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TEST REPORT For FCC

Test Report No. : CTK-2014-00211
Date of Issue : 2014-03-03
FCC ID : A3LSX021AN
Model/Type No. : SX021ANM
Variant Model/Type No. : SX021ANC
Kind of Product : Digital Set Top Box
Applicant : Samsung Electronics Co., Ltd.
Applicant Address : 129, Samsung-ro, YeongTong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Manufacturer : Samsung Electronics Co., Ltd.
Manufacturer Address : 129, Samsung-ro, YeongTong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Contact Person : Jaywoo Lee / Engineer
Telephone : +82-31-277-2787
Received Date : 2014-02-12
Test period : Start : 2014-02-12 End : 2014-02-28

The test results presented in this report relate only to the object tested.

Tested by

Won-Jae, Hwang
Test Engineer
Date: 2014-03-03

Reviewed by

Young-Joon, Park
Technical Manager
Date: 2014-03-03



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REPORT REVISION HISTORY

Date	Revision	Page No
2014-03-03	Issued (CTK-2014-00211)	All

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1.0 General Product Description

Kind of Product	Digital Set Top Box
Variant Model/Type No.	SX021ANM
Variant Model/Type No.	SX021ANC
Serial number	Prototype
EUT condition	Pre-production, not damaged
Frequency Range	2405 MHz - 2480 MHz
RF output power	4.02 dBm
Number of channels	16
Transfer Rate	250 Kbps
Type of Modulation	DSSS
Channel Spacing	5 MHz
Duty cycle TX power	1.0
Power Source	DC 12 V (Adaptor)
Antenna Type	Chip antenna * 2 Gain : 3.4 dBi

1.1 Tested Frequency

	LOW	MID	HIGH
Frequency (MHz)	2405	2445	2480



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1.2 Model Differences

- SX021ANM is Basic model.
- SX021ANM and SX021ANC are identical to each other only except for model designations at requests of a buyer.

1.3 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.4 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	DELL INC.	Inspiron 6400	-
Switching Adapter2	DDongguang Lite Power 2nd Plant	LA65NS0-00	-

1.5 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.6 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



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1.7 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	3 m & 10 m SAC and Conducted Test Site	 R-948, C-986, T-1843
KOREA	KCC	EMI (10 m SAC and Conducted Test Site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and Interruptions)	 No. 51, KR0025
International	KOLAS	EMC	



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2 Summary of tests

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

The sample was tested according to the following specification:

- FCC Part 15.247, ANSI C63.4-2003

The tests were performed according to the method of measurements prescribed in

KDB No.558074

2.1 Technical Characteristic Test

2.1.1 6dB 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 = 40 MHz

VBW = 100 kHz (VBW ≥ RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data:

<ANT_0>

Frequency (MHz)	Channel No.	Test Results		
		6dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	Result
2405	11	1.601	2.391	Complies
2445	19	1.632	2.415	Complies
2480	26	1.615	2.403	Complies

<ANT_1>

Frequency (MHz)	Channel No.	Test Results		
		6dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	Result
2405	11	1.601	2.391	Complies
2445	19	1.612	2.401	Complies
2480	26	1.625	2.402	Complies

Minimum Standard:

6 dB Bandwidth > 500kHz

See next pages for actual measured spectrum plots.



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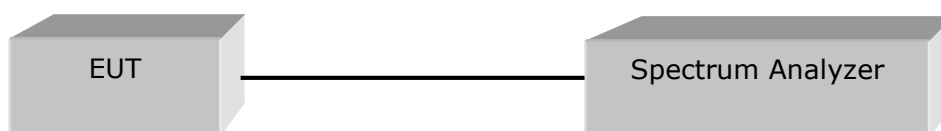
2.1.2 Maximum peak Conducted Output Power

Test Location

RF Test Room

Test Procedures

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Limit

< 1 W

Test Results

Cable loss : 0.57 dB

<ANT_0>

Frequency (MHz)	Channel No.	Mesurement data (dBm)	Total Power (dBm)	Limit	Result
2405	11	3.45	4.02	30dBm	Complies
2445	19	3.08	3.65		Complies
2480	26	2.80	3.37		Complies

<ANT_1>

Frequency (MHz)	Channel No.	Mesurement data (dBm)	Total Power (dBm)	Limit	Result
2405	11	2.70	3.27	30dBm	Complies
2445	19	2.32	2.89		Complies
2480	26	2.00	2.57		Complies



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2.1.3 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

VBW = (VBW ≥ RBW)

Sweep = Auto

Span = 5 MHz

Detector function = peak

Trace = max hold

Test Results

<ANT_0>

Frequency (MHz)	Ch.	Test Results	
		dBm	Result
2405	11	-12.205	Complies
2445	19	-12.814	Complies
2480	26	-12.280	Complies

<ANT_1>

Frequency (MHz)	Ch.	Test Results	
		dBm	Result
2405	11	-12.040	Complies
2445	19	-13.686	Complies
2480	26	-13.332	Complies

Minimum Standard:

Power Spectral Density	< 8dBm @ 3 kHz BW
------------------------	-------------------

See next pages for actual measured spectrum plots.



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Power Density Measurement

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2.1.4 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 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

RBW = 100 kHz

VBW = 100 kHz

Span = 20 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

- All conducted emission in any 100 kHz 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.

Minimum Standard:	> 20 dBc
--------------------------	----------

See next pages for actual measured spectrum plots.



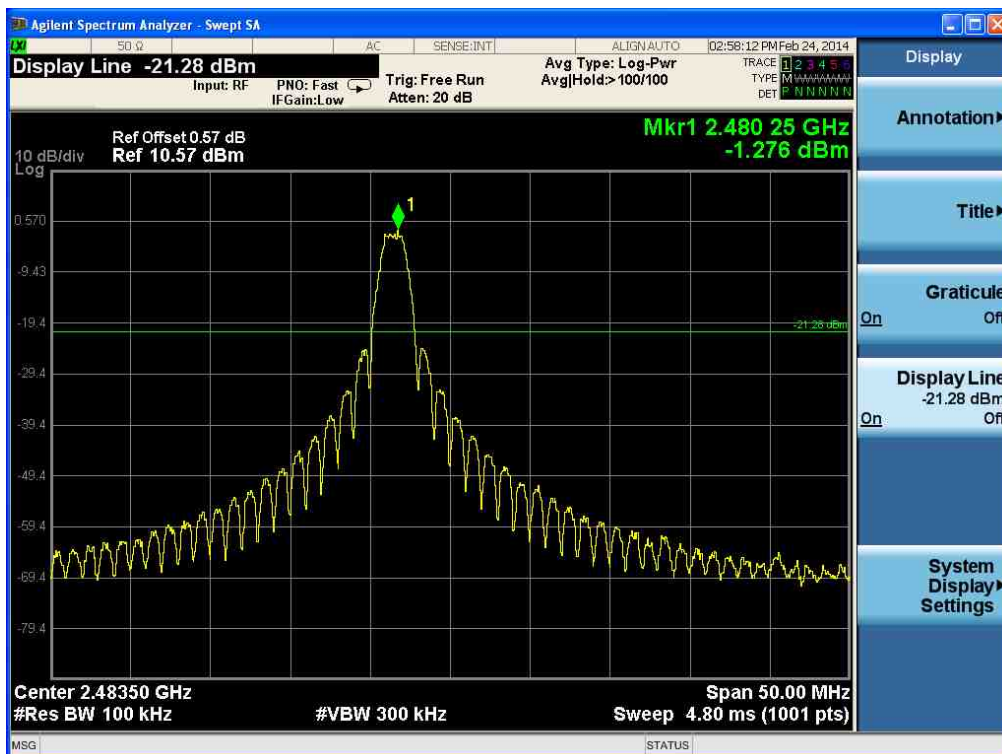
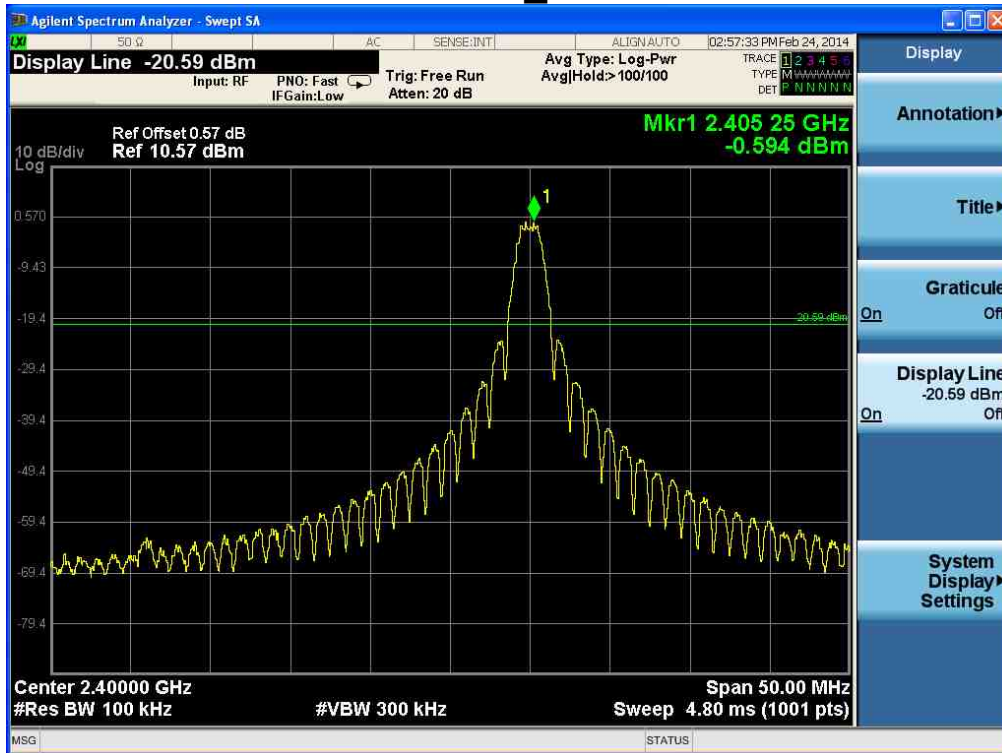
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Band-edge Measurements

