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TEST REPORT For FCC

Test Report No.	:	CTK-2012-00128
Date of Issue	:	March 28, 2012
FCC ID	:	U5MSLP-T400R
Model/Type No.	:	SLP-T40*R
Kind of Product	:	Thermal transfer label printer
Applicant	:	BIXOLON Co., Ltd.
Applicant Address	:	7th~8th FL, Miraeasset Venture Tower, 685, Sampyeong-dong, Bundang-gu Seongnam-si, Gyeonggi-do, Korea
Manufacturer	:	BIXOLON Co., Ltd.
Manufacturer Address	:	7th~8th FL, Miraeasset Venture Tower, 685, Sampyeong-dong, Bundang-gu Seongnam-si, Gyeonggi-do, Korea
Contact Person	:	Hyun-suk Son / Assistant Manager
Telephone	:	+82-31-218-5582
Received Date	:	March 13, 2012
Test period	:	Start : March 16, 2012 End : March 28, 2012
Test Results	:	☒ In Compliance ☐ Not in Compliance

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

Tested by

Won-Jae, Hwang
Test Engineer
Date: March 28, 2012

Reviewed by

Young-Joon, Park
Technical Manager
Date: March 28, 2012

REPORT REVISION HISTORY

Date	Revision	Page No
March 28, 2012	Issued (CTK-2012-00128)	All

TABLE OF CONTENTS

1.0 General Product Description

Equipment model name	: SLP-T40*R
Serial number	: Prototype
EUT condition	: Pre-production, not damaged
Antenna type	: Dipole antenna Gain -10.455 dBi
Frequency Range	: 902.75 MHz - 927.25 MHz
RF power	: 5.06 dBm - Conducted
Number of channels	: 50 CH
Channel Spacing	: 0.5 MHz
Channel Access Protocol	: Frequency Hopping
Type of Modulation	: ASK
Power Source	: DC 24 V

1.1 Tested Frequency

	LOW	MID	HIGH
Frequency (MHz)	902.75	915.25	927.25

1.2 Model Differences

- Models (SLP-T40*R) is identical to each other only except for below chart.

*	It can be numerical 0 to 9.
Ex)	0; 200dpi printing resolution (SLP-T400R)
	3; 300dpi printing resolution (SLP-T403R)

- Model SLP-T403R was tested.

1.3 Device Modifications

The following modifications was applied by the applicant:

Not applicable

1.4 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
Personal COMPUTER	SAMSUNG Electronics Co., Ltd.	DM-V400	ZYZF9WAZC01489B	-
LCD Monitor	D E L L I N C .	SE198WFPf	CN-ORR716-72872-81T-OWGI	-
Mouse(PS/2)	Dongguan Primax Electronis Ltd	N3+ Optical	K045205911	-
Keyboard	MONTEREY INTERNATIONAL CORP.	K65ZCH301115	ZCH3011	-

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.

1.7 Laboratory Accreditations and Listings

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

2.0 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	> 50 hops		C
15.247(a)	Occupoed Bandwidth	< 500 KHz		C
15.247	Time of Occupancy	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 1Watt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.247 /15.209	Field Strength of Harmonics	< 54 dBuV (at 3m)	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

2.1 Transmitter Requirements

2.1.1 Carrier Frequency Separation

Test Location

RF Test Room

Test Procedures

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT has 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 = 5 MHz
RBW = 100 kHz (≥ 1% of the span) Sweep = auto
VBW = 100 kHz (≥ RBW) Detector function = peak
Trace = max hold

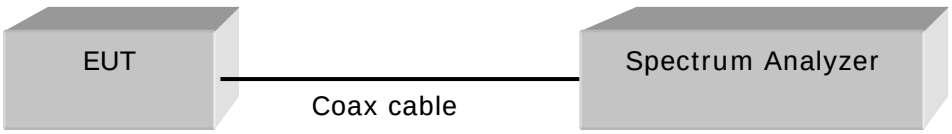


Figure 1 : Measurement setup for the carrier frequency separation

Limit

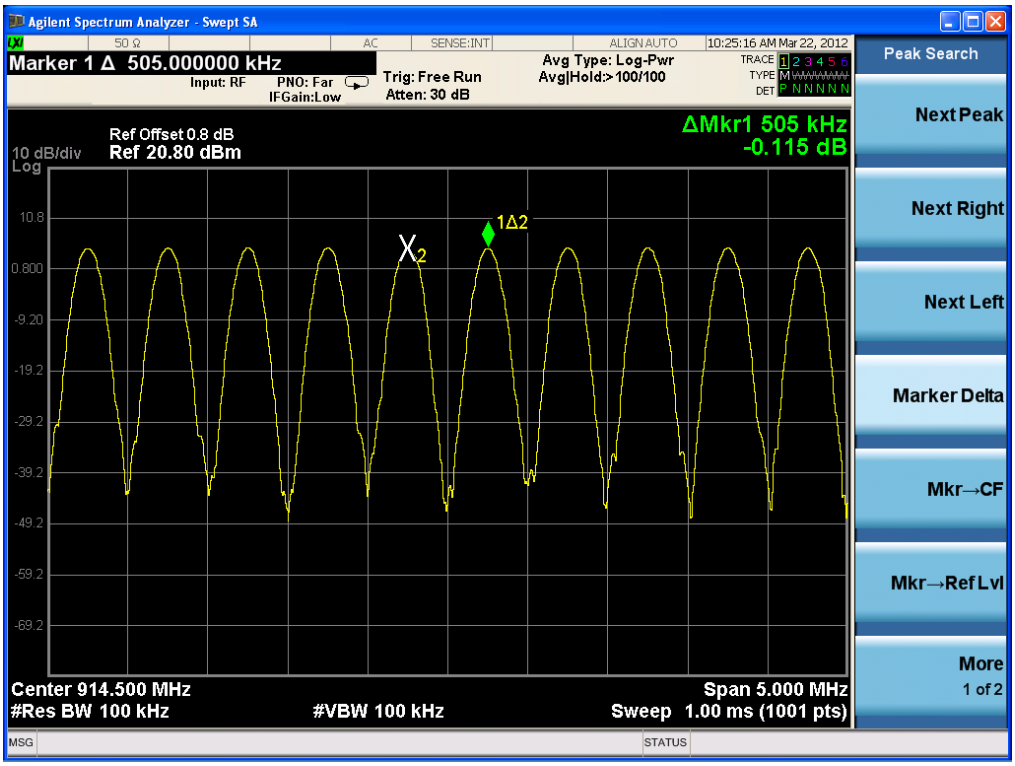
The EUT shall have hopping channel carrier frequencies separated minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Results

Carrier Frequency Separation (kHz)	≥25 kHz or 20 dB BW (kHz)	Margin (kHz)	Result
505	52.16	452.84	Complies

See next pages for actual measured spectrum plots.

Carrier Frequency Separation



2.1.2 Number of Hopping Frequencies

Test Location

RF Test Room

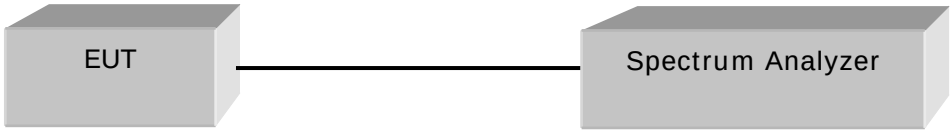
Test Procedures

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

The spectrum analyzer is set to:

Frequency range Start = 900 MHz, Stop = 930 MHz

RBW = 300 kHz (≥ 1% of the span) Sweep = auto
VBW = 300 kHz (≥ RBW) Detector function = peak
Trace = max hold



