



47 CFR PART 15D

TEST REPORT

Of

Media Touch

Trade Name: technicolor
Brand Name: Media Touch
Model Name: TVA201
Report No.: SZ10080166E03
FCC ID.: G95-TVA201

prepared for

Beijing Thomson Commerce Co., Ltd

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Change History		
Issue	Date	Reason for change
1.0	November 10, 2010	First edition



1. TEST CERTIFICATION

Equipment under Test: Media Touch

Trade Name: technicolor

Brand Name: Media Touch

Model Name: TVA201

FCC ID: G95-TVA201

Applicant: Beijing Thomson Commerce Co., Ltd

6/F, Building A Technology Fortune Center, No.8 Xue Qing Road, Hai Dian District, Beijing, China

Manufacturer: Hong Fu Jin Percision Industry (Shen Zhen) Co., Ltd

No.2, 2nd Donghuan Road 10th Yousong Industrial District Longhua Town, Baoan, Shenzhen, Guang Dong, China

Test Standards: 47 CFR Part 15 Subpart D

Test Date(s): September 13, 2010 – October 21, 2010

Test Result: PASS

*** We Hereby Certify That:**

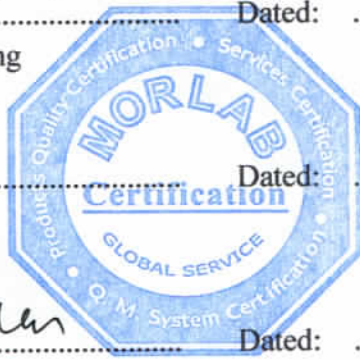
The equipment under test was tested by Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Cao Shao Dong Dated: 2010.11.10
Cao Shao Dong

Reviewed by: Ni Yong Dated: 2010.11.10
Ni Yong

Approved by: Shu Luan Dated: 2010.11.10
Shu Luan



2. GENERAL INFORMATION

2.1 EUT Description

EUT Type Media Touch
Model Name..... TVA201
Serial No. (n.a, marked #1 by test site)
Hardware Version..... PEM3
Software Version V006
Modulation Type DSSS, OFDM , GMSK
Power Supply Battery
 Brand Name: technicolor
 Model No.: GSP 065590
 Serial No.: (n.a. marked #1 by test site)
 Capacitance: 3450mAh
 Rated Voltage: 3.7V
 Manufacturer: Sunwoda Electronic Co., Ltd
Ancillary Equipment 1 ... AC Adapter (Charger for Battery)
 Brand Name: (n.a)
 Model Name: MU18-D150120-A1
 Serial No.: (n.a. marked #1 by test site)
 Rated Input: 100- 240V~, 0.6A, 50/60Hz
 Rated Output: 15V=, 1.2A
 Manufacturer: Leader Electronics Inc.

Note 1: The EUT is a Wireless Multimedia device that supports 47 CFR Part 15 Subpart D protocols.

Note 2: The EUT is the Wireless Internet connected portable device controlled by a touch panel and supporting services around multimedia, communication and infotainment. It supports DECT, 802.11b, 802.11g and 802.11n (HT20/40), and only DECT was tested in this report

Note 3: Please refer to Annex B for the photographs of the EUT. For more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer Additional Information.

2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart D:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-09 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No	Section	Description	Result
1	15.307(b)	Coordination with fixed microwave	NOTE1
2	15.309 (b)	Cross reference	PASS
3	15.311 & 15.19 (a)(3)	Labeling requirements	NOTE1
4	15.317 & 15.203	Antenna requirement	PASS
5	15.319(b)	Digital modulation techniques	NOTE1
6	15.315&15.207(a)	Power line conducted emissions	PASS
7	15.323 (a)	Transmitter emission bandwidth	PASS
8	15.319 (c)	Peak transmit power	PASS
9	15.319 (d)	Power spectral density	PASS
10	15.319 (e)	Antenna gain	NOTE1
11	15.319 (f)	Automatic discontinuation of transmission	NOTE1
12	15.319 (i)	Radio frequency radiation exposure	PASS
13	15.323 (c)(2)	Monitoring thresholds	PASS
14	15.323 (c)(9)	Monitoring threshold relaxation	PASS
15	15.323 (c)(1)	Monitoring time	PASS
16	15.323 (c)(3)	Duration of transmission	PASS
17	15.323 (c)(4)	Connection acknowledgement	PASS
18	15.323 (c)(5)	Upper threshold selected channel,power accuracy,segment occupancy	PASS
19	15.323 (c)(6)	Random waiting	NOTE1
20	15.323 (c)(7)	Monitoring bandwidth	PASS
21	15.323 (c)(8)	Monitoring antenna	NOTE1
22	15.323 (c)(10)	Duplex connections	NOTE1
23	15.323 (c)(11)	Alternative monitoring interval for co-located devices	NOTE1
24	15.323 (c)(12)	Fair access	NOTE1
25	15.323 (d)	Emissions inside and outside the sub-band-conducted	PASS
26	15.323(e)	Frame period and jitter	PASS
27	15.323(f)	Carrier frequency stability	PASS

NOTE: 1. Customer declaration .See separate documents showing the label design and the placement of the label on the EUT.

