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FCC PART 15 SUBPART C TEST REPORT

Part 15.247

Report Reference No.....:	**CTL1502060364-WF02**
Compiled by (position+printed name+signature) .:	File administrators Happy Guo
Name of the organization performing the tests (position+printed name+signature) .:	Test Engineer Nice Nong
Approved by (position+printed name+signature) .:	Manager Tracy Qi
Date of issue.....:	Apr. 06, 2015
Test Laboratory Name .....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address .....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Applicant's name.....:	**HYIN TECHNOLOGY CO.,LTD**
Address .....:	709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China
Test specification:	
Standard.....:	FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
TRF Originator.....:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF.....:	Dated 2011-01

Test item description .....:	**Industrial Rugged Handheld Computer**
FCC ID……..:	**2AEG8-HY3800W**
Trade Mark .....:	HYINTECH
Model/Type reference .....:	HY3800W
Modulation .....:	FHSS
Work Frequency Range .....:	902.75-927.25MHz
Antenna Type .....:	loop
Antenna Gain.....:	6.0dBi
Result .....:	**Positive**

TEST REPORT

Test Report No. :	CTL1502060364-WF02	Apr. 06, 2015 Date of issue

Equipment under Test	:	Industrial Rugged Handheld Computer
Model /Type	:	HY3800W
Applicant	:	**HYIN TECHNOLOGY CO.,LTD**
Address	:	709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China
Manufacturer	:	**HYIN TECHNOLOGY CO.,LTD**
Address	:	709, Building 212, Tairan Industrial Part, Che Gong Miao, Futian District, Shenzhen, Guangdong, China

Test Result according to the standards on page 4:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

ANSI C63.4-2009

FCC Public Notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

2 . SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Mar. 07, 2015
Testing commenced on	:	Mar. 07, 2015
Testing concluded on	:	Apr. 06, 2015

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	●	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 7.4V from battery

Description of the test mode

Channel list:

Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	902.75	18	911.25	35	919.75
2	903.25	19	911.75	36	920.25
3	903.75	20	912.25	37	920.75
4	904.25	21	912.75	38	921.25
5	904.75	22	913.25	39	921.75
6	905.25	23	913.75	40	922.25
7	905.75	24	914.25	41	922.75
8	906.25	25	914.75	42	923.25
9	906.75	26	915.25	43	923.75
10	907.25	27	915.75	44	924.25
11	907.75	28	916.25	45	924.75
12	908.25	29	916.75	46	925.25
13	908.75	30	917.25	47	925.75
14	909.25	31	917.75	48	926.25
15	909.75	32	918.25	49	926.75
16	910.25	33	918.75	50	927.25
17	910.75	34	919.25		

2.3. Short description of the Equipment under Test (EUT)

Industrial Rugged Handheld Computer, support RFID.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel low (902.75MHz), mid (915.25MHz) and high (927.25MHz).

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

● - supplied by the lab

○ AC adapter Manufacturer: HYIN TECHNOLOGY CO.,LTD
Model No.: JT-H9001000

2.6. NOTE

1. The EUT is a Industrial Rugged Handheld Computer,The functions of the EUT listed as below:

	Test Standards	Reference Report
RFID	FCC Part 15 Subpart C (Section15.247) FCC Per 47 CFR 2.1091(b)	CTL1502060364-WF02 CTL1502060364-SAR

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	902-928	2400-2483.5	5725-5850
RFID	√	–	–

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCCID: 2AEG8-HY3800W filing to comply with of the FCC Part 15.247 Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

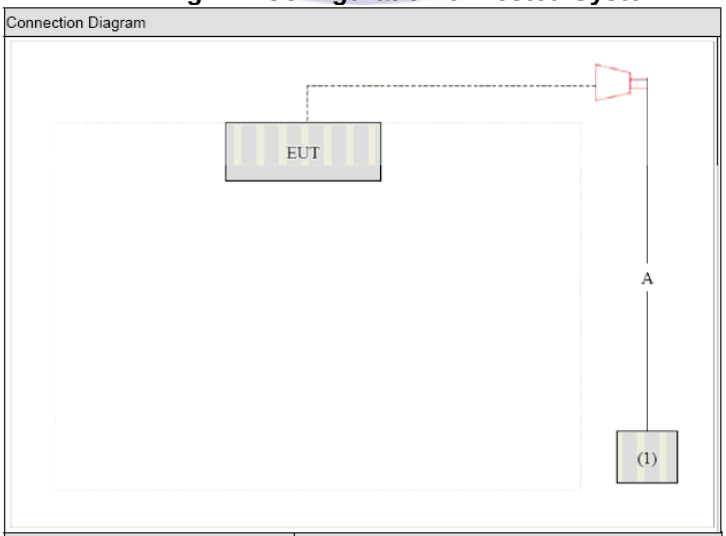
3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Signal Cable Type		Signal cable Description
A	Coaxial Cable	Shielded, >5m

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Radiated Emission	12.75GHz-25 GHz	4.68dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2014/07/12	2015/07/11
EMI Test Receiver	R&S	ESCI	103710	2014/07/10	2015/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2014/07/06	2015/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2014/07/06	2015/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2014/07/12	2015/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2014/07/12	2015/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2014/07/12	2015/07/11
LISN	R&S	ENV216	101316	2014/07/10	2015/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2014/07/10	2015/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2014/07/10	2015/07/09
Amplifier	HP	8447D	3113A07663	2014/07/10	2015/07/09
Power Sensor	Rohde&Schwarz	OSP-120 (including B157)	115683	2014/07/02	2015/07/01
Transient Limiter	Com-Power	LIT-153	532226	2014/07/10	2015/07/09
Radio Communication Tester	R&S	CMU200	3655A03522	2014/07/06	2015/07/05
Temperature/Humidity Meter	zhicheng	ZC1-2	22522	2014/07/10	2015/07/09
SIGNAL GENERATOR	HP	8647A	3200A00852	2014/07/10	2015/07/09
Wideband Peak Power Meter	Anritsu	ML2495A	220.23.35	2014/07/06	2015/07/05
Power Sensor	Anritsu	MA2411B	0738552	2014/07/06	2015/07/05
Climate Chamber	ESPEC	EL-10KA	A20120523	2014/07/06	2015/07/05
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	/	2014/07/06	2015/07/05
High-Pass Filter	K&L	41H10-1375/U12750-O/O	/	2014/07/06	2015/07/05
RF Cable	HUBER+SUHNER	RG214	/	2014/07/09	2015/07/08

3.7. Summary of Test Result

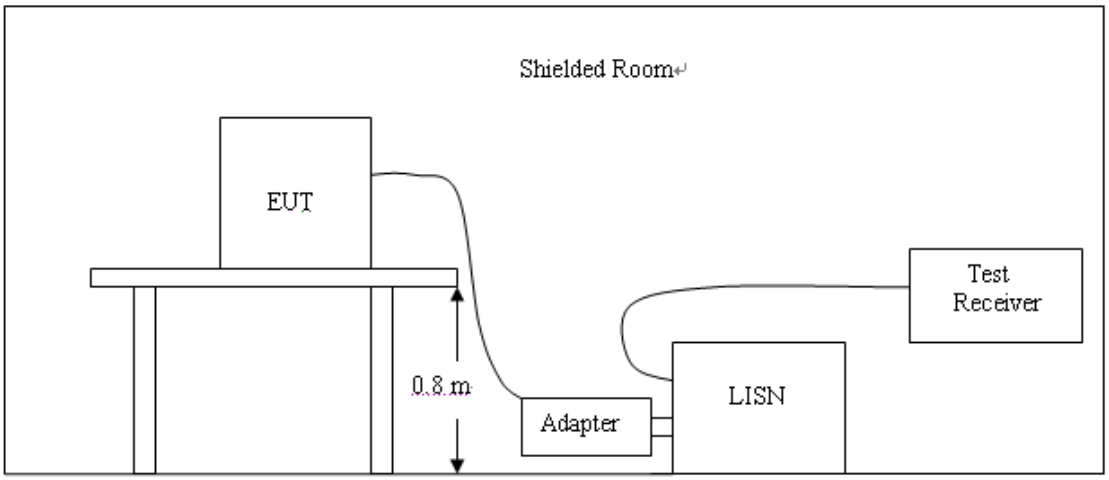
FCC PART 15 Subpart C		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)	20dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.247(a)	Frequency Separation	PASS
FCC Part 15.247(a)	Number of hopping frequency	PASS
FCC Part 15.247(a)	Time of Occupancy	PASS

