TEST REPORT

1. Applicant

Name : SEGI LIMITED

Address : Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt road, Hongkong City, 186, CHINA

2. Products

Name : Car Alarm Transmitter

Model/Type : 1BAMR-SS

Manufacturer : SEGI LIMITED

3. Test Standard : FCC CFR 47 Part 15, Subpart C section 15.247

4. Test Method : ANSI C63.4-2009

5. Test Result : Positive

6. Date of Application : September. 27, 2010

7. Date of Issue : October. 01, 2010

Tested by

Sung-kyu Cho

Sung-kyu Cho
Telecommunication Team
Engineer

Approved by

Jeong-min Kim

Jeong-min Kim
Telecommunication Team
Manager

Korea Testing Laboratory

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	SEGI LIMITED
Address	Room 1808, 18/F, Tower 2, Admiralty Center, 18 Harcourt road, Hongkong City,186, CHINA
Contact Person	Eui Seok Chung
Telephone No.	82-32-623-5550
Facsimile No.	82-32-623-6667
E-mail address	euiseok@magicar.com
Manufacturer Name	SEGI LIMITED
Manufacturer Address	Chenjiapucun, Liaobu Town, Dongguan City, Guangdong Province, P.R.China(523-408)

1.2. Equipment (EUT)

FCC Classification	DSS – Part 15 Spread Spectrum Transmitter
Model Name	1BAMR-SS
FCC ID	VA5JR760-1WSS
IC Number	7087A-R760WSS
Frequency Band	910.92 ~ 919.08 MHz
EUT Modes of Operation	Transmitter
Type of Modulation	FSK
Number of Channels	25 channels
Antenna Type	Pattern Antenna
Antenna Gain	3.68 dBi
Input power supply	DC 6V (battery type)

1.3. Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Sung-kyu Cho
Telephone number	+82 31 5000 132
Facsimile number	+82 31 5000 149
E-mail address	skcho@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for : SEGI Limited

Equipment Under Test : 1BAMR-SS

Receipt of Test Sample : 2010. 09. 27

Test Start Date : 2010. 09. 27

Test End Date : 2010. 09. 30

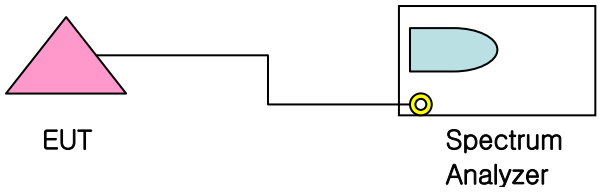
The following table represents the list of measurements required under the FCC CFR47 Part 15.205, 15.247, and 15.209 & RSS-210.

FCC Part 15 Rules	IC RSS-210 Rules	Test Requirements	Result	Comments
15.247 (a)(1)	Annex A8.1(1)	20dB Bandwidth	Pass	See Data sheets
15.247 (b)(1)	Annex A8.4(1)	Maximum Peak Power	Pass	See Data sheets
15.247(d)	Annex A8.5	100 KHz Bandwidth of Frequency Band Edges	Pass	See Data sheets
15.247 (a)(1)	Annex A8.1(2)	Hopping channel separation	Pass	See Data sheets
15.247 (a)(1)(i)	Annex A8.1(3)	Number of hopping channels	Pass	See Data sheets
15.247 (a)(1)(i)	Annex A8.1(4)	Dwell time	Pass	See Data sheets
15.247 (d)	Annex A8.5	Conducted Spurious Emission	Pass	See Data sheets
15.205 & 15.209	Table 1 & Table 2	Radiated Spurious Emissions	Pass	See Data sheets

3. Measurement & Results

3.1. 20 dB Bandwidth : Session 15.247(a)(1)