Limit

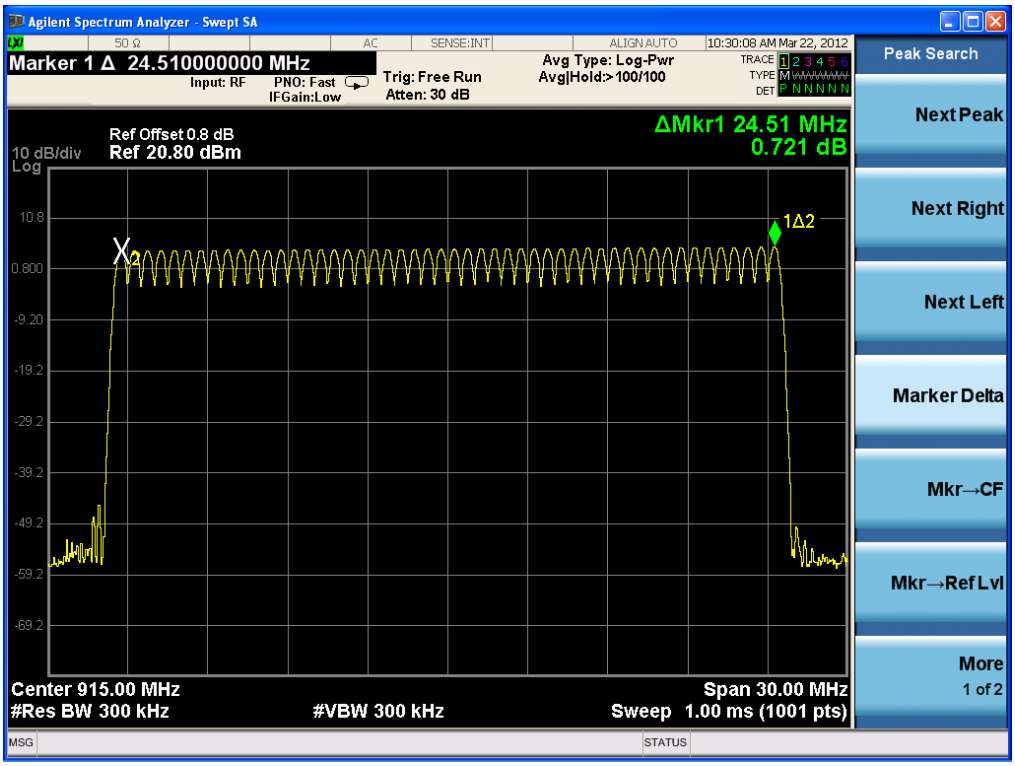
The EUT in the 902MHz - 928MHz band shall use at least 50 channels.

Test Results

Total number of Hopping Channels	Result
50	Complies

See next pages for actual measured spectrum plots.

Number of Hopping Frequencies



2.1.3 Occupied Bandwidth

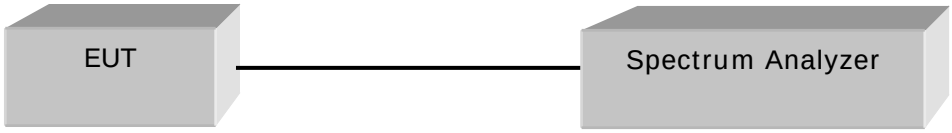
Test Location

RF Test Room

Test Procedures

The bandwidth at 20 dB below the highest inband 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 20 dB 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 = 500kHz
RBW = 3 kHz (≥ 1% of the span) Sweep = auto
VBW = 3 kHz (≥ RBW) Detector function = peak
Trace = max hold



Limit

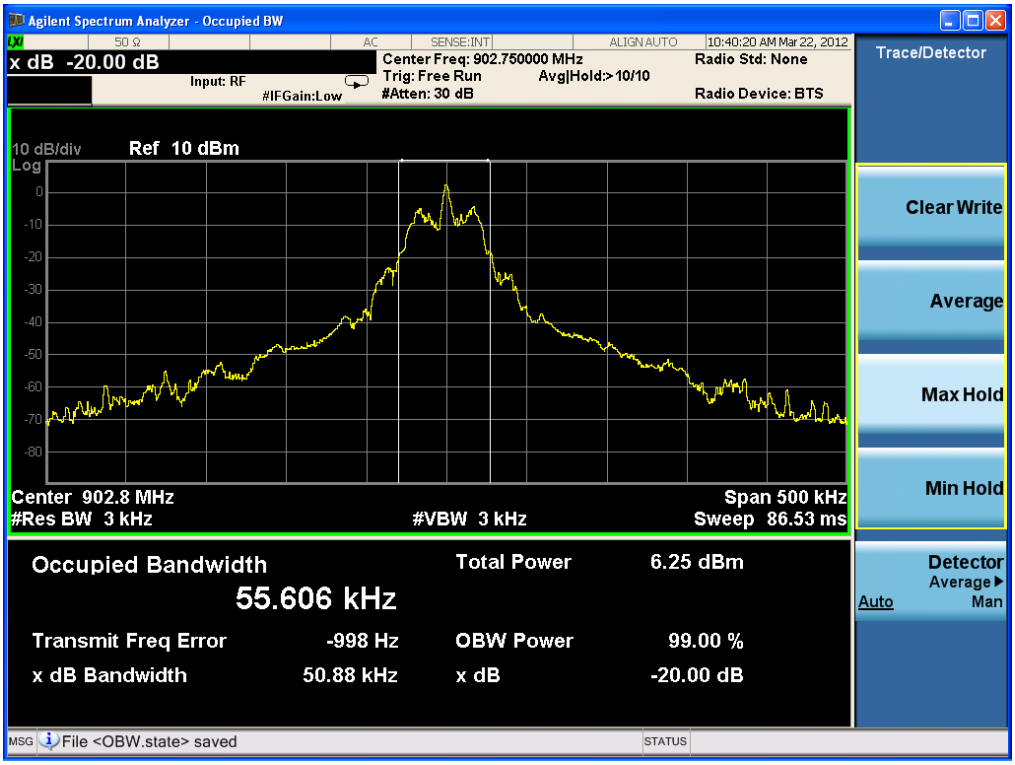
The maximum allowed 20dB bandwidth of the hopping channel is 500 kHz

Test Results

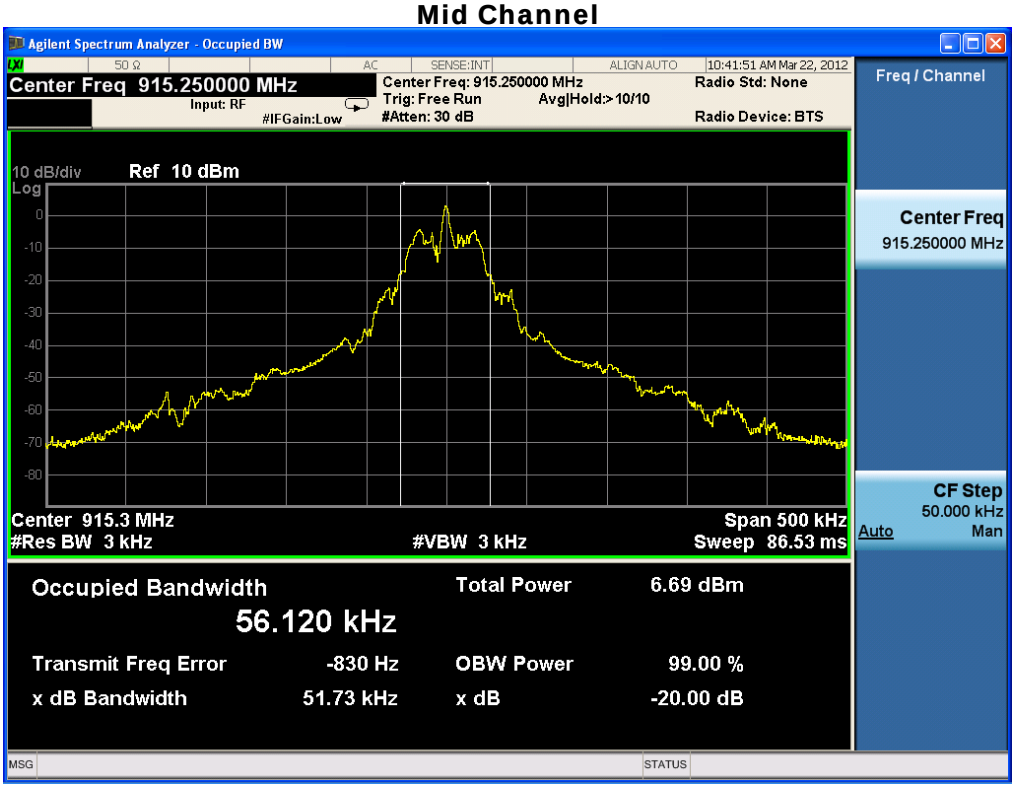
Frequency (MHz)	20dB bandwidth (KHz)	99% bandwidth (KHz)	Result
902.75	50.88	55.61	Complies
915.25	51.73	56.12	Complies
927.25	52.16	55.69	Complies

See next pages for actual measured spectrum plots.