Remark: The measurement uncertainty is not included in the test result.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

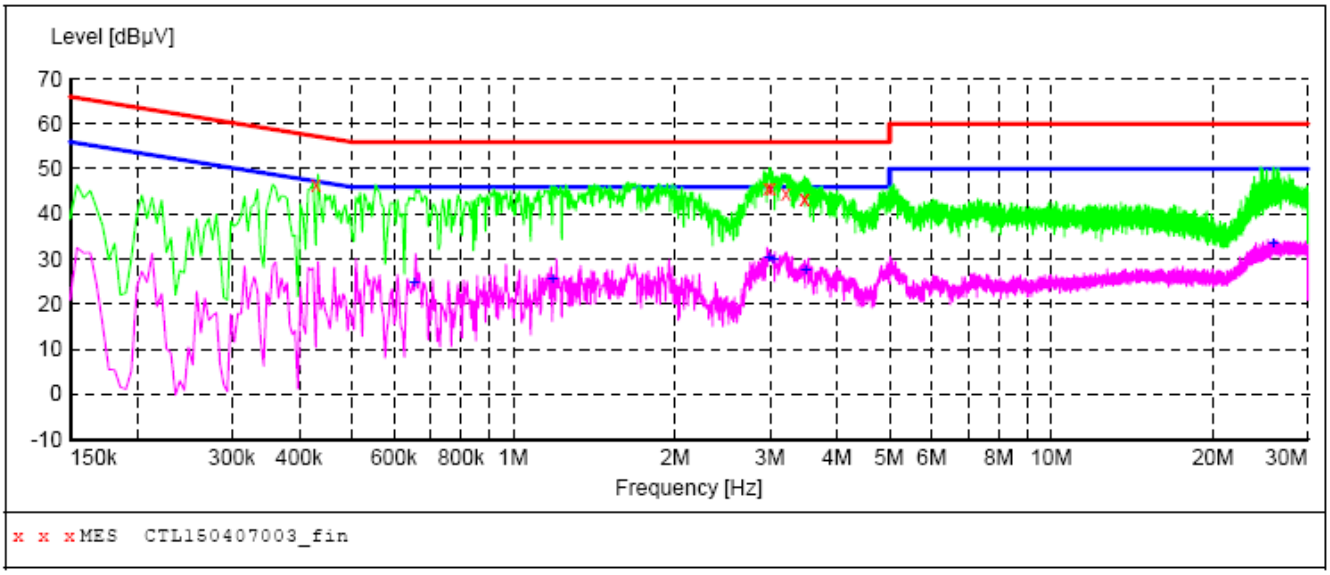
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Channel low (902.75MHz) is the worst case as results in the report based on the Pre-test for all modulation models.

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150407003_fin"

4/7/2015 9:22AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.430000	46.40	10.2	57	10.9	QP	L1	GND
2.972000	45.70	10.4	56	10.3	QP	L1	GND
3.014000	45.50	10.4	56	10.5	QP	L1	GND
3.212000	44.60	10.4	56	11.4	QP	L1	GND
3.476000	43.40	10.4	56	12.6	QP	L1	GND
3.482000	43.40	10.4	56	12.6	QP	L1	GND

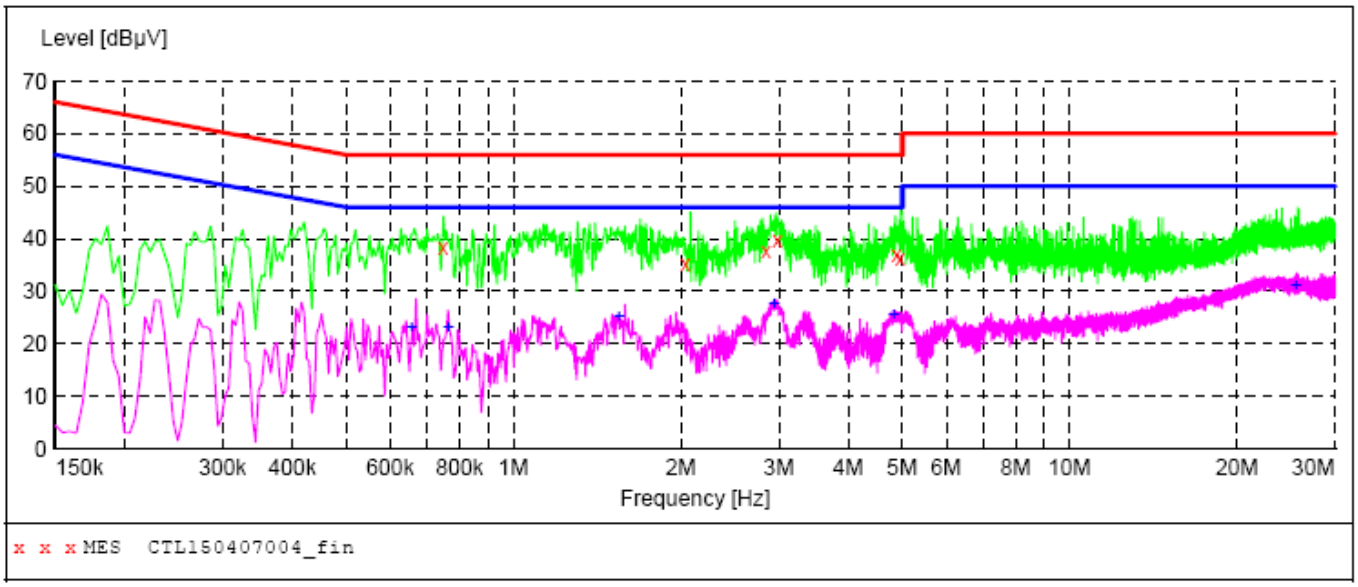
MEASUREMENT RESULT: "CTL150407003_fin2"

4/7/2015 9:22AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.656000	24.50	10.2	46	21.5	AV	L1	GND
1.184000	25.70	10.3	46	20.3	AV	L1	GND
2.996000	30.20	10.4	46	15.8	AV	L1	GND
3.044000	29.70	10.4	46	16.3	AV	L1	GND
3.500000	27.60	10.4	46	18.4	AV	L1	GND
25.874000	33.50	11.1	50	16.5	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150407004_fin"

4/7/2015 9:26AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.746000	38.30	10.2	56	17.7	QP	N	GND
2.036000	35.10	10.4	56	20.9	QP	N	GND
2.840000	37.60	10.4	56	18.4	QP	N	GND
2.978000	39.80	10.4	56	16.2	QP	N	GND
4.880000	37.00	10.4	56	19.0	QP	N	GND
4.952000	36.30	10.4	56	19.7	QP	N	GND

MEASUREMENT RESULT: "CTL150407004_fin2"

