

NCC RADIO TEST REPORT

Product name	ESL accesspoint
Applicant	SES-imagotag Deutschland GmbH
Manufacture	SES-imagotag Deutschland GmbH
Rating(s)	DC 5V (Powered by adapter)
Trademark	ses-imagotag
Model and/or type reference	SMARTAP 320
Standard	LP0002:2018
Test Result	Pass

Date of receipt : 03-09-2019

Signature :

Date of Issue : 03-18-2019



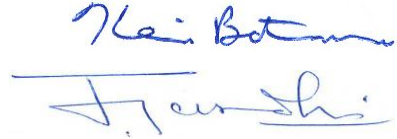
NCC RADIO TEST REPORT

Report Reference No...... M80620J727

Compiled by (+ signature) Kevin Bothmann

Approved by (+ signature) Jay Gandhi

Date of issue..... 2019-03-18



Applicant's name SES-imagotag Deutschland GmbH

Address Bundesstraße 16, 77955 Ettenheim Germany

Manufacture's Name SES-imagotag Deutschland GmbH

Address Bundesstraße 16, 77955 Ettenheim Germany

Test specification:

Standard LP0002: 2018

Test procedure EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、2.1053 and 2.1055

Non-standard test method..... N/A

Test item description

Product name : ESL accesspoint

Brand name : ses-imagotag

Model and/or type reference : SMARTAP 320

Rating(s) : DC 5V (Powered by adapter)or
DC5V from adapter

Testing Laboratory information

Testing Laboratory Name : Electro Magnetic Test, Inc.

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CAB Identifier Number : US0036

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Testing.....

Date of receipt of test item..... Mar. 08, 2019

Date (s) of performance of tests..... Mar. 09~ Mar. 18, 2019

Date of Issue Mar. 18, 2019

Test Result..... **Pass**

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, TFindboxn, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	A-0118
	Open Field Test Site "A"	-
	Mains Conducted Emissions Test Site "A"	-
	Telecom Conducted Emissions Test Site "A"	-
	3 Meter Semi-Anechoic Chamber Site "E"	-
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	-
	Mains Conducted Emissions Test Site "E"	-
	Telecom Conducted Emissions Test Site "E"	-
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
TFindboxn	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

***THESE AGENCIES DO NOT ISSUE AN IDENTIFYING NUMBER TO TEST LABS.**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

LP0002 : 2018			
Standard Section	Test Item	Judgment	Remark
2.3	Conducted Emission	PASS	None
4.8.1.4/2.8	Radiated Spurious Emission	PASS	None
4.8.1.2 (1)	Peak Output Power	PASS	None
4.8.1.5 (2)	6dB Occupied Bandwidth	PASS	None
4.8.1.5 (2)	Power Density	PASS	None
4.8.1.4/2.8	Restricted Bands	PASS	None
4.8.1.2/4.8.1.3	Antenna Requirement	PASS	None

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	1.38dB
2	Radiated Emission Test	3.17dB
3	RF power,conducted	0.16dB
4	Spurious emissions,conducted	0.21dB
5	All emissions,radiated(<1G)	4.68dB
6	All emissions,radiated(>1G)	4.89dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	ESL accesspoint	
Brand Name	ses-imagotag	
Model Name	SMARTAP 320	
Derivative Model	N/A	
OEM Brand/Model Name	N/A	
Product Description	The EUT is a ESL accesspoint.	
	Operation Frequency:	920.9750MHz~924.2750 MHz
	Modulation Type:	DSSS
	Number Of Channel	7
	Antenna Designation:	Please see Note 3.
	Antenna Gain(Peak)	1 dBi
	Output Power:	7.16dBm
Channel List	Please refer to the Note 2.	
Power Rating	DC 5V (Powered by adapter)	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	N/A	
EUT Modification(s)	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

Description of Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	920.9750	05	923.1750
02	921.5250	06	923.7250
03	922.0750	07	924.2750
04	922.6250		

3.

Table for Filed Antenna

	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
	Sunnway Technology Co. Ltd	AN0827-12BC 06SM-B	External Antenna	N/A	1 dBi	Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01 /CH04 /CH07

For Conducted Emission	
Final Test Mode	Description
Mode 1	CH01 /CH04 /CH07

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01 /CH04 /CH07

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) For all tests the worst-case was selected as the table above, the data of the worst-case is shown in the report.

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

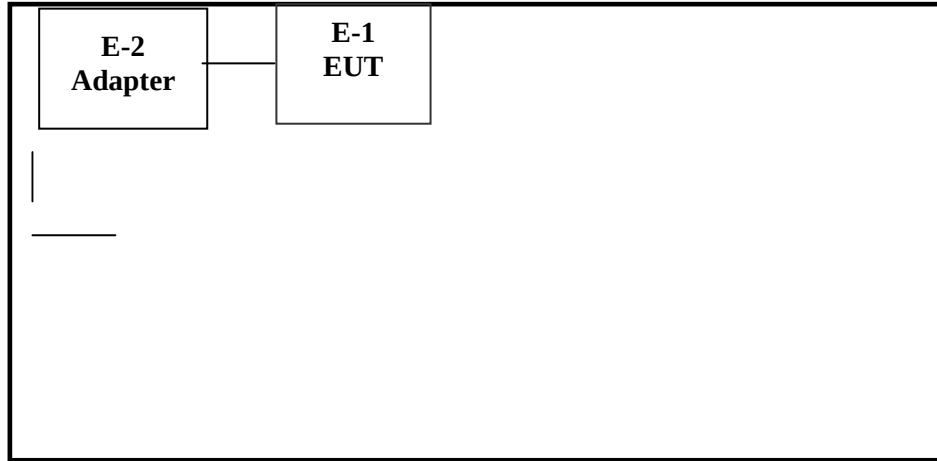
Test software Version	Test program: Fixed		
Frequency	920.9750 MHz	922.6250 MHz	924.2750 MHz
Parameters	Default	Default	Default

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Block diagram of EUT configuration

Non-Conductive Table

80 cm above Ground Plane



2.5 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	ESL accesspoint	ses-imagotag	SMARTAP 320	N/A	N/A	EUT
E-2	Adapter	PHIHONG	PSC15R-050	N/A	N/A	EUT.

Item	Shielded Type	Ferrite Core	Length	Note
1#	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” or “with ferrite core”; “NO” means “unshielded” or “without ferrite core”

2.5.1 EQUIPMENTS LIST FOR ALL TEST ITEMS

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	April 29, 2018	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	April 29, 2018	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650	2521A00584	April 29, 2018	1 Year
Preamplifier	Com Power	PA-102	1482	April 29, 2018	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 8, 2018	1 Year
LISN	Com Power	LI-200	12012	September 10, 2018	1 Year
LISN	Com Power	LI-200	12214	September 10, 2018	1 Year
LISN	Com Power	LI-200	1767	September 10, 2018	1 Year
LISN	Com Power	LI-200	1768	September 10, 2018	1 Year
Biconical Antenna	Com Power	AB-100	01557	December 29, 2018	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	December 22, 2018	1 Year
Horn Antenna	Com Power	AHA-118	711054	December 22, 2018	1 Year
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39B2234T	N/A	N/A
Plotter	Hewlett Packard	7470A	2308A96499	N/A	N/A

EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	June 12, 2018	1 Year
BiConiLog Antenna	ETS-Lindgren	3142D	00102183	August 14, 2018	1 Year
Horn Antenna	ETS-Lindgren	3117	00109294	May 6, 2018	1 Year
Preamplifier	Rohde & Schwarz	TS-PR18	100056	June 12, 2018	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Acer	Aspire 8930	85100050123	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A
Loop Antenna	ARA	PLA-1030/B	1029	May 19, 2018	1 Year

3. TRANSMITTER EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150kHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5			66 - 56 *	56 - 46 *	LP0002
0.50 -5.0			56.00	46.00	LP0002
5.0 -30.0			60.00	50.00	LP0002

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

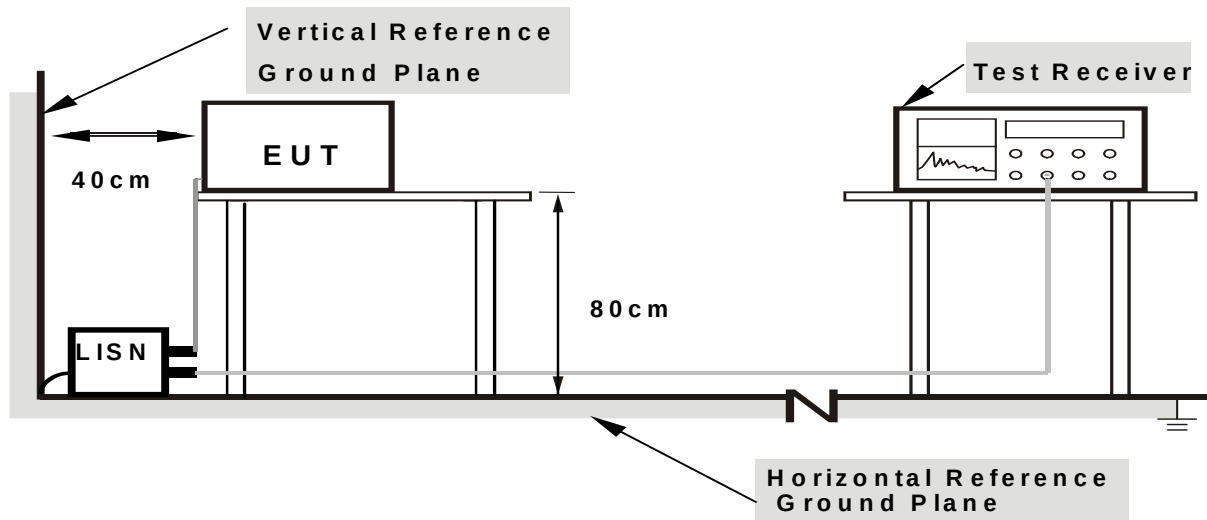
3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP

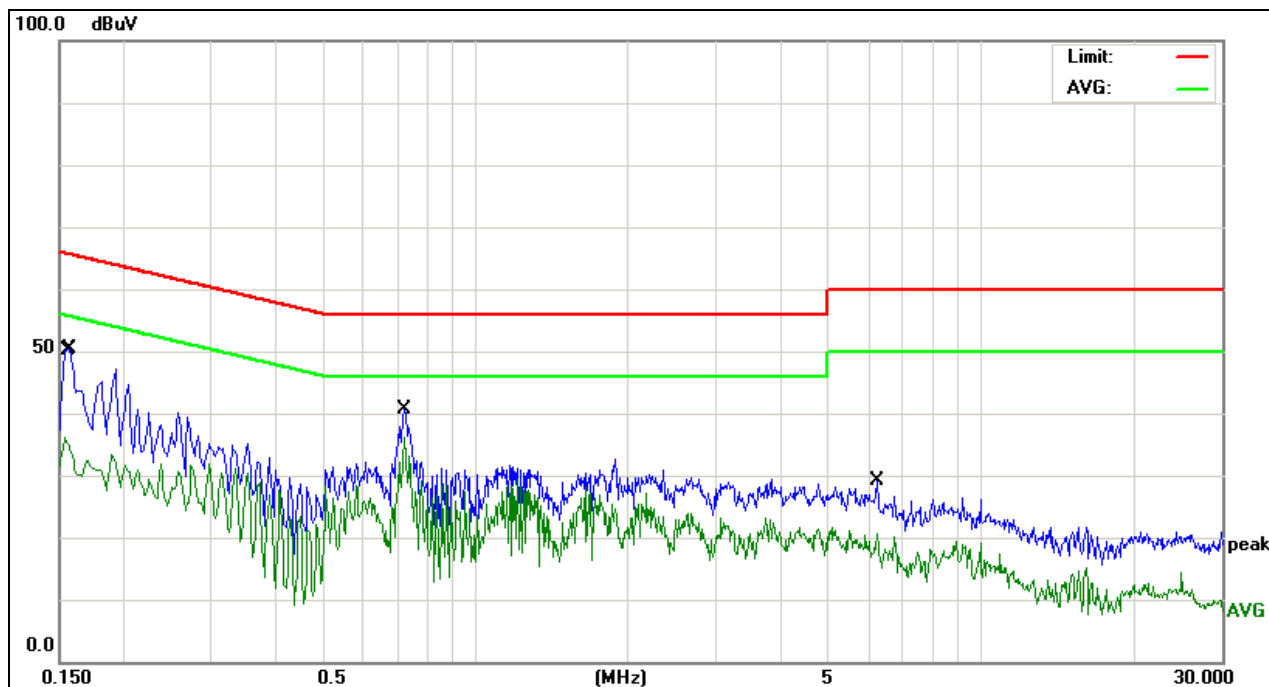


Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 TEST RESULTS

EUT :	ESL accesspoint	Model Name. :	SMARTAP 320
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2019-3-15
Test Mode :	Mode 1	Phase :	L
Test Voltage :	DC 5V from Adapter, AC 110V/60Hz for Adapter		

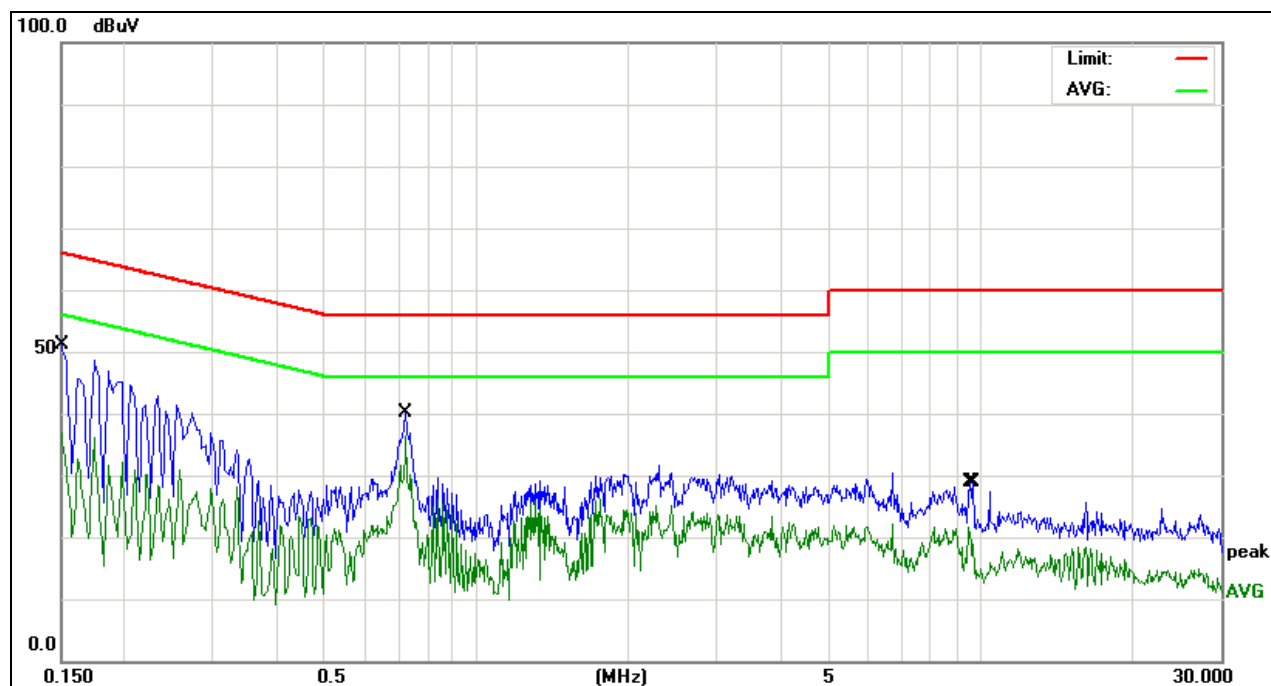


Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. '*' means the worst case

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1539	24.22	11.84	36.06	55.78	-19.72	AVG
2		0.1580	38.67	11.75	50.42	65.56	-15.14	QP
3		0.7220	30.65	9.97	40.62	56.00	-15.38	QP
4	*	0.7220	26.17	9.97	36.14	46.00	-9.86	AVG
5		6.2420	19.03	10.13	29.16	60.00	-30.84	QP
6		6.2420	10.37	10.13	20.50	50.00	-29.50	AVG