3.1.1. Test Setup Layout

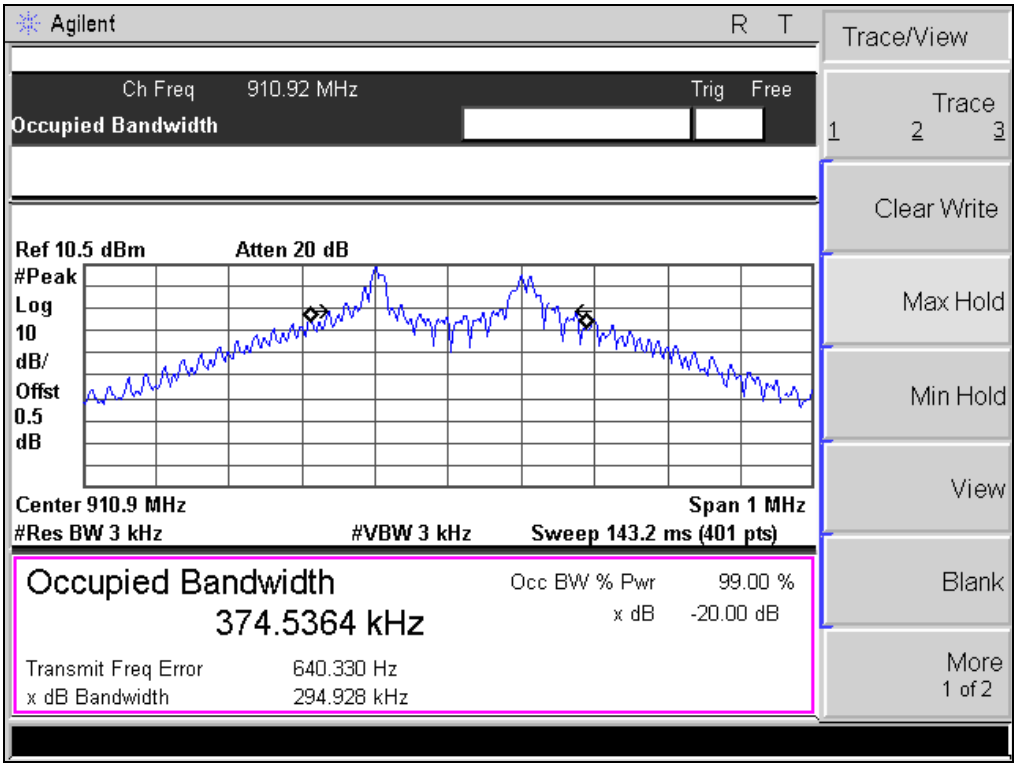


3.1.2. Limit

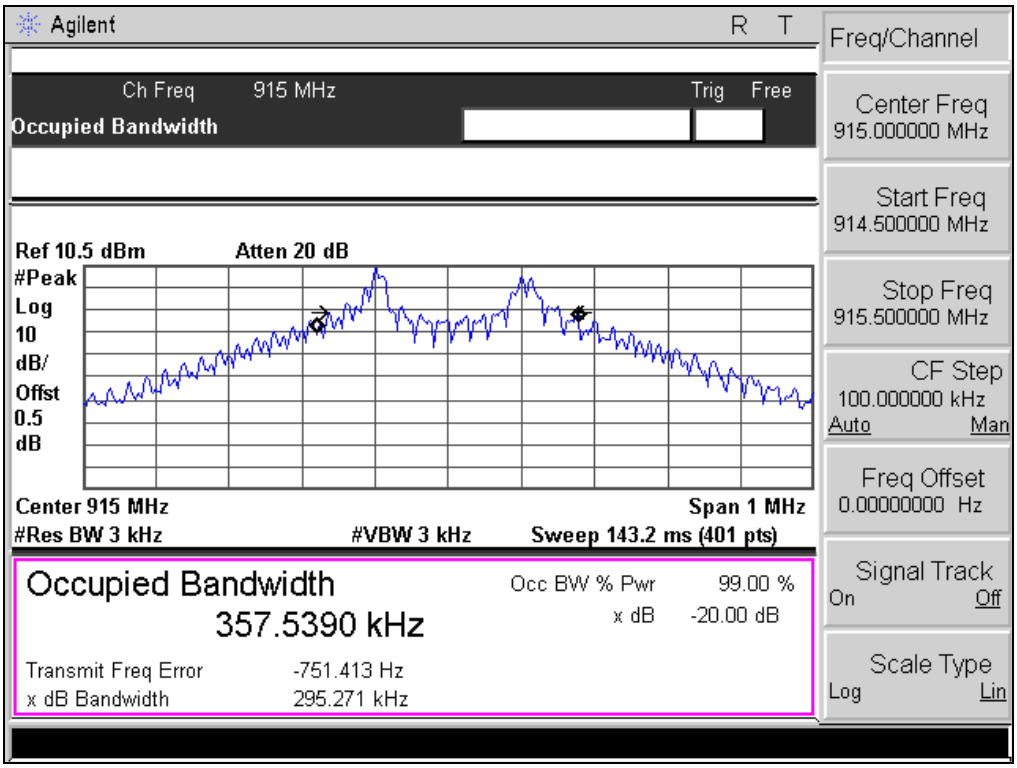
- The 20 dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 20 dB. Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

3.1.3. Test result

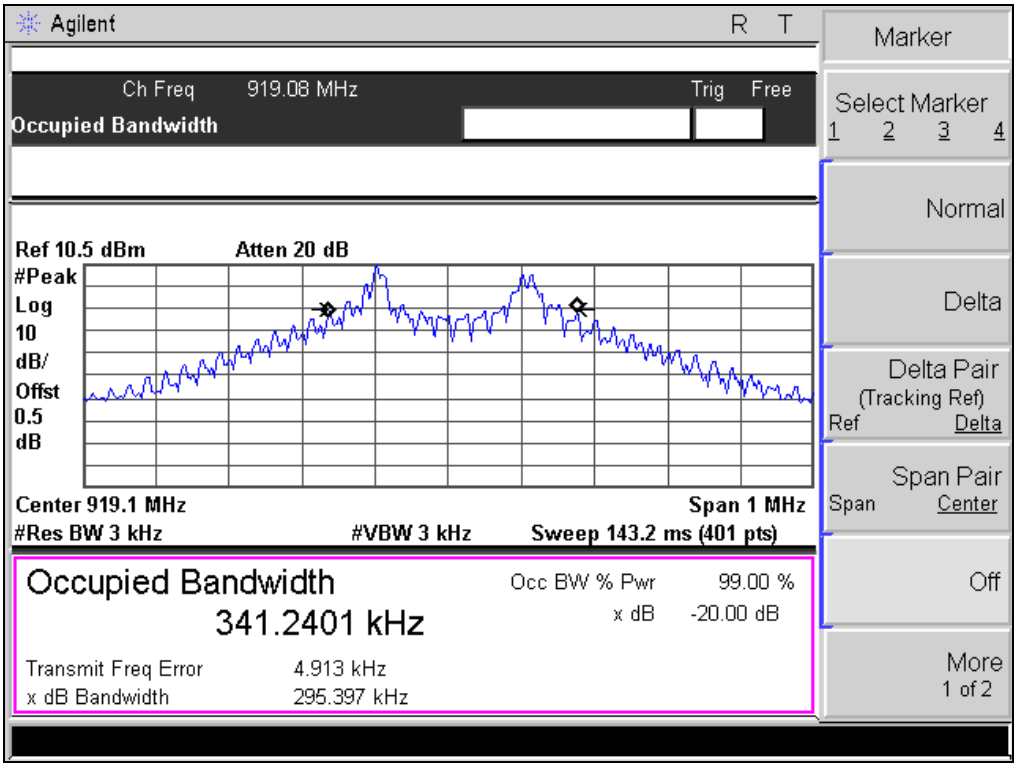
Frequency (MHz)	Channel Number	Result (kHz)	Verdict
910.92	1	294.92	Pass
915.00	13	295.27	Pass
919.08	25	295.39	Pass