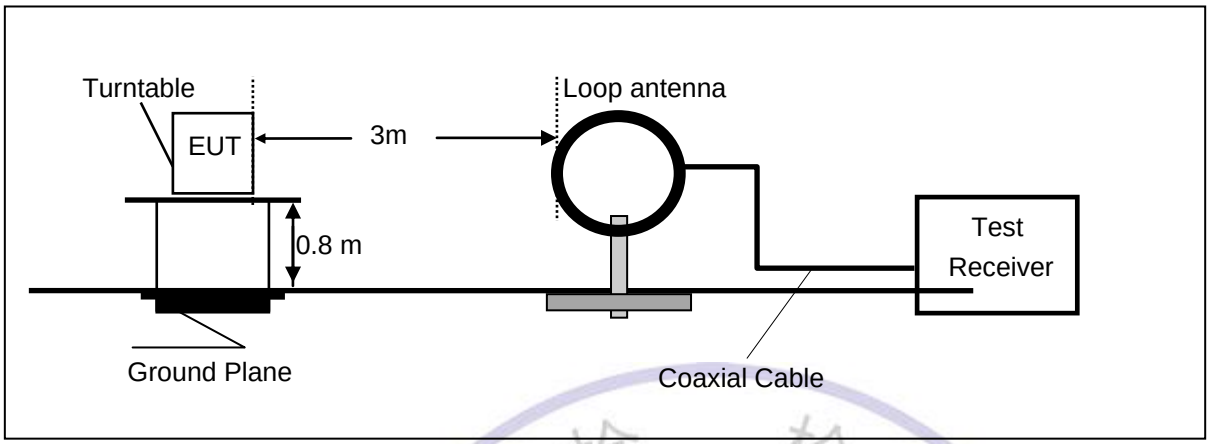
4/7/2015 9:26AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.656000	23.00	10.2	46	23.0	AV	N	GND
0.764000	23.10	10.2	46	22.9	AV	N	GND
1.550000	25.10	10.3	46	20.9	AV	N	GND
2.942000	27.70	10.4	46	18.3	AV	N	GND
4.832000	25.60	10.4	46	20.4	AV	N	GND
25.550000	31.10	11.1	50	18.9	AV	N	GND

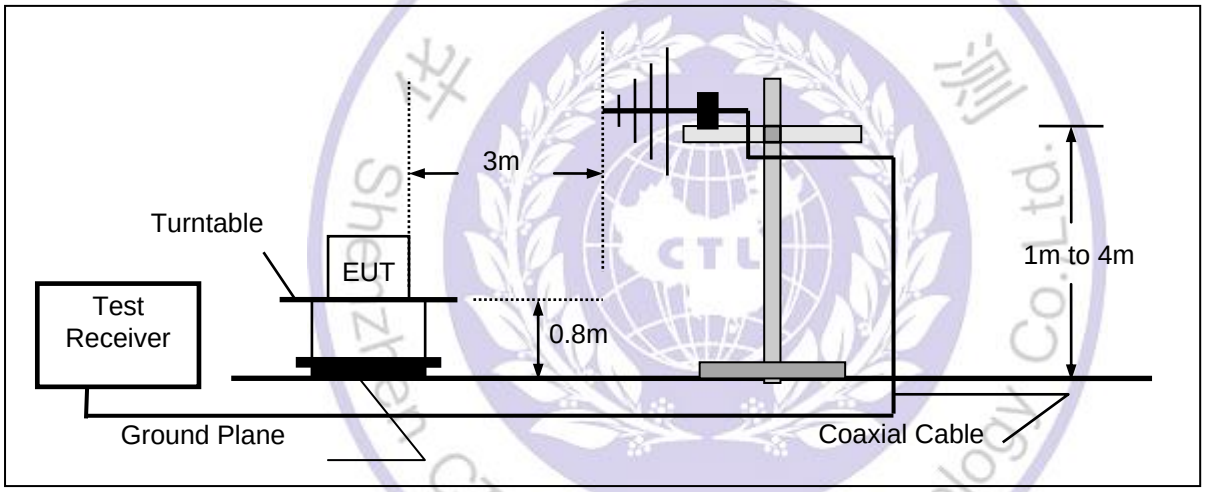
4.2. Radiated Emission

TEST CONFIGURATION

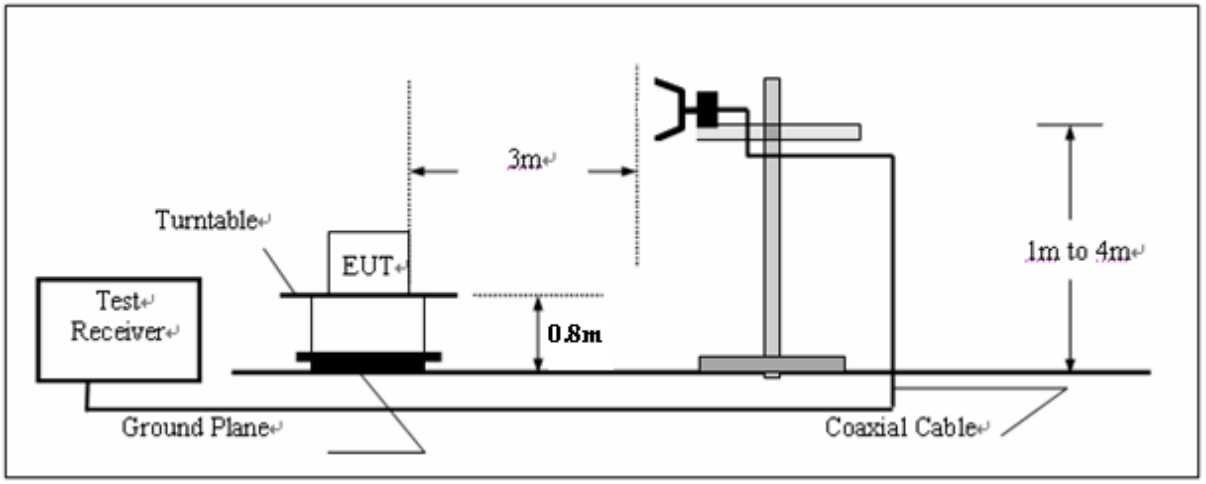
Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The fundamental frequency is 2400-2483.5MHz, So the radiation emissions frequency range were tested from 9KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

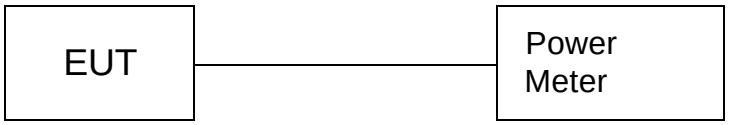
TEST RESULTS

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	902.75	96.3	26.6	122.9	Fundamental	/	PK
	V	589.21	25.5	18.6	44.1	46	1.9	QP
	V	773.14	20.2	22.4	42.6	46	3.4	QP
	V	902	16.6	23.7	40.3	46	5.7	QP
	V	1062	22.6	27.1	49.7	54（Note 3）	24.3	PK
	V	1805	22.1	30.2	52.3	54	1.7	AV
	H	1805	36.9	30.2	67.1	74	6.9	PK
	V	2708	13.8	33.9	47.7	54（Note 3）	6.3	PK
	H	10000	6.8	40.3	47.1	54（Note 3）	6.9	PK
26	V	915.25	96.9	26.9	123.8	Fundamental	/	PK
	V	341.79	28.4	15.4	43.8	46	2.2	QP
	V	269.52	27.4	14.3	41.7	46	4.3	QP
	V	1043	23.0	27.9	50.9	54（Note 3）	23.1	PK
	V	1830	20.5	30.6	51.1	54	2.9	AV
	H	1830	41.2	30.6	71.8	74	2.2	PK
	V	2746	15.8	34.1	49.9	54（Note 3）	4.1	PK
	H	10000	6.9	40.3	47.2	54（Note 3）	6.8	PK
50	V	927.25	75.5	26.9	102.4	Fundamental	/	PK
	V	226.54	28.8	14.1	42.9	46	3.1	QP
	V	509.13	23.3	18.1	41.4	46	4.6	QP
	V	928	19.7	23.8	43.5	46	2.5	QP
	V	960	14.2	24.5	38.7	46	7.3	QP
	V	1022	21.6	28.2	49.8	54（Note 3）	24.2	PK
	V	1854	17.8	30.4	48.2	54	5.8	AV
	H	1854	38.9	30.4	69.3	74	4.7	PK
	V	2782	14.4	34.9	49.3	54（Note 3）	4.7	PK
	H	10000	7.0	40.3	47.3	54（Note 3）	6.7	PK

Note: 1. Measure Level = Reading Level + Factor.
2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2013 and KDB558074 D01 v03r02,The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the wideband power meter to test peak power and record the result.