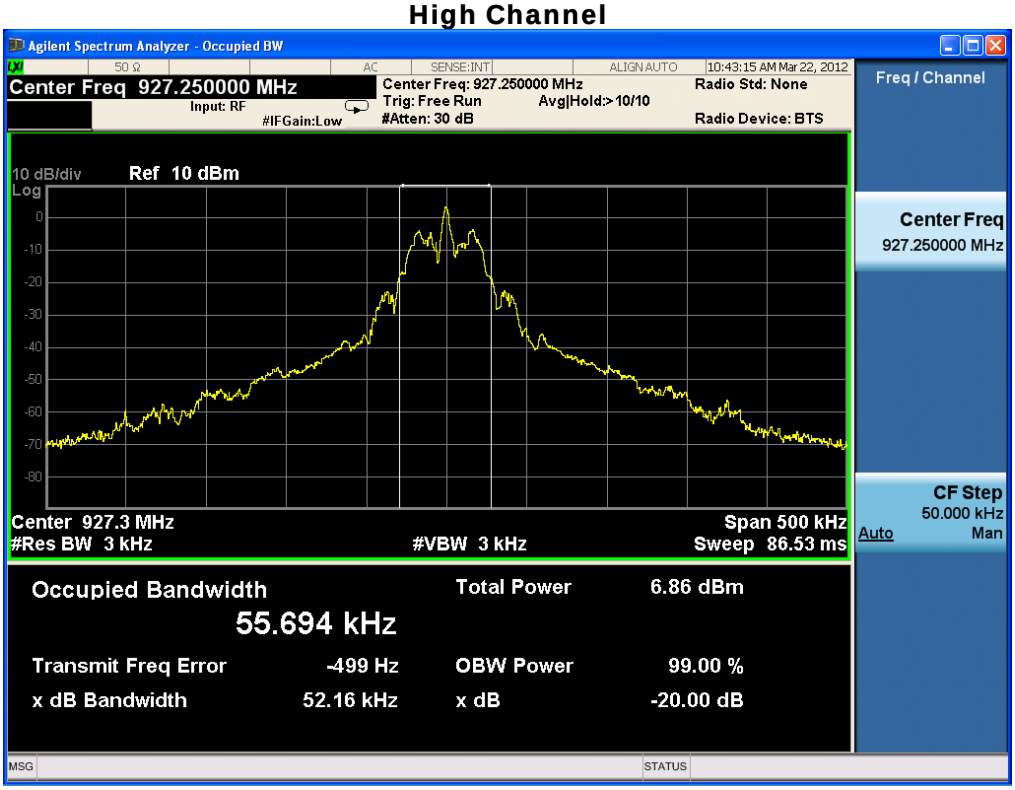
Low Channel



Mid Channel



High Channel



2.1.4 Time of Occupancy (Dwell Time)

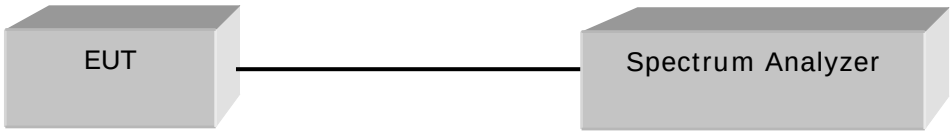
Test Location

RF Test Room

Test Procedures

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

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
Span = zero
RBW = 3 kHz Trace = max hold
VBW = 10 KHz (≥ RBW) Detector function = peak
Sweep = as necessary to capture the entire dwell time per hopping channel



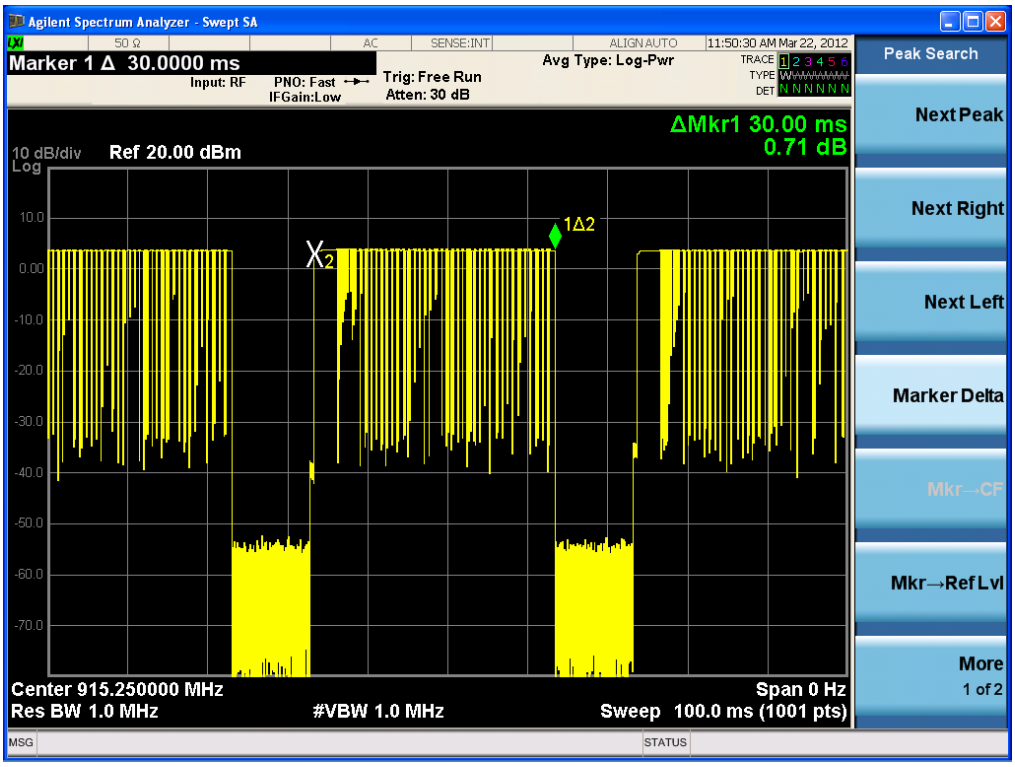
Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period .

Test Results

Pulse Width (sec)	Limit (sec)	Margin (sec)
0.03	0.4	0.32

See next pages for actual measured spectrum plots.



2.1.5 Maximum peak Conducted Output Power

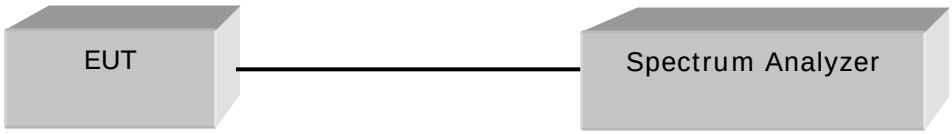
Test Location

RF Test Room

Test Procedures

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

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
Span = 2 MHz (approximately 5 times of the 20 dB bandwidth)
RBW = 1 MHz (greater than the 20 dB bandwidth of the EUT)
VBW = 1 MHz (≥ RBW) Detector function = peak
Trace = max hold Sweep = auto



Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operation in the 902-928 MHz band, employing at least 50 hopping channels: 1 watt

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

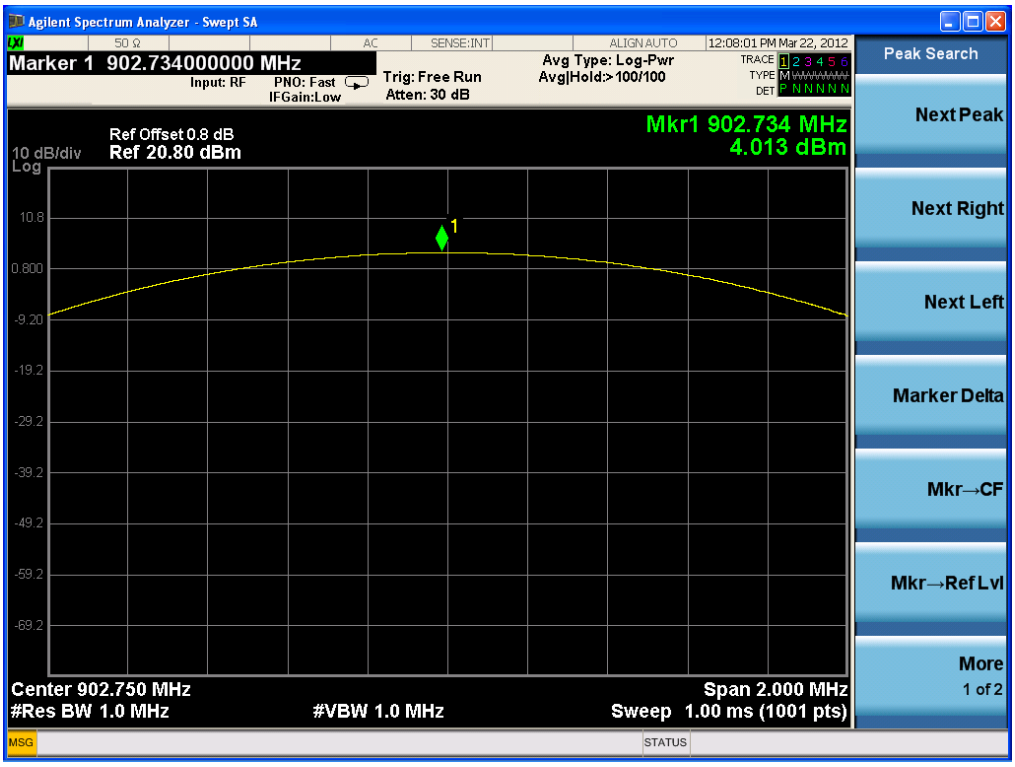
Antenna Gain : -10.455 dBi
Limit : 30 dBm – (-10.455 - 6) dBi = 46.455 dBm