EUT :	ESL accesspoint	Model Name. :	SMARTAP 320
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2019-3-15
Test Mode :	Mode 1	Phase :	N
Test Voltage :	DC 5V from Adapter, AC 110V/60Hz for Adapter		



Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. '*' means the worst case

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1500	39.19	11.94	51.13	65.99	-14.86	QP
2		0.1500	24.90	11.94	36.84	55.99	-19.15	AVG
3		0.7260	30.25	9.97	40.22	56.00	-15.78	QP
4	*	0.7260	26.52	9.97	36.49	46.00	-9.51	AVG
5		9.4940	11.49	10.14	21.63	50.00	-28.37	AVG
6		9.6820	18.83	10.17	29.00	60.00	-31.00	QP

Test result: The unit does meet the NCC requirements.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to LP0002.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

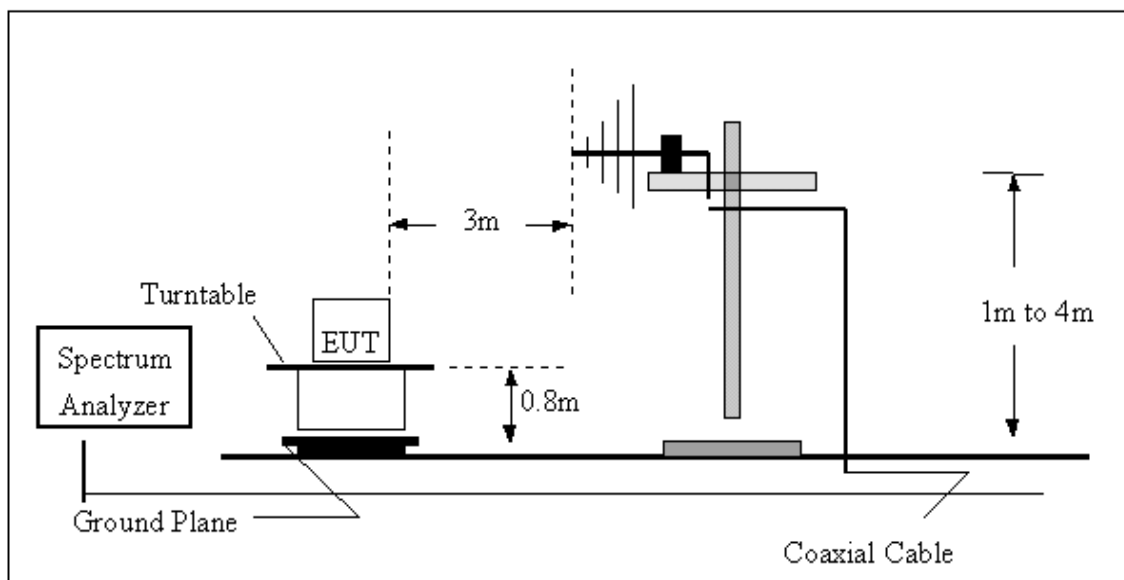
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

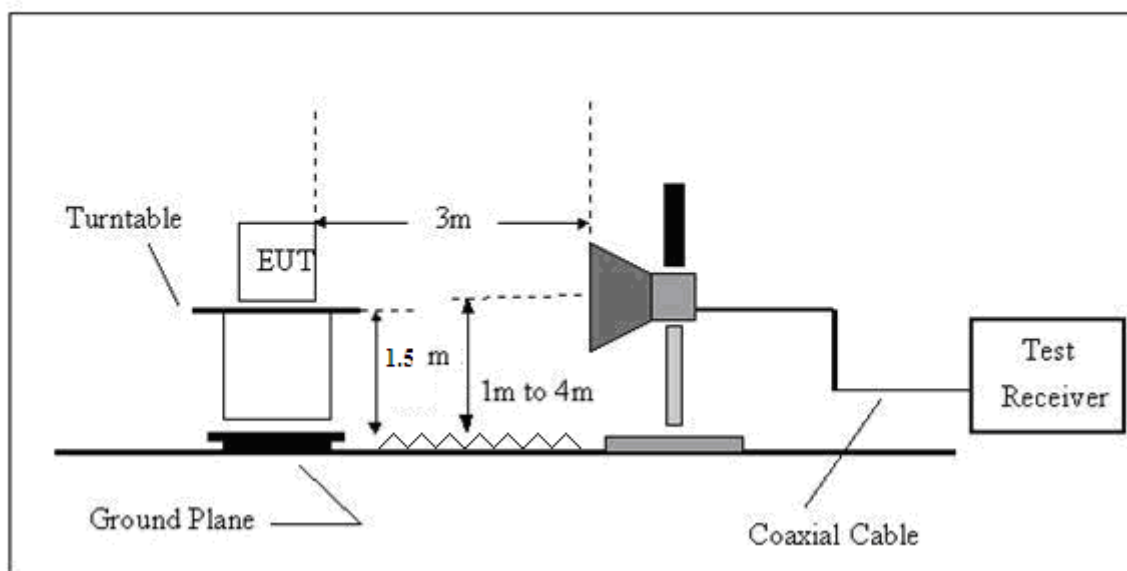
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters (For frequencies above 1GHz, table 1.5 meters) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.4 EUT OPERATING CONDITIONS

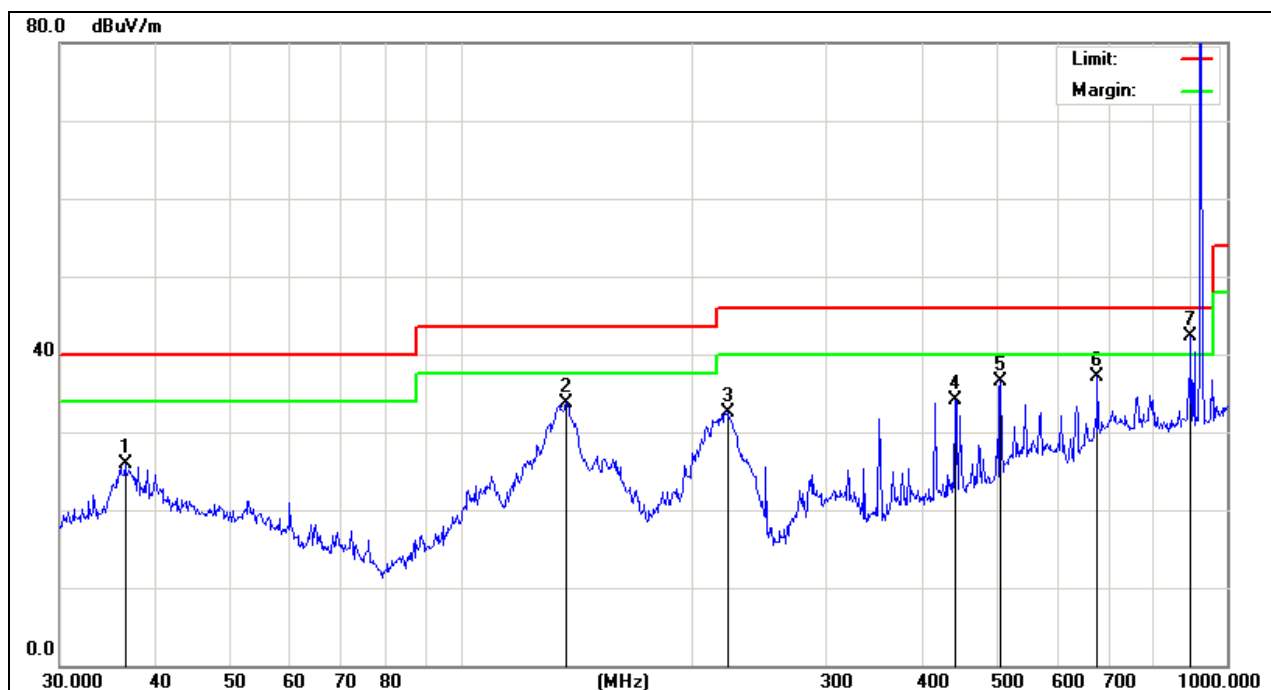
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS (BLOW 30MHZ)

There is not detected blow 30MHz.

3.2.6 TEST RESULTS (BETWEEN30 – 1000 MHZ)

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX	Polarization :	Horizontal
Test Power :	DC 5V (Powered by adapter)		

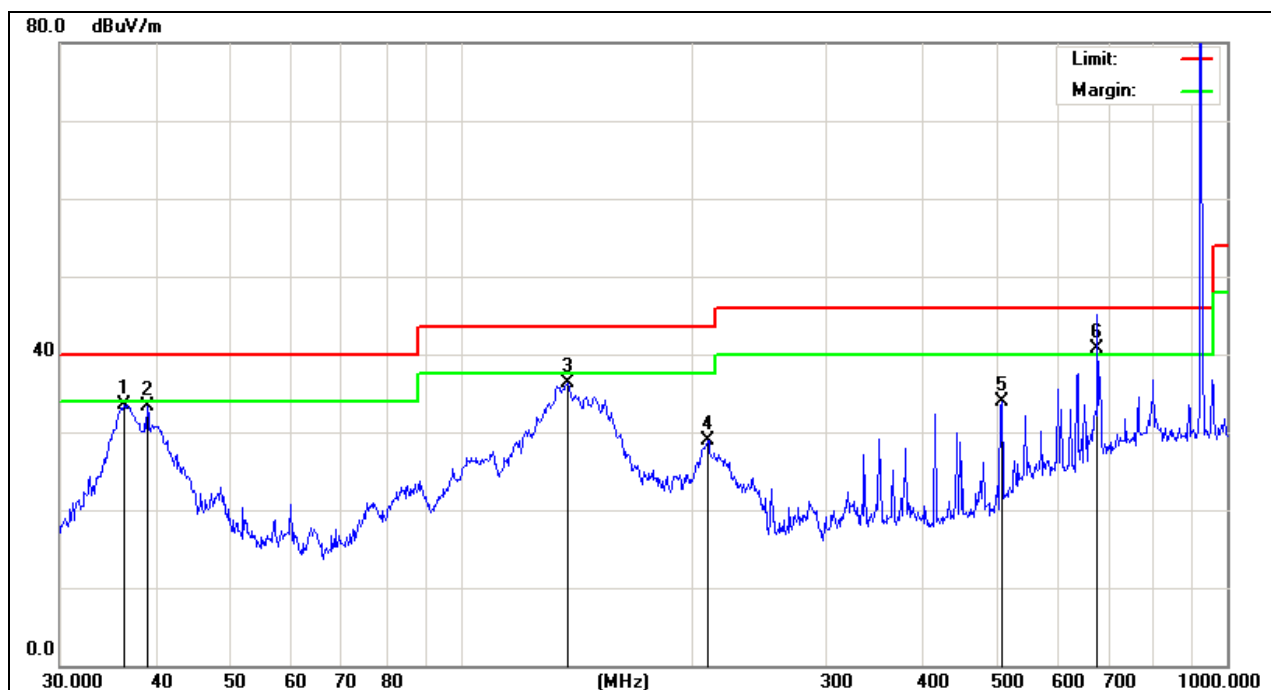


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		36.5092	29.19	-3.29	25.90	40.00	-14.10	peak
2		137.4202	41.10	-7.36	33.74	43.50	-9.76	peak
3		222.9502	39.12	-6.58	32.54	46.00	-13.46	peak
4		441.7426	34.74	-0.63	34.11	46.00	-11.89	peak
5		506.4791	34.57	2.00	36.57	46.00	-9.43	peak
6		677.5798	30.97	6.18	37.15	46.00	-8.85	peak
7	*	896.9964	34.79	7.52	42.31	46.00	-3.69	peak

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX	Polarization :	Vertical
Test Power :	DC 5V (Powered by adapter)		



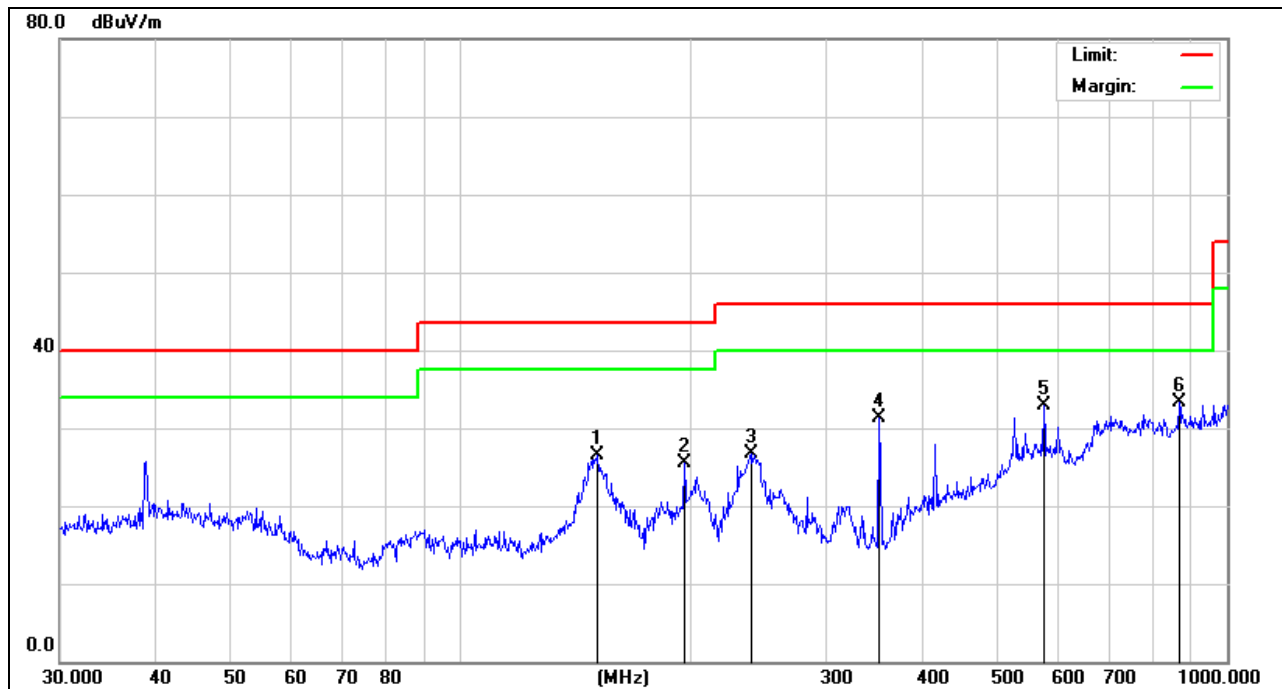
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		36.3814	38.14	-4.63	33.51	40.00	-6.49	peak
2		39.0245	37.67	-4.32	33.35	40.00	-6.65	peak
3		137.9028	44.45	-8.06	36.39	43.50	-7.11	peak
4		210.0482	32.74	-3.75	28.99	43.50	-14.51	peak
5		508.2582	34.98	-1.08	33.90	46.00	-12.10	peak
6	*	677.5798	36.90	3.88	40.78	46.00	-5.22	QP

Test result: The unit does meet the NCC requirements.