LIMIT

The Maximum Peak Output Power Measurement limit is 30dBm.

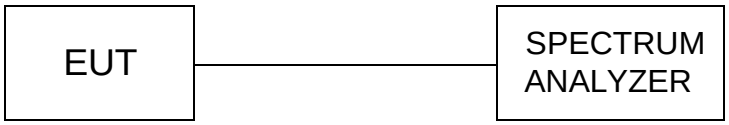
TEST RESULTS

Product	:	Industrial Rugged Handheld Computer
Test Item	:	Power Output
Test Mode	:	Keeping TX

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	902.75	27.43	30.00	Pass
26	915.25	28.03	30.00	Pass
50	927.25	27.71	30.00	Pass

4.4. 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10: 2013.
Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel
RBW ≧ 1% of the 20dB bandwidth, VBW ≧ RBW, Sweep = auto, Detector function = peak, Trace = max hold
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.
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. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

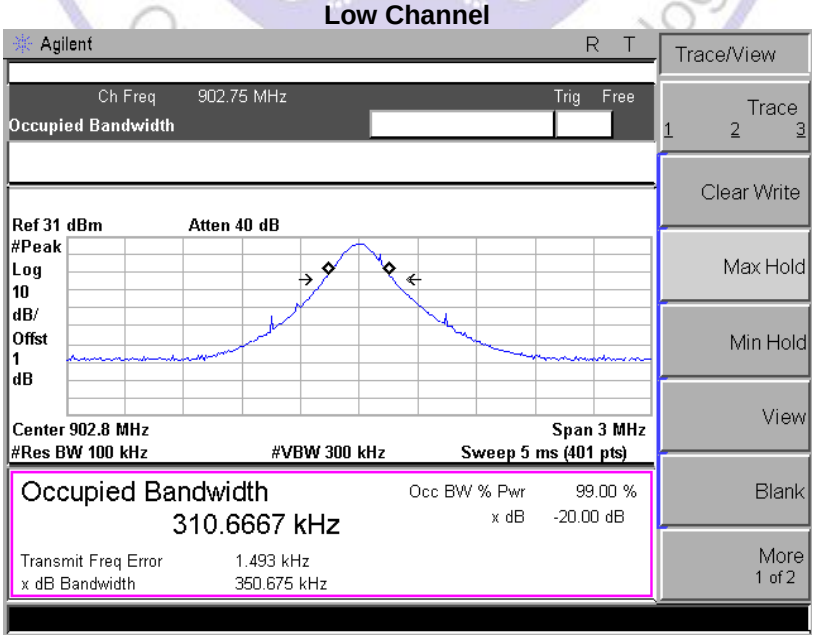
LIMIT

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

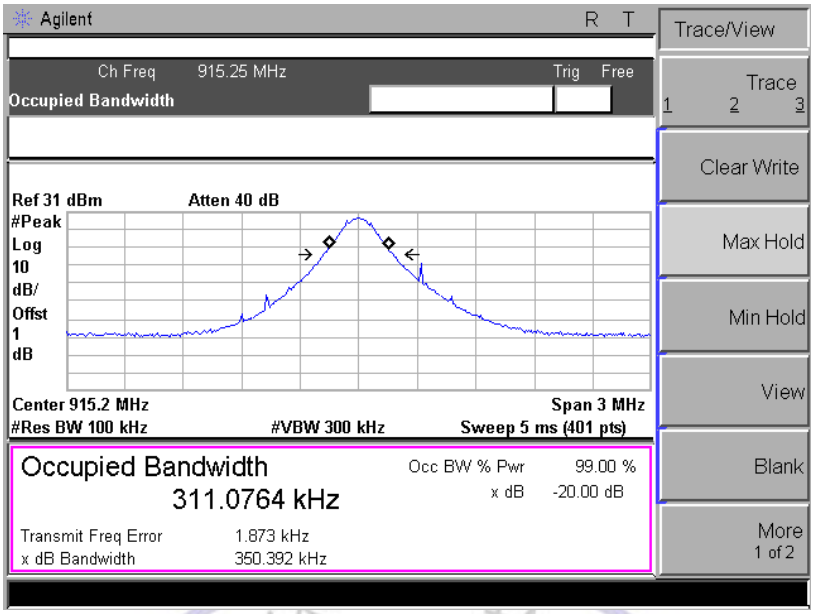
TEST RESULTS

CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (KHz)	LIMIT (KHz)	PASS/FAIL
902.75	350.675	500	PASS
915.25	350.392	500	PASS
927.25	348.516	500	PASS