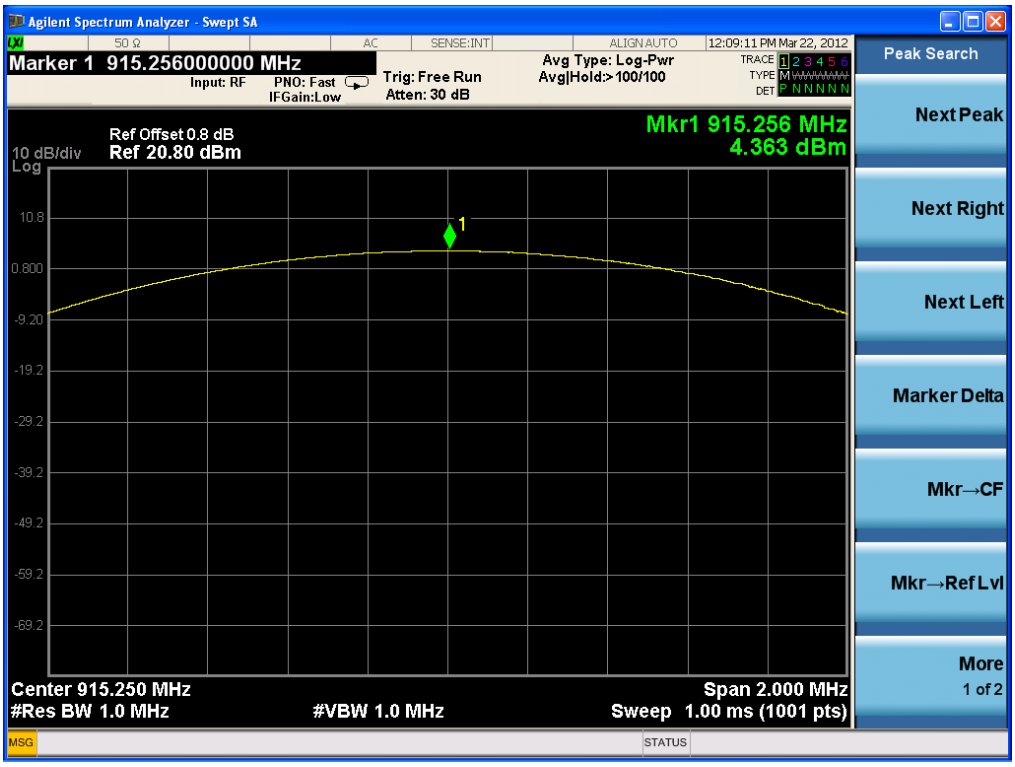
Test Results

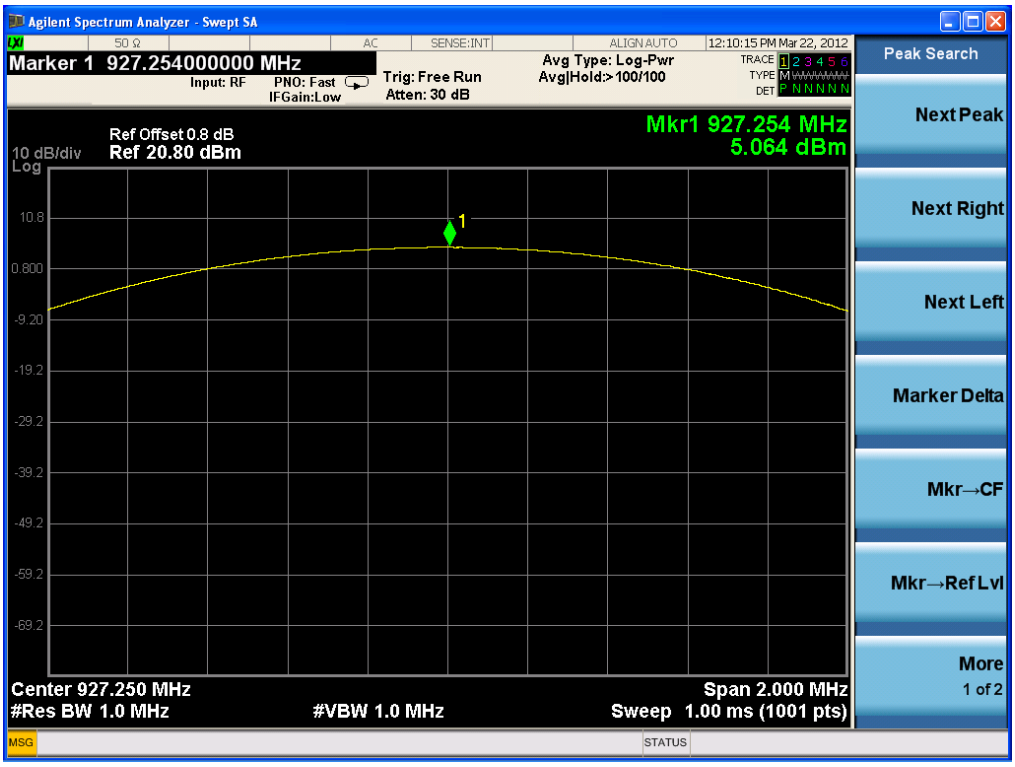
Frequency (MHz)	Peak output power(dBm)	Peak output power(mW)	Limit (dBm)	Margin (dB)	Result
902.75	4.013	2.519	46.455	42.442	Complies
915.25	4.363	2.730	46.455	42.092	Complies
929.25	5.064	3.209	46.455	41.391	Complies

See next pages for actual measured spectrum plots.

Maximum peak Conducted Output Power







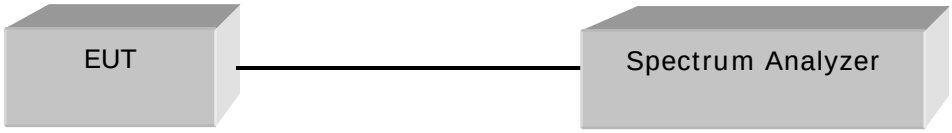
2.1.6 Band-edge

Test Location
RF Test Room

Test Procedures

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

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
RBW = 100 kHz
VBW = 300 kHz (≥ RBW)
Span = 5 MHz
Detector function = peak
Trace = max hold
Sweep = auto