- Occupied Bandwidth : Ch 1 -



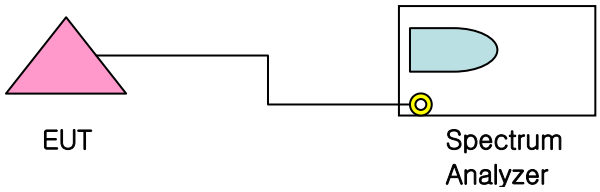
- Occupied Bandwidth : Ch 13 -



- Occupied Bandwidth : Ch 25 -

3.2. Maximum Peak Power : Section 15.247(b)(1)

3.2.1. Test Setup Layout

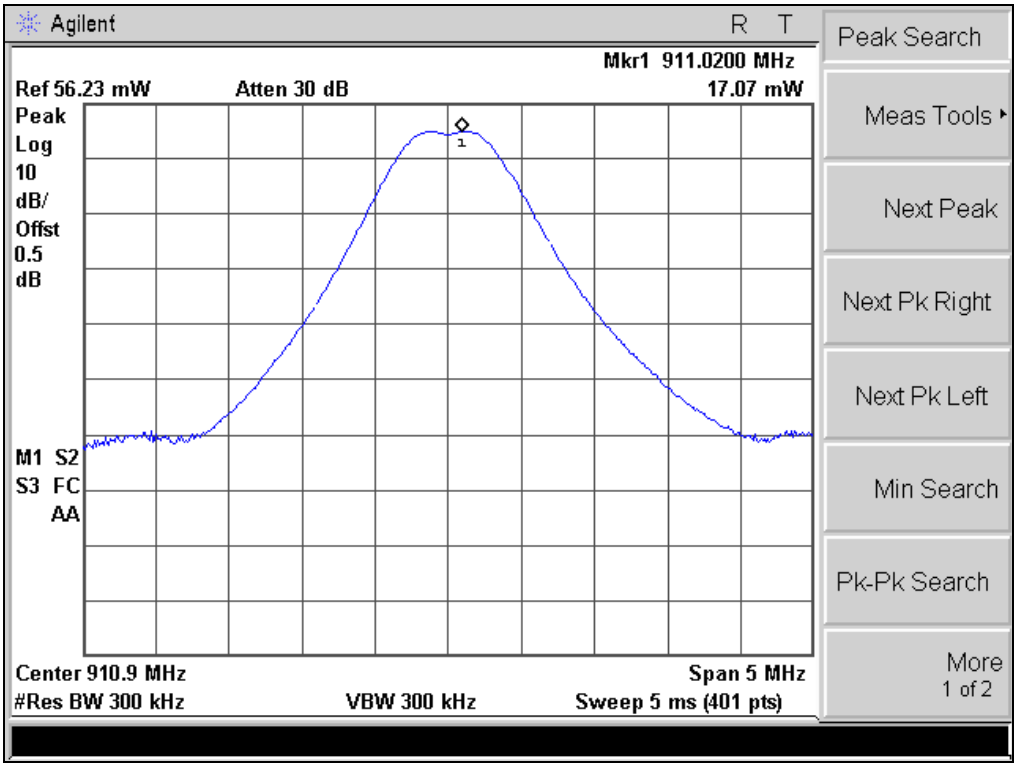


3.2.2. Limit

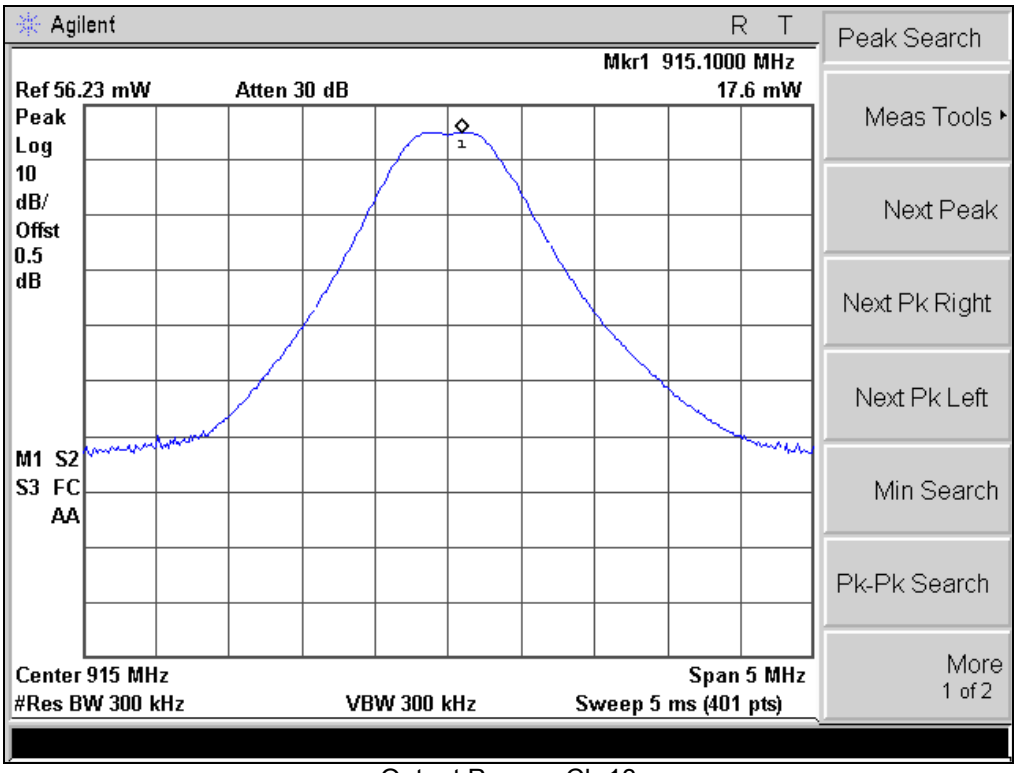
- For Frequency hopping systems operating in the 902~928 MHz band: 1 watt for systems employing at least 50 hopping channels; and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

3.2.3. Test result

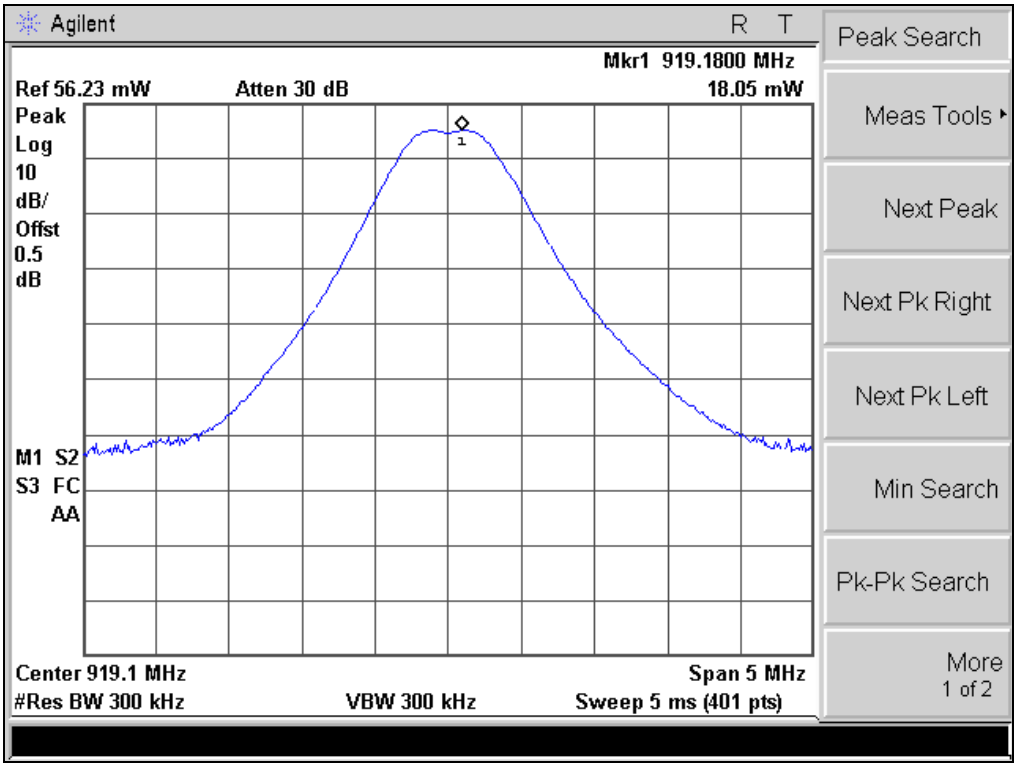
Frequency (MHz)	Channel Number	Result (mW)	Limit (W)	Verdict
910.92	1	17.07	0.25	Pass
915.00	13	17.60	0.25	Pass
919.08	25	18.05	0.25	Pass



- Output Power : Ch 1 -



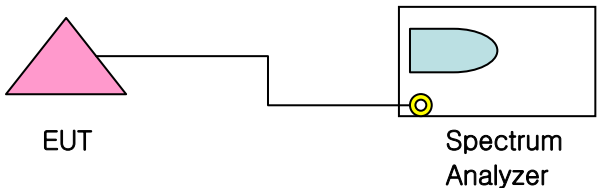
- Output Power : Ch 13 -



- Output Power : Ch 25 -

3.3. 100 KHz Bandwidth of Frequency Band Edges : Section 15.247(d)