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

2.3.2 Test Environment Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	±1.8dB
Uncertainty of Radiated Emission:	±3.1dB

3. TEST CONDITIONS SETTING

3.1 Test Mode

1. The test mode

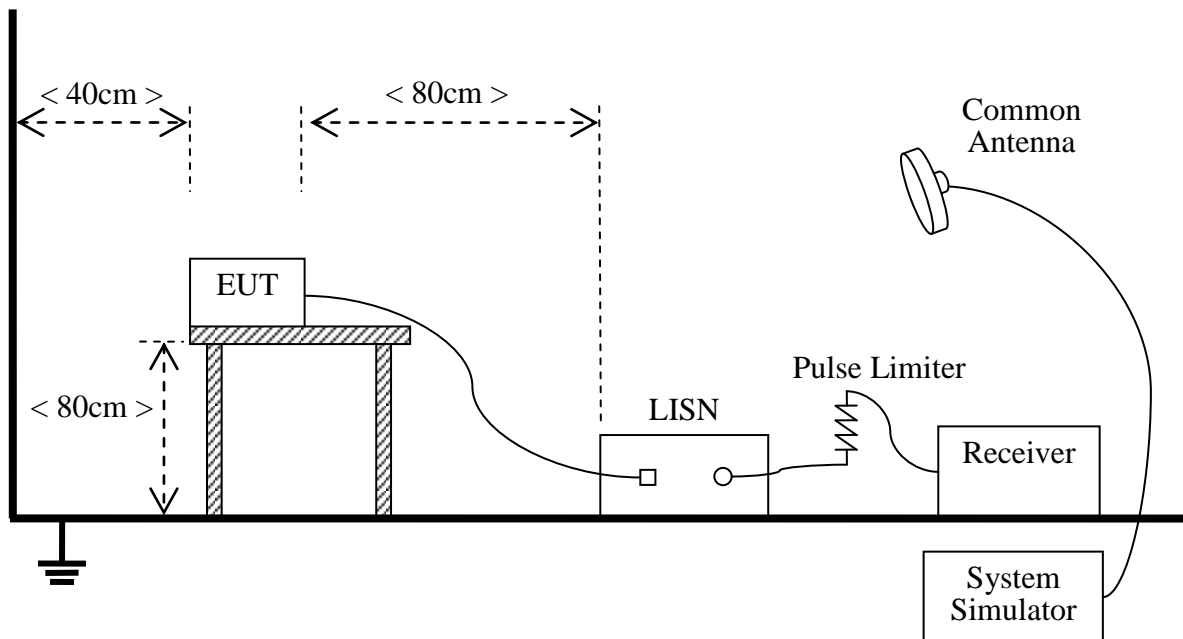
The tested equipment is a DECT base station that complies with ETSI EN 300175. The frequencies have been reprogrammed to comply with the FCC and IC requirements to an Isochronous UPCS device after FCC Part 15D and RSS-213 Issue 2. The EUT is a responding device as described in ANSI C63.17 and is designed to operate together with a DECT handset, which is then the initiating device.

Frequency Channel	Frequency	Test Frequency
CH4	1921.536	FL
CH3	1923.264	
CH2	1924.992	FM
CH1	1926.720	
CH0	1928.448	FH