Limit

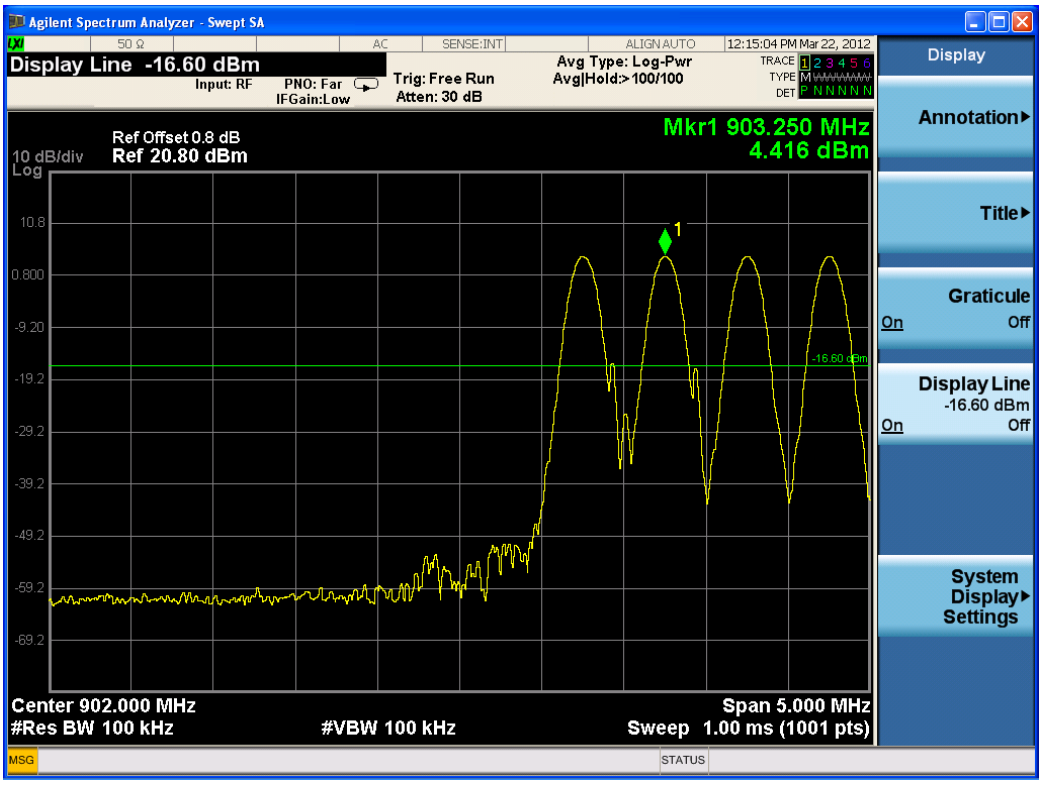
> 20 dBc

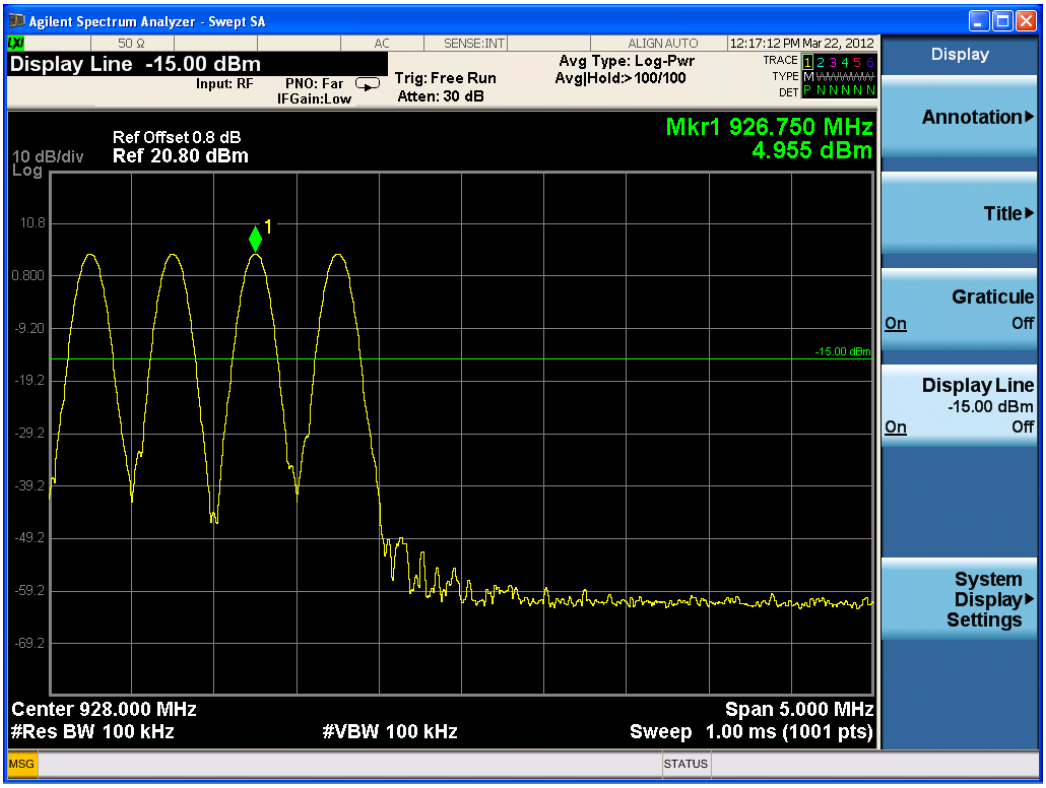
Test Results

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

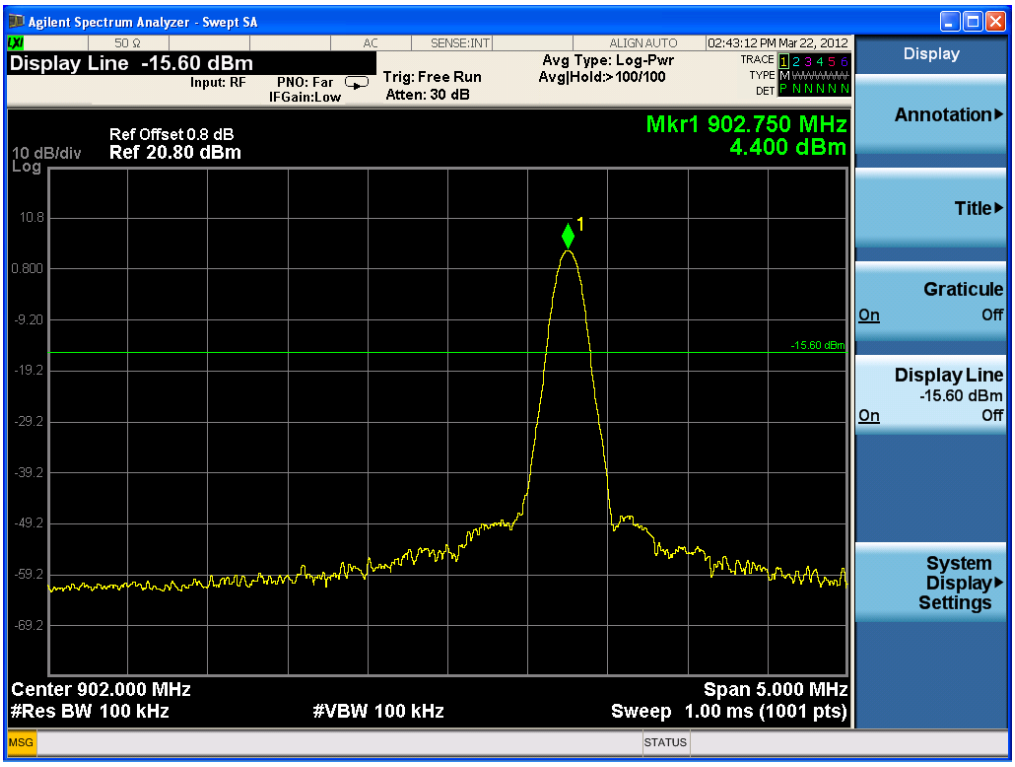
See next pages for actual measured spectrum plots.

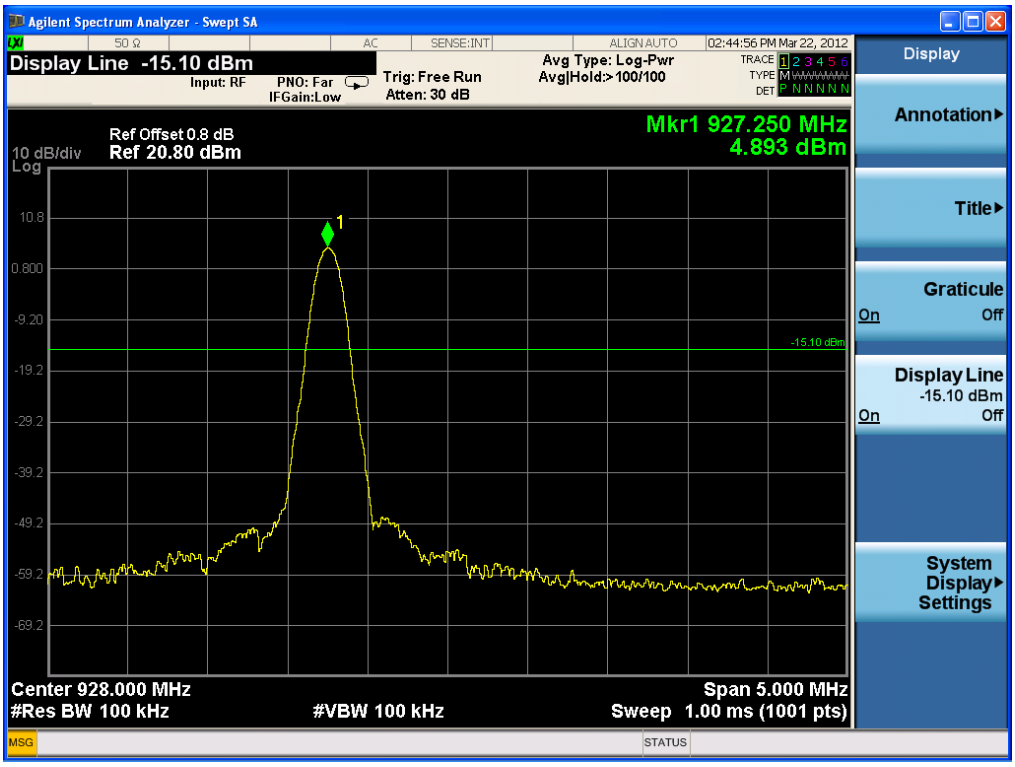
Band – edge (with Hopping)