<ANT_0>



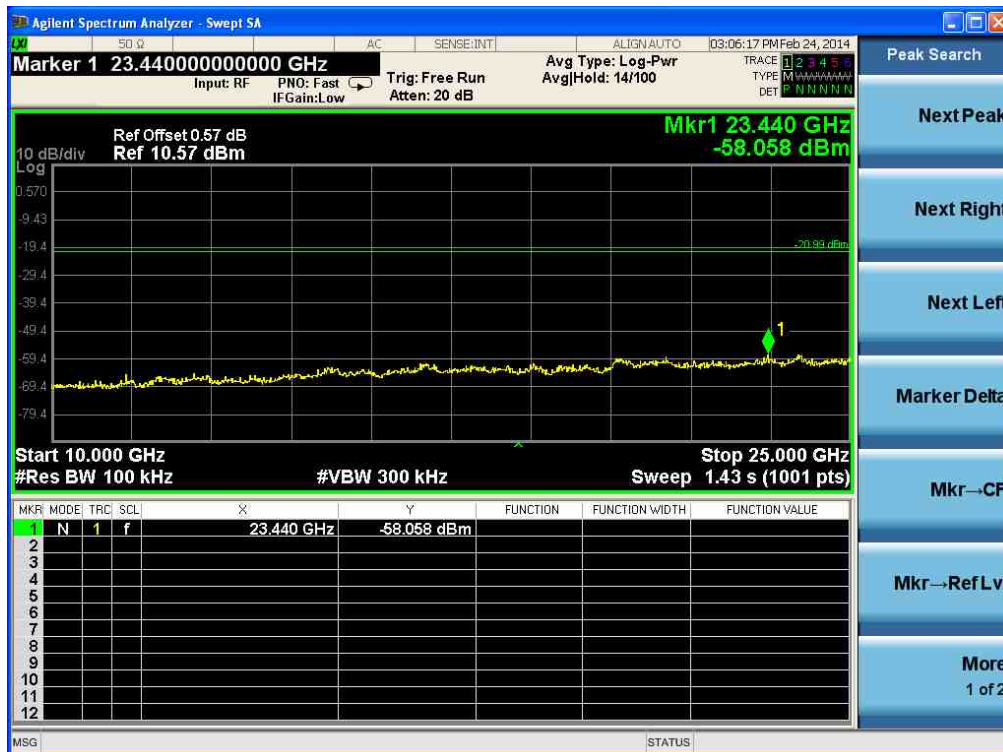
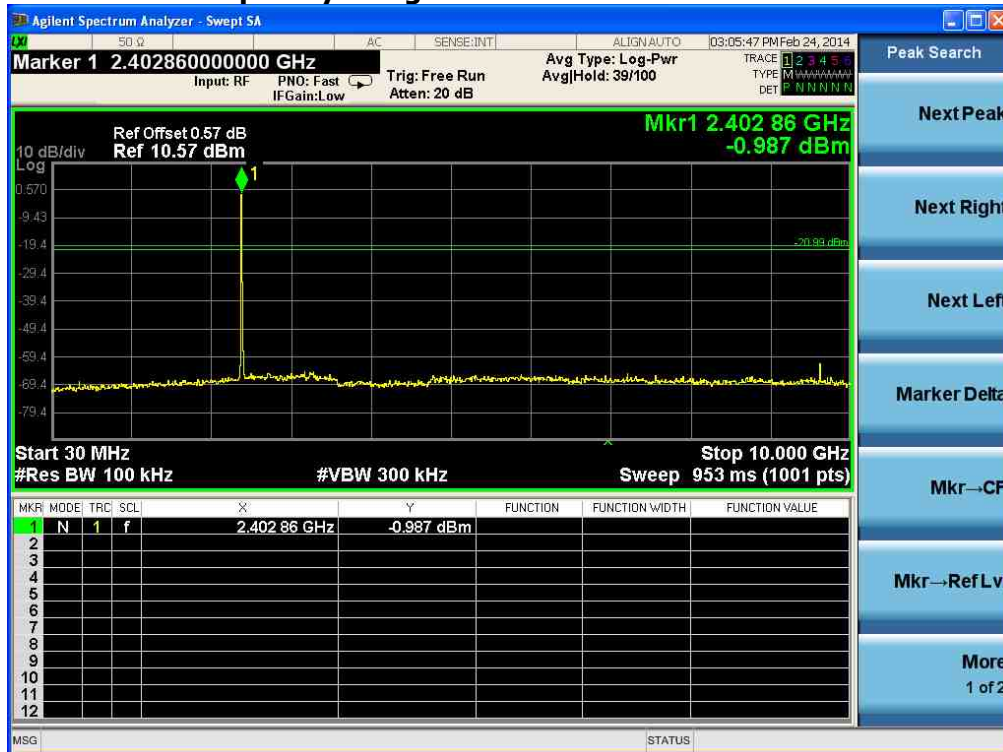


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Band - edge (at 20 dB blow) - Low channel Frequency Range = 30 MHz ~ 10th harmonic