3.2 Test Setup and Equipments List

3.2.1 Conducted Emission

A. Test Setup:



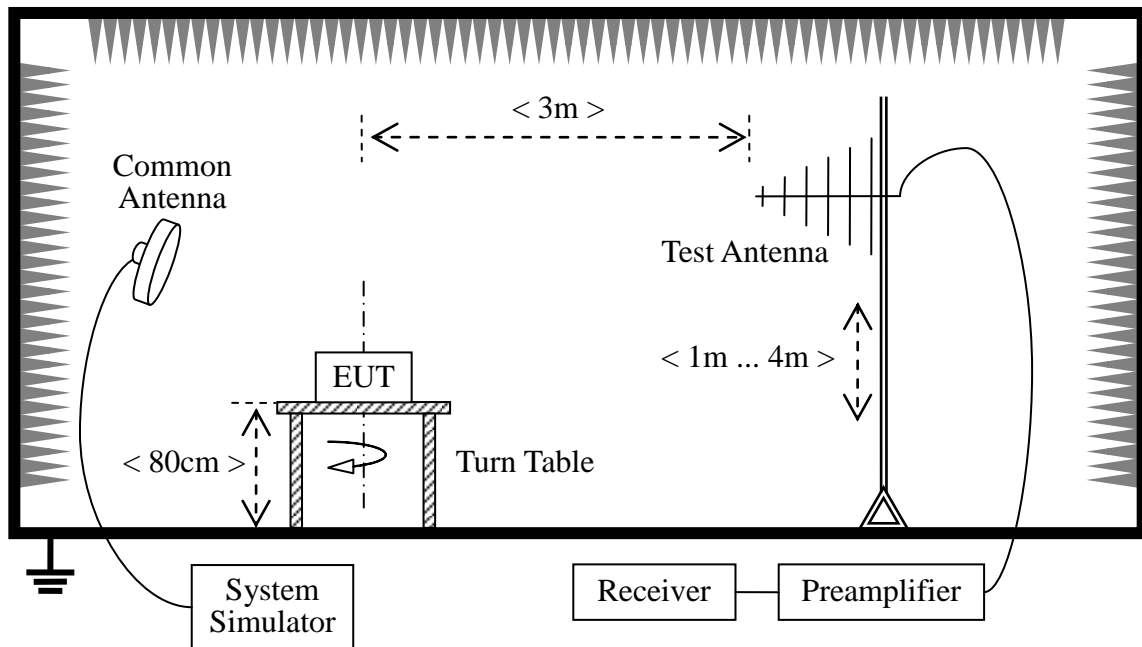
The EUT is placed on a 0.8m high insulating table, which stands on the grounded conducting floor, and keeps 0.4m away from the grounded conducting wall. The EUT is connected to the power mains through a LISN which provides $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument. The Common Antenna is used for the call between the EUT and the System Simulator (SS). A Pulse Limiter is used to protect the measuring instrument. The factors of the whole test system are calibrated to correct the reading.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2009.09	2year
LISN	Schwarzbeck	NSLK 8127	812744	2009.09	2year
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	(n.a.)	(n.a.)
System Simulator	Agilent	E5515C	GB43130131	2009.09	2year
Personal Computer	IBM	IBM_T20	(n.a.)	(n.a.)	(n.a.)
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)	(n.a.)

3.2.2 Radiated Emission

C. Test Setup:



The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower. The Common Antenna is used for the call between the EUT and the System Simulator (SS).

D. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2009.09	2year
Semi-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.09	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2009.09	2year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2009.09	2year
System Simulator	Agilent	E5515C	GB43130131	2009.09	2year
Personal Computer	IBM	IBM_T20	(n.a.)	(n.a.)	(n.a.)
Bluetooth-Headset	Nokia	HS-36W	(n.a.)	(n.a.)	(n.a.)
T-Flash Card	SanDisk	256MB	(n.a.)	(n.a.)	(n.a.)

4. TEST RESULT

4.1 Coordination with fixed microwave – Part 15.307(b)

4.1.1 Standard Applicable:

Each application for certification of equipment operating under the provisions of this Subpart must be accompanied by an affidavit from UTAM, Inc. certifying that the applicant is a participating member of UTAM, Inc. In the event a grantee fails to fulfill the obligations attendant to participation in UTAM, Inc., the Commission may invoke administrative sanctions as necessary to preclude continued marketing and installation of devices covered by the grant of certification, including but not limited to revoking certification.

4.1.2 Result

The affidavit from UTAM, Inc. is included in the documentation supplied by the applicant:

4.2 Cross reference– PART 15.309 (b)

4.2.1 Standard Applicable:

The requirements of Subpart D apply only to the radio transmitter contained in the PCS device. Other aspects of the operation of a PCS device may be subject to requirements contained elsewhere in this Chapter. In particular, a PCS device that includes digital circuitry not directly associated with the radio transmitter also is subject to the requirements for unintentional radiators in Subpart B.

FCC 15.109(a)

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength	
	$\mu\text{V/m}$	$\text{dB } \mu\text{V/m}$
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

NOTE:

- Field Strength ($\text{dB } \mu\text{V/m}$) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.
- In the emission tables above, the tighter limit applies at the band edges.