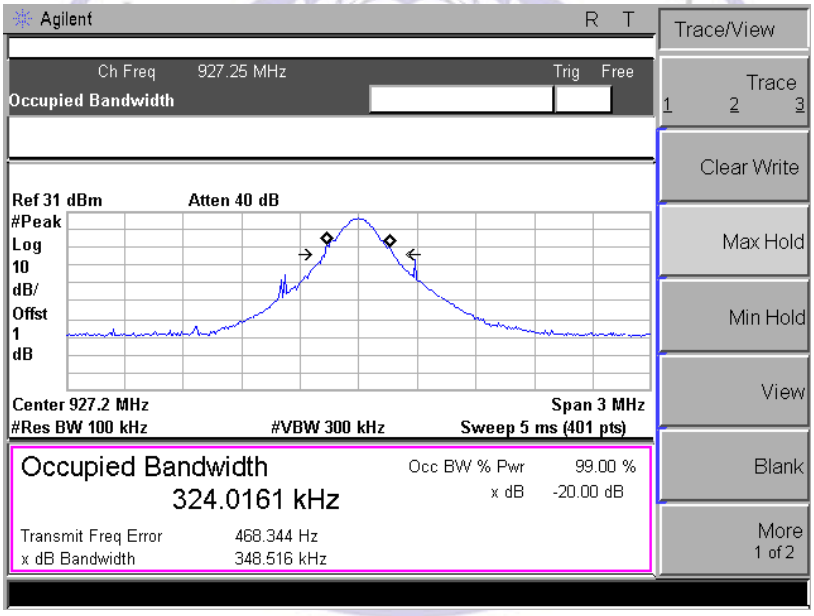
Low Channel



Middle Channel



High Channel



4.5. Band Edge

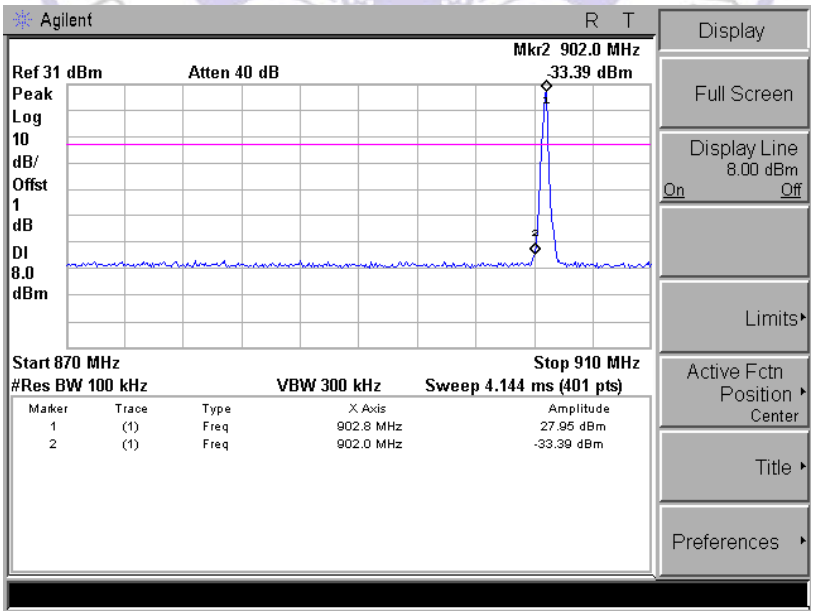
Applicable Standard

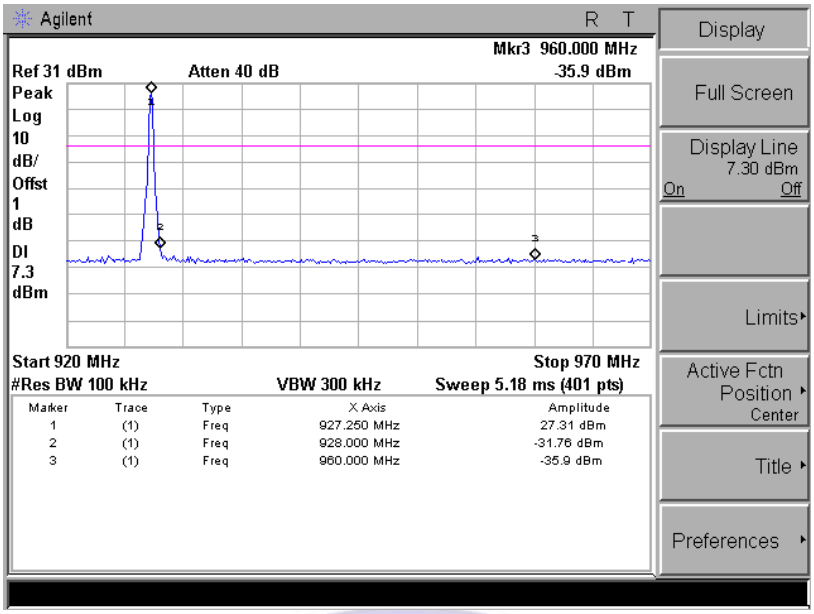
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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) (see §15.205(c)).

TEST PROCEDURE

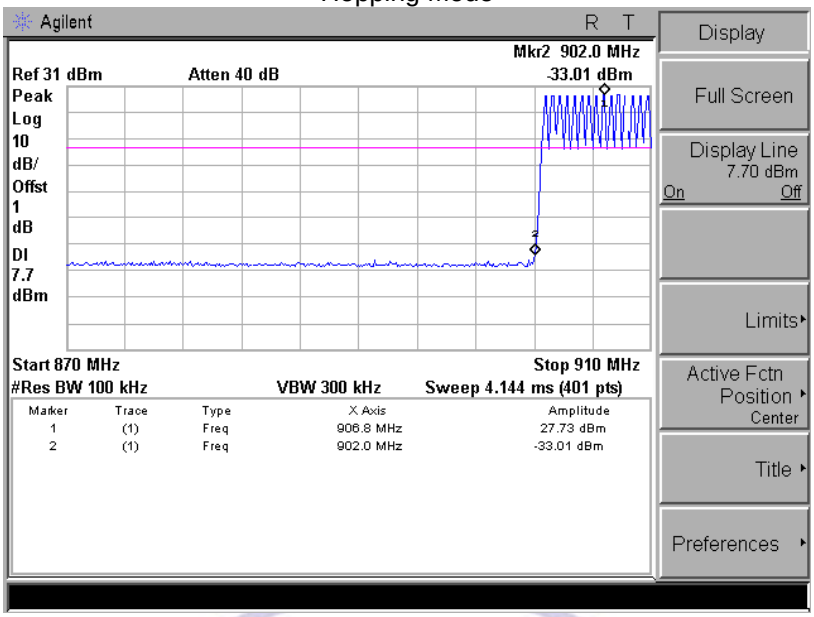
According to ANSI C63.10: 2013.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation.
RBW ≧ 1% of the span
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.
Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

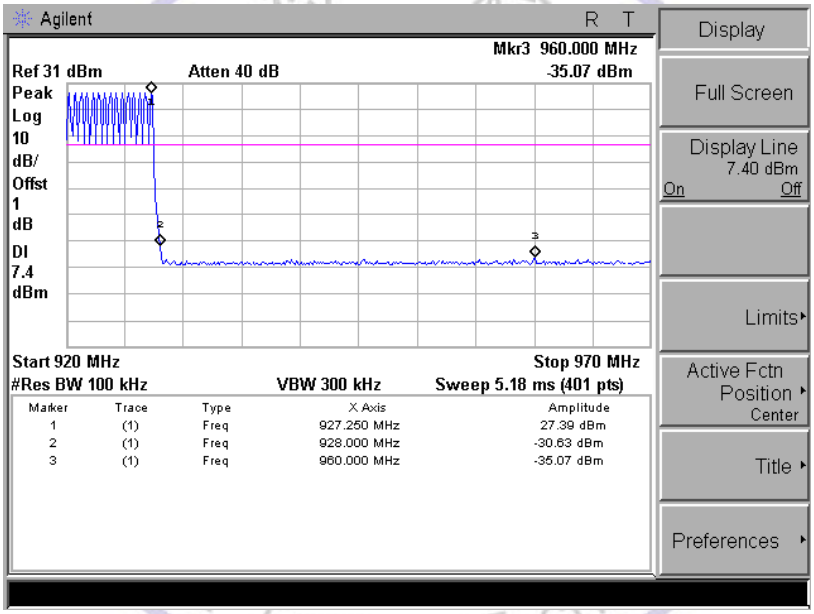
TEST RESULTS





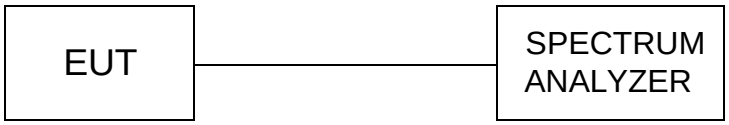
Hopping Mode





4.6. Frequency Separation

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10: 2013.
The EUT must have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≧ 1% of the span
Video (or Average) Bandwidth VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

LIMIT

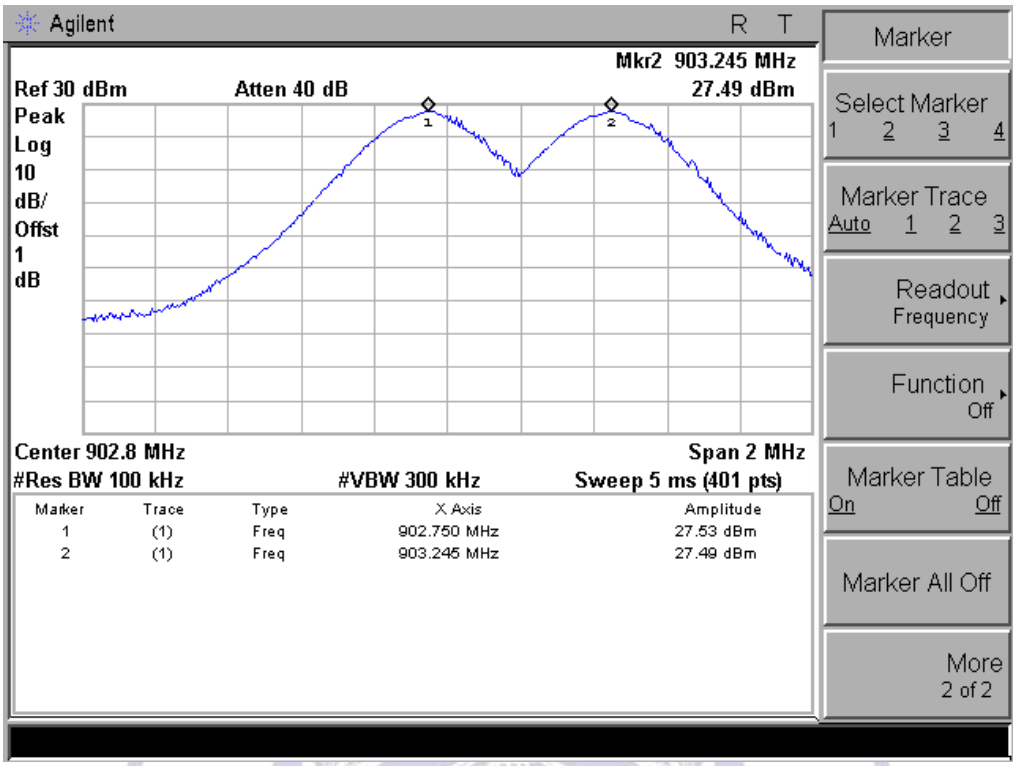
According to 15.247(a)(1),frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