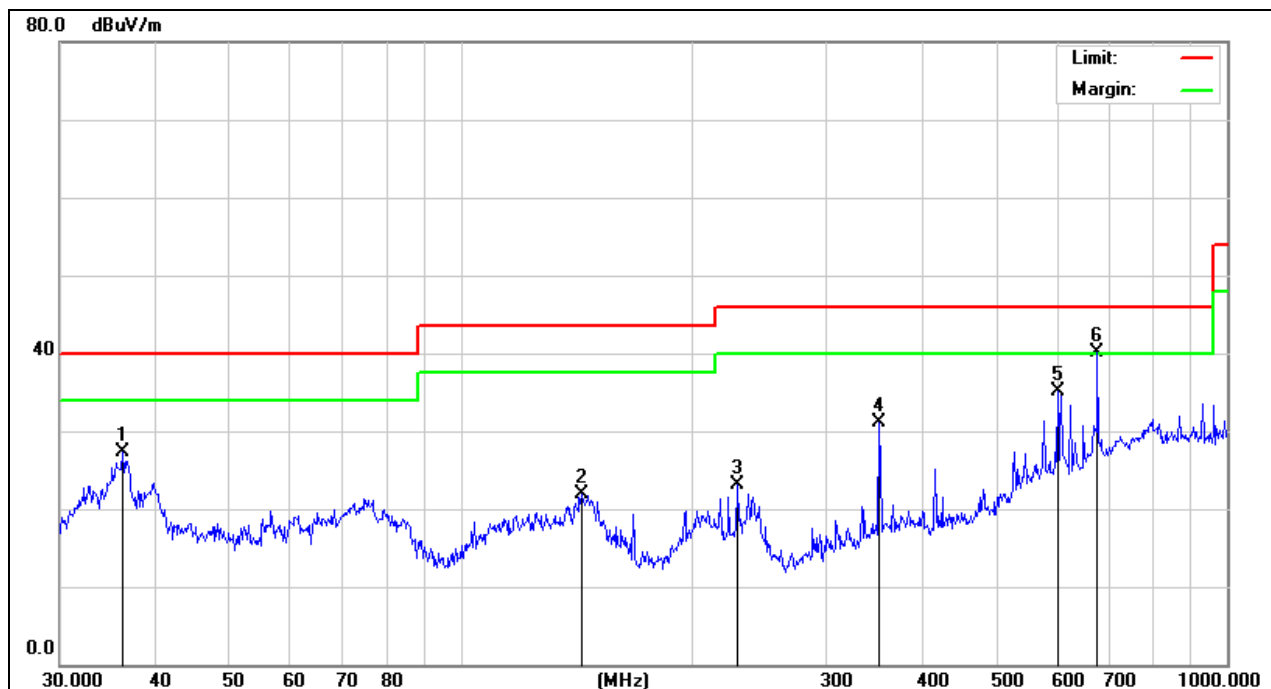
EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	RX	Polarization :	Horizontal
Test Power :	DC 5V (Powered by adapter)		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		151.0666	33.16	-6.73	26.43	43.50	-17.07	Peak
2		195.8220	33.01	-7.56	25.45	43.50	-18.05	Peak
3		239.9874	33.16	-6.52	26.64	46.00	-19.36	Peak
4		351.7079	38.35	-7.06	31.29	46.00	-14.71	Peak
5		576.6443	28.50	4.31	32.81	46.00	-13.19	Peak
6	*	866.0879	26.38	6.93	33.31	46.00	-12.69	Peak

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	RX	Polarization :	Vertical
Test Power :	DC 5V (Powered by adapter)		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		36.2541	32.03	-4.64	27.39	40.00	-12.61	Peak
2		143.8295	29.17	-7.26	21.91	43.50	-21.59	Peak
3		230.0985	30.66	-7.46	23.20	46.00	-22.80	Peak
4		351.7079	35.87	-4.75	31.12	46.00	-14.88	Peak
5		601.4265	31.85	3.20	35.05	46.00	-10.95	Peak
6	*	677.5798	36.21	3.88	40.09	46.00	-5.91	Peak

Test result: The unit does meet the NCC requirements.

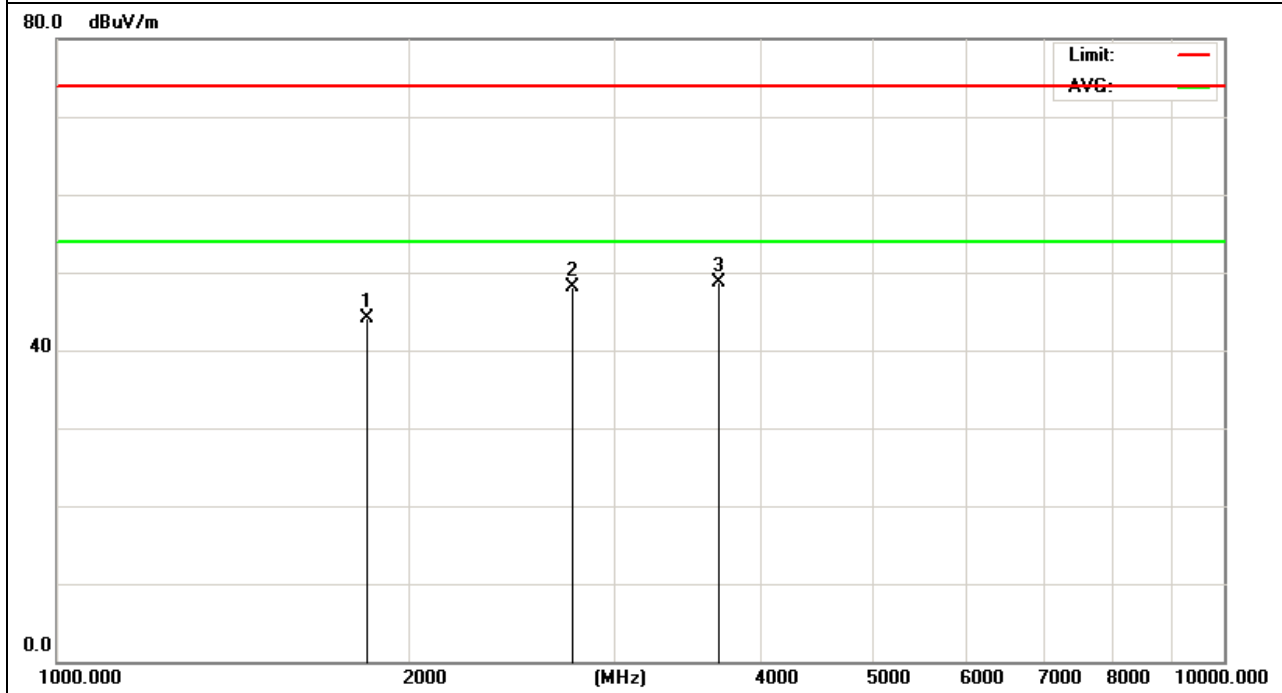
3.2.7 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Model1(920.9750MHz)	Polarization :	Vertical
Test Power :	DC 5V (Powered by adapter)		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1841.950	53.54	-9.42	44.12	74.00	-29.88	peak
2762.925	51.31	-3.13	48.18	74.00	-25.82	peak
3683.900	47.51	1.27	48.78	74.00	-25.22	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

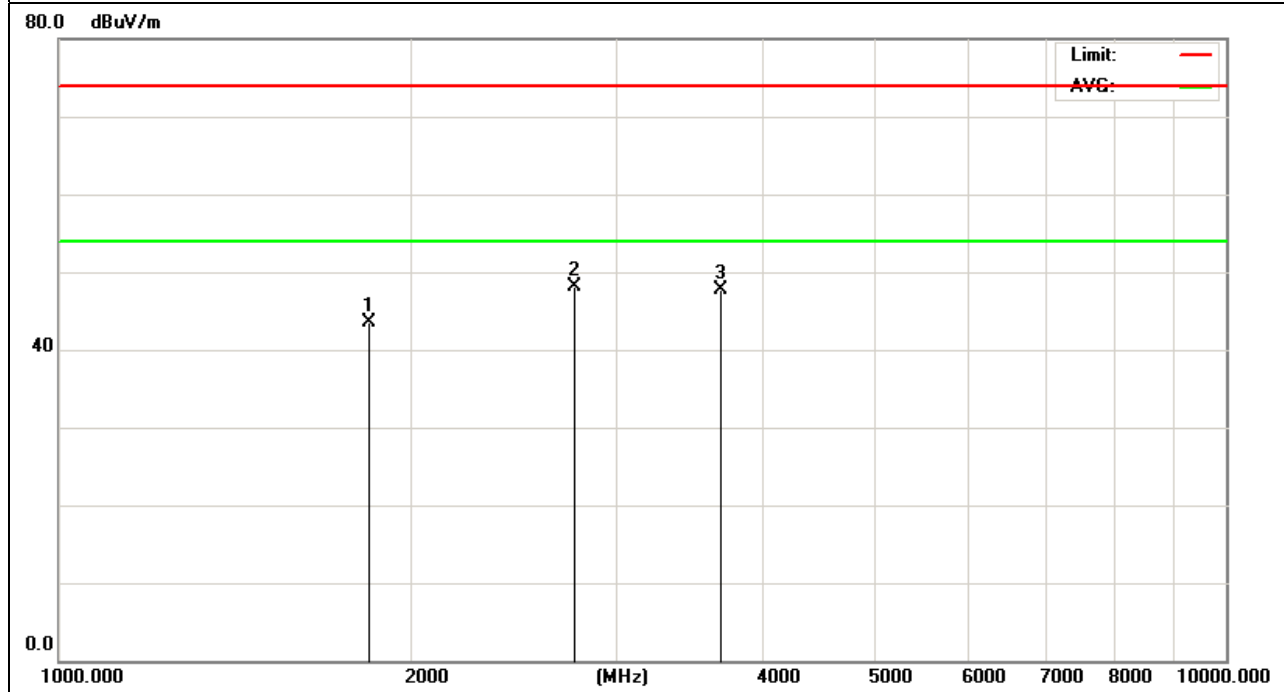


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Model1(920.9750MHz)	Polarization :	Horizontal
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1841.950	52.96	-9.42	43.54	74.00	-30.46	peak
2762.925	51.18	-3.13	48.05	74.00	-25.95	peak
3683.900	46.39	1.27	47.66	74.00	-26.34	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

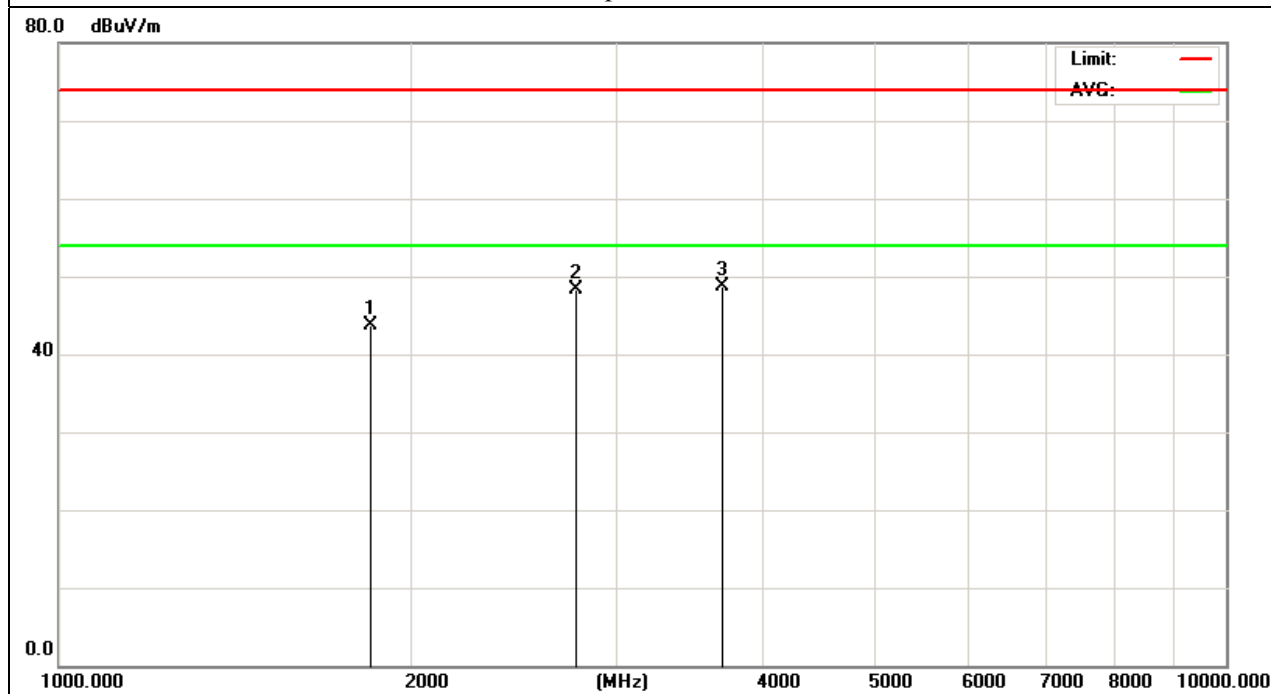


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Model(922.6250MHz)	Polarization :	Vertical
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1845.250	53.22	-9.42	43.80	74.00	-30.20	peak
2767.875	51.36	-3.09	48.27	74.00	-25.73	peak
3690.500	47.28	1.34	48.62	74.00	-25.38	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

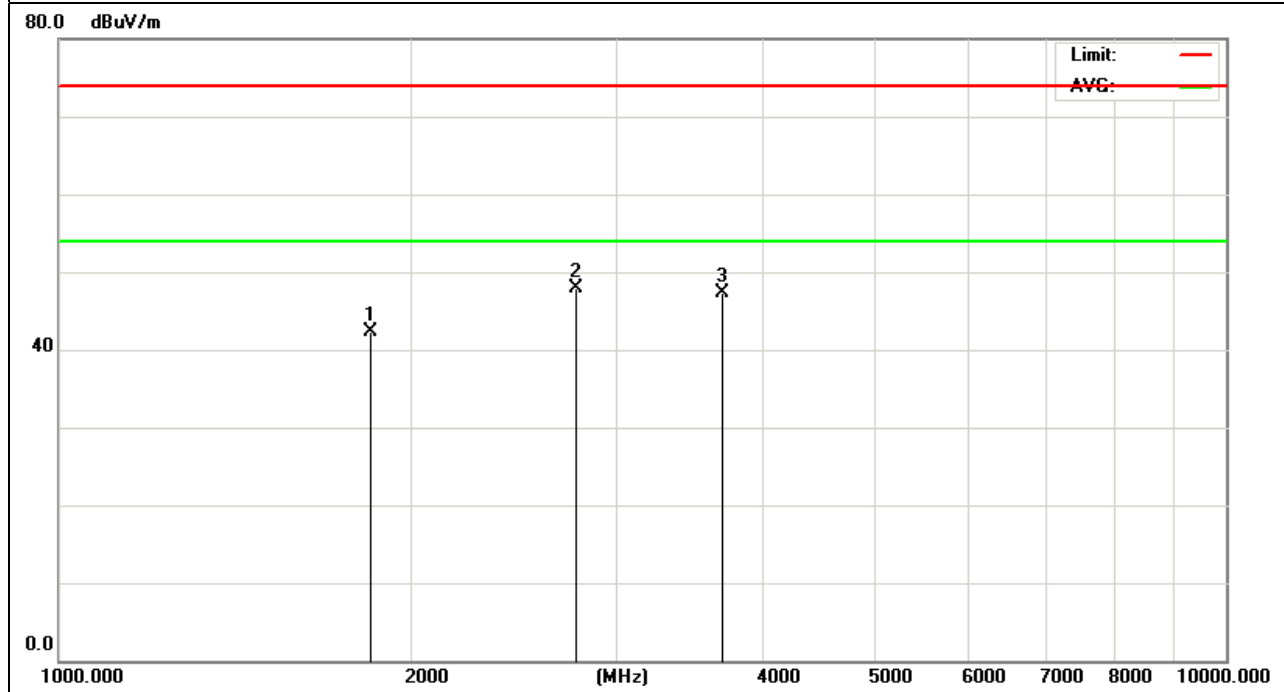


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Mode1(922.6250MHz)	Polarization :	Horizontal
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1845.250	51.74	-9.42	42.32	74.00	-31.68	peak
2767.875	51.09	-3.09	48.00	74.00	-26.00	peak
3690.500	46.05	1.34	47.39	74.00	-26.61	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