4.2.2 Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

4.2.3 Test Mode

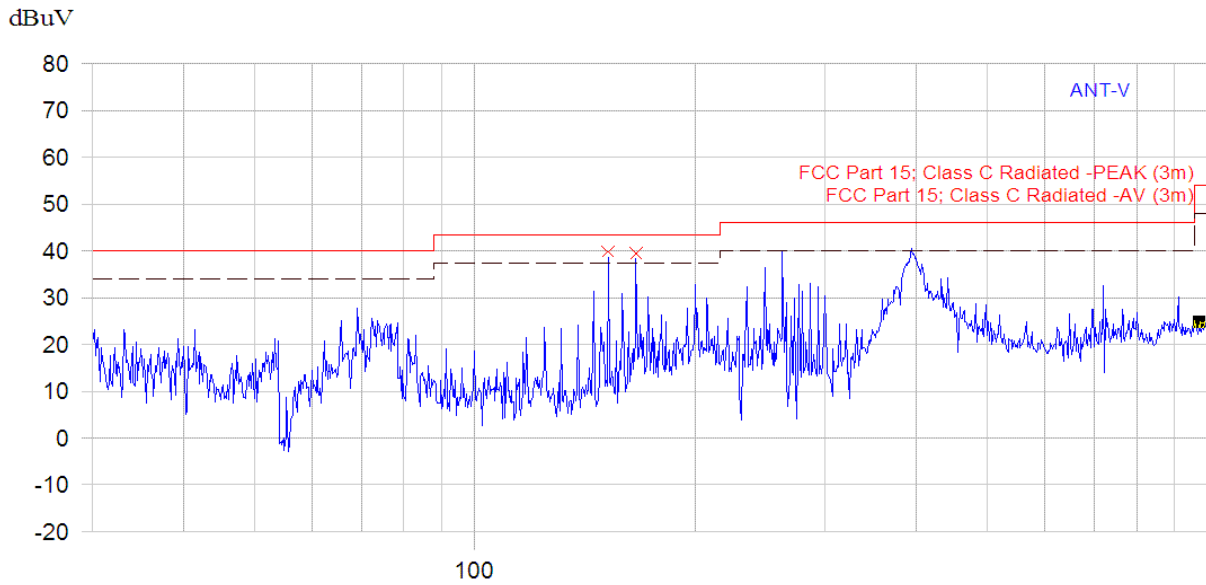
A. Test Verdict Recorded for Suspicious Points:

No.	@Frequency (MHz)	Emission Level ($\text{dB } \mu\text{V/m}$)			Quasi-Peak Limit ($\text{dB } \mu\text{V/m}$)	Result
		PK	QP	Antenna Polarization		
1	152.062	39.8	--	Vertical	43.5	PASS
2	165.087	39.4	--	Vertical	43.5	PASS
3	152.112	40.2	--	Horizontal	43.5	PASS
4	394.032	41.3	--	Horizontal	46	PASS



B. Test Plots

218.19, 21.95



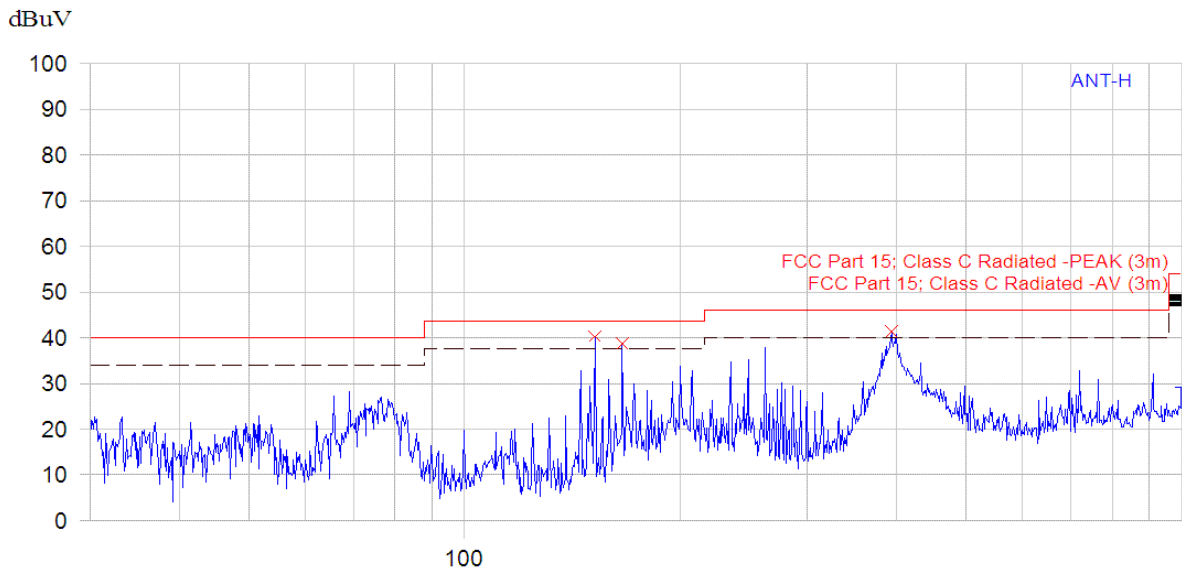
9/25/2010 6:00:54 PM

(Start = 30.00, Stop = 1000.00) MHz

	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	152.062	39.8			ANT	
2	165.887	39.4			ANT	

ANT-V

344.57, 17.12



9/25/2010 6:28:06 PM

(Start = 30.00, Stop = 1000.00) MHz

	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	152.112	40.2			ANT-H	
2	165.912	38.7			ANT-H	
3	394.032	41.3			ANT-H	

ANT-H

4.3 Labeling requirements– PART 15.311 & 15.19 (a)(3)

4.3.1 Standard Applicable:

The FCC Identifier shall be displayed on the label, and the device(s) shall bear the following statement in a conspicuous location on the device or in the user manual if the device is too small: Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label itself shall be of a permanent type, not a paper label, and shall last the lifetime of the equipment.