3.3.1. Test Setup Layout

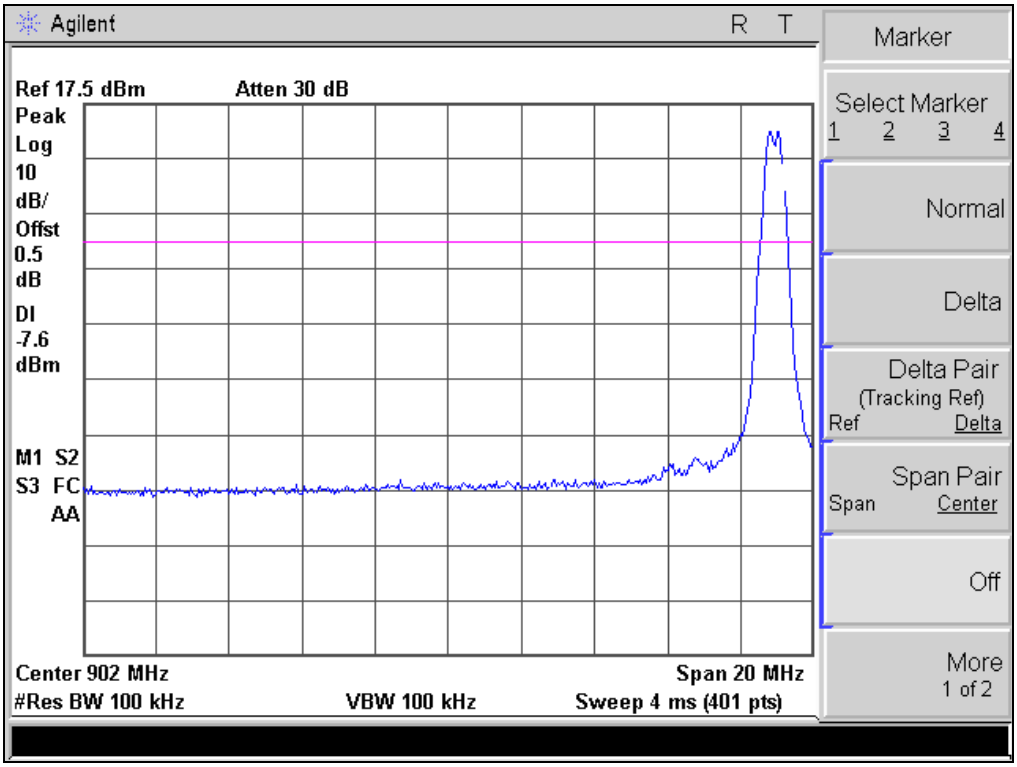


3.3.2. Limit

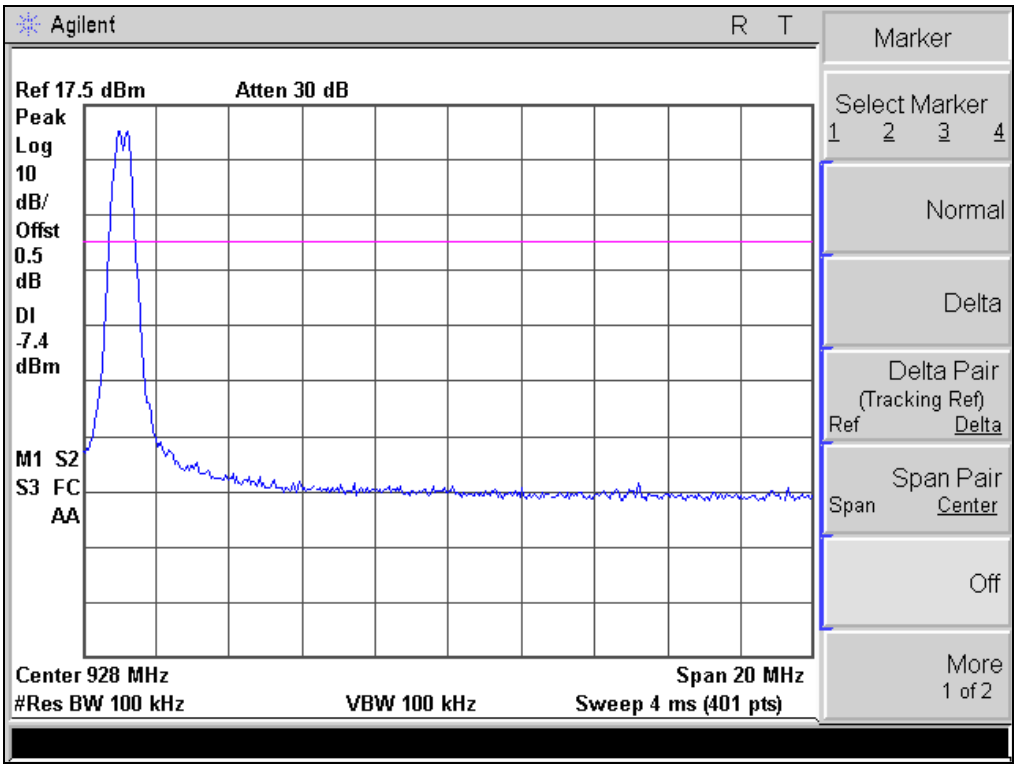
- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum of digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in section 15.209(a) is not required.

3.3.3. Test result

Frequency (MHz)	Channel Number	Result (dBc)	Limit (dBc)	Verdict
910.92	1	40 >	20	Pass
919.08	25	40 >	20	Pass



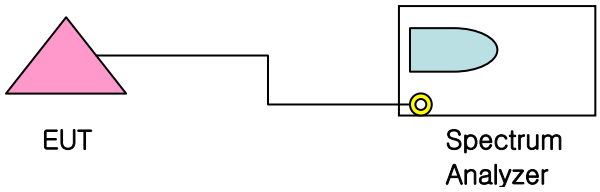
- Lower side band edge -



- Upper side band edge –

3.4. Hopping Channel Separation : Section 15.247(a)(1)

3.4.1. Test Setup Layout

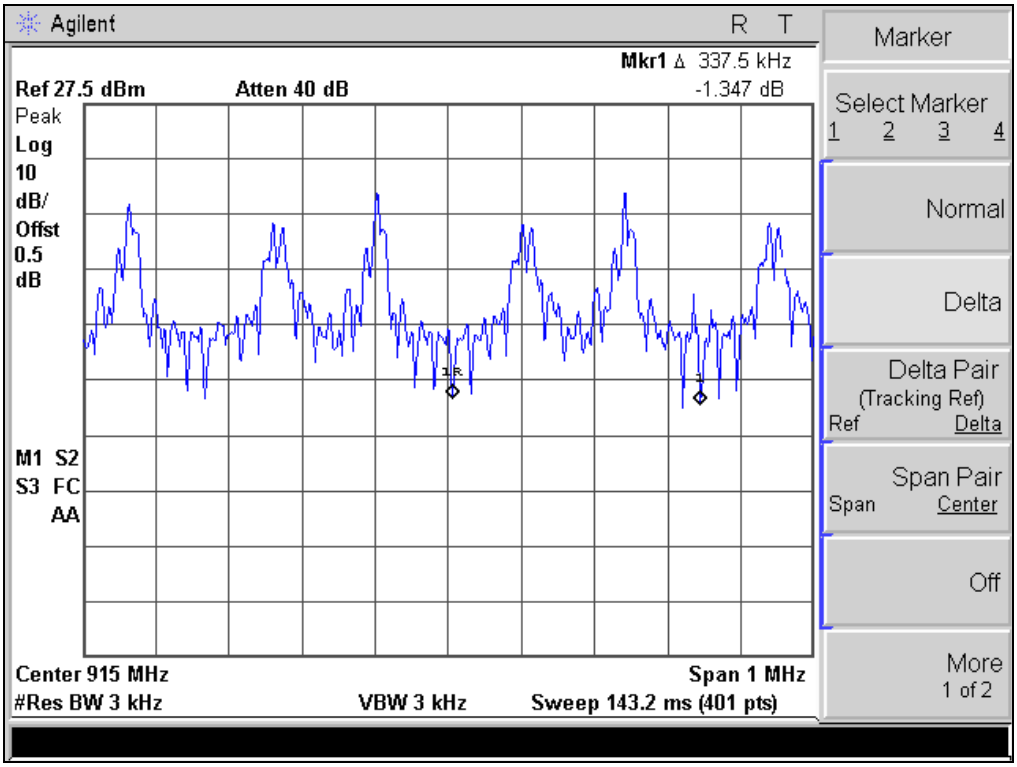


3.4.2. Limit

- Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB Bandwidth of the hopping channel, whichever greater.