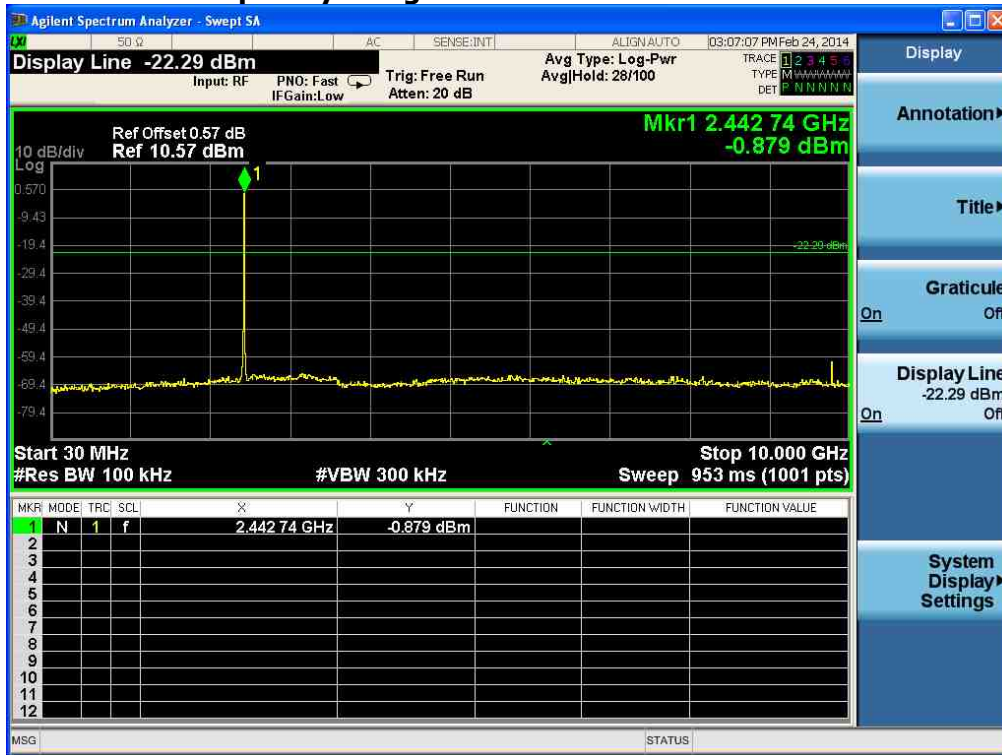


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Band – edge (at 20 dB blow) – Mid channel Frequency Range = 30 MHz ~ 10th harmonic



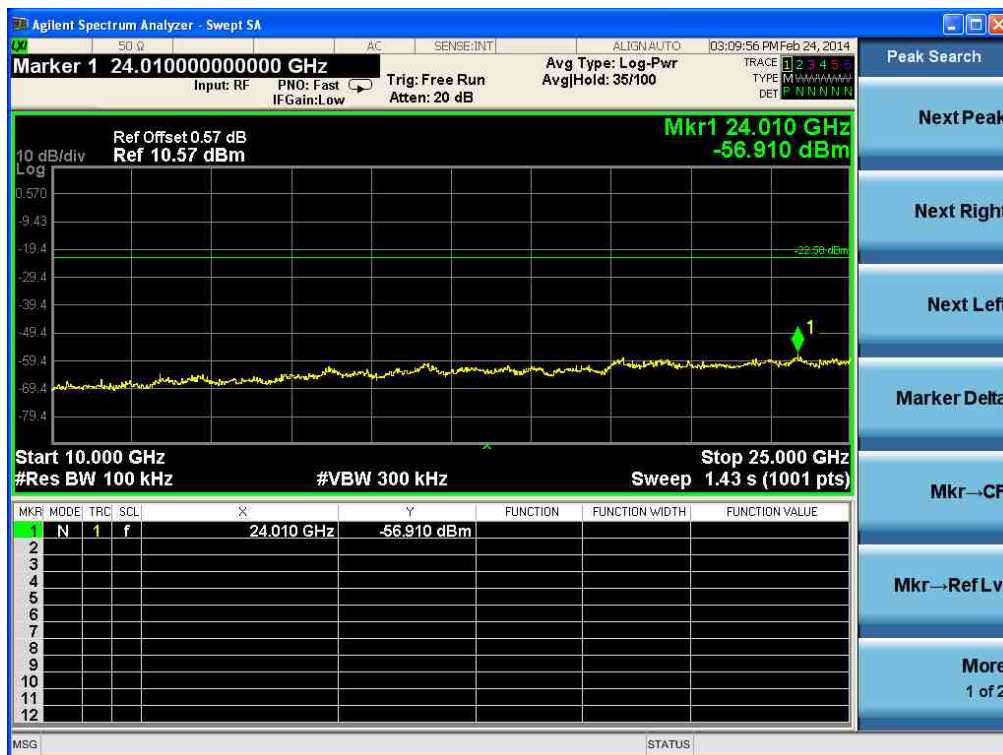
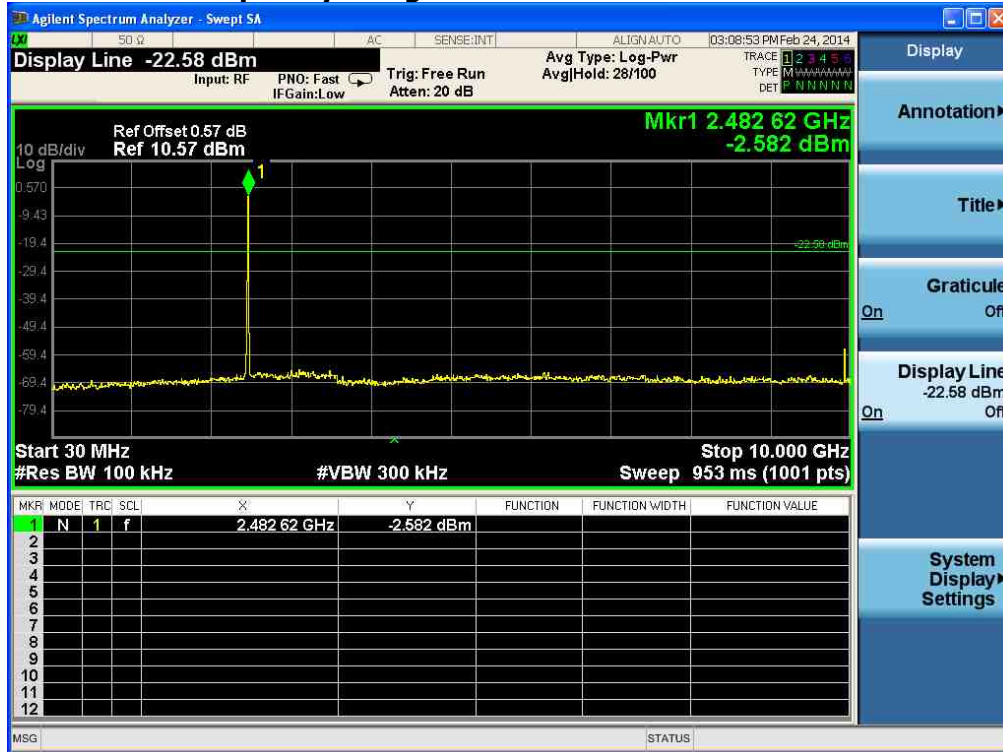


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Band – edge (at 20 dB blow) – High channel Frequency Range = 30 MHz ~ 10th harmonic