TEST RESULTS

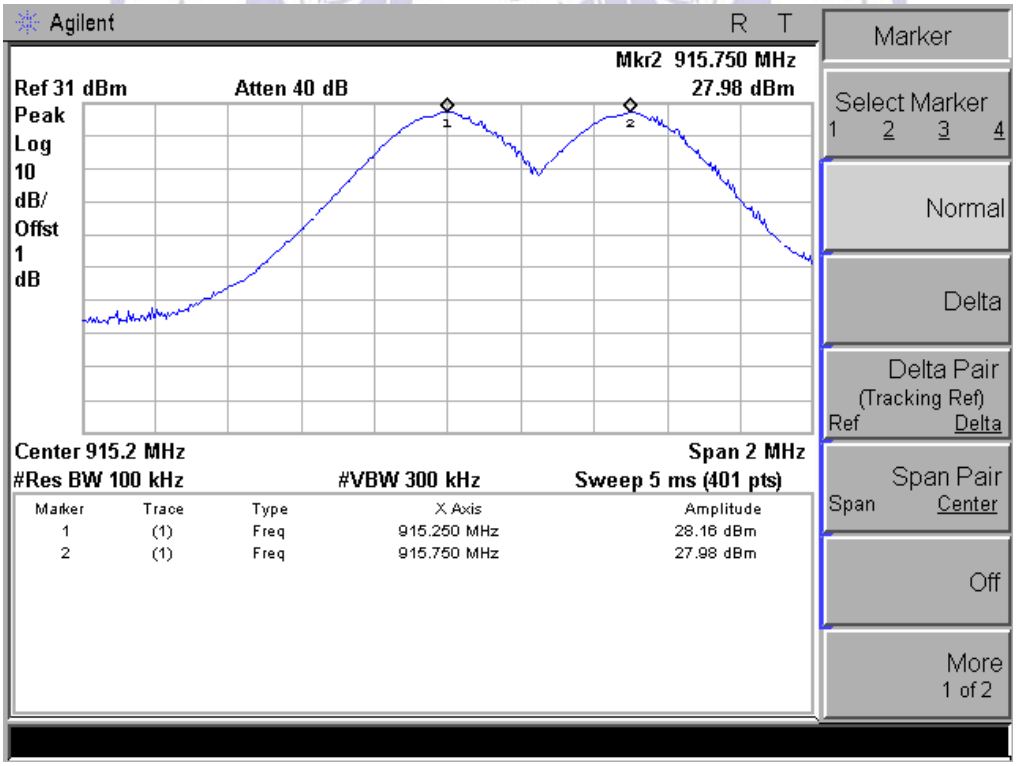
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit	Result
Low Channel	902.75	0.495	25KHz or 20dB bandwidth	Pass
Adjacency Channel	903.25			
Mid Channel	915.25	0.500	25KHz or 20dB bandwidth	Pass
Adjacency Channel	915.75			
High Channel	927.25	0.500	25KHz or 20dB bandwidth	Pass
Adjacency Channel	926.75			

Photos of Frequency separation Measurement

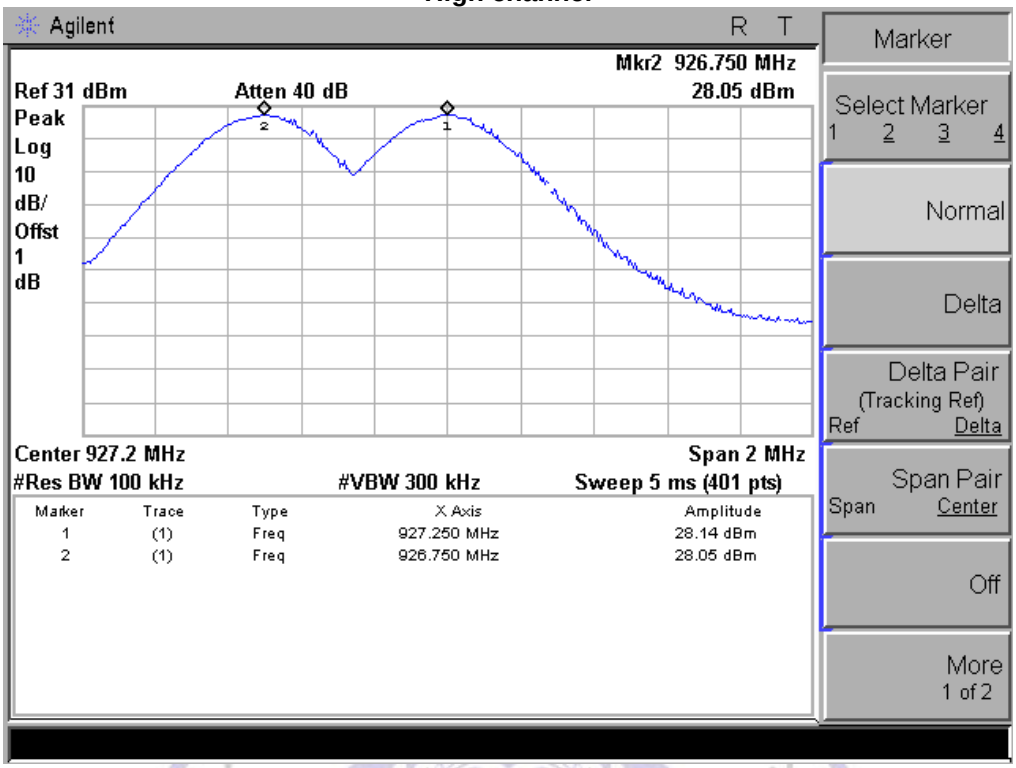
Low channel



Middle channel

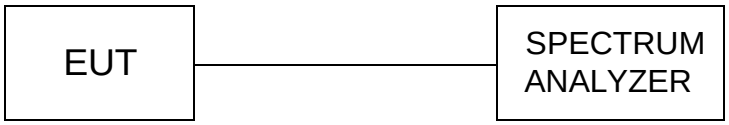


High channel



4.7. Number of hopping frequency

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10: 2013.
The EUT must have its hopping function enabled.
Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW ≧ 1% of the span
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. It may prove necessary to bread the span up to sections, in order to clearly show all of the hopping frequencies.