4.3.2 Result

See separate documents showing the label design and the placement of the label on the EUT.

4.4 Antenna requirement– PART 15.317 & 15.203

4.4.1 Standard Applicable:

the EUT have not detachable antenna. The tested equipment has only integral antennas. The conducted tests were performed on a sample with a temporary antenna connector.

4.5 Digital modulation techniques –PART 15.319(b)

4.5.1 Standard Applicable:

All transmissions must use only digital modulation techniques.

4.5.2 Result: Meets the requirement

Please see the declaration provided by applicant.

4.6 Power line conducted emissions –PART 15.315&15.207(a)

4.6.1 Standard applicable:

FCC 15.315

An unlicensed PCS device that is designed to be connected to the public utility (AC) power line must meet the limits specified in the Section 15.207

FCC 15.207(a)

According to FCC section 15.107, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- The limit subjects to the Class B digital device.
- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

4.6.2 Test Description

See section 3.2.1 of this report.

4.6.3 Test Result

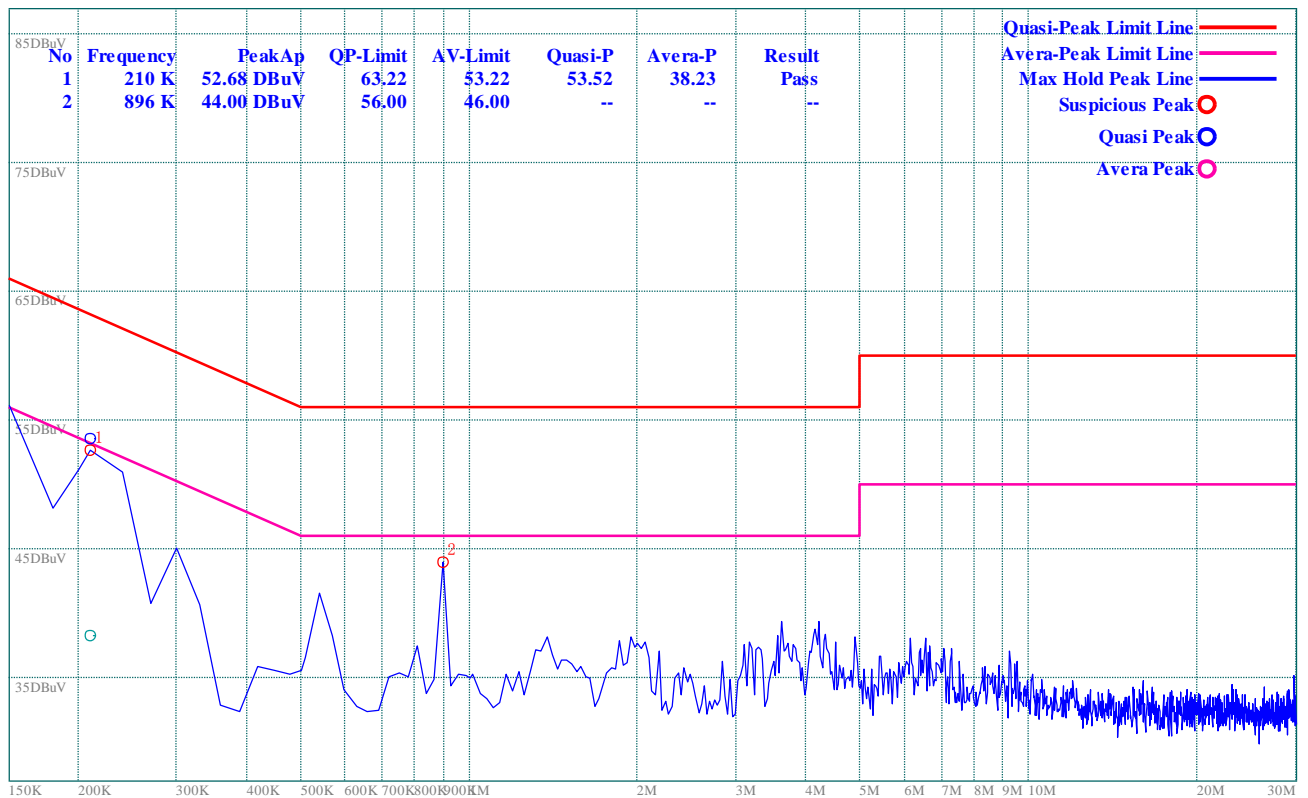
The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. All test modes are considered, refer to recorded points and plots below.