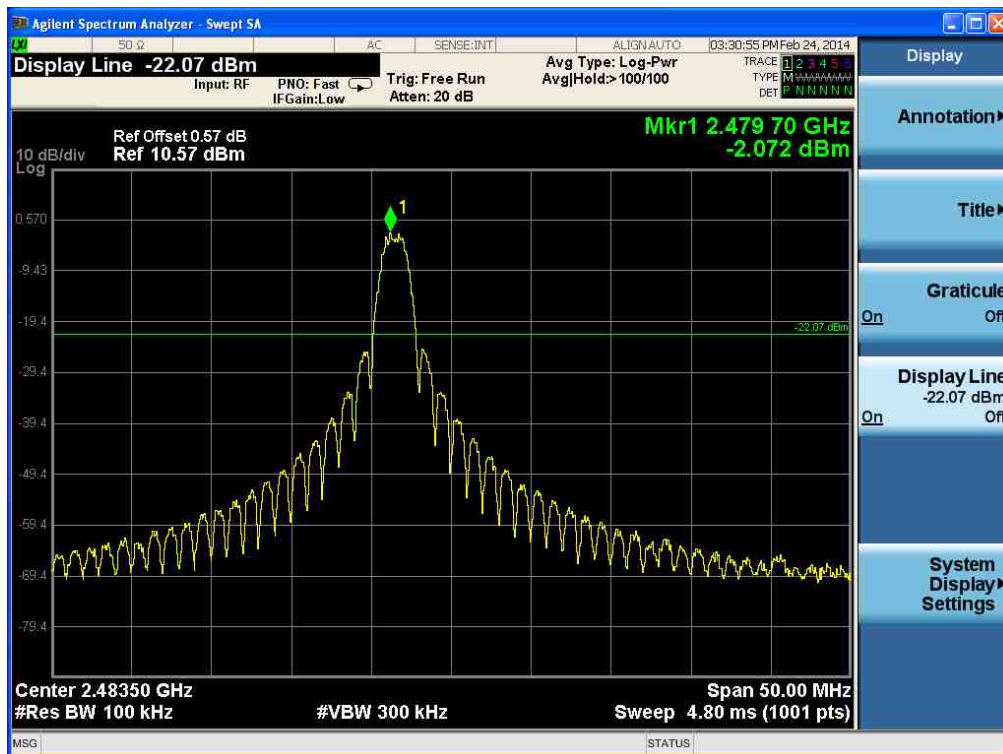
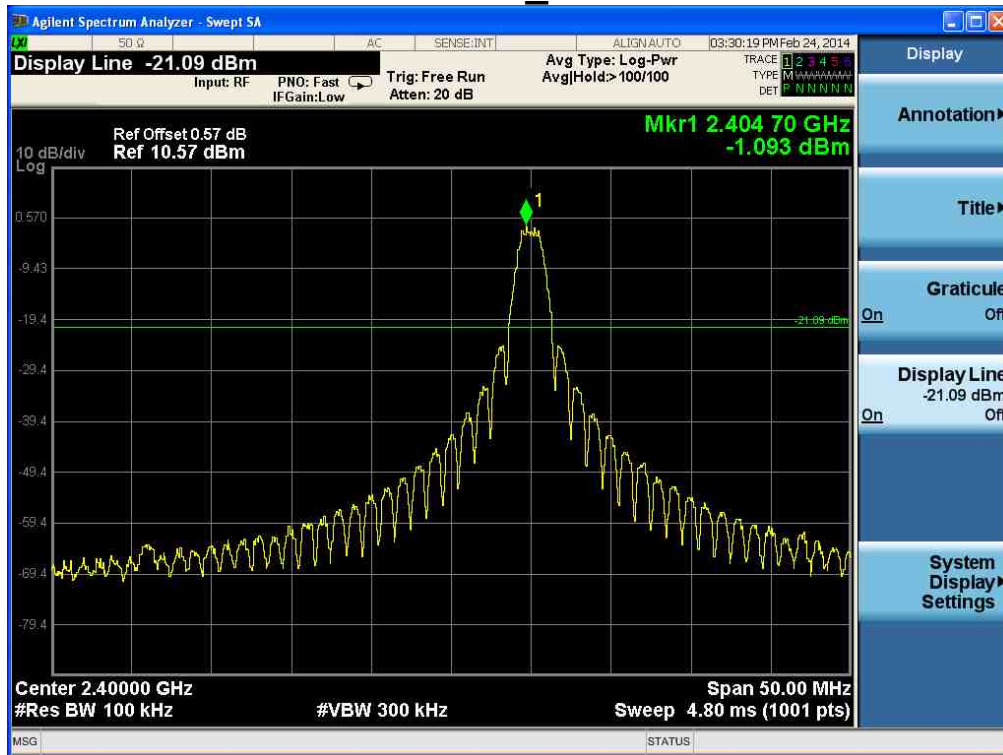


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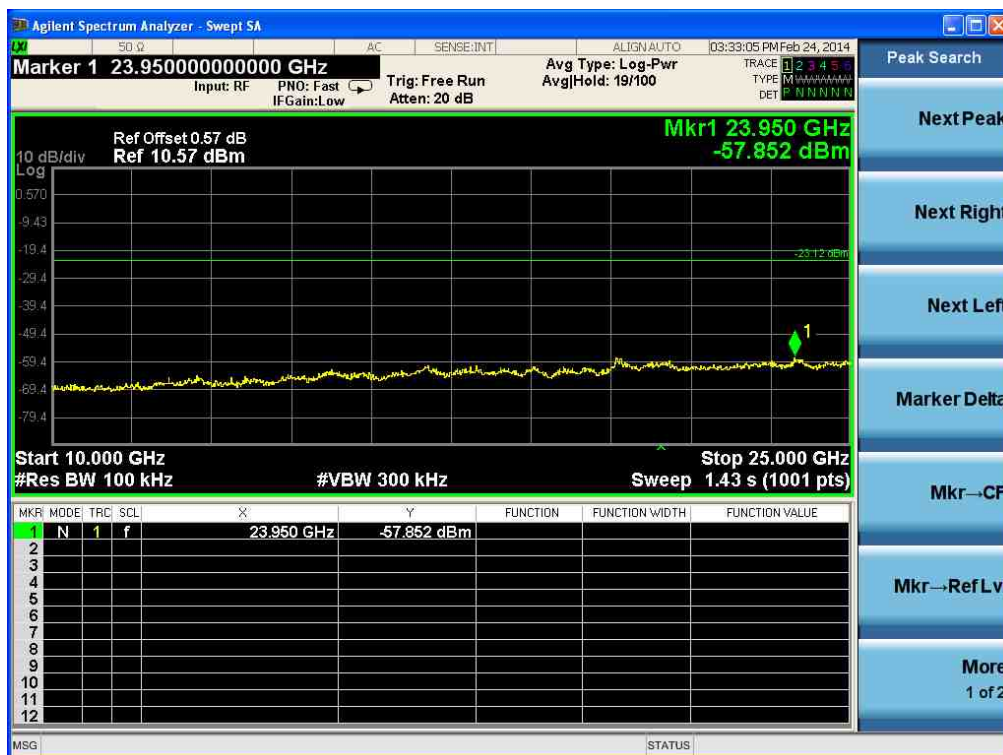
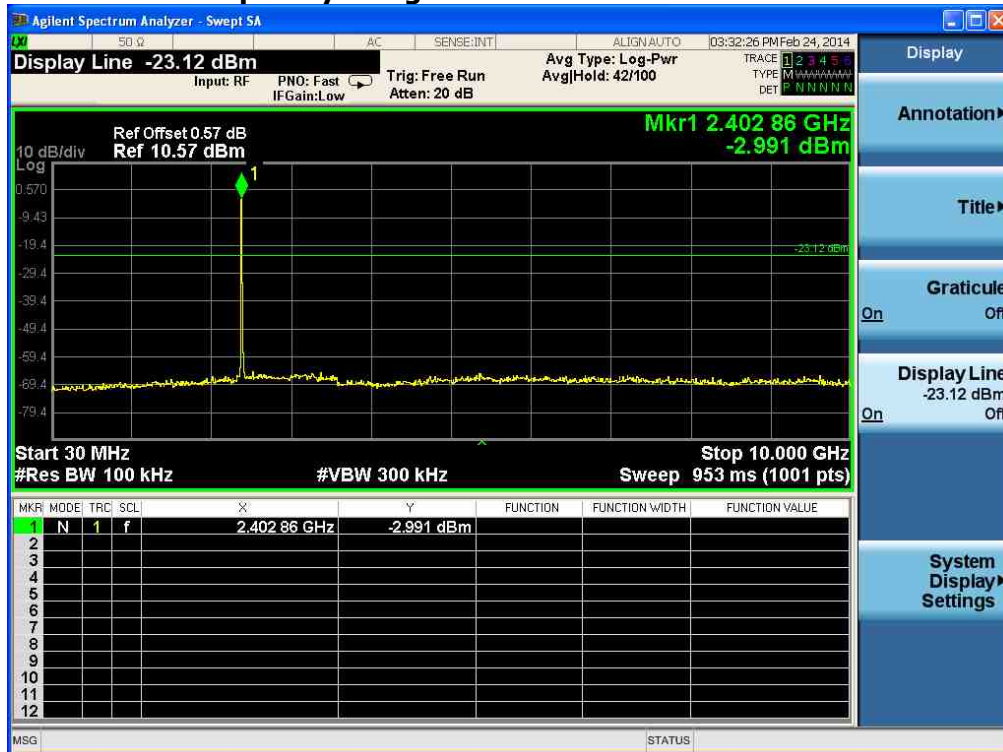
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Band – edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic



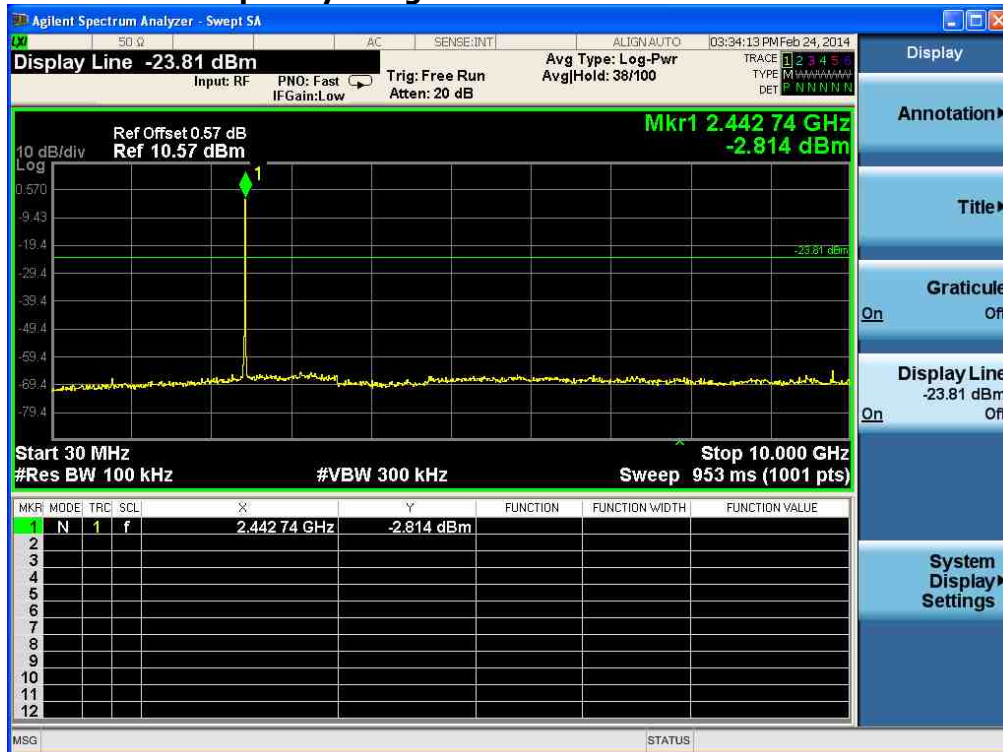


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Band – edge (at 20 dB blow) – Mid channel Frequency Range = 30 MHz ~ 10th harmonic



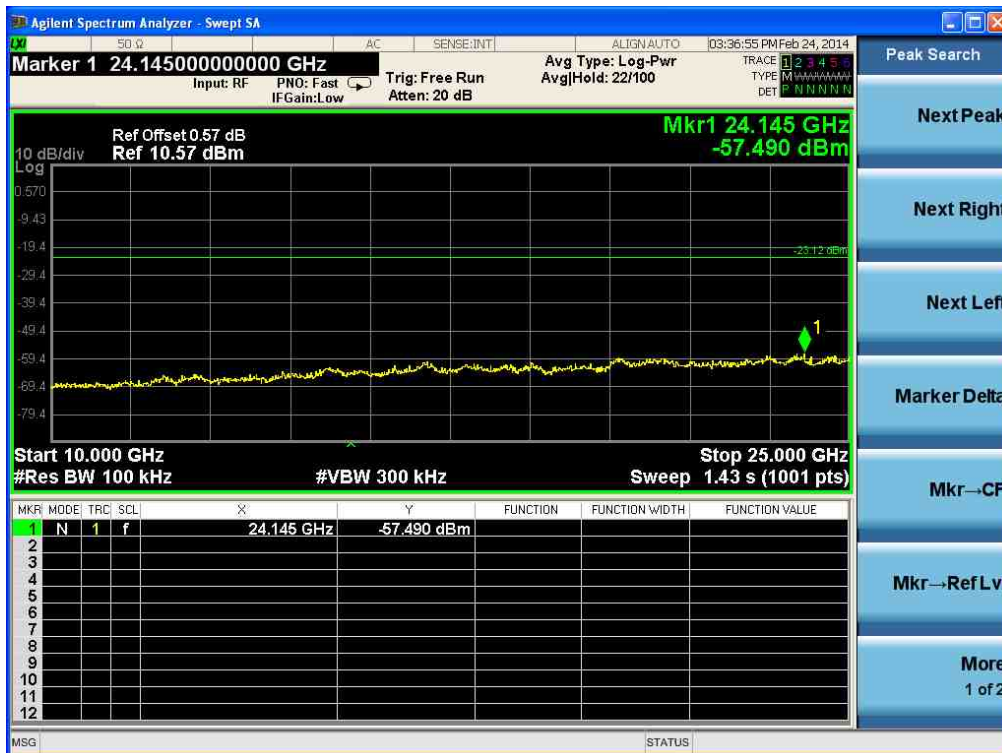
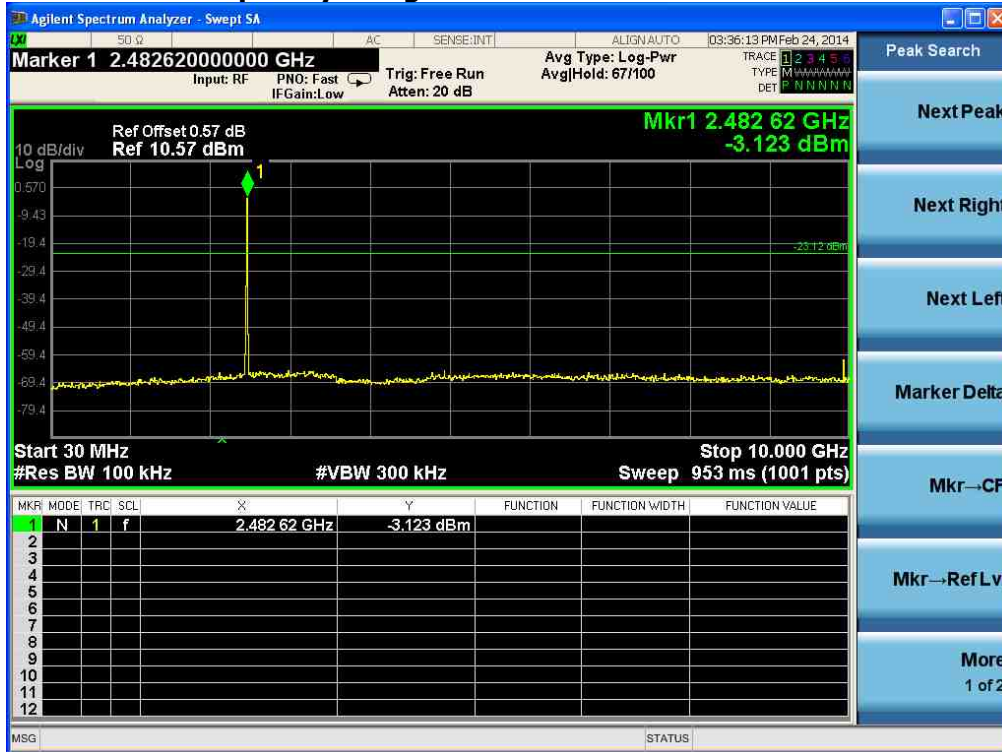


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Band – edge (at 20 dB blow) – High channel Frequency Range = 30 MHz ~ 10th harmonic