LIMIT

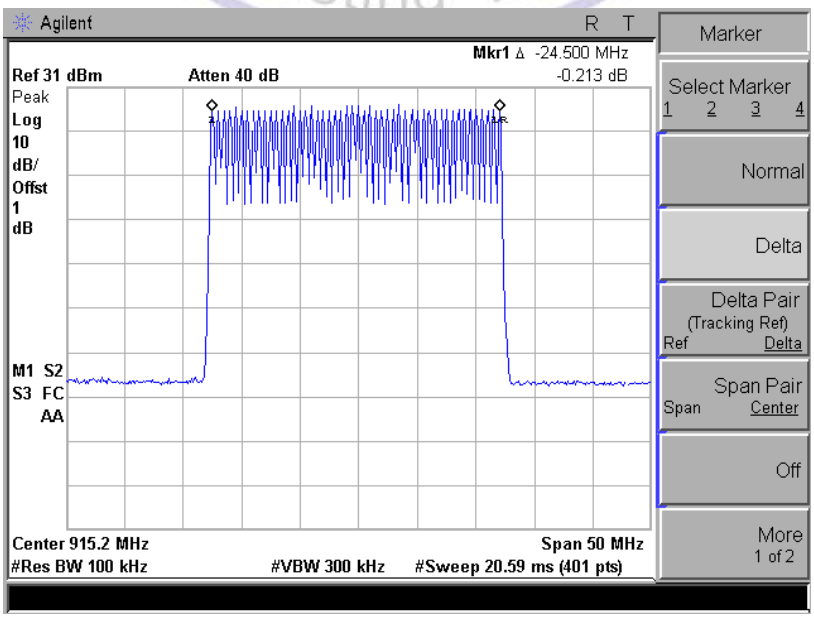
if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the sys-tem shall use at least 25 hopping frequencies.

TEST RESULTS

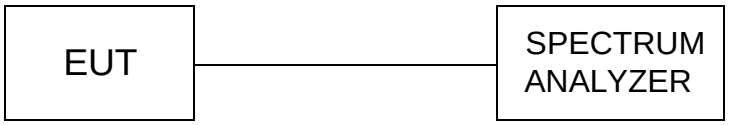
Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Limit
902-928	50	≥25

Photos of Number of hopping channel Measurement



4.8. Time Of Occupancy(Dwell Time)

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10: 2013.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1MHz

VBW ≧ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

LIMIT

if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period

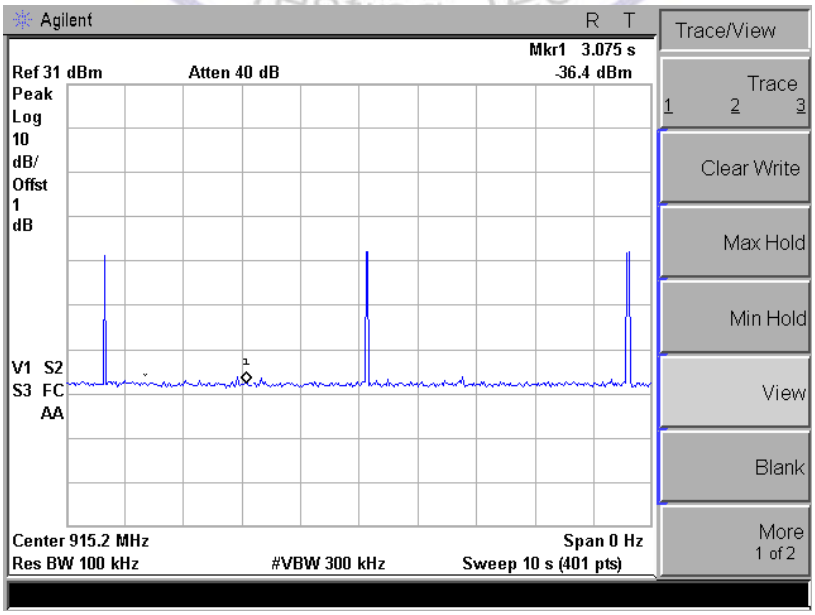
TEST RESULTS

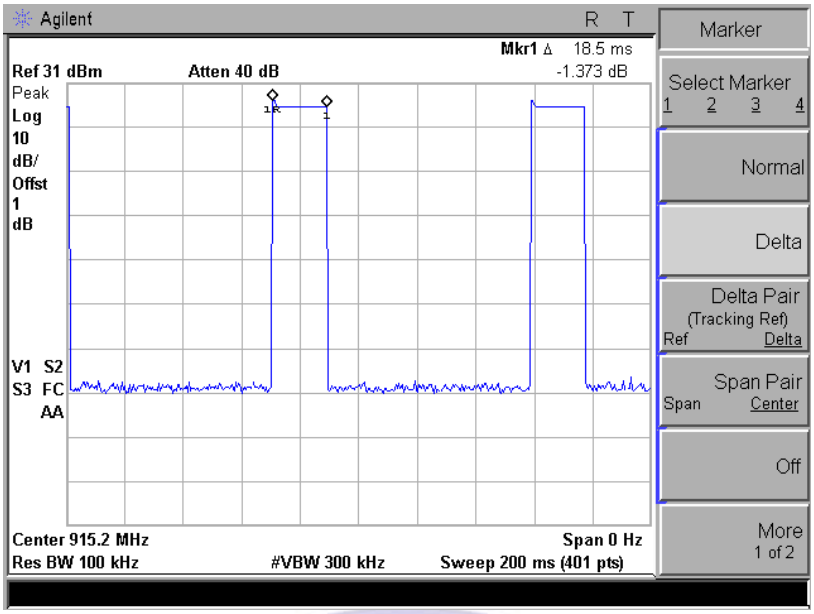
PASS

In 10s total 3 times be found, per transmitting time is 18.5ms, so

Dwell Time=3*18.5ms=55.5ms<400ms

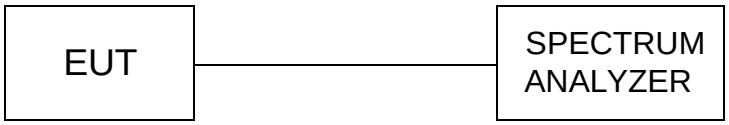
Photos of Dwell Time Measurement：





4.9. Spurious RF Conducted Emissions

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10: 2013.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100KHz, VBW ≧ RBW, Sweep =auto, Detector function = peak, Trace = max hold

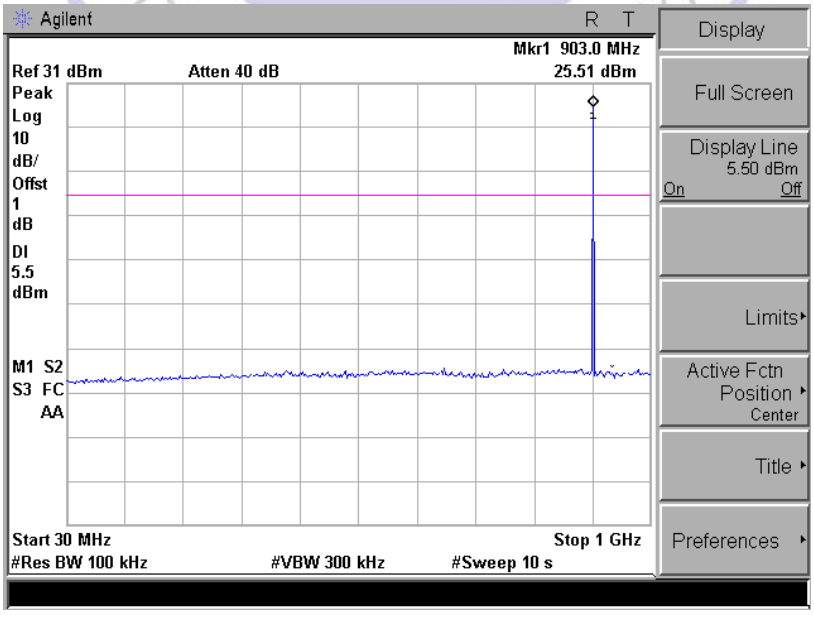
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

