attenuator (3dB)	8491A	37822	HP	1 year	2010-10-08
7	Attenuator (10dB)	8491A	63196	HP	1 year	2010-10-08
8	EMI Test Receiver	ESCI7	100722	R&S	1 year	2010-10-08
9	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
10	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
11	RF Amplifier	8447D	2949A02670	HP	2 year	2009-10-12
12	RF Amplifier	8449B	3008A02126	HP	1 year	2010-03-29
13	Test Receiver	ESHS10	828404/009	R&S	1 year	2010-03-29
14	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	2 year	2009-04-02
15	Log Periodic Antenna	VULP 9118	9118 A 401	SCHWARZBECK	2 year	2009-04-13
16	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	2 year	2009-04-13
17	Horn Antenna	3115	00055005	ETS LINDGREN	2 year	2009-03-16
18	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
19	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
20	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
21	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
22	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
23	Hygro-Thermograph	THB-36	0041557-01	ISUZU	1 year	2010-04-12
24	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
25	Power Divider	11636A	6243	HP	1 year	2010-10-08
26	DC Power Supply	6622A	3448A03079	HP	1 year	2010-10-08
27	Frequency Counter	5342A	2826A12411	HP	1 year	2010-03-30
28	Power Meter	EPM-441A	GB32481702	HP	1 year	2010-03-29
29	Power Sensor	8481A	US41030291	HP	1 year	2010-10-08
30	Audio Analyzer	8903B	3729A18901	HP	1 year	2010-10-08
31	Modulation Analyzer	8901B	3749A05878	HP	1 year	2010-10-08
32	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2010-10-08
33	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	2 year	2009-03-02
34	Stop Watch	HS-3	601Q09R	CASIO	2 year	2010-03-31
35	LISN	ENV216	100408	R&S	1 year	2010-10-08
36	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2 year	2010-05-13
37	Attenuator (30dB)	8498A	3318A10929	HP	1 year	2011-01-05