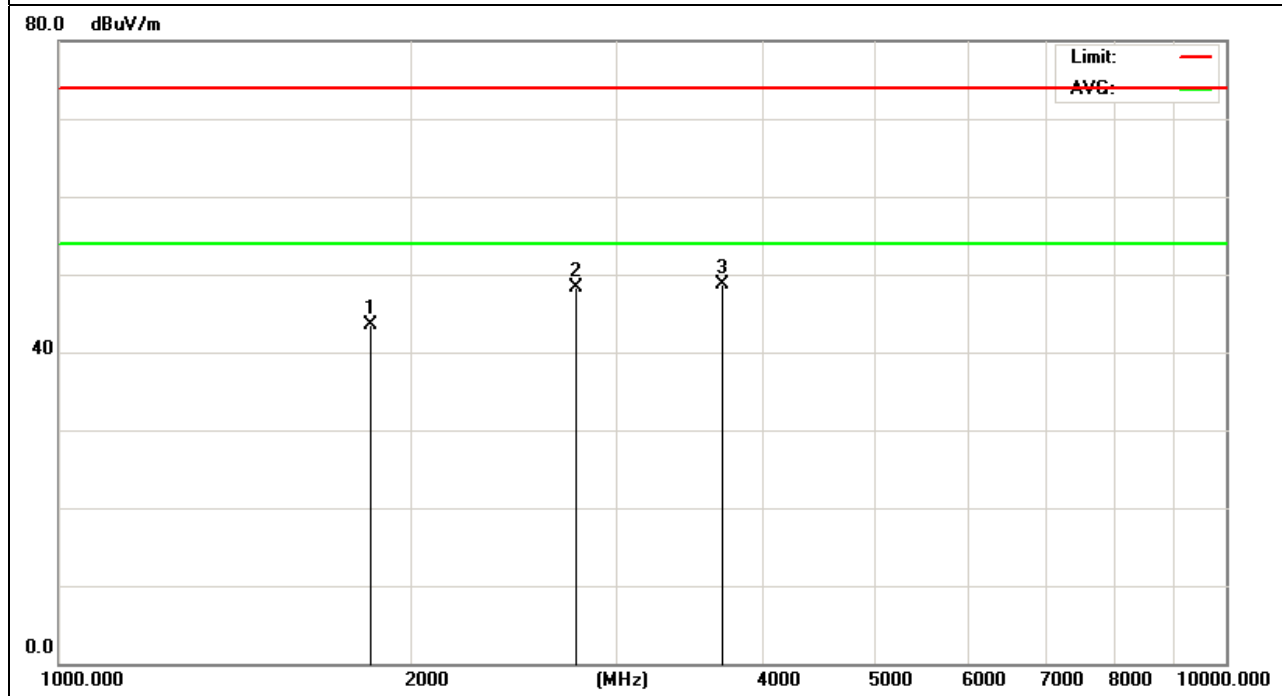


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Mode1(924.2750MHz)	Polarization :	Vertical
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1848.550	52.99	-9.43	43.56	74.00	-30.44	peak
2772.825	51.34	-3.05	48.29	74.00	-25.71	peak
3697.100	47.26	1.41	48.67	74.00	-25.33	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

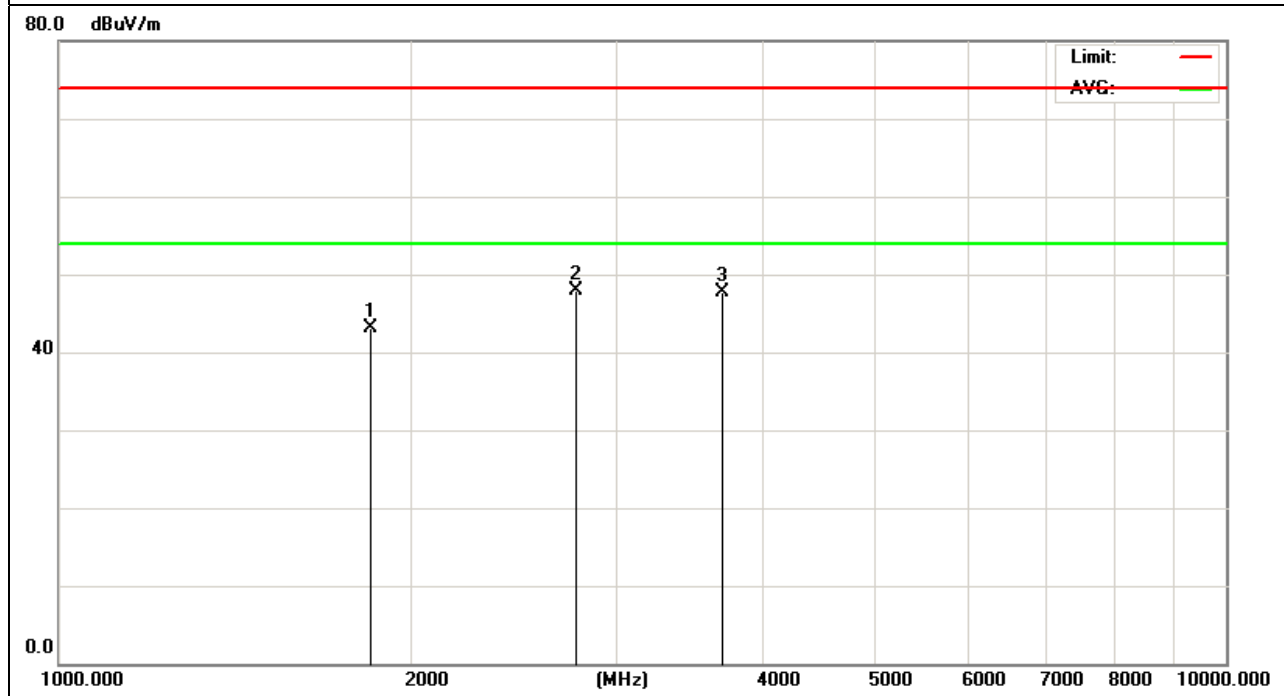


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	TX Mode1(924.2750MHz)	Polarization :	Horizontal
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1848.550	52.56	-9.43	43.13	74.00	-30.87	peak
2772.825	50.97	-3.05	47.92	74.00	-26.08	peak
3697.100	46.24	1.41	47.65	74.00	-26.35	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Remark:

All the modes had been tested, but only the worst data recorded in the report.

No any other emissions detected which are tested to compliance with the limit. No recording in the test report.

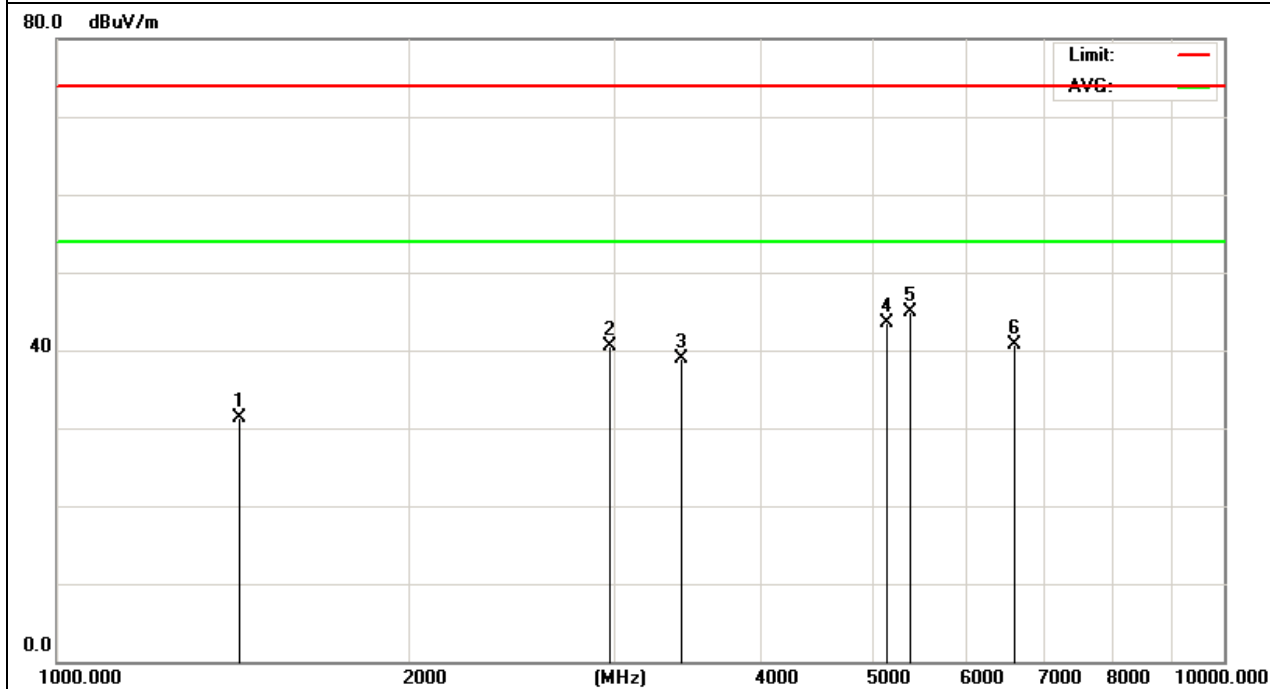
Test result: The unit does meet the NCC requirements.

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	RX (worst case)	Polarization :	Vertical
Measurement Distance	3 m	Frenqucy Range	1GHz to 10GHz
Test Power :	DC 5V (Powered by adapter)		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1435.310	41.47	-10.14	31.33	74.00	-42.67	peak
2972.745	42.41	-1.87	40.54	74.00	-33.46	peak
3423.300	39.67	-0.82	38.85	74.00	-35.15	peak
5140.241	38.67	4.81	43.48	74.00	-30.52	peak
5373.271	40.75	4.25	45.00	74.00	-29.00	peak
6621.114	34.87	5.93	40.80	74.00	-33.20	peak
1435.310	41.47	-10.14	31.33	74.00	-42.67	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

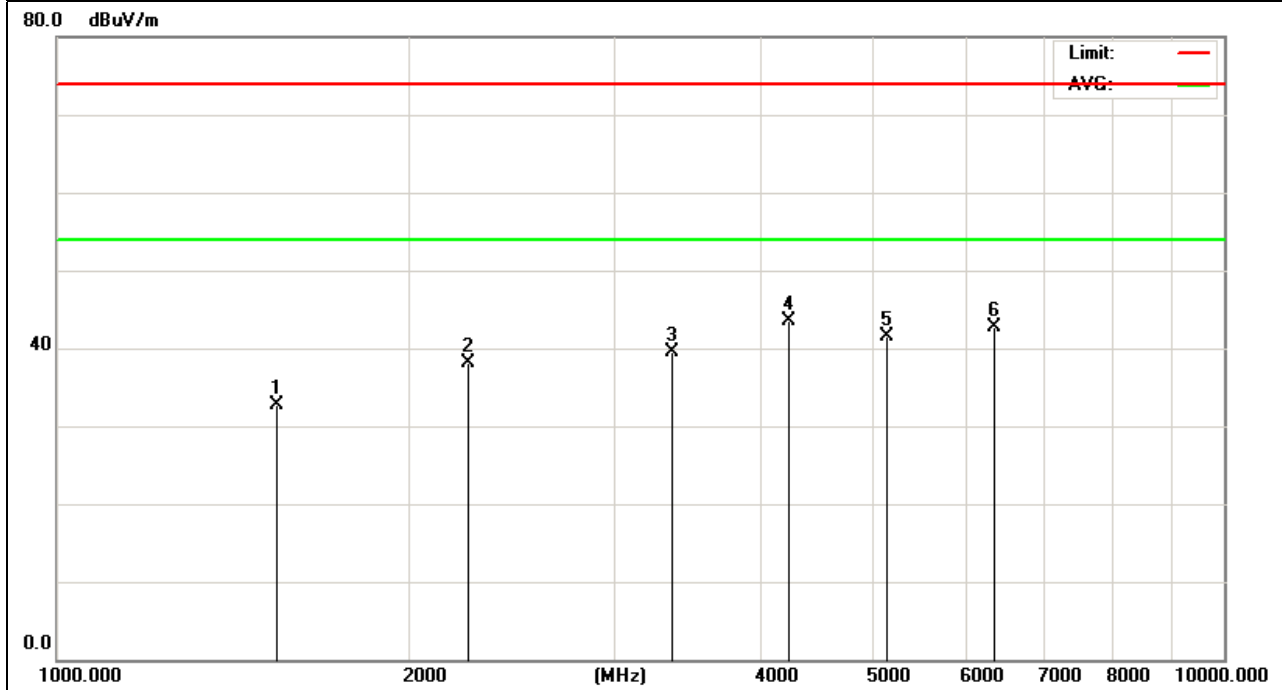


EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2019-3-15
Test Mode :	RX (worst case)	Polarization :	Horizontal
Measurement Distance	3 m	Frenqucy Range	1GHz to 10GHz
Test Power :	DC 5V (Powered by adapter)		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1544.410	42.52	-9.87	32.65	74.00	-41.35	peak
2245.000	45.21	-7.02	38.19	74.00	-35.81	peak
3362.480	40.39	-0.96	39.43	74.00	-34.57	peak
4233.240	39.21	4.21	43.42	74.00	-30.58	peak
5140.241	36.63	4.81	41.44	74.00	-32.56	peak
6341.280	37.11	5.63	42.74	74.00	-31.26	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Remark:

All the modes had been tested, but only the worst data recorded in the report.

No any other emissions detected which are tested to compliance with the limit. No recording in the test report.

Test result: The unit does meet the NCC requirements.

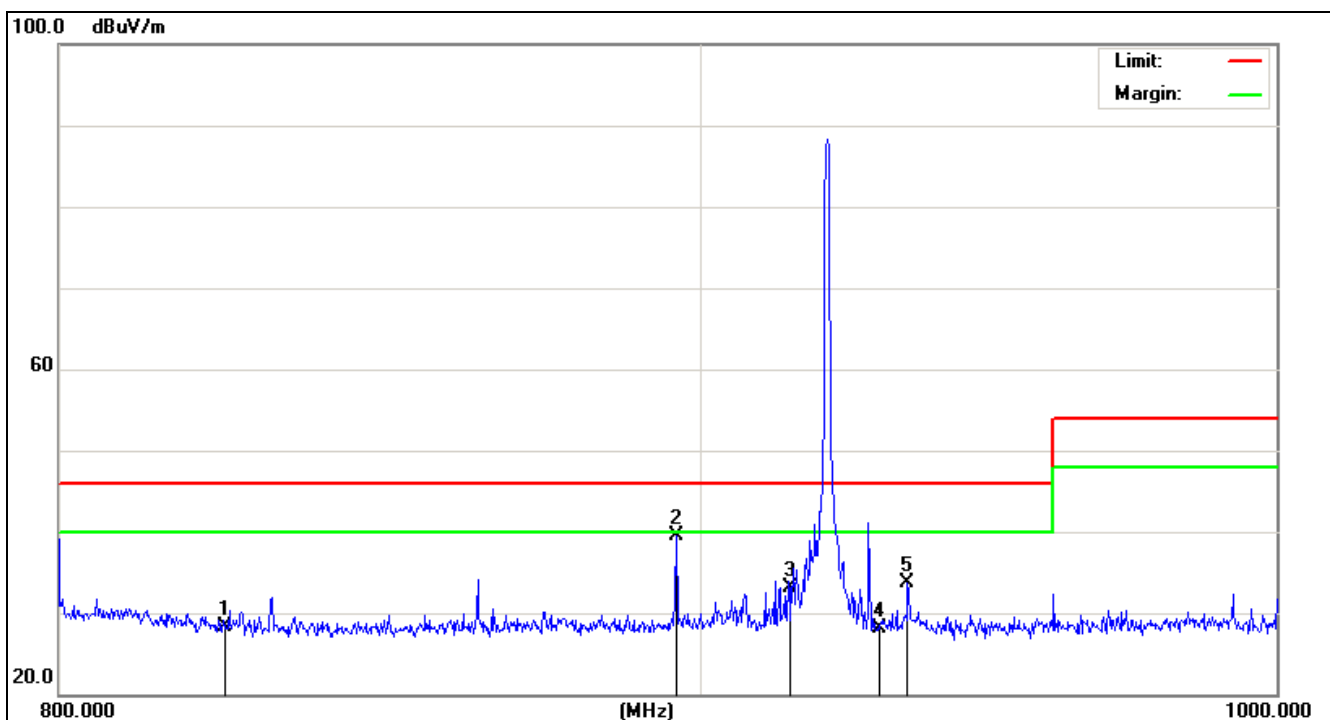
3.2.8 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Test Data	2019-3-15
Pressure :	1010 hPa	Relative Humidity :	54%
Test Mode :	Mode 1	Test Voltage :	DC 5V (Powered by adapter)
Note :	1. The transmitter was setup to transmit at the lowest channel. Then the field strength was measured at 800-1000 MHz, 1000-1250 MHz.		