4.6.3.1 Test Mode

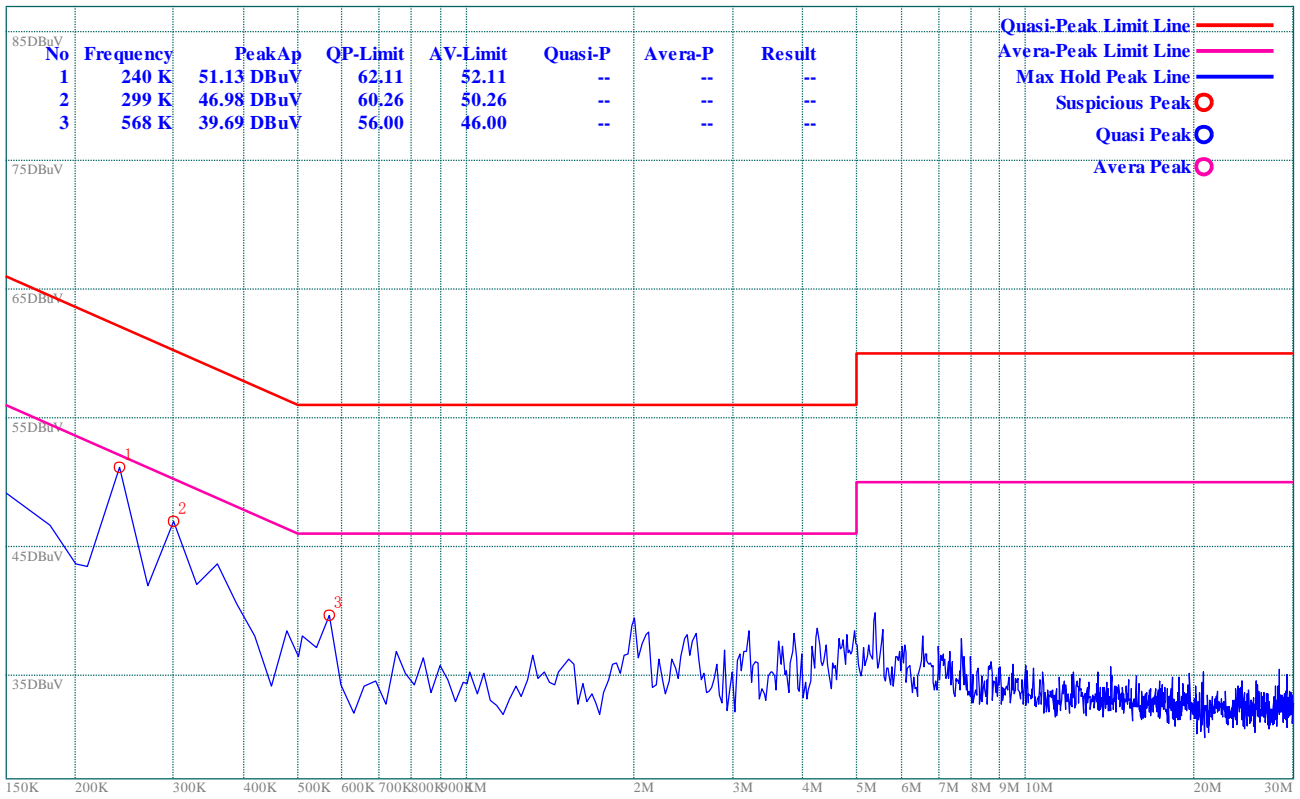
A. Test Verdict Recorded for Suspicious Points:

No.	@Frequency (MHz)	Measured Emission Level (dB μ V)				Limit (dB μ V)		Verdict
		PK	QP	AV	Phase	QP	AV	
1	0.210	52.68	53.52	38.23	L	63.22	53.22	PASS
2	0.896	44.00	--	--	L	56.0	46.0	PASS
3	0.240	51.13	--	--	N	62.11	52.11	PASS
4	0.299	46.98	--	--	N	60.26	50.26	PASS

B. Test Plot:



LISN-L

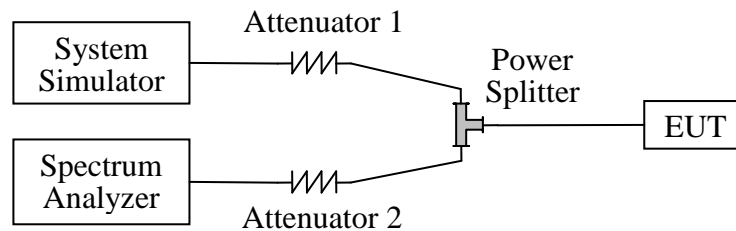


LISN-N

4.7 Transmitter emission bandwidth – PART 15.323 (a)

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below

Test Setup 1:



fx = 1921.536 MHz				
ΔP (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1920.9435	1922.1135	1.170	50kHz > Δf > 2.5M Hz

fx = 1924.992 MHz				
ΔP (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1924.3920	1925.577	1.185	50kHz > Δf > 2.5M Hz

fx = 1928.448 MHz				
ΔP (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1927.855	1929.033	1.178	50kHz > Δf > 2.5M Hz

Notes: 1 See emission bandwidth plots in Annex C.