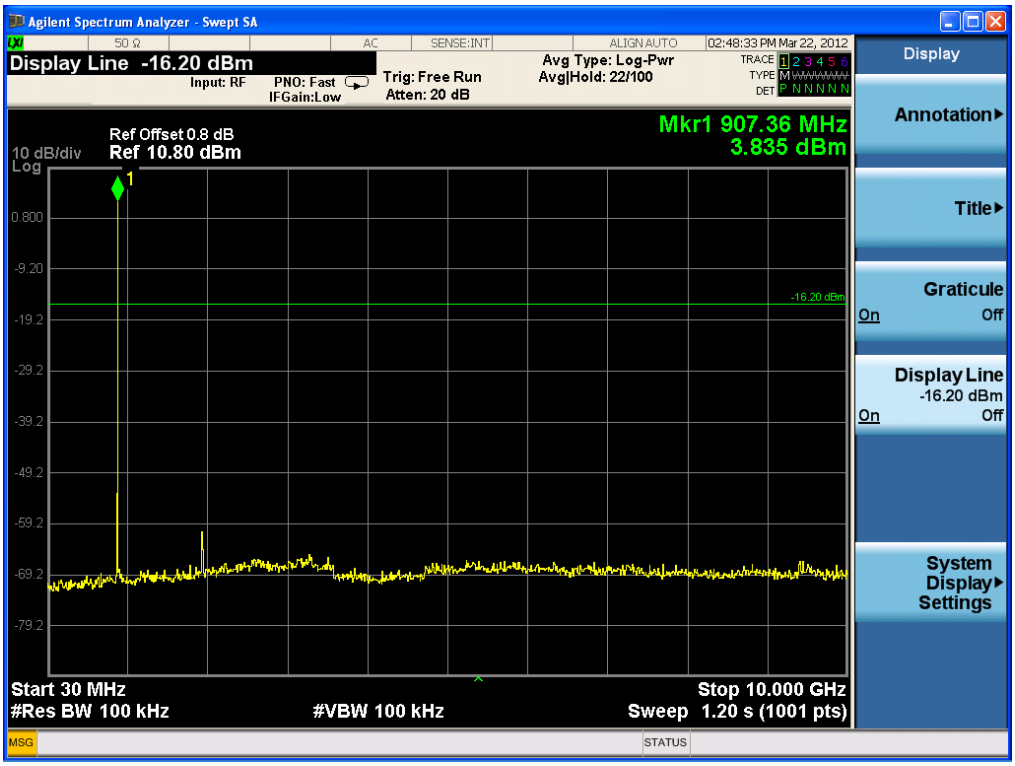


Band – edge (without Hopping)

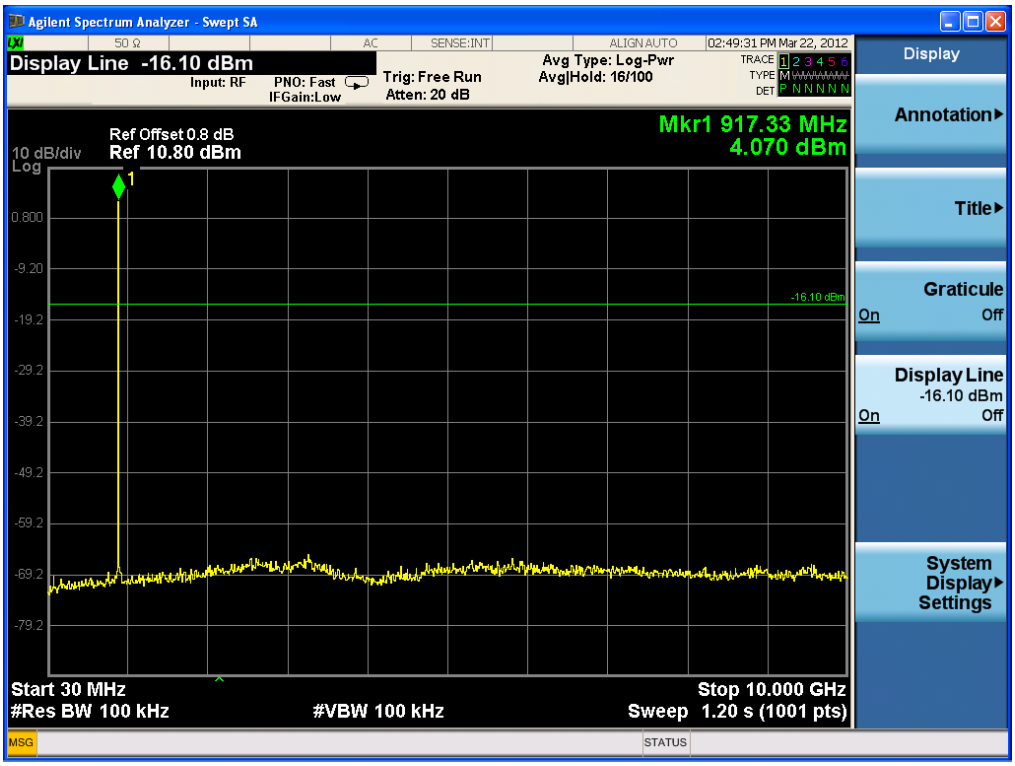




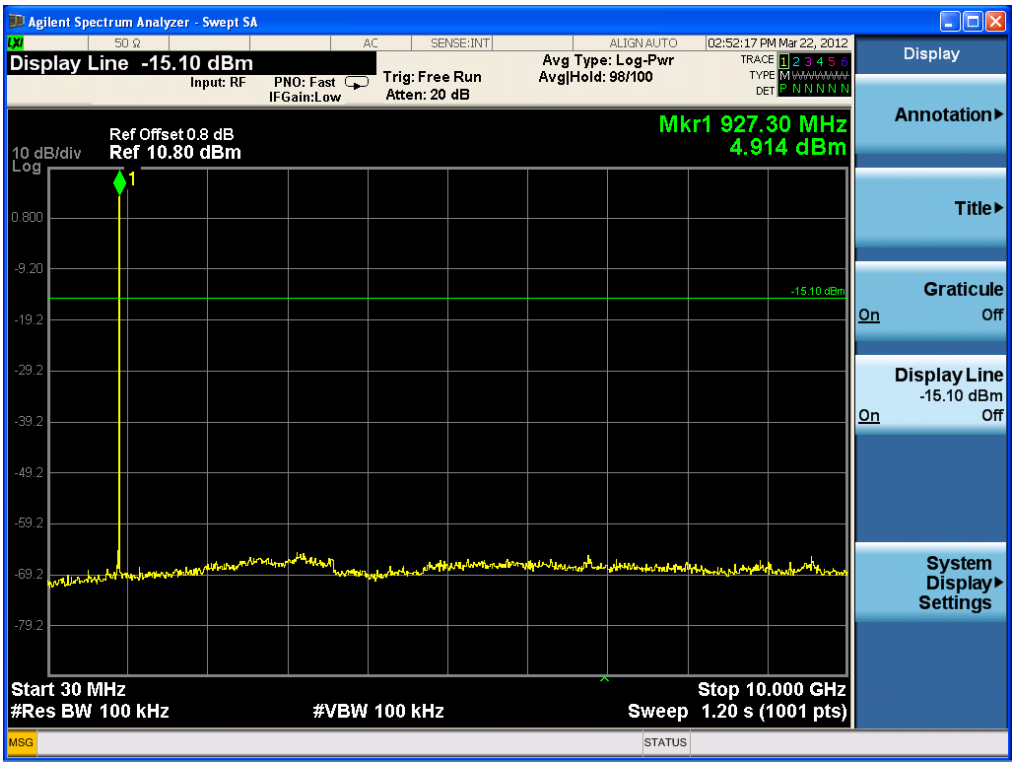
Band – edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic



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



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



2.1.7 Field Strength of Emissions

Test Location

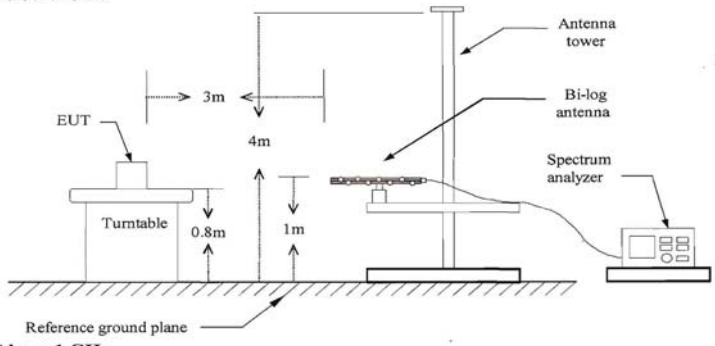
☒ Testing was performed at a test distance of 3 meter Open Area Test Site

Test Procedures

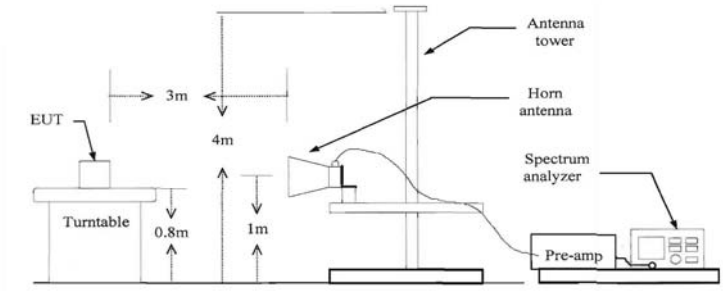
The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:
Below 1GHz :
RBW=100KHz/VBW=300KHz/Sweep=AUTO
Above 1GHz:
(a) PEAK:RBW=VBW=1MHz/Sweep=AUTO
(b) AVERAGE:RBW=1MHz/VBW=10Hz/Sweep=AUTO

Below 1 GHz



Above 1 GHz



Limit

- **15.209(a)**

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m
30-88	100**	40
88-216	150**	43.5
216-960	200**	46
Above 960	500	54

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequnency 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.

Test Results

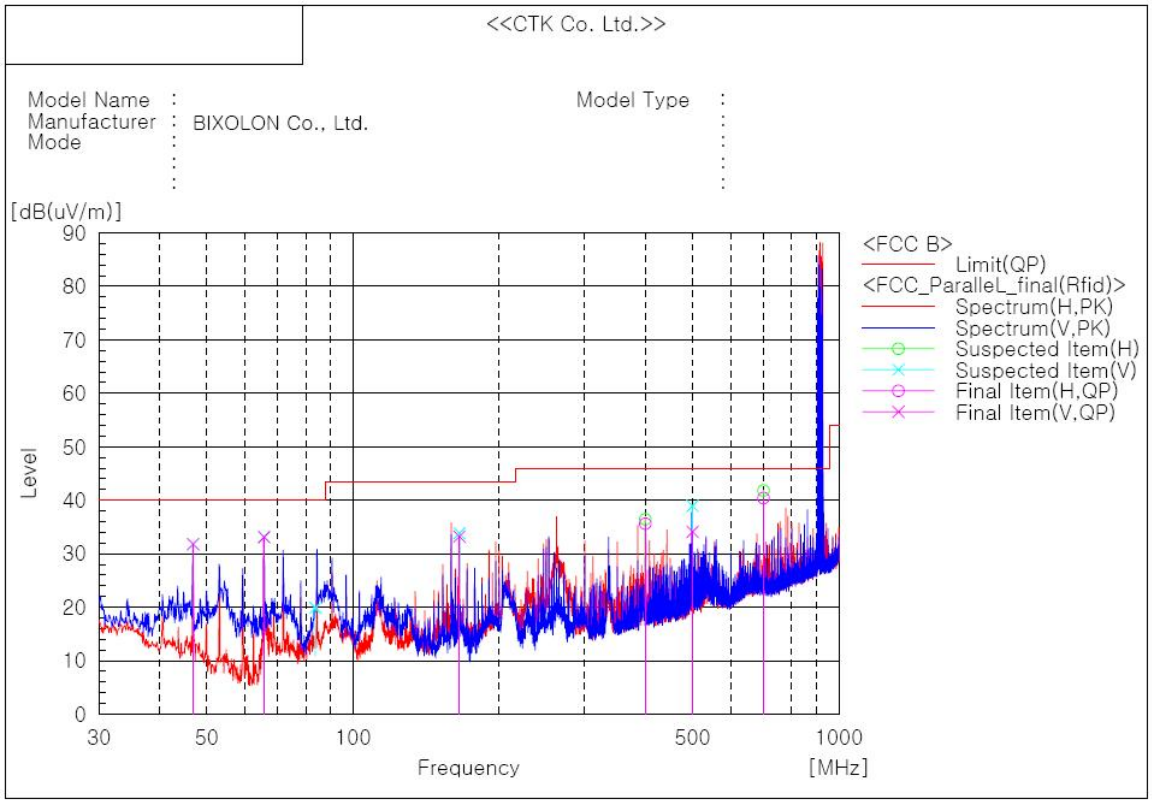
EUT	Thermal transfer label printer	Measurement Detail	
Model	SLP-T40*R	Frequency Range	Below 1000MHz
Channel	Hopping mode(Worst Case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
699.979	40.4	5.6	Quasi-Peak

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	46.873	V	51.2	-19.4	31.8	40.0	8.2	100.0	264.0
2	65.640	V	57.1	-24.0	33.1	40.0	6.9	100.0	0.0
3	165.558	V	53.1	-19.9	33.2	43.5	10.3	100.0	293.0
4	399.978	H	47.1	-11.5	35.6	46.0	10.4	100.0	33.0
5	499.971	V	42.8	-8.7	34.1	46.0	11.9	100.0	144.0
6	699.979	H	45.1	-4.7	40.4	46.0	5.6	100.0	172.0

Test Results

EUT	Thermal transfer label printer	Measurement Detail	
Model	SLP-T40*R	Frequency Range	1-10GHz
Channel	Hopping mode(Worst Case)	Detector function	Average/Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2408.75	33.8/54.5	20.2/19.5	Average/Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Height [m]	Correction Factor	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1600.00	39.2	51.4	V	1.0	-0.2	54.0	74.0	39.0	51.2	15.0	22.8
2408.75	29.5	50.2	V	1.0	4.3	54.0	74.0	33.8	54.5	20.2	19.5
1203.13	31.5	49.9	V	1.0	-3.6	54.0	74.0	27.9	46.3	26.1	27.7
1118.13	32.4	50.6	V	1.0	-4.6	54.0	74.0	27.8	46.0	26.2	28.0
1606.35	41.2	43.1	H	1.0	-0.1	54.0	74.0	41.1	43.0	12.9	31.0

Restricted band edge test data

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

2.1.8 Conducted Voltage 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
0.7035	32.0	14.0	Average

Test Data-Hopping mode(Worst Case)

[HOT]