3.4.3. Test result

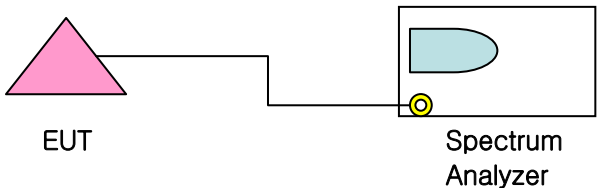
Mode	Result (kHz)	Limit (kHz)	Verdict
Hopping mode	337.5	295.39	Pass



– Hopping Channel Separation –

3.5. Number of Hopping Channels : Session 15.247(a)(1)(i)

3.5.1. Test Setup Layout

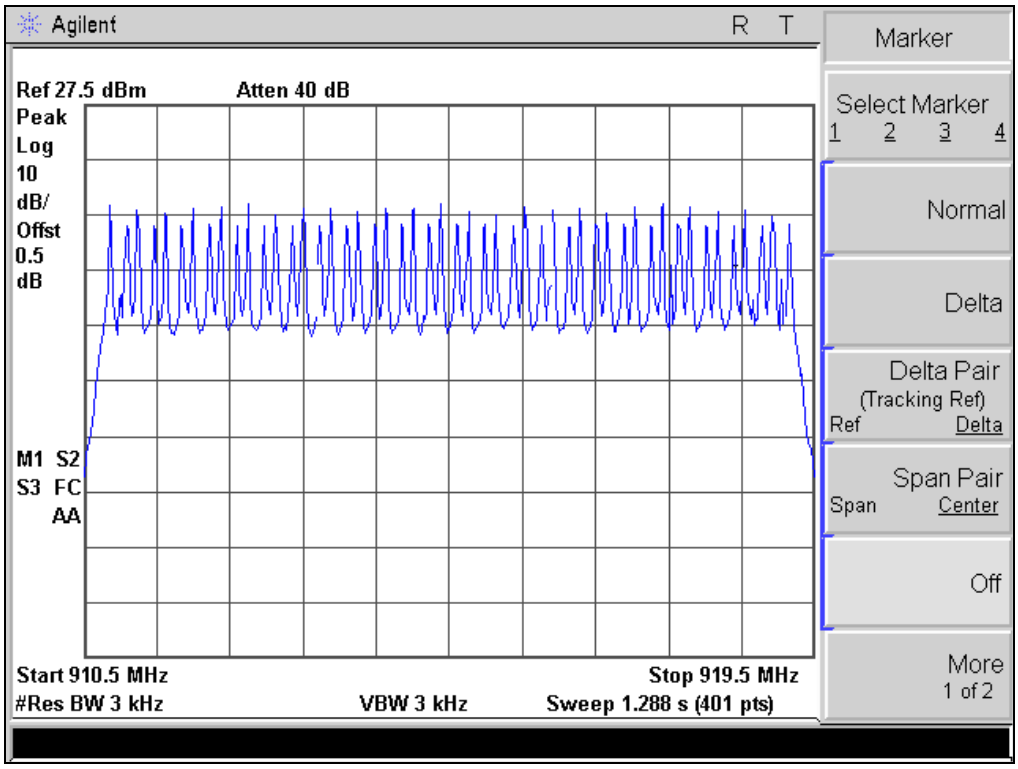


3.5.2. Limit

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is is 250 kHz or greater, the system shall use at least 25 hopping frequencies

3.5.3. Test result

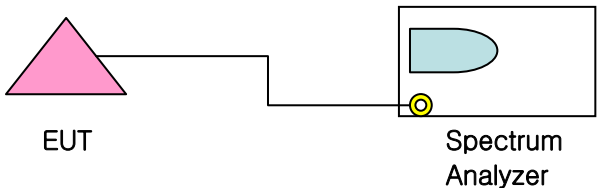
Mode	Frequency (MHz)	Result (channel)	Limit (channel)	Verdict
Hopping mode	--	25	≥ 25	Pass



– Number of hopping Channels –

3.6. Dwell Time : Session 15.247(a)(1)(i)

3.6.1. Test Setup Layout



3.6.2. Limit

- 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 system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

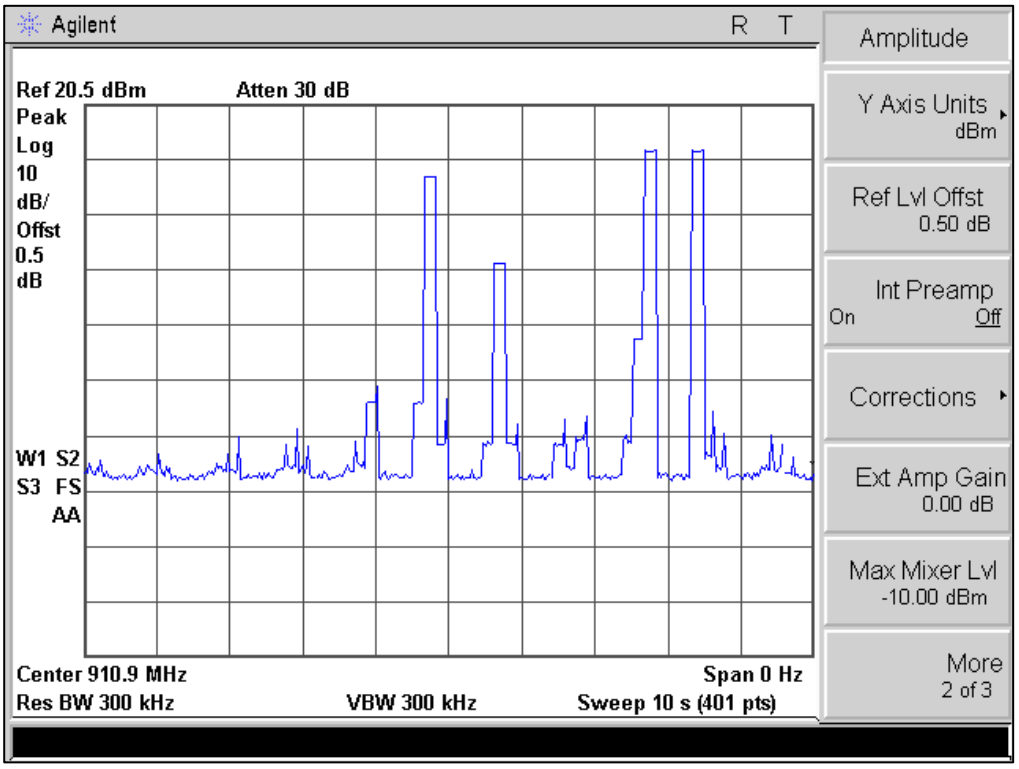
The dwell time is calculated by:
Dewll Time : Time slot length * The number of hopping channels in 10s