2 Emission bandwidth rounded up.

4.8 Peak transmit power – PART 15.319 (c)

The peak transmit power is measured in accordance with ANSI C63.17 sub-clause 6.1.2 using test setup 1 (page 21).

The limit for Peak Transmit Power (PTP) is calculated using the following formula:

$$PTP = 5 \text{ Log}_{10} \text{ EBW} - 10 \text{ dBm}$$

This limit must be corrected to take into account any gain of the antenna greater than 3dBi.

Where: EBW is the transmitter emission bandwidth in Hz as determined in the previous test.

Limit	EBW = 1.185 MHz
	PTP = 5 Log ₁₀ 1.185MHz – 10 dBm
	PTP = 20.37dBm

Results

Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	20.06	20.37
1924.992	19.98	20.37
1928.448	20.01	20.37

Note: 1. Permanent antenna was replaced with temporary antenna connector to enable conducted measurement.

2. Antenna gain < 3dBi and so correction of the limit is not required.
3. See Annex D for Peak Transmit Power Plots.

4.9 Power spectral density– PART 15.319 (d)

The power spectral density is measured using test setup 1, (page 21).

4.9.1 Limit

The power spectral density shall not exceed 3mW in any 3 kHz bandwidth as measured with a spectrum analyser having a resolution bandwidth of 3 kHz.

4.9.2 Results

Frequency (MHz)	Power Spectral Density (mW/3kHz)	Limit (mW/3kHz)
1921.536	-2.560	3
1924.992	-0.299	3
1928.448	-1.708	3

Note: 1. See Annex E for Power Spectral Density Plots.



4.10 Antenna gain – PART 15.319 (e)

Any directional gain of the antenna exceeding 3dBi has an effect on the limit applied to the measurements taken for the peak transmit power test. If the directional gain of the antenna is less than 3dBi it is not required to be taken into account.

Maximum Antenna Gain	Exceeds 3dBi by
+2.04dBi	N/A

Note: Statement by manufacturer declaring maximum antenna gain. See attached exhibit

4.11 Automatic discontinuation of transmission– PART 15.319 (f)

4.11.1 Standard applicable:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals

4.11.2 Procedure

Please see the declaration provided by applicant.

4.11.3 Results:

Meets the requirement

4.12 Radio frequency radiation exposure – PART 15.319 (i)

This information is contained in a separate document (是关于 SAR 的测试)

4.13 Monitoring thresholds– PART 15.323 (c)(2)

4.13.1 Standard applicable:

The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth of the device.

4.13.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 7.3.1

4.13.3 Result: Not apply

Note: For EUT which support LIC there is no need to measure lower threshold because it is automatically met by LIC Procedure.

4.14 Monitoring threshold relaxation– PART 15.323 (c)(9)

4.14.1 Standard applicable:

Devices that have a power output lower than the maximum permitted under the rules can increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

4.14.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 4

4.14.3 Results:

Complies

Measurement Data:

This requirement is covered by results of Least Interfered Channel (LIC) test according to FCC 15.323(c) (5)

4.15 Monitoring time– PART 15.323 (c)(1)**4.15.1 Standard applicable:**

Immediately prior to initiating transmission, devices must monitor the combined time and spectrum window in which they intend to transmit. For a period of at least 10 milliseconds for systems designed to use a 10 millisecond or shorter frame period or at least 20 milliseconds for systems designed to use a 20 millisecond frame period.

4.15.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 7.3.4

4.15.3 Results: Complies

EUT monitors the combined time and spectrum window prior to initiation of transmission.

Measurement Data:

This requirement is covered by results of Least Interfered Channel (LIC) test according to FCC 15.323(c) (5)

4.16 Duration of transmission– PART 15.323 (c)(3)**4.16.1 Standard applicable:**

Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

4.16.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 8.2.2

4.16.3 Test Results: Complies

Result

Repetition of Access Criteria	Maximum Transmission Time	Maximum Transmission Time Limit	Pass/Fail
Period	10minutes	<8 Hours	Pass

Notes: 1. The portable part is the initiating device that repeats the access criteria.

4.17 Connection acknowledgement– PART 15.323 (c)(4)

4.17.1 Standard applicable:

The test was carried out in two parts. The first was to verify that with the companion device off the EUT does not transmit on the same time/spectrum window for more than the limit. The second was to verify that after a connection is broken the EUT terminates its transmission on the current communication channel within 30 seconds or less.