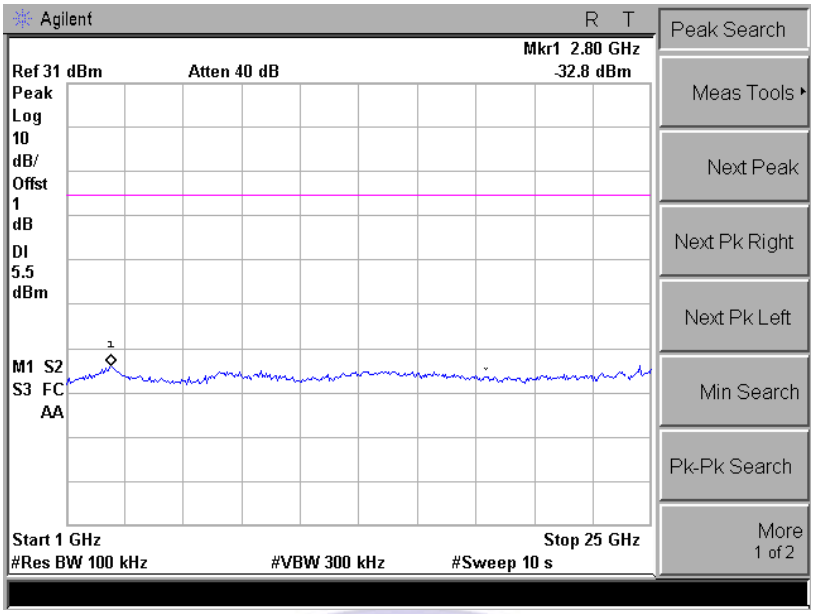
LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

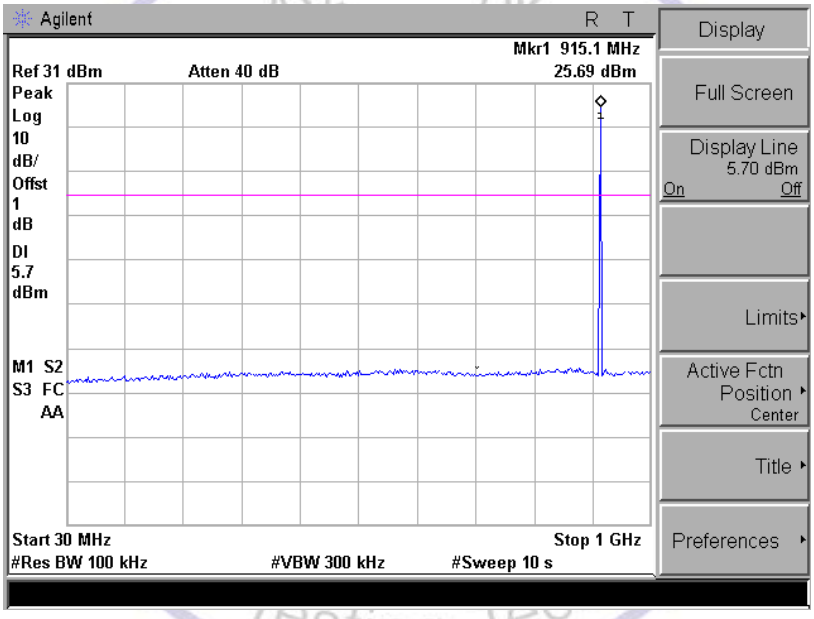
TEST RESULT

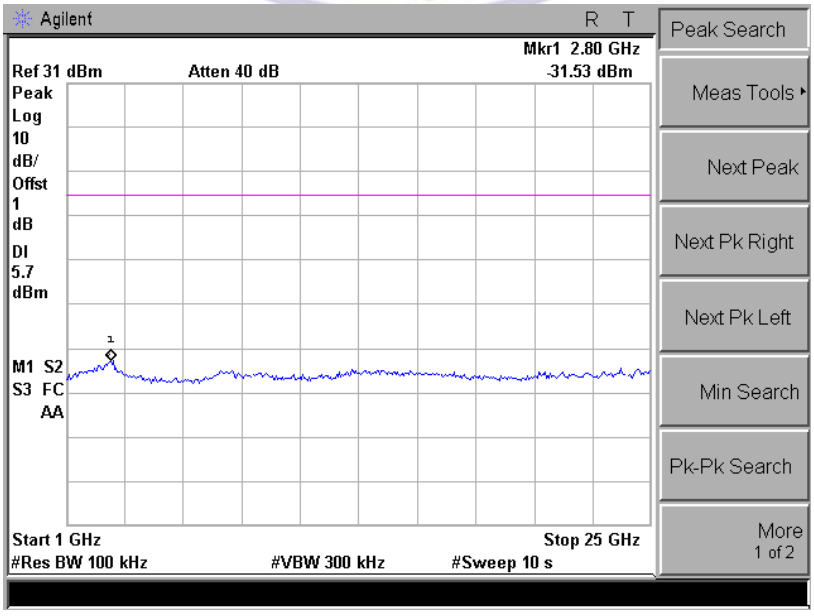
Low Channel



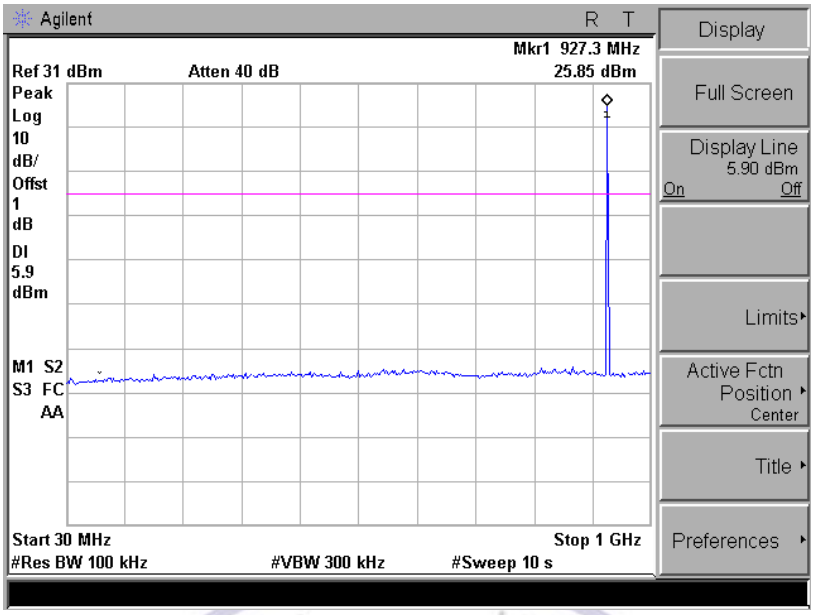


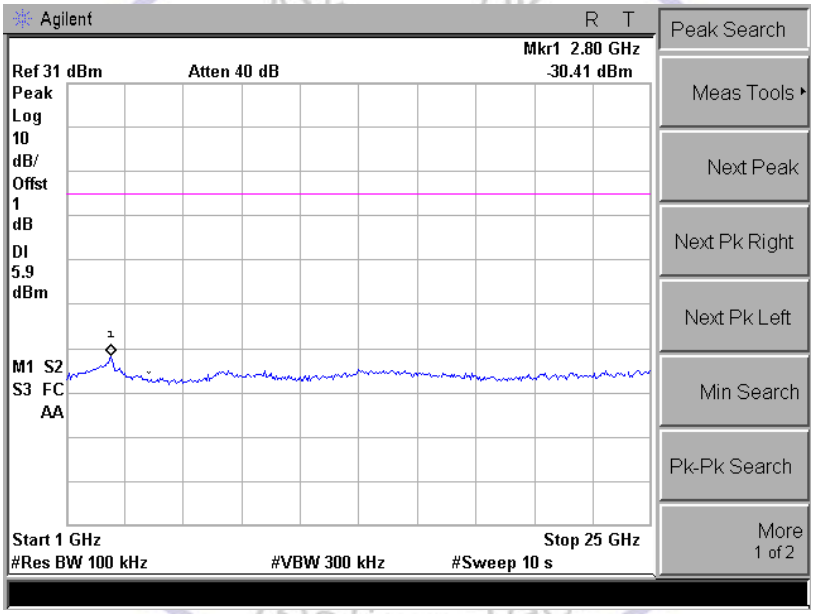
Middle Channel





High Channel





.....End of Report.....