The maximum time slot length = 154 ms
The maximum number of hopping channels in 10s = 2

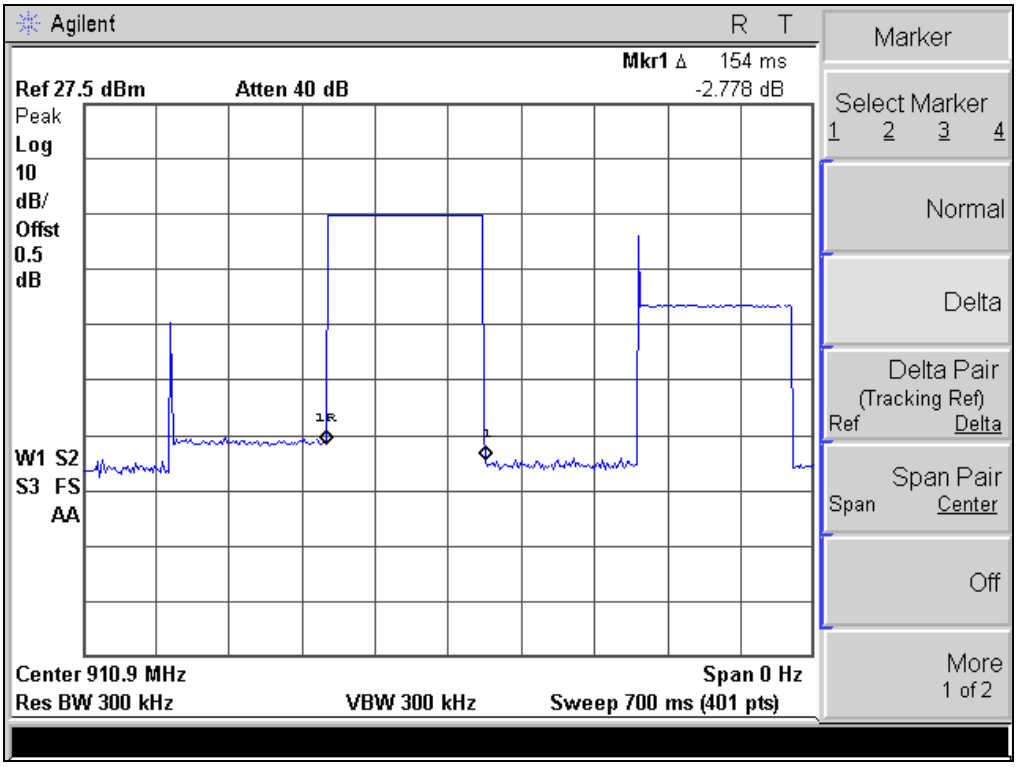
Therfore:
Dwell Time = 154 ms * 2 = 308 ms

3.6.3. Test result

Frequency (MHz)	Dwell time (ms)	Limits (msec)	Verdict
915	308	≤ 400	Pass



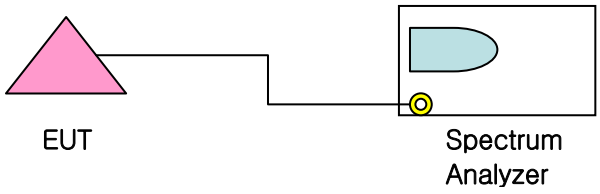
- The maximum number of hopping channels in 10 s -