Remark :

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
- (2) EUT Orthogonal Axis :
“X” - denotes Laid on Table ; ”Y” - denotes Vertical Stand ; ”Z” - denotes Side Stand
- (3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (4) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical

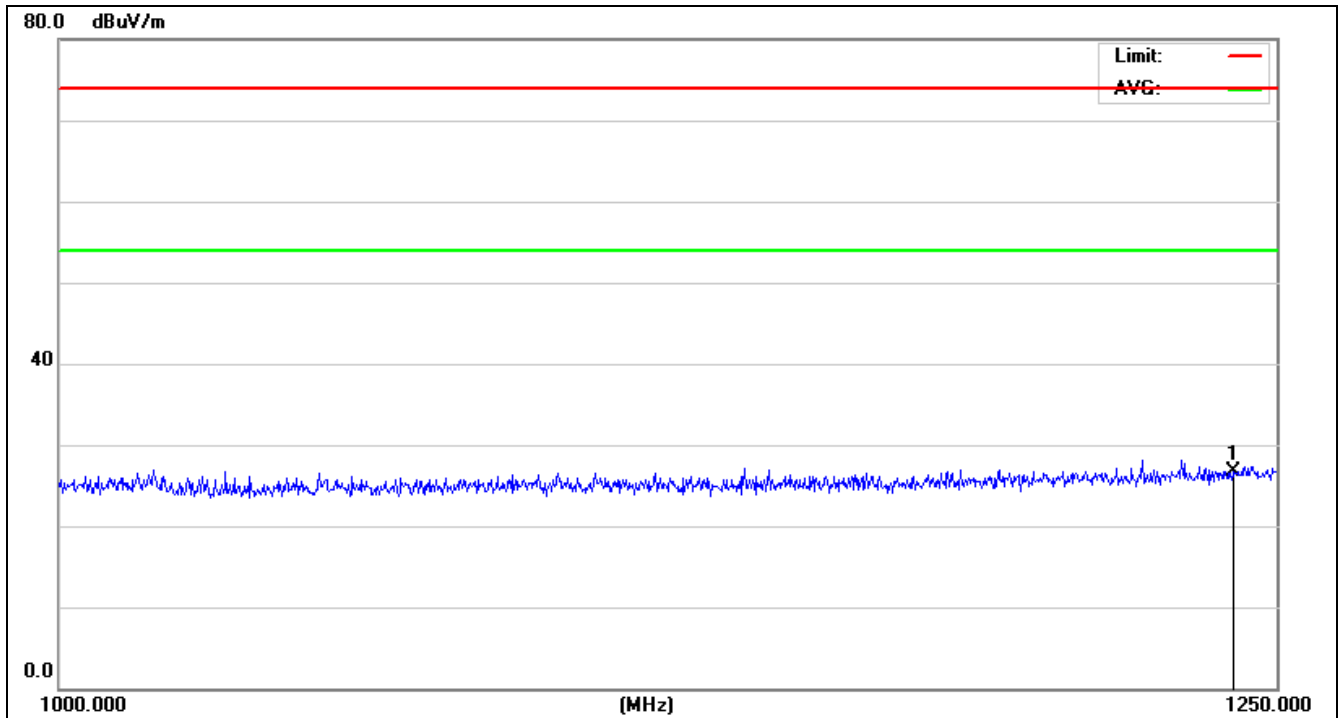


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		825.0000	22.49	5.91	28.40	46.00	-17.60	QP
2	*	896.0000	33.55	6.03	39.58	46.00	-6.42	QP
3		915.0000	27.07	6.07	33.14	46.00	-12.86	QP
4		930.0000	22.08	5.97	28.05	46.00	-17.95	QP
5		934.7999	27.93	5.87	33.80	46.00	-12.20	QP

Vertical

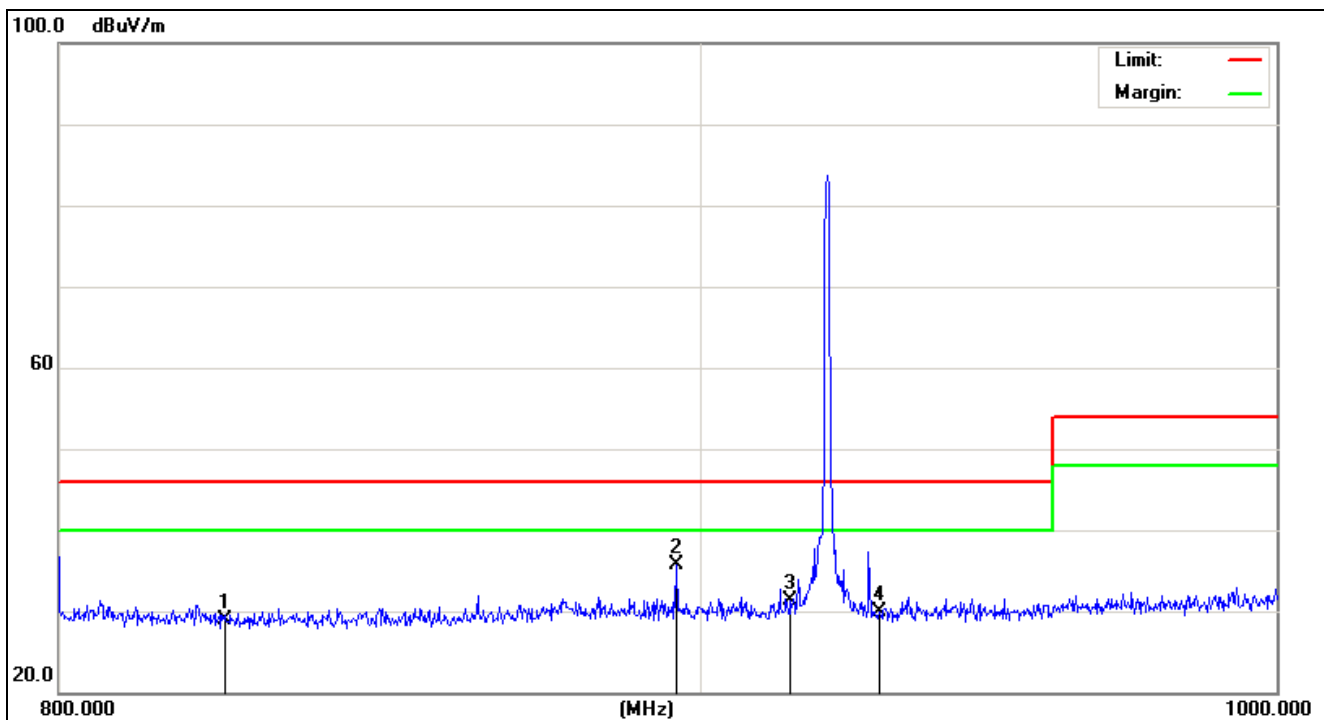


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	1240.000	27.25	-0.60	26.65	74.00	-47.35	peak

Horizontal

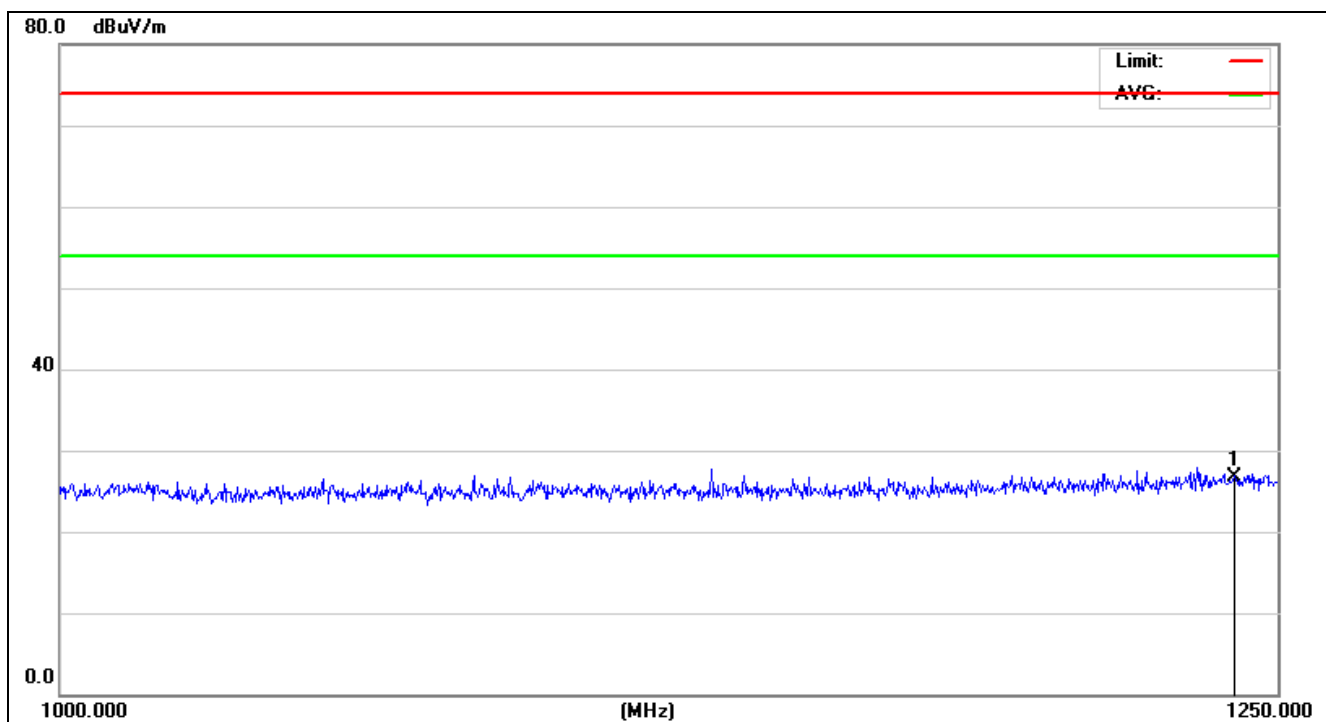


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		825.0000	22.04	6.81	28.85	46.00	-17.15	QP
2	*	896.0000	28.13	7.51	35.64	46.00	-10.36	QP
3		915.0000	23.96	7.42	31.38	46.00	-14.62	QP
4		930.0000	22.55	7.27	29.82	46.00	-16.18	QP

Horizontal

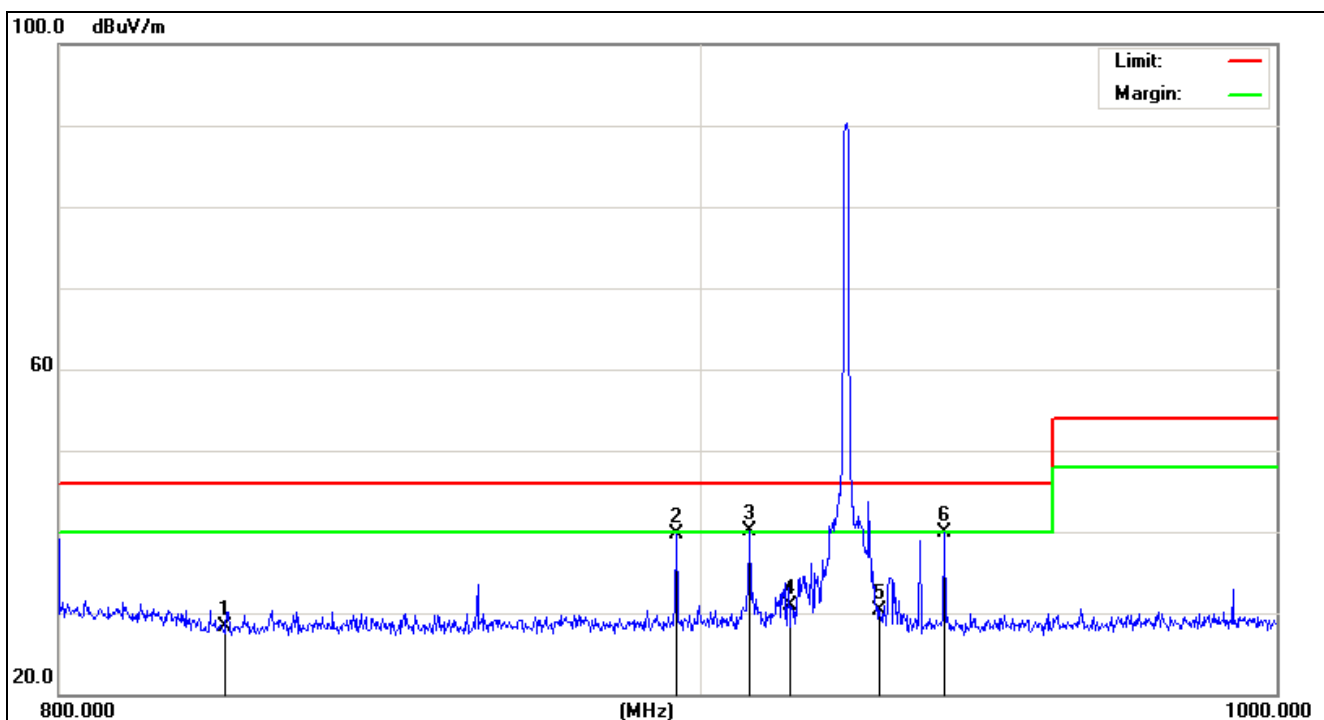


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	1240.000	27.38	-0.60	26.78	74.00	-47.22	peak