2.1.5 Field Strength of Emissions

Test Location

- ☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop 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.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) 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 emissions levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 25 GHz (2.4 GHz 10th harmonic)
RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz
VBW $\geq$ RBW
Sweep = auto

Limit

- 15.209(a)

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

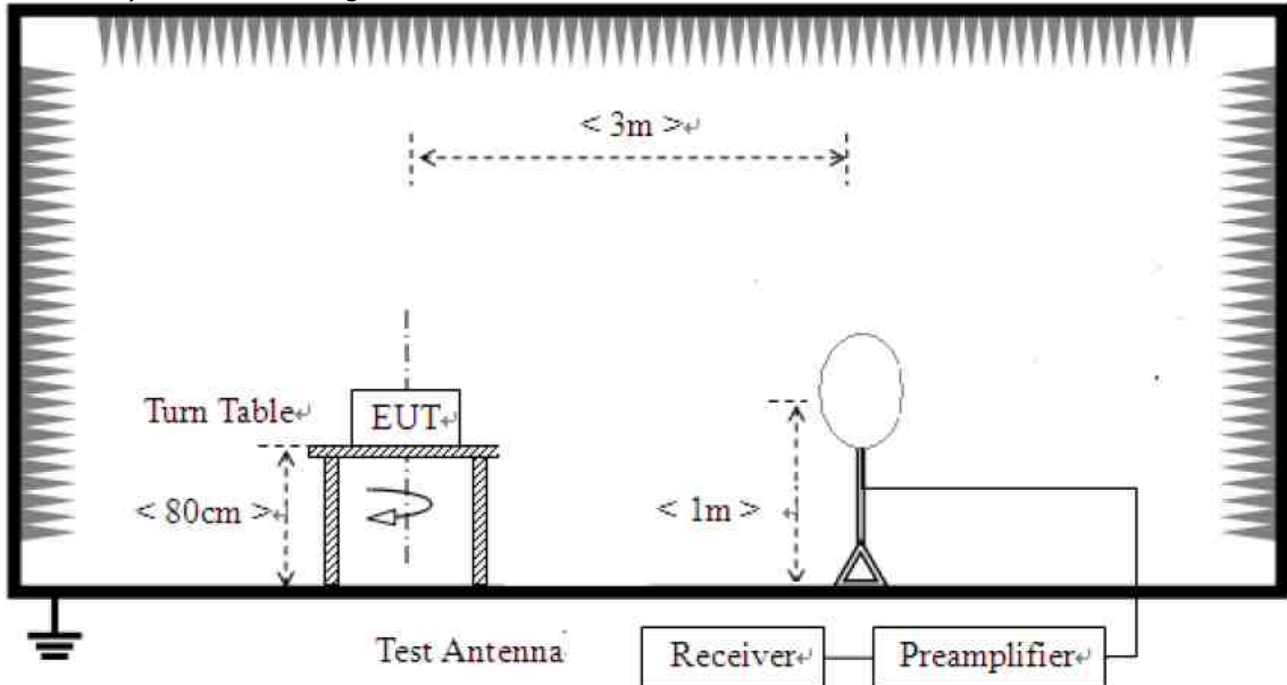
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231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

Note :

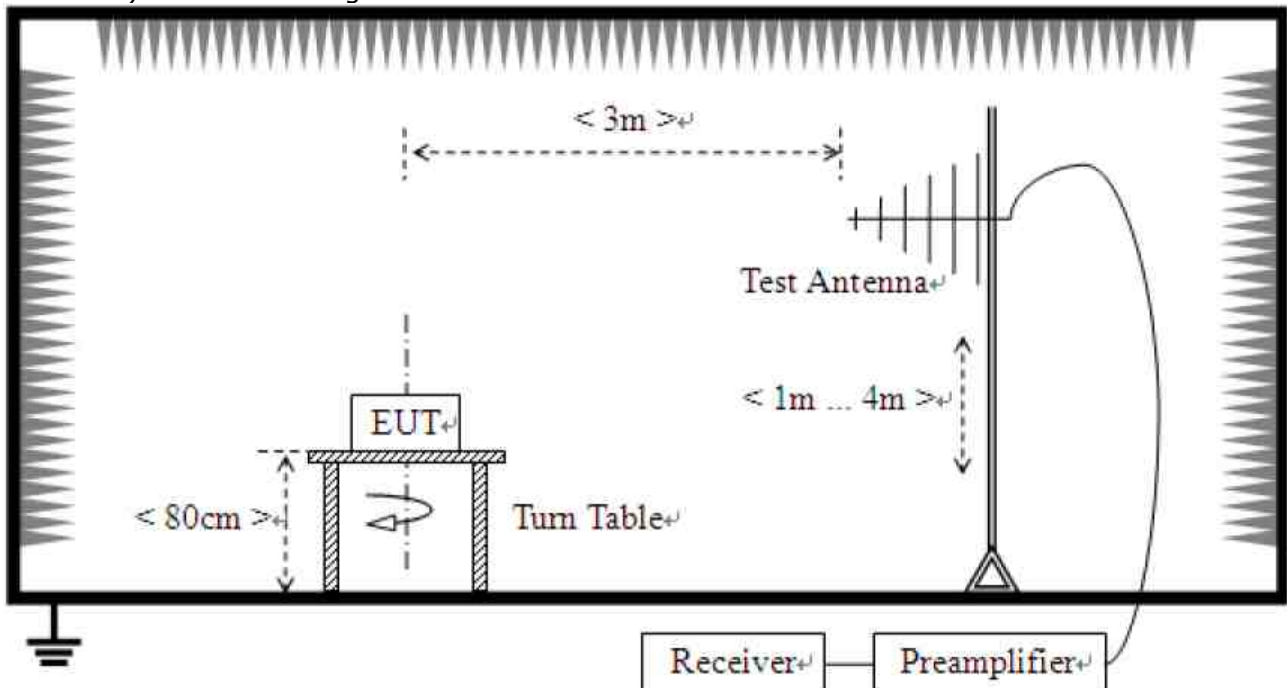
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)

Test Setup:

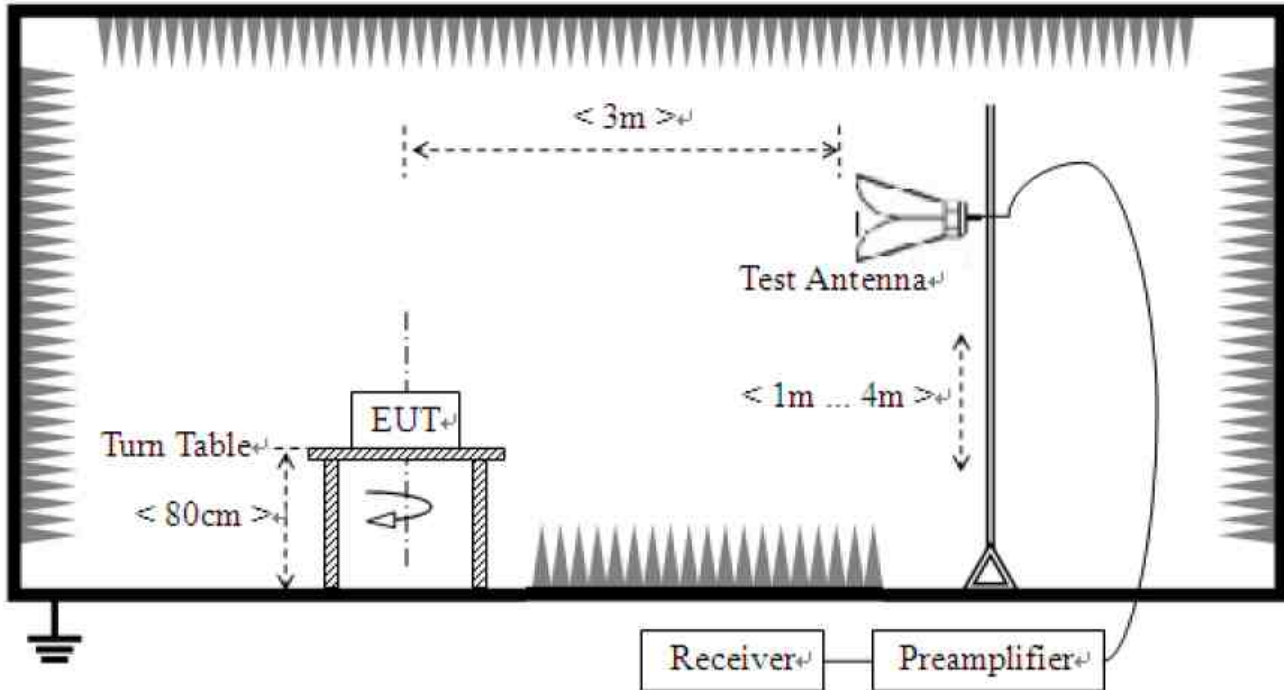
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test Results