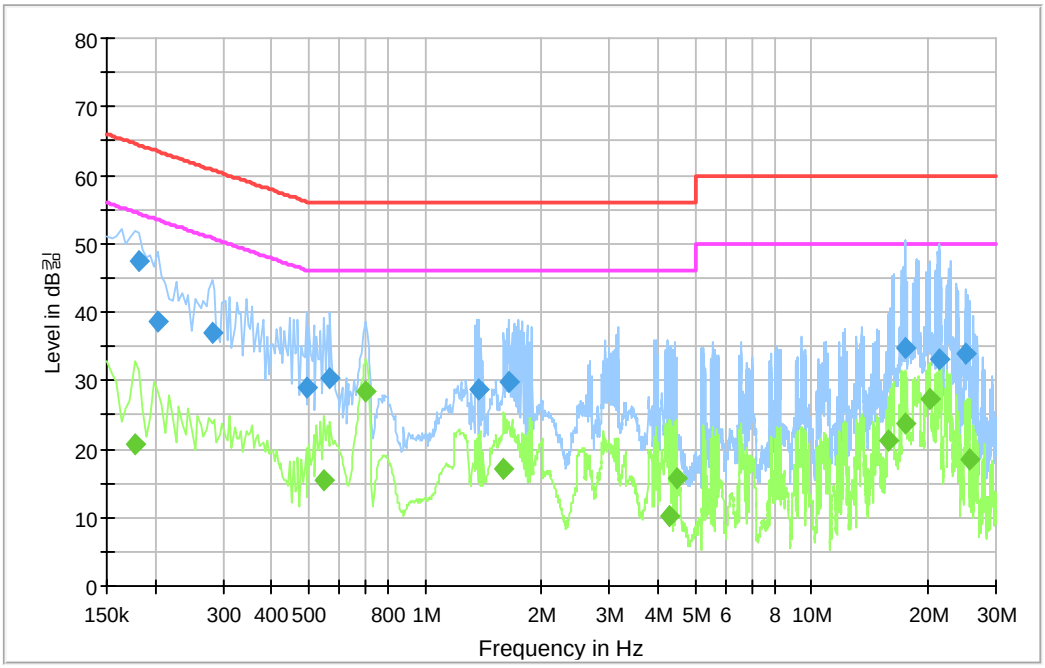
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	47.5	1000.0	9.000	On	L1	10.0	17.0	64.4
0.204000	38.8	1000.0	9.000	On	L1	10.1	24.7	63.4
0.280500	36.9	1000.0	9.000	On	L1	10.1	23.9	60.8
0.492000	28.9	1000.0	9.000	On	L1	10.0	27.2	56.1
0.568500	30.4	1000.0	9.000	On	L1	10.0	25.6	56.0
1.374000	28.6	1000.0	9.000	On	L1	10.0	27.4	56.0
1.639500	29.8	1000.0	9.000	On	L1	9.9	26.2	56.0
17.475000	34.8	1000.0	9.000	On	L1	9.8	25.2	60.0
21.511500	33.0	1000.0	9.000	On	L1	9.8	27.0	60.0
25.003500	33.8	1000.0	9.000	On	L1	10.0	26.2	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	20.6	1000.0	9.000	On	L1	9.9	34.0	54.6
0.546000	15.4	1000.0	9.000	On	L1	10.0	30.6	46.0
0.703500	28.4	1000.0	9.000	On	L1	10.1	17.6	46.0
1.599000	17.2	1000.0	9.000	On	L1	9.9	28.8	46.0
4.294500	10.3	1000.0	9.000	On	L1	9.8	35.7	46.0
4.461000	15.7	1000.0	9.000	On	L1	9.8	30.3	46.0
15.778500	21.3	1000.0	9.000	On	L1	9.8	28.7	50.0
17.511000	23.7	1000.0	9.000	On	L1	9.8	26.3	50.0
20.202000	27.3	1000.0	9.000	On	L1	9.8	22.7	50.0
25.494000	18.4	1000.0	9.000	On	L1	10.0	31.6	50.0

3CE_CISPR 22 Class B_L1



[NEUTRAL]

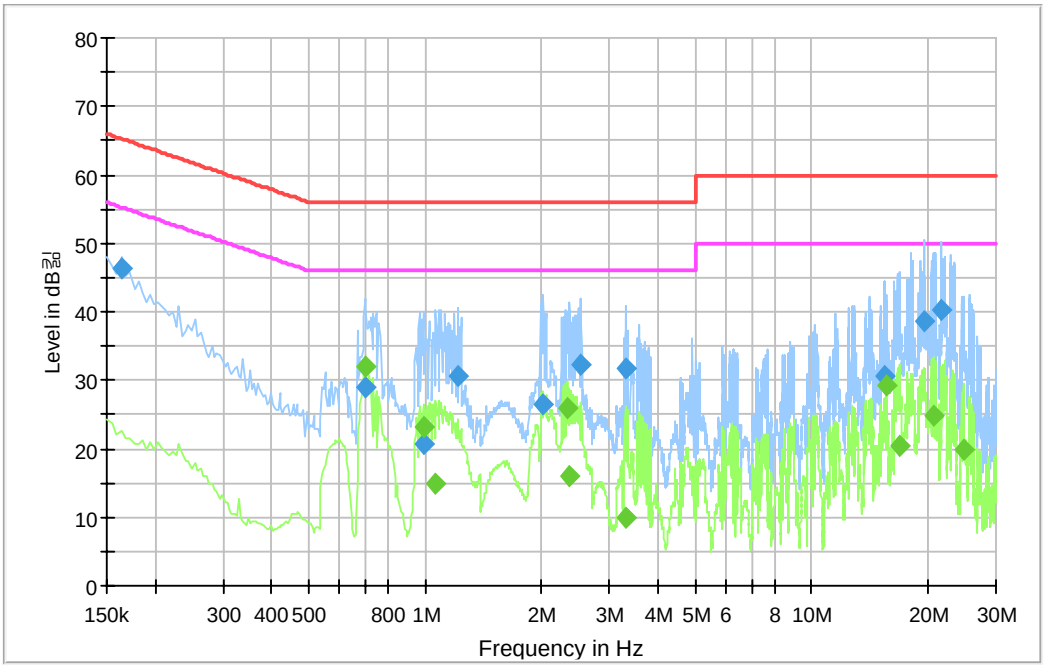
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	46.2	1000.0	9.000	On	N	10.0	19.1	65.3
0.699000	29.1	1000.0	9.000	On	N	10.1	26.9	56.0
0.991500	20.8	1000.0	9.000	On	N	10.0	35.2	56.0
1.216500	30.7	1000.0	9.000	On	N	10.0	25.3	56.0
2.026500	26.6	1000.0	9.000	On	N	9.9	29.4	56.0
2.530500	32.2	1000.0	9.000	On	N	9.9	23.8	56.0
3.313500	31.8	1000.0	9.000	On	N	9.8	24.2	56.0
15.526500	30.7	1000.0	9.000	On	N	9.8	29.3	60.0
19.531500	38.7	1000.0	9.000	On	N	9.9	21.3	60.0
21.700500	40.3	1000.0	9.000	On	N	9.9	19.7	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.703500	32.0	1000.0	9.000	On	N	10.1	14.0	46.0
0.991500	23.2	1000.0	9.000	On	N	10.0	22.8	46.0
1.068000	14.9	1000.0	9.000	On	N	10.0	31.1	46.0
2.341500	26.0	1000.0	9.000	On	N	9.9	20.0	46.0
2.364000	16.1	1000.0	9.000	On	N	9.9	29.9	46.0
3.304500	9.8	1000.0	9.000	On	N	9.8	36.2	46.0
15.625500	29.2	1000.0	9.000	On	N	9.8	20.8	50.0
16.903500	20.3	1000.0	9.000	On	N	9.8	29.7	50.0
20.706000	24.7	1000.0	9.000	On	N	9.9	25.3	50.0
24.787500	19.9	1000.0	9.000	On	N	10.1	30.1	50.0

3CE_CISPR 22 Class B_N



APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2012-11-10
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2012-11-10
3	EMI Test Receiver	Rohde & Schwarz	ESVS30	826638/008	2012-07-07
4	ULTRA Broadband Antenna	Rohde & Schwarz	HL562	361324/014	2013-11.03
5	LOOP ANTENNA	EMCO	6502	9107-2652	2012-10-29
6	Attenuator	HP	8498A	1801A06913	2012-11-14
7	EPM Series Power Meter	HP	E4418A	GB38272734	2012-11-10
8	Power Sensor	HP	8487A	3318A03524	2012-07-07
9	Audio Analyzer	HP	8903B	2747A03432	2012-11-10
10	ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2012-11-21
11	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2012-11-10
12	Modulation Analyzer	HP	8901B	3438A05228	2012-11-18
13	Attenuator	HP	8494A	3308A33351	2012-11-14
14	Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2013-01-12
15	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2012-11-10
16	EMC Analyzer	Agilent	E7405A	MY45110859	2013-02-13
17	Horn Antenna	ETS-Lindgren	3115	00078894	2013-03-22
18	Horn Antenna	ETS-Lindgren	3115	00078895	2013-03-22
19	Dipole Antenna	SCHWARZBECK	VHA 9103	VHA91032557	2013-11-04
20	Dipole Antenna	SCHWARZBECK	UHA 9105	UHA91052417	2013-11-04
21	OPT H64 AMPLIFIER	HP	8447F	3113A06814	2012-03-31
22	PREAMPLIFIER	Agilent	8449B	3008A02307	2012-11-17
23	Radio Communication Tester	Rohde & Schwarz	CMU200	106765	2013-02-09
24	LISN	Rohde & Schwarz	ENV216	101235	2012-08-18
25	LISN	Rohde & Schwarz	ENV216	101236	2012-08-18
26	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2012-11-10
27	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2013-02-09