Vertical

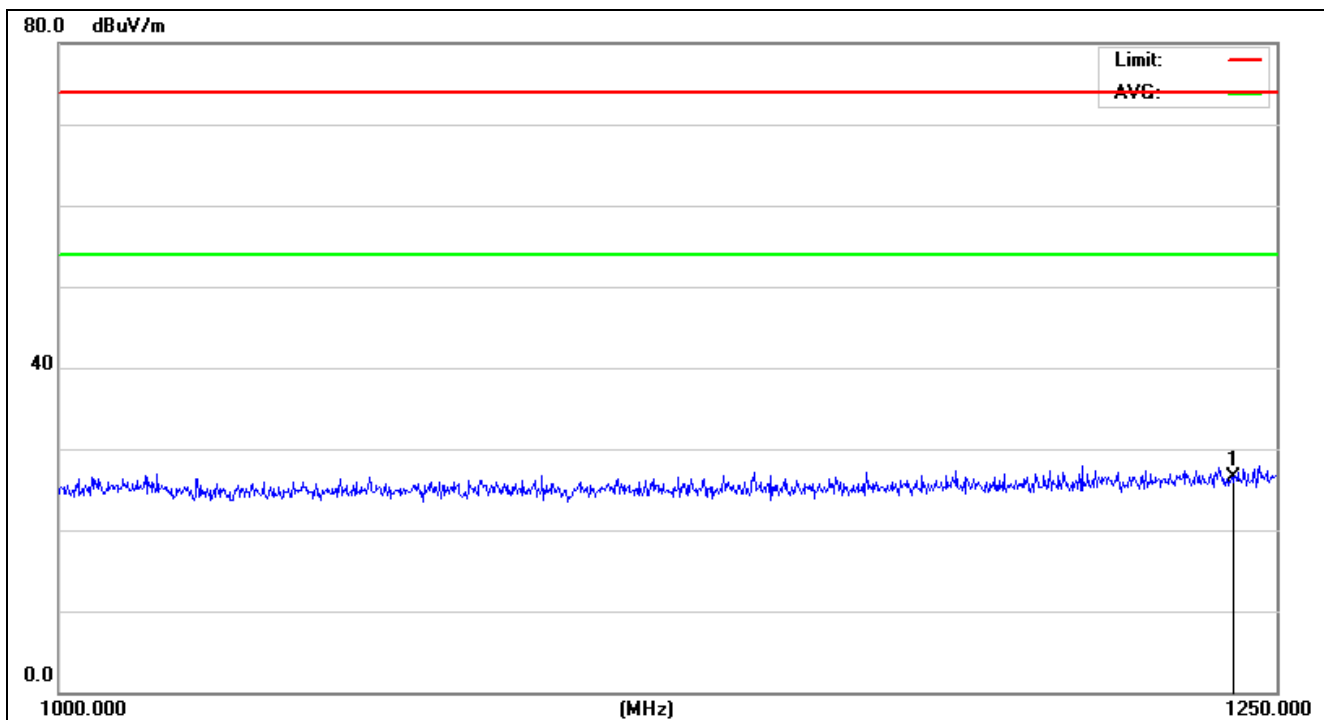


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		825.0000	22.30	5.91	28.21	46.00	-17.79	QP
2		896.0000	33.58	6.03	39.61	46.00	-6.39	QP
3	*	908.0000	34.03	6.09	40.12	46.00	-5.88	QP
4		915.0000	24.84	6.07	30.91	46.00	-15.09	QP
5		930.0000	24.37	5.97	30.34	46.00	-15.66	QP
6		941.0000	34.16	5.77	39.93	46.00	-6.07	QP

Vertical

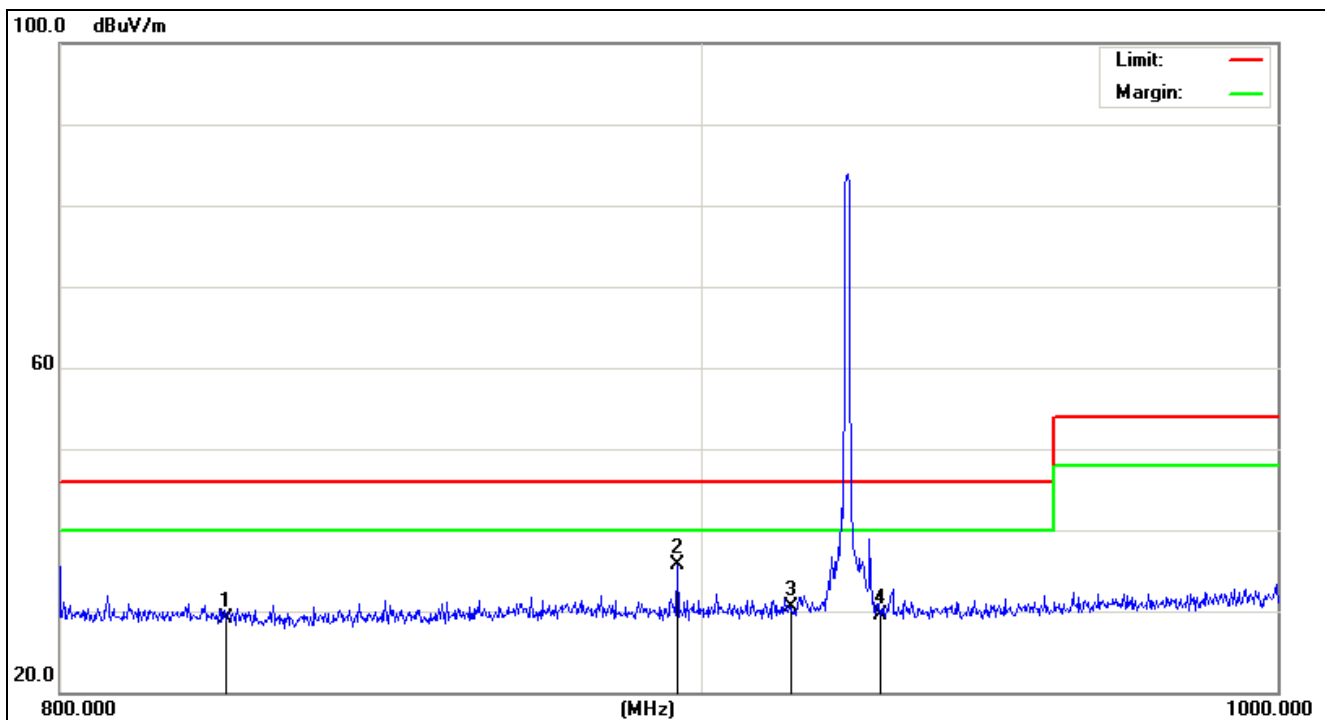


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	1240.000	27.07	-0.60	26.47	74.00	-47.53	peak

Horizontal

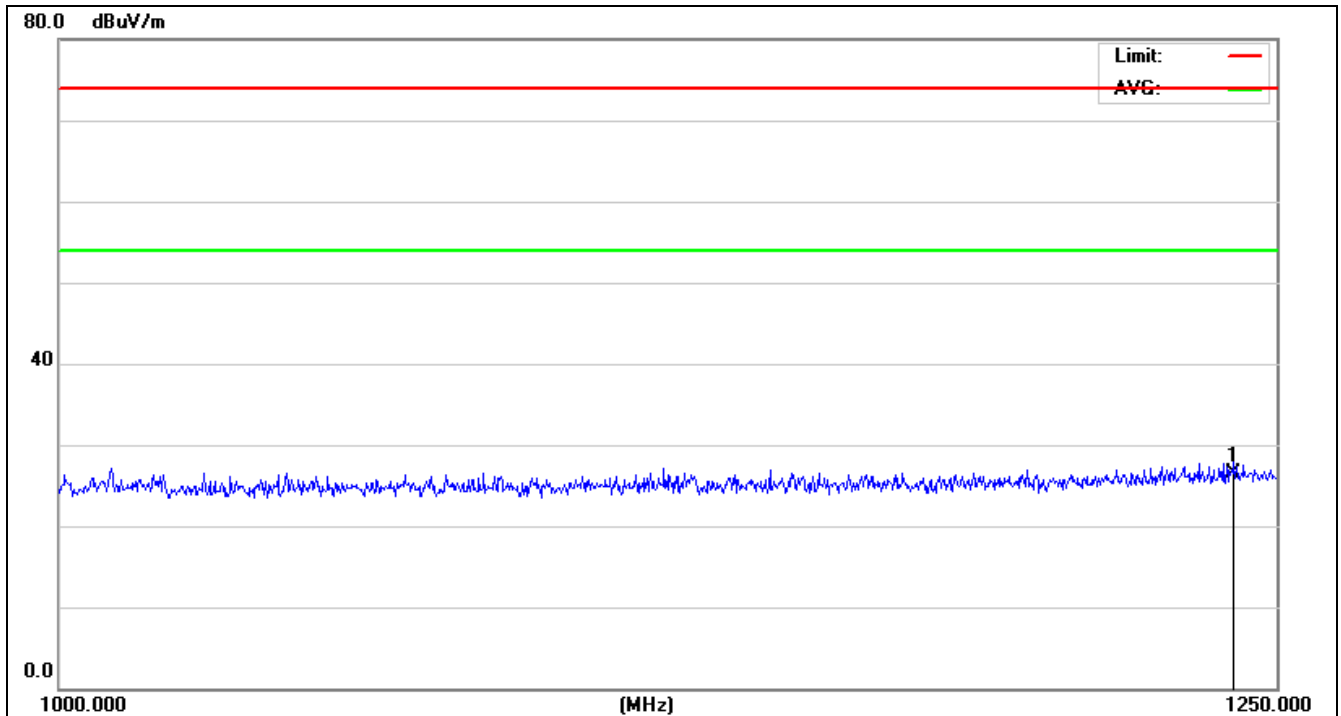


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1		825.0000	22.22	6.81	29.03	46.00	-16.97 QP
2	*	896.0000	28.18	7.51	35.69	46.00	-10.31 QP
3		915.0000	23.15	7.42	30.57	46.00	-15.43 QP
4		930.0000	22.26	7.27	29.53	46.00	-16.47 QP

Horizontal



Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	1240.000	27.17	-0.60	26.57	74.00	-47.43	peak

Test result: The unit does meet the NCC requirements.

4. OCCUPIED BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.8.1.5 (2)	Bandwidth	$\geq 500\text{kHz}$ (6dB bandwidth)	920-928	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	$>$ Measurement Bandwidth or Channel Separation
RB	100 kHz (6dB Bandwidth) / 100 kHz (Channel Separation)
VB	300 kHz (6dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 100kHz, VBW=100kHz, Sweep time = Auto.

4.1.2 TEST SETUP



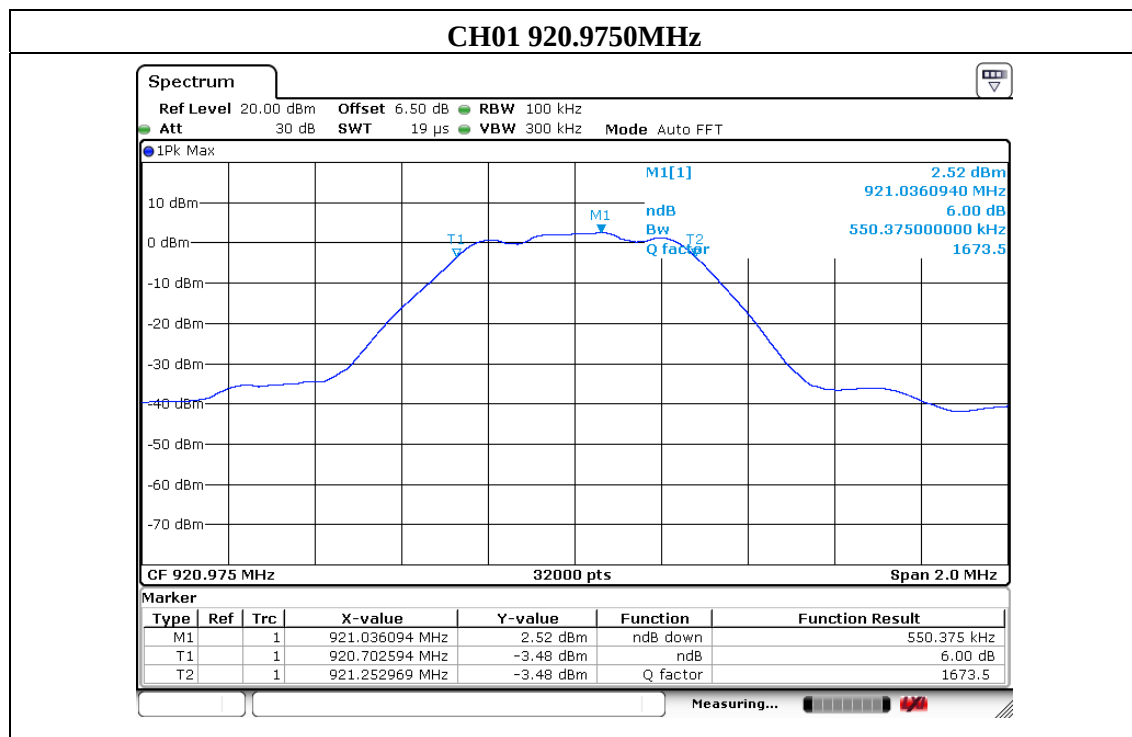
4.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

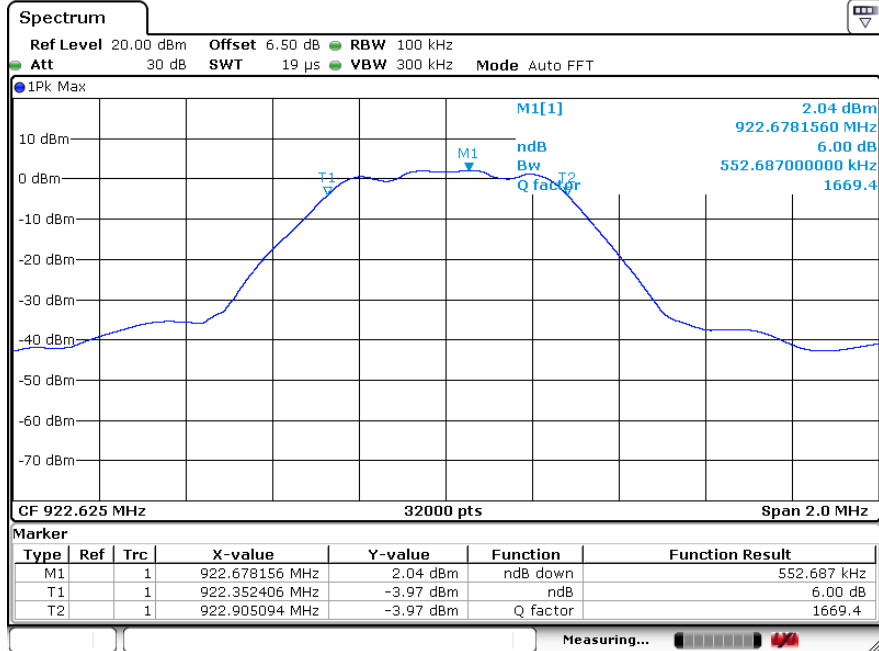
4.1.4 TEST RESULTS

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Power :	DC 5V (Powered by adapter)
Test Mode :	Mode 1		

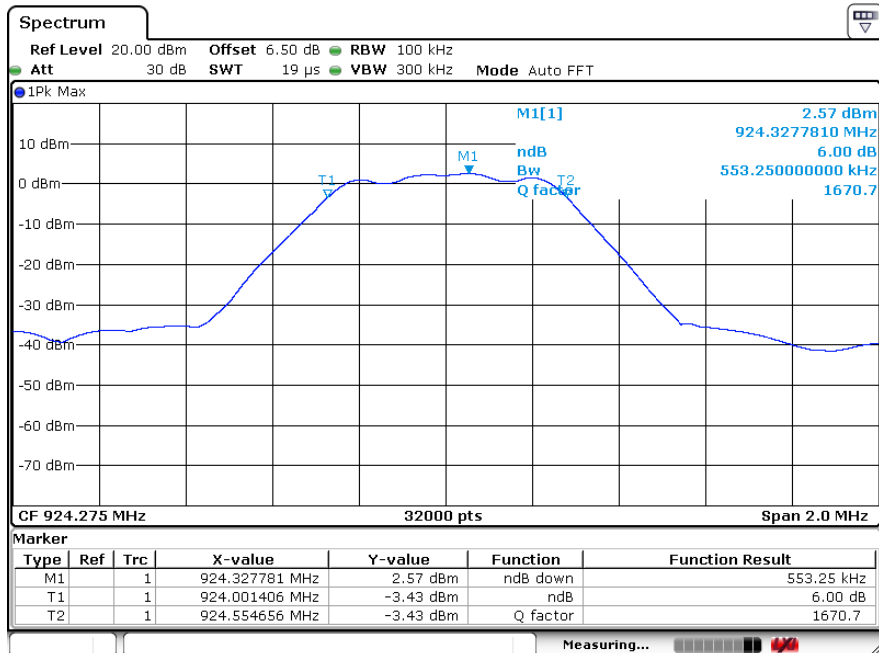
Test Mode	Test Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)
Mode 1	CH01	920.9750MHz	550.375	≧ 500
	CH04	922.6250MHz	552.687	≧ 500
	CH07	924.2750MHz	553.250	≧ 500



CH04 922.6250MHz



CH07 924.2750MHz



5. POWER DENSITY

5.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.8.1.5 (2)	Power density	8dBm	920-928	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	3 kHz
VB	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 3kHz, VBW=10kHz.