1) 9 kHz to 30 MHz

EUT	Digital Set Top Box	Measurement Detail	
Model	SX021ANM	Frequency Range	9 kHz – 30 MHz
Test mode	ANT_0, Ch.11 (Worst Case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

Note :

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)



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Test Results

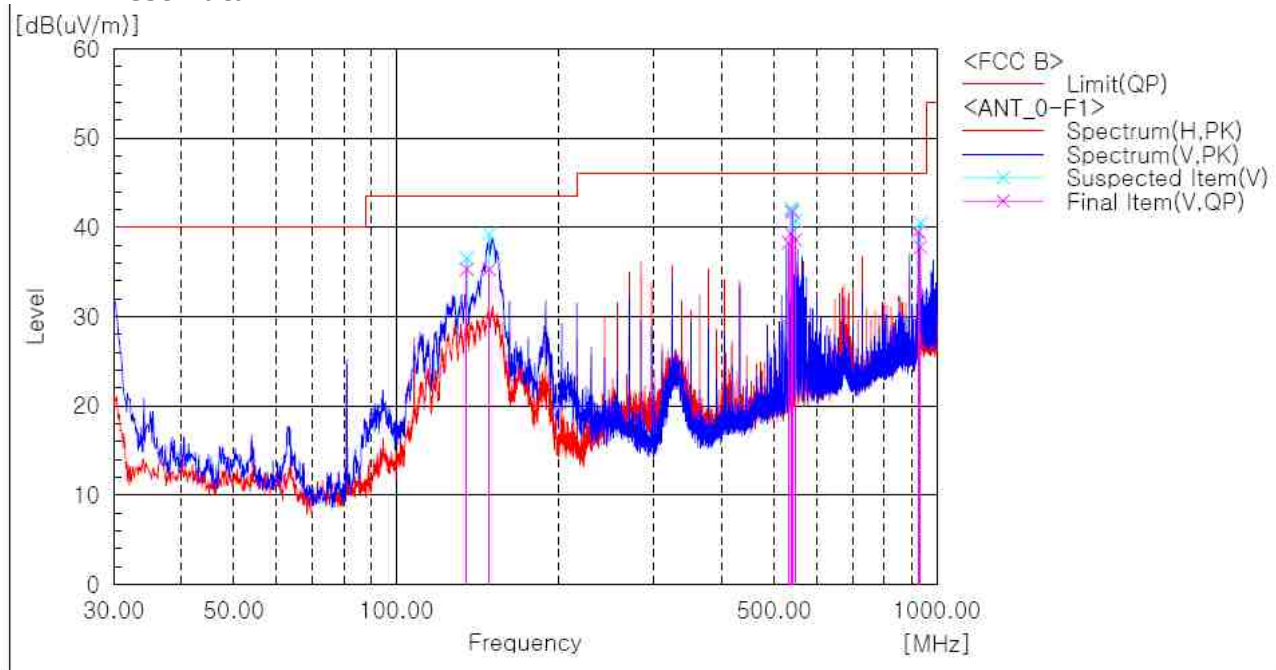
EUT	Digital Set Top Box	Measurement Detail	
Model	SX021ANM	Frequency Range	Below 1000MHz
Mode	ANT_0, Ch.11 (Worst Case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
539.978	41.7	4.3	Quasi-peak

Test Data



Final Result

No.	Frequency (P)	Reading	c.f	Result	Limit	Margin	Height	Angle
	[MHz]	[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	537.553	V 42.5	-3.2	39.3	46.0	6.7	100.0	0.0
2	539.978	V 44.9	-3.2	41.7	46.0	4.3	100.0	0.0
3	148.461	V 41.2	-5.9	35.3	43.5	8.2	100.0	290.0
4	547.980	V 41.6	-3.0	38.6	46.0	7.4	100.0	0.0
5	932.706	V 33.4	4.4	37.8	46.0	8.2	100.0	66.0
6	923.976	V 35.4	4.1	39.5	46.0	6.5	100.0	66.0
7	135.003	V 44.3	-9.0	35.3	43.5	8.2	100.0	290.0
8	532.339	V 41.6	-3.3	38.3	46.0	7.7	100.0	0.0

Remark :

1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(X axis) and the worst case was recorded.



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Test Results

<ANT_0>

EUT	Digital Set Top Box	Measurement Detail	
Model	SX021ANM	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.5	52.55	1.45	Average

Test Data

Ch.11(Low Channel)

Channel 25 (25W Channel)							
Frequency [MHz]	Reading [dBuV/m] AV/Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Ch.18(Mid Channel)

Channel 20 (100.000000 MHz)							
Frequency [MHz]	Reading [dBuV/m] AV/Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Ch.26(High Channel)

CH20 (High Channel)							
Frequency [MHz]	Reading [dBuV/m] AV/Peak	Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin [dB] AV / Peak
			Ant	CL+Amp			
No emissions were detected at a level greater than 20dB below limit.							

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV/Peak		Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Ant	CL+Amp						
2483.50	47.80	57.20	H	28.57	-23.82	54.00	74.00	52.55	61.95	1.45	12.05



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<ANT_1>

EUT	Digital Set Top Box	Measurement Detail	
Model	SX021ANM	Frequency Range	1-25GHz
		Detector function	Average / Peak

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.5	42.35	11.65	Average

Test Data

Ch.11(Low Channel)

CH11 (Low Channels)							
Frequency [MHz]	Reading [dBuV/m] AV/Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak	Margin
			[dB]				[dB]
			Ant	CL+Amp			AV / Peak
No emissions were detected at a level greater than 20dB below limit.							

Ch.18(Mid Channel)

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

Ch.26(High Channel)

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

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV/Peak		Pol.	Correction Factor [dB]		Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
				Ant	CL+Amp						
2483.50	37.60	48.60	H	28.57	-23.82	54.00	74.00	42.35	53.35	11.65	20.65



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2.1.6 AC Conducted Emissions

Test Location

Shielded Room

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- 15.207(a)

Frequency (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.