- Maximum Time Slot Length -

3.7. Conducted Spurious Emission : Session 15.247(d)

3.7.1. Test Setup Layout

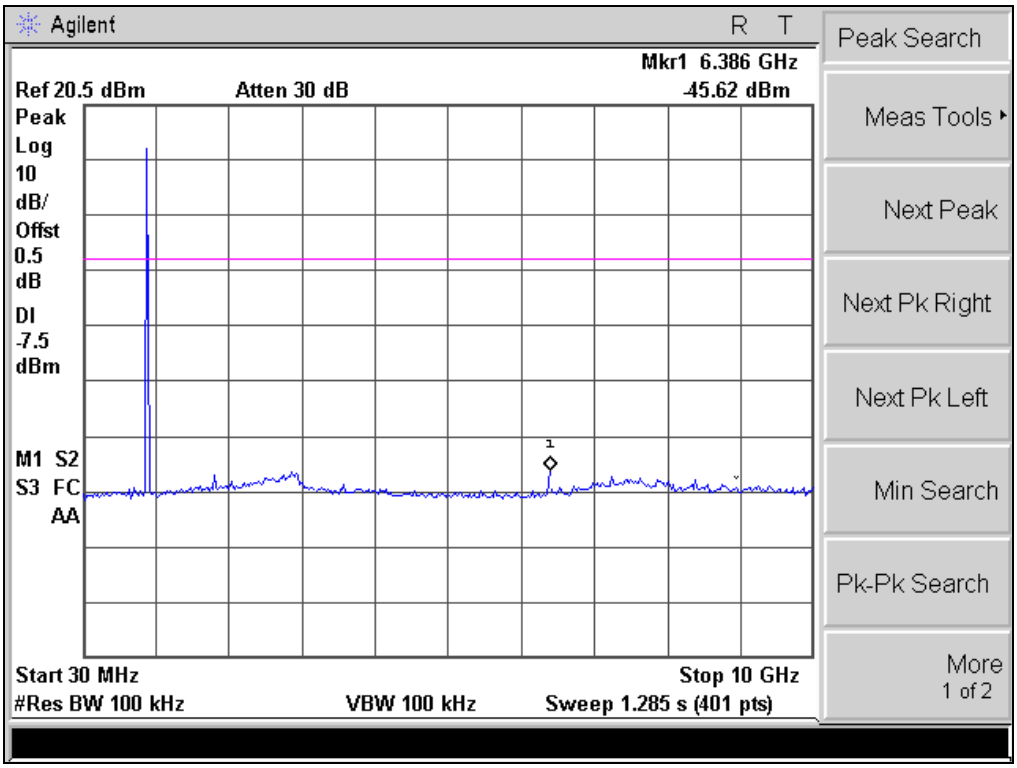


3.7.2. Limit

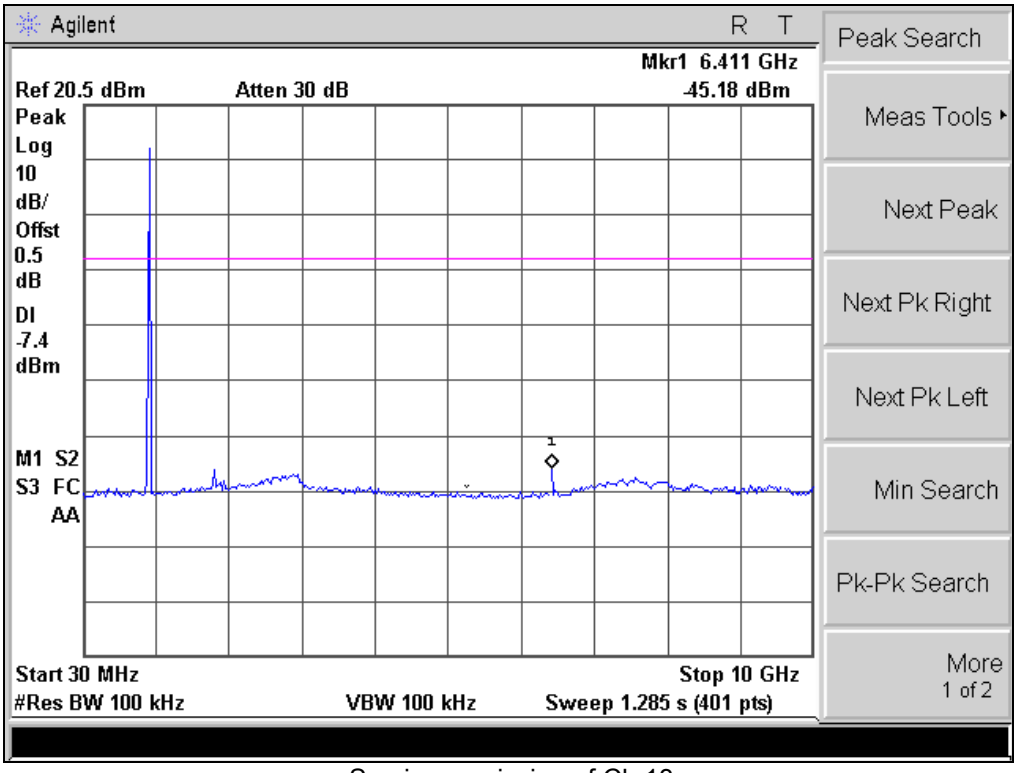
- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum of digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in section 15.209(a) is not required.

3.7.3. Test result

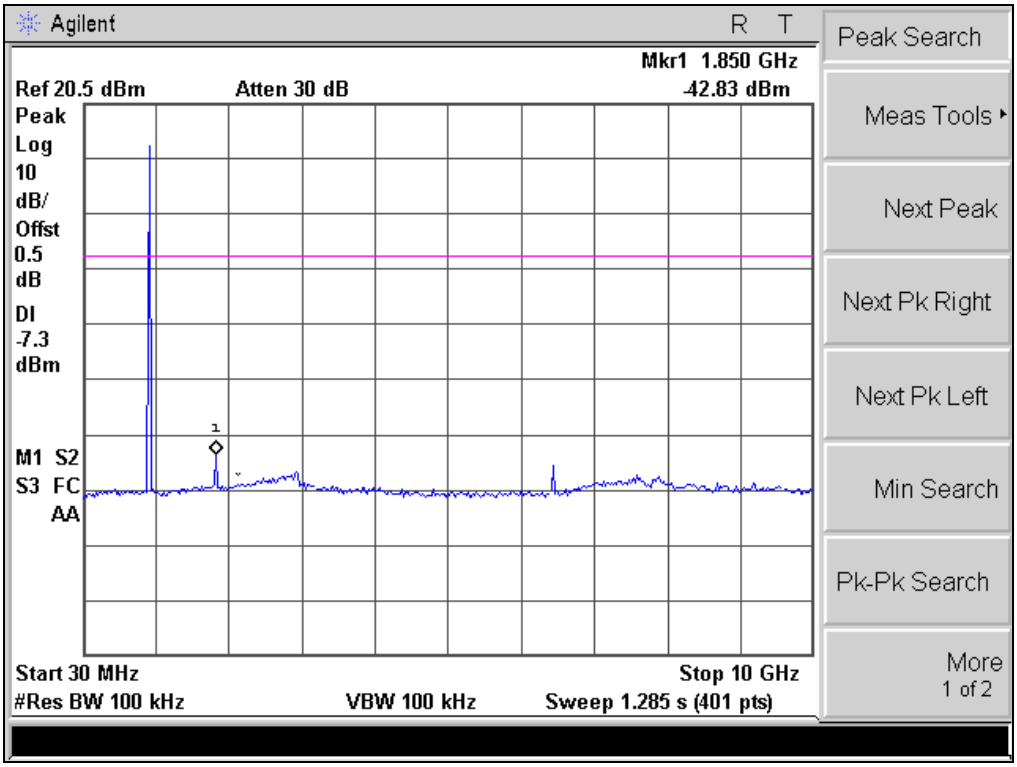
Frequency (MHz)	Channel Number	Result (dBc)	Limit (dBc)	Verdict
910.92	1	40 >	20	Pass
915.00	13	40 >	20	Pass
919.08	25	40 >	20	Pass



- Spurious emission of Ch 1 -



– Spurious emission of Ch 13 -



– Spurious emission of Ch 25 –

3.8. Radiated Spurious Emissions : Session 15.205 & 15.209

3.8.1. Test Procedure

3.8.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

3.8.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

Tested in x, y, z axis and worst case results are reported

The maximum frequency range measuring with the spectrum from 30 MHz to 10th harmonic was investigated with the transmitter.

3.8.1.3 Limits

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)). In addition, where an average detector is used for determining compliance with the limits in 15.209(a), there is a corresponding peak limit 20 dB above the specified average limit according to 15.35(b)

MHz	MHz	MHz	MHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	[2]
13.36 - 13.41			

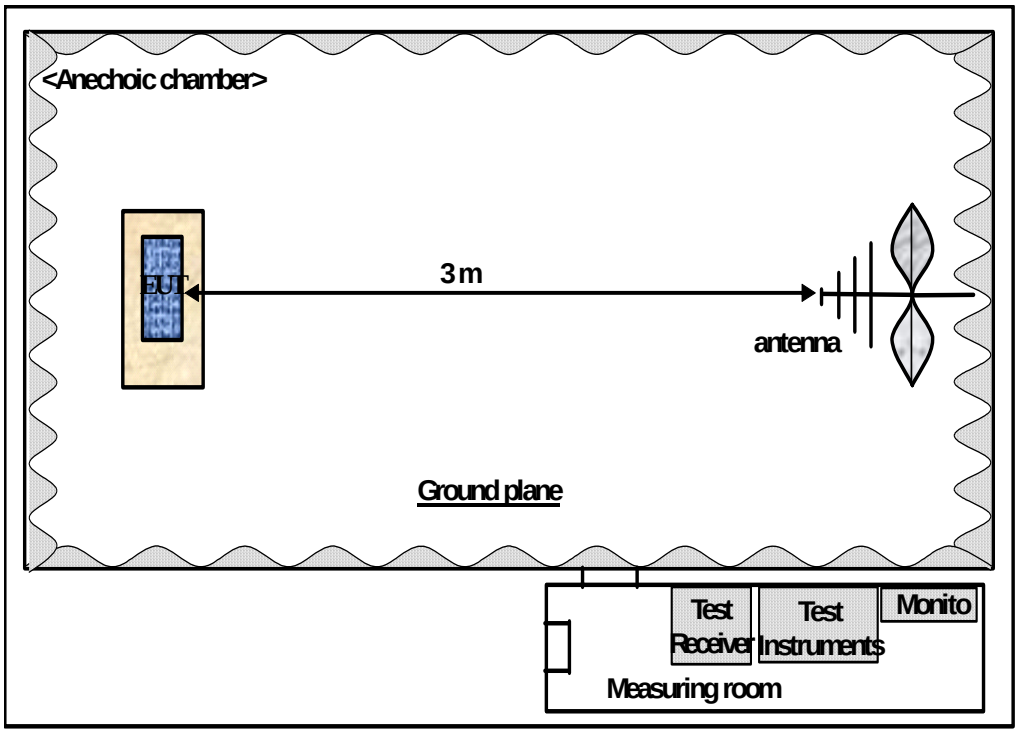
[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