5.1.2 TEST SETUP



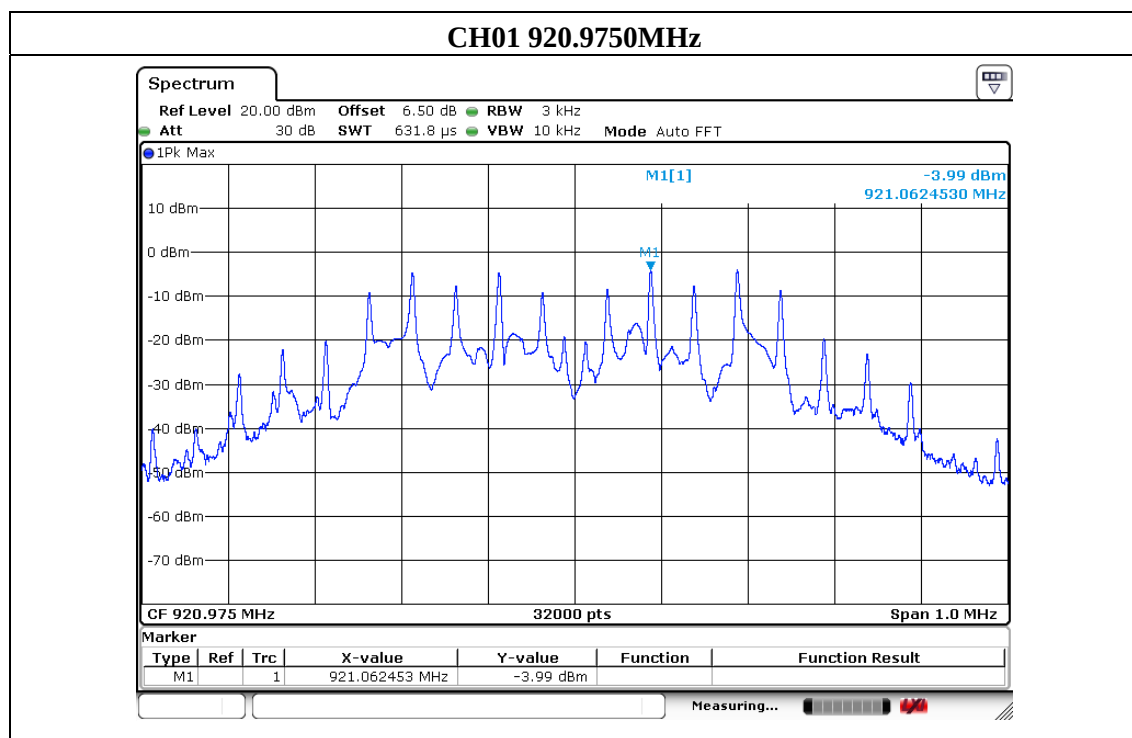
5.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

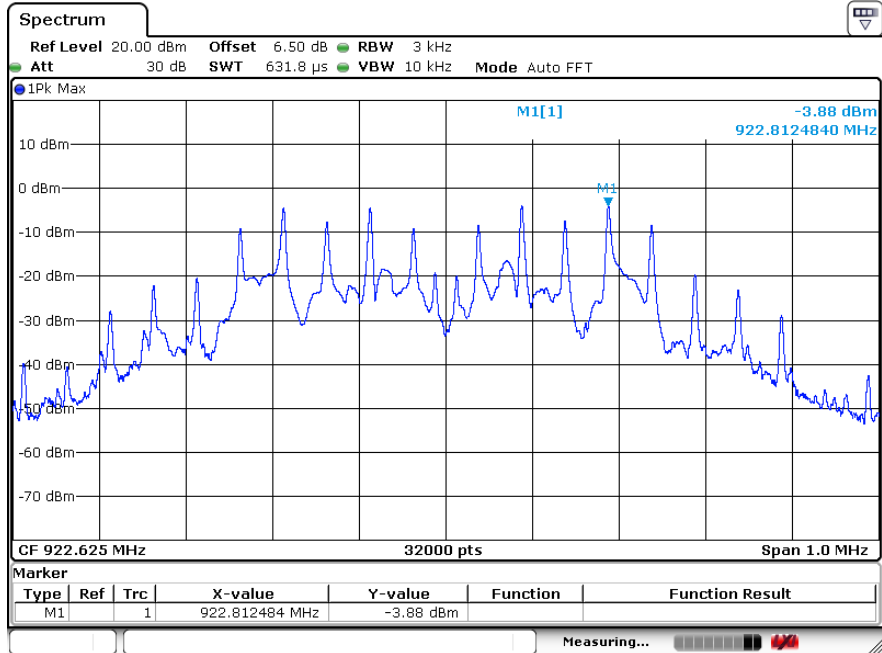
5.1.4 TEST RESULTS

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Voltage :	DC 5V (Powered by adapter)
Test Mode :	Mode 1		

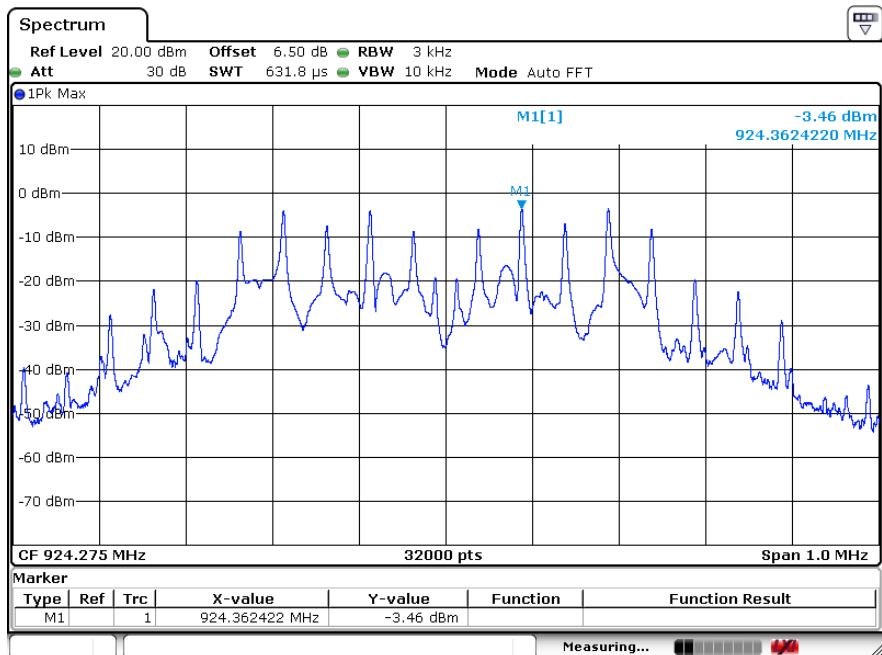
Test Channel	Frequency(MHz)	Power Density(dBm)	LIMIT(dBm)
CH01	920.9750 MHz	-3.99	8.00
CH04	922.6250 MHz	-3.88	8.00
CH07	924.2750 MHz	-3.46	8.00



CH04 922.6250MHz



CH07 924.2750MHz



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.8.1.2 (1)	Peak Output Power	1 watt or 30dBm	920-928	PASS

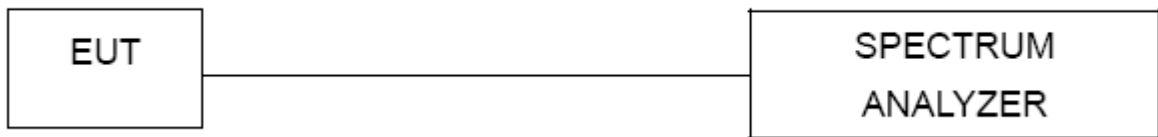
6.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 1 MHz, VBW= 3 MHz, Sweep time = Auto.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



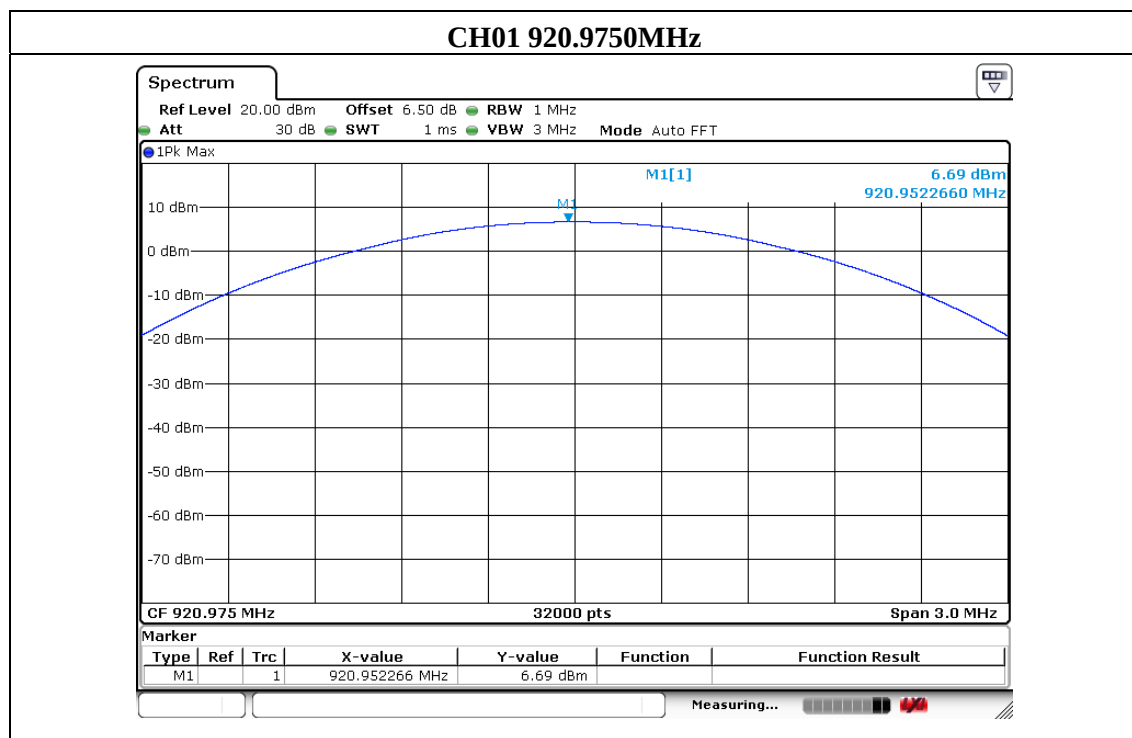
6.1.4 EUT OPERATION CONDITIONS

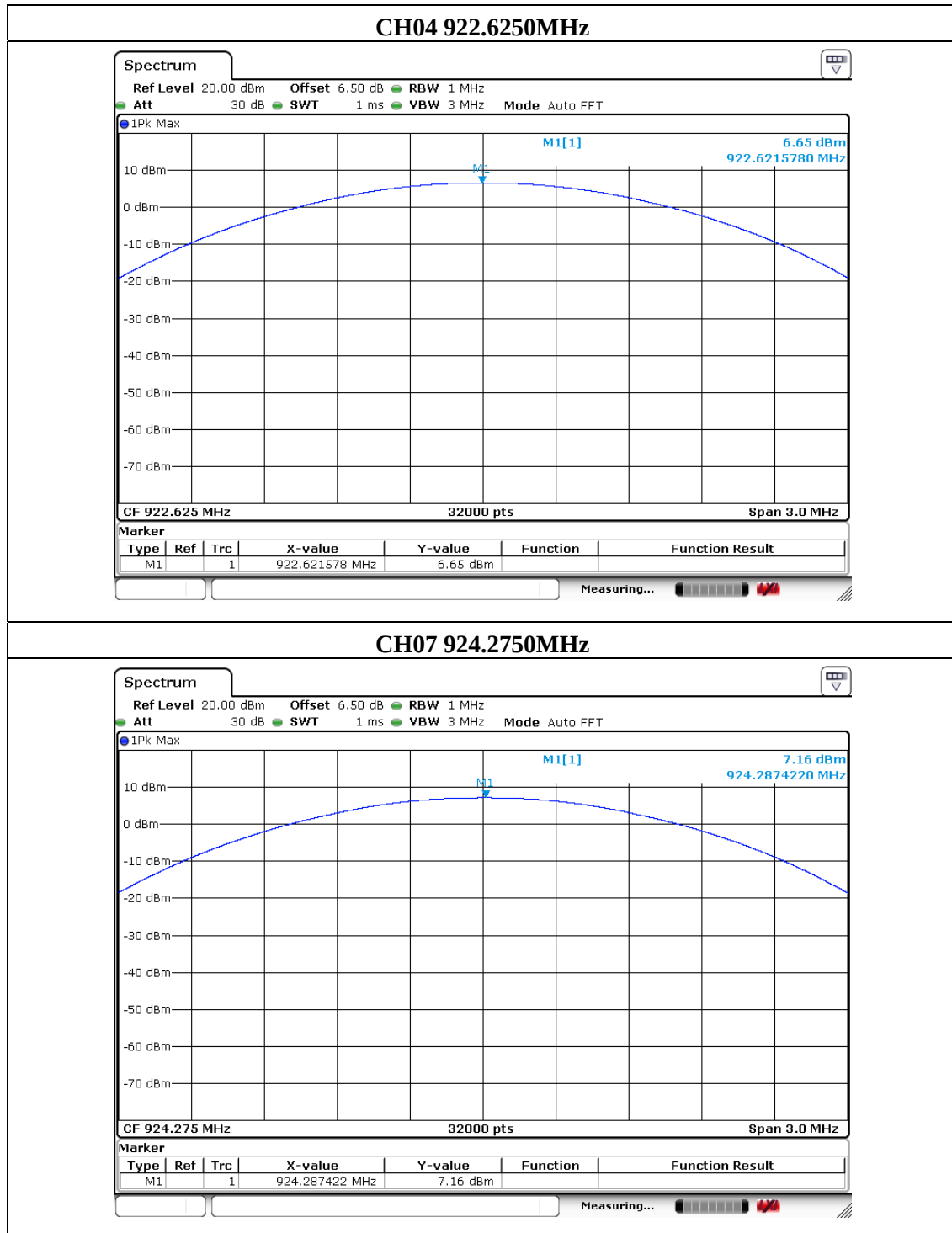
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	24 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Voltage :	DC 5V (Powered by adapter)
Test Mode :	Mode 1		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)	Result
CH01	920.9750 MHz	6.69	30	PASS
CH04	922.6250MHz	6.65	30	PASS
CH07	924.2750 MHz	7.16	30	PASS





7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 APPLIED PROCEDURES / LIMIT

4.8.1.4: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in Section 2.8.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

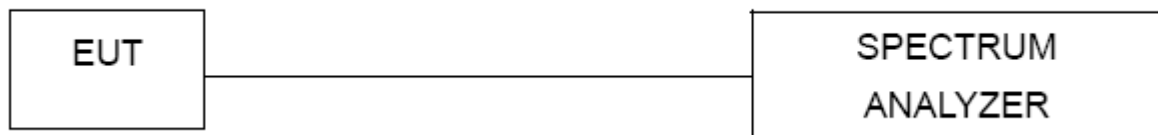
The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 kHz /300 kHz for Peak

7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100kHz, VBW=300kHz, Sweep time = Auto.