Test Results

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
0.177	54.4	10.3	QuasiPeak



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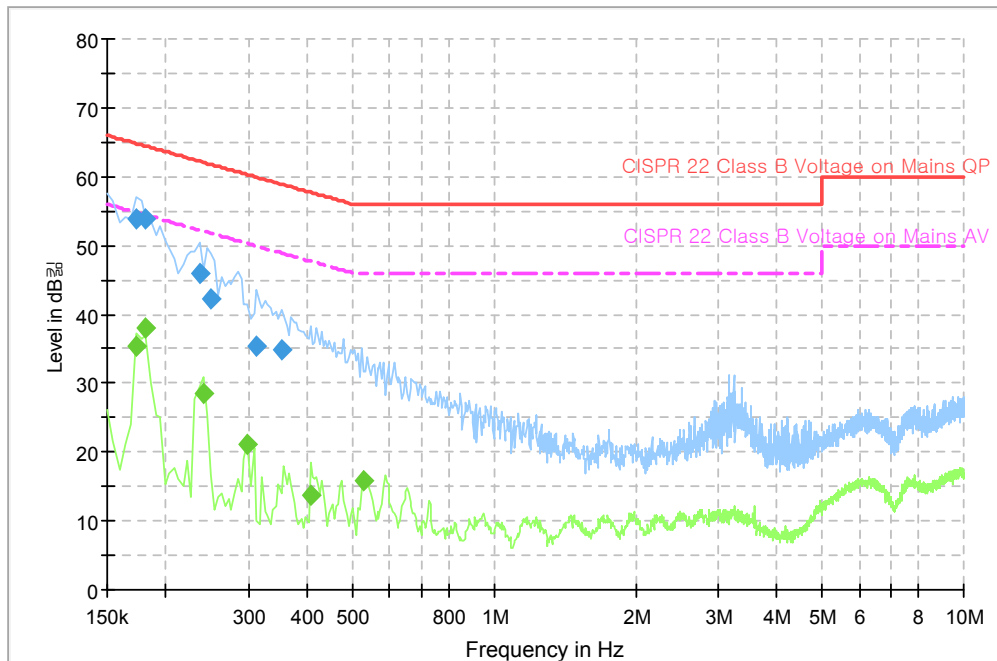
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Test Data

[HOT]

3CE_CISPR 22 Class B_L1



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.172500	53.8	1000.0	9.000	On	L1	9.9	11.0	64.8
0.181500	53.9	1000.0	9.000	On	L1	9.9	10.5	64.4
0.235500	45.8	1000.0	9.000	On	L1	9.8	16.4	62.3
0.249000	42.4	1000.0	9.000	On	L1	9.8	19.4	61.8
0.312000	35.4	1000.0	9.000	On	L1	10.0	24.5	59.9
0.352500	34.7	1000.0	9.000	On	L1	10.1	24.2	58.9

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.172500	35.3	1000.0	9.000	On	L1	9.9	19.6	54.8
0.181500	38.0	1000.0	9.000	On	L1	9.9	16.4	54.4
0.240000	28.6	1000.0	9.000	On	L1	9.8	23.5	52.1
0.298500	21.2	1000.0	9.000	On	L1	9.9	29.1	50.3
0.406500	13.7	1000.0	9.000	On	L1	10.1	34.1	47.7
0.528000	15.8	1000.0	9.000	On	L1	10.1	30.2	46.0



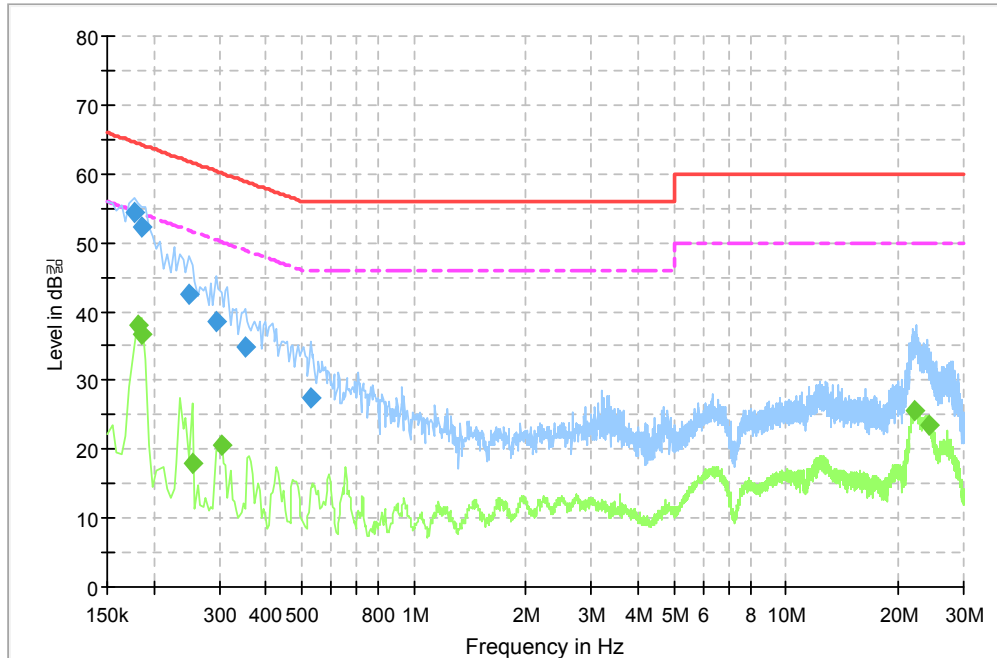
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[NEUTRAL]

3CE_CISPR 22 Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.177000	54.4	1000.0	9.000	On	N	9.9	10.3	64.6
0.186000	52.2	1000.0	9.000	On	N	9.9	12.0	64.2
0.249000	42.5	1000.0	9.000	On	N	9.8	19.3	61.8
0.294000	38.5	1000.0	9.000	On	N	9.9	21.9	60.4
0.352500	34.8	1000.0	9.000	On	N	10.0	24.1	58.9
0.528000	27.5	1000.0	9.000	On	N	10.1	28.5	56.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.181500	38.2	1000.0	9.000	On	N	9.9	16.3	54.4
0.186000	36.6	1000.0	9.000	On	N	9.9	17.6	54.2
0.253500	18.0	1000.0	9.000	On	N	9.8	33.7	51.6
0.303000	20.7	1000.0	9.000	On	N	9.9	29.5	50.2
22.101000	25.7	1000.0	9.000	On	N	10.1	24.3	50.0
24.274500	23.6	1000.0	9.000	On	N	10.0	26.4	50.0



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APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2013-11-08	2014-11-08
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2013-11-08	2014-11-08
3	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2013-12-06	2014-12-06
4	EMI Test Receiver	Rohde & Schwarz	ESCI7	100816	2013-12-06	2014-12-06
5	Trilog Broadband Antenna	SCHWARZBECK	VULB 9161 SE	9161-4133	2012-06-11	2014-06-11
6	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2012-06-06	2014-06-06
7	Attenuator	HP	8498A	1801A06913	2013-11-12	2014-11-12
8	EPM Series Power Meter	HP	E4418A	GB38272734	2013-11-08	2014-11-08
9	Power Sensor	HP	8487A	3318A03524	2013-07-06	2014-07-06
10	Audio Analyzer	HP	8903B	2747A03432	2013-11-08	2014-11-08
11	ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2013-11-08	2014-11-08
12	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2013-11-08	2014-11-08
13	Attenuator	HP	8494A	3308A33351	2013-11-12	2014-11-12
14	Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2014-01-16	2015-01-16
15	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2013-11-08	2014-11-08
16	Horn Antenna	ETS-Lindgren	3115	00078895	2013-02-28	2015-02-28
17	Horn Antenna	ETS-Lindgren	3115	00078894	2013-05-13	2015-05-13
18	Horn Antenna	ETS-Lindgren	3116	00062916	2013-03-20	2015-03-20
19	Horn Antenna	ETS-Lindgren	3116	00062504	2013-05-27	2015-05-27
20	OPT H64 AMPLIFIER	HP	8447F	3113A06814	2013-03-21	2014-03-21
21	PREAMPLIFIER	Agilent	8449B	3008A02307	2013-11-08	2014-11-08
22	Radio Communication Tester	Rohde & Schwarz	CMU200	106765	2013-02-06	2015-02-06
23	LISN	Rohde & Schwarz	ENV216	101235	2013-08-02	2014-08-02
24	LISN	Rohde & Schwarz	ENV216	101236	2013-08-02	2014-08-02
25	LISN	Rohde & Schwarz	ENV216	101151	2013-11-08	2014-11-08
26	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2013-11-08	2014-11-08
27	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2014-02-04	2015-02-04
28	6dB Attenuator	R&S	DNF	272.4110.50	2013-11-12	2014-11-12
29	AMPLIFIER	Sonoma Instrument Co.	310	291721	2013-03-21	2014-03-21
30	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2013-06-27	2014-06-27
31	Signal Generator	Rohde & Schwarz	SMBV100A	258008	2013-09-07	2014-09-07