3.8.1.4 Sample Calculation

The emission level measured in decibels above one microvolt (dB) was following sample calculation.
For example ;

	Measured Value at 4824 MHz	33.9 dBμV /N
	Antenna Factor & Cable loss	45.0 dB/m
−	Preamplifier	-30.0 dB
=	Radiated Emission	48.9 dBμV/m

3.8.1.5 Test configuration



3.8.2. Test Results

3.8.2.1 Fundamental Radiated Emission

Model No. : 1BAMR-SS
Test distance : 3m
Test mode : Continuous TX
Date : September 28, 2010

Frequncy (MHz)	Antenna Pol	Bandwidth Detector	Reading level	Correction factor	Duty Cycle Factor	Level Corrected	Limit	Margin	Remark	EUT
910.92	H	100, Peak	87.80	25.85	0.00	113.65	N/A	N/A	Peak	X
910.92	V	100, Peak	74.50	25.85	0.00	100.35	N/A	N/A	Peak	X
915.00	H	100, Peak	86.83	25.85	0.00	112.68	N/A	N/A	Peak	Y
915.00	V	100, Peak	75.8	25.85	0.00	101.65	N/A	N/A	Peak	Y
919.08	H	100, Peak	87.73	25.85	0.00	113.58	N/A	N/A	Peak	Z
919.08	V	100, Peak	84.66	25.85	0.00	110.51	N/A	N/A	Peak	Z

Level Corrected = Reading level + Correction factor (dB/m)
Correction factor = Antenna factor + Cable loss

Note
1. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
2. Tesing is include the rotation of the EUT through three orthogonal axes to determine the maximum emission.

3.8.2.2 Radiated Spurious Emission

Model No. : 1BAMR-SS
Test distance : 3m
Test mode : Continuous TX
Date : September 28, 2010

Frequncy (MHz)	Antenna Pol	Bandwidth Detector	Reading level	Correction factor	Duty Cycle Factor	Level Corrected	Limit	Margin	Remark	EUT
1821.84	H	1000, Peak	53.73	1.22	0.00	54.95	N/A	N/A	Peak	X
1821.84	V	1000, Peak	49.17	1.22	0.00	50.39	N/A	N/A	Peak	X
1830.00	H	1000, Peak	52.88	1.22	0.00	54.10	N/A	N/A	Peak	X
1830.00	V	1000, Peak	52.26	1.22	0.00	53.48	N/A	N/A	Peak	X
1838.16	H	1000, Peak	53.15	1.23	0.00	54.38	N/A	N/A	Peak	X
1838.16	V	1000, Peak	52.67	1.23	0.00	53.90	N/A	N/A	Peak	X
No emission in the restricted bands were found.										

Level Corrected = Reading level + Correction factor (dB/m)
Correction factor = Antenna factor + Cable loss – Pre-amplifier (when using a pre-amplifier)

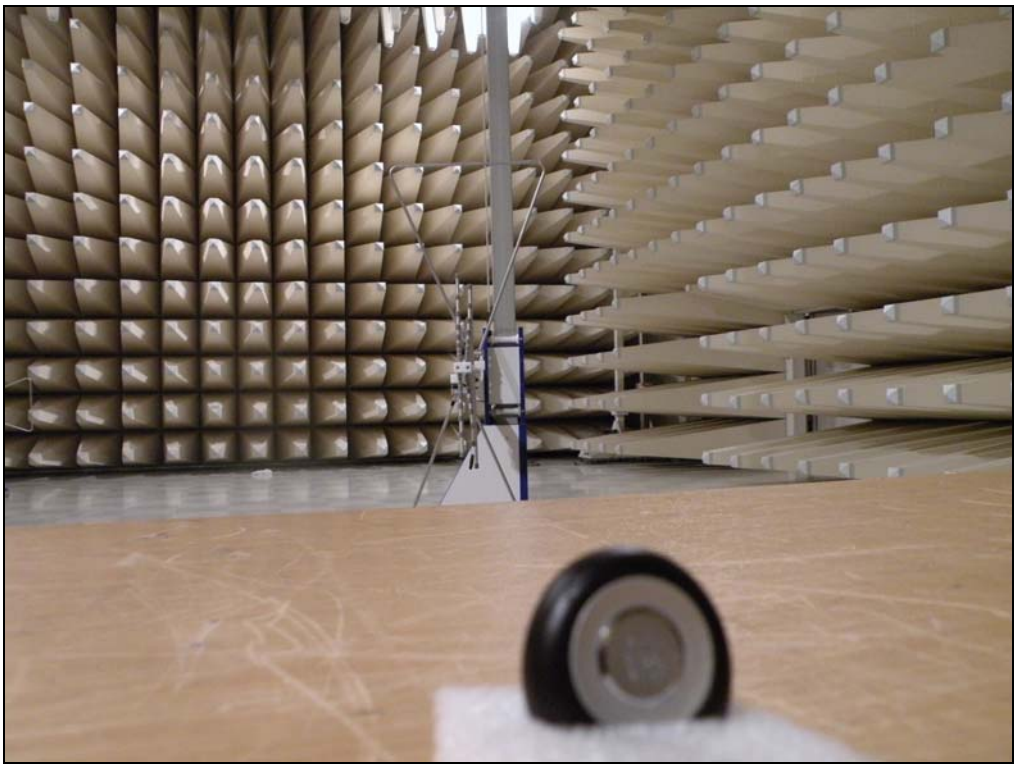
Note
1. Measurement was done over the frequency range from 30 MHz to 10th hramonic. The EUT was rotated and the antenna was changed to a range of height of from 1 m to 4 m above the ground plane for maximum response.
2. Pre-amplifier was used in the range between 1 ~ 10 GHz.
3. Tesing is include the rotation of the EUT through three orthogonal axes to determine the maximum emission.

Remark
1. Noise floor of 30 ~ 1000 MHz : <20 dBuV at 3m distance
2. Noise floor of 1000 ~ 5000 MHz : <40 dBuV at 3m distance
3. Noise floor of 5000 ~ 10000 MHz : <45 dBuV at 3m distance

4. TEST EQUIPMENTS

No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 Hz ~ 26.5 GHz)	R&S	ESIB26	100280	08/28/2010 ~ 08/28/2011
2	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2009 ~ 12/01/2010
3	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	08/30/2010 ~ 08/30/2011
4	Pre-Amplifier (100 kHz ~ 1 GHz)	SONOMA.	310N	186270	02/04/2010 ~ 02/04/2011
5	Pre-Amplifier (0.5 GHz ~ 26.5 GHz)	Agilent	83017A	MY39500982	05/18/2010 ~ 05/18/2011
6	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	02/17/2010 ~ 02/17/2011
7	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	179	06/01/2009 ~ 06/01/2011
8	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	04/13/2010 ~ 04/13/2012
9	Horn Ant. (18 GHz ~ 40 GHz)	EMCO	3116	2664	03/26/2009 ~ 03/26/2011
10	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	01/14/2010 ~ 01/14/2012
11	DC Power Supply	Agilent	E4356A	MY41000296	10/05/2009 ~ 10/05/2010
12	Power Meter	Agilent	E4417A	GB4129075	09/17/2010~ 09/17/2011

Appendix.1 Test setup photo



<Radiated Emission>