7.1.2 TEST SETUP



7.1.3 EUT OPERATION CONDITIONS

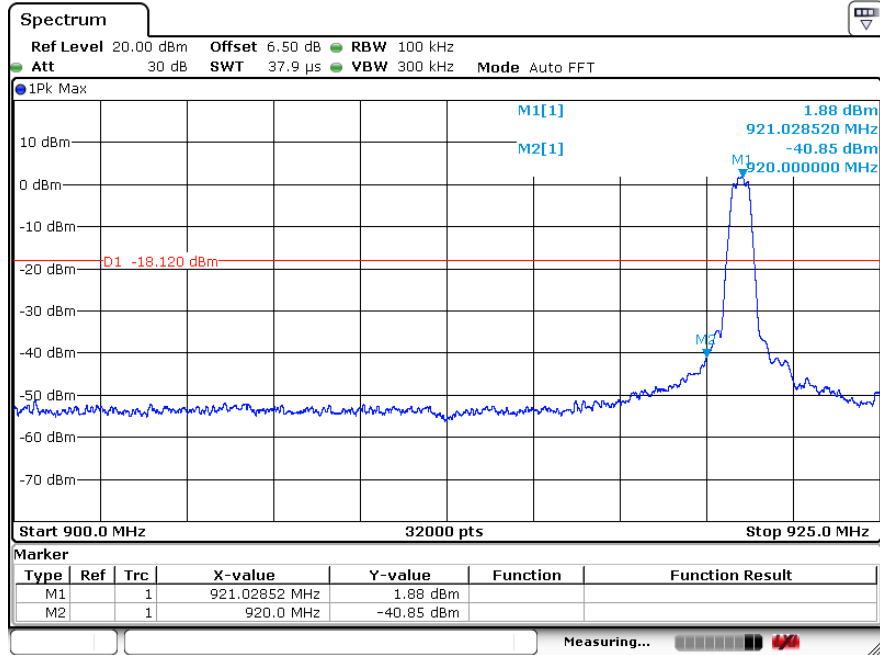
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.4 TEST RESULTS

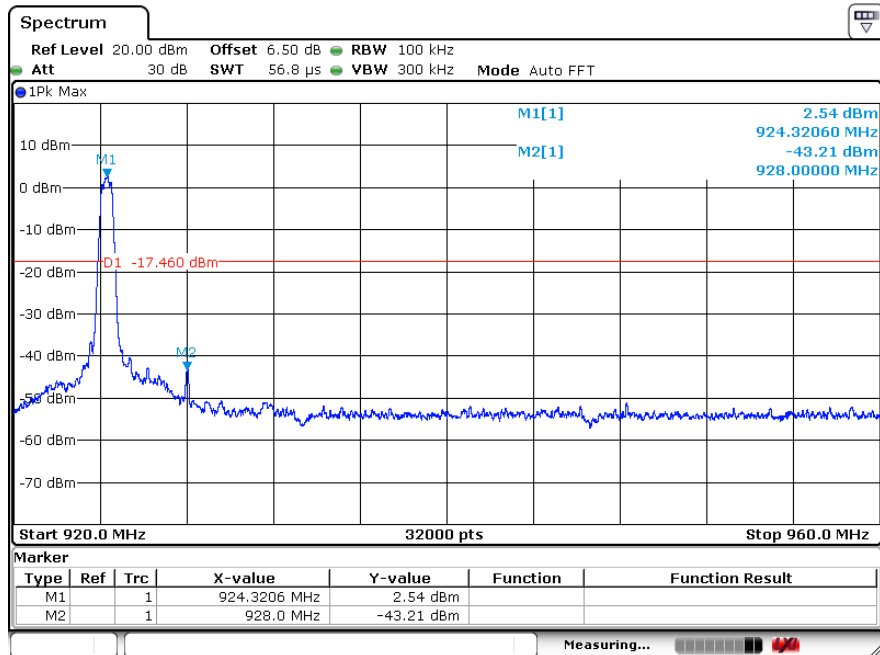
EUT :	ESL accesspoint	Model Name :	SMARTAP 320
Temperature :	25 °C	Relative Humidity :	53%
Pressure :	1010 hPa	Test Voltage :	DC 5V (Powered by adapter)
Test Mode:	Mode 1		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.	

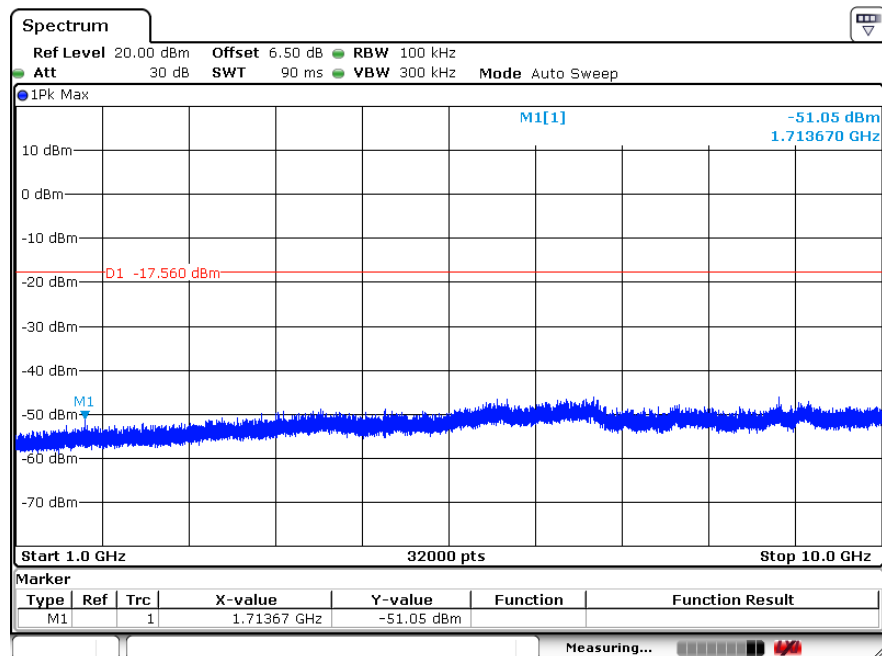
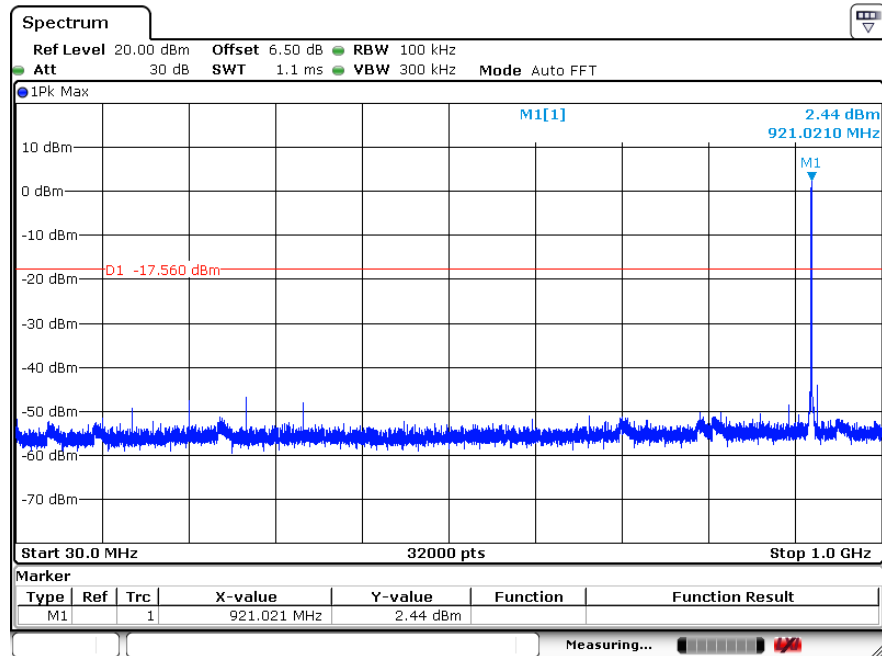
CH01 (Lower)



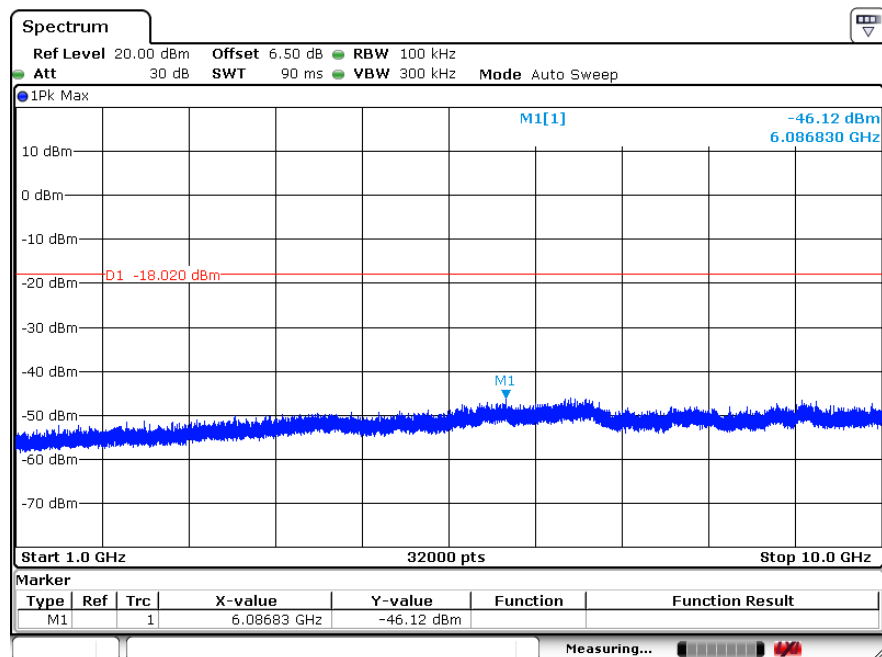
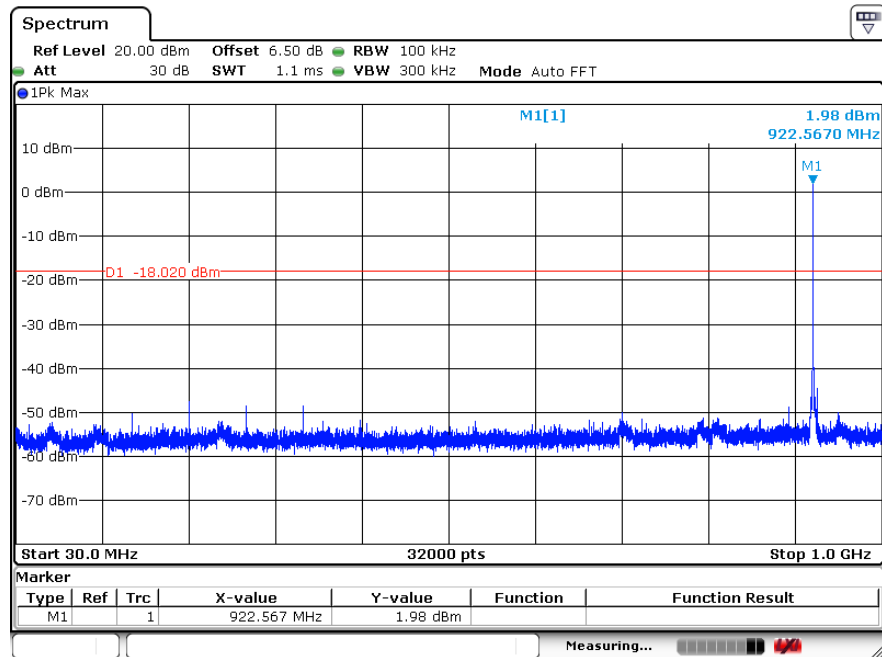
CH07 (Upper)



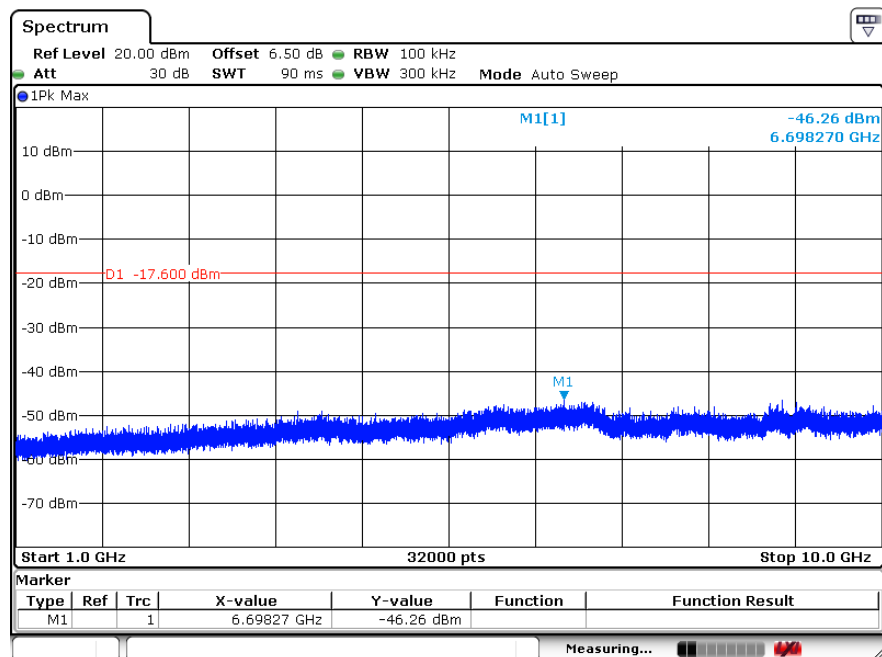
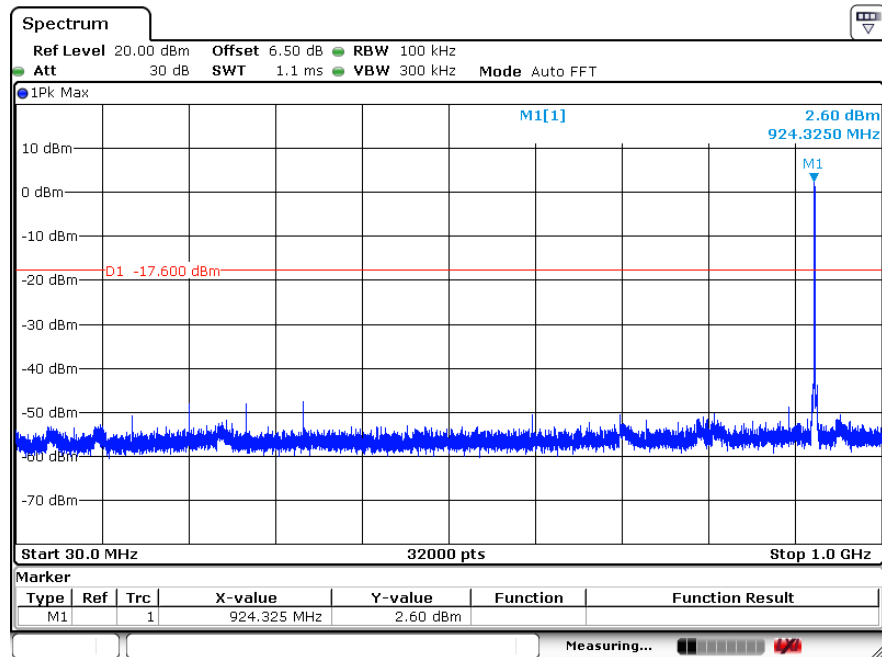
CH01



CH04



CH07



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

4.8.1.2&4.8.1.3 requirement: Systems operating in the 920-928 MHz band that operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by equal the maximum conducted output power that the directional gain of the antenna exceeds 6dBi.

8.2 EUT ANTENNA

The antenna is an external Antenna and no consideration of replacement. Antenna max gain is 1dBi from 0.824GHz to 0.96GHz.

9. EUT TEST PHOTO

**Radiated Measurement Photos
30MHz-1GHz**



**Radiated Measurement Photos
Above 1GHz**



Conducted Measurement Photos