4.17.2 Measurement procedure

The connection acknowledgement test was carried out in accordance with ANSI C63.17 sub-clause 8.2.1

4.17.3 Result

Test	Time Taken (seconds)	Limit (seconds)	Pass/Fail
Transmission on communications channel no acknowledgement received (note 1)	0.45	1	

Established communication channel termination, acknowledgements blocked during communication (note 1)	6.31	30	
---	------	----	--

Note: 1. The companion device transmits a beacon signal when acknowledgements are blocked.
2. The EUT does not transmit a control channel.

4.18 Upper threshold selected channel, power accuracy, segment occupancy – PART 15.323 (c)(5)

4.18.1 Standard applicable:

Least interfered Channel

The EUT was frequency administered to operating on two frequencies only, f1 and f2.

f1 = 1924.992 MHz

f2 = 1926.720 MHz

Test b)

Interference on f1 was set at TL + UM + 7dB and at TL + UM on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

Test c)

Interference on f1 was set at TL + UM and at TL + UM + 7dB on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

Test d)

Interference on f1 was set at TL + UM + 1dB and at TL + UM - 6dB on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

Test e)

Interference on f1 was set at TL + UM - 6dB and at TL + UM + 7dB on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

4.18.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 7.3.2, 7.3.3, 7.3.4

4.18.3 Results:

Complies

Result

Test	Transmit on f1	Transmit on f2	Wanted Transmit Channel	Pass/Fail
b	No	Yes	f2	Pass
c	Yes	No	f1	Pass
d	No	Yes	f2	Pass
e	Yes	No	f1	Pass

Note: 1. All tests were repeated 5 times.

4.19 Random waiting – PART 15.323 (c)(6)

4.19.1 Standard applicable:

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same window after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

4.19.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 8.1.3

4.19.3 Results:

The manufacturer declares that this provision is not utilized by the EUT.

4.20 Monitoring bandwidth– PART 15.323 (c)(7)

The monitoring bandwidth test was carried out in accordance with ANSI C63.17 sub-clause 7.4. ANSI C63.17 sub-clause 7.4 states that if the monitoring is made through the radio receiver used by the EUT for communication the intended bandwidth requirements for the monitoring system are met. As declared by the manufacturer the EUT uses the radio receiver used for communication for monitoring therefore the intended bandwidth requirements for the monitoring system are met of ANSI C63.17 sub-clause 7.4 are met.

4.21 Monitoring antenna – PART 15.323 (c)(8)

The antenna of the EUT used for transmitting is the same antenna that is used for monitoring.

4.22 Duplex connections– PART 15.323 (c)(10)

4.22.1 Standard applicable:

An initiating device may attempt to establish a duplex connection by monitoring both its intended transmits and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

4.22.2 Measurement procedure

Measurement method according to ANSI C63.17, clause 8.3

This test is required for equipment that uses the access criteria in FCC 15.323(c)(10).

4.22.3 Test Results:

The manufacturer declares that this provision is not utilized by the EUT.

4.23 Alternative monitoring interval for co-located devices – PART 15.323

(c)(11)

4.23.1 Standard applicable:

An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating device. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

4.23.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 8.4

4.23.3 Results:

The manufacturer declares that this provision is not utilized by the EUT.

4.24 Fair access to spectrum related to (c)(10) & (c)(11) – PART 15.323 (c)(12)

4.24.1 Standard applicable:

The provisions of (c) (10) or (c) (11) shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum for other devices.

4.24.2 Results:

The manufacturer declares that EUT does not work in a mode which denies fair access to spectrum for other devices.

4.25 Emissions inside and outside the sub-band –conducted- PART 15.323 (d)

4.25.1 RF carrier set to the lowest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.

Out-of-Band Emissions from UPCS bandedge	FREQ (MHz)	EMISSION LEVEL (dBm)	LIMIT (dBm)
> - 2.5MHz	641.1	-44.97	-39.5
- 1.25 MHz – 2.5 MHz		Note 10	-29.5
- 1.25 MHz		Note 10	-9.5
+ 1.25 MHz		Note 10	-9.5
+ 1.25 MHz – 2.5 MHz		Note 10	-29.5
> + 2.5MHz	3845	-51.46	-39.5
	5762.5	-46.50	-39.5
Limits	Out-of-Band Emissions from UPCS bandedge	Attenuation (dB) required below reference power of 112mW	
	± 1.25MHz	30	
	±1.25 MHz – 2.5 MHz	50	
	> ±2.5MHz	60	
	In band Emissions from centre of emission bandwidth	Attenuation (dB) required below permitted peak power for the EUT	
	1B – 2B	30	
	2B – 3B	50	
	3B – UPCS band edge	60	

Notes: 1 EUT fitted with temporary antenna connector.

2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a.

3 New / Fully Charged batteries used for battery powered products.

4 See Annex F for out of band emissions compliance plots.

5 See Annex G for in band emissions compliance plots.

- 6 As per 15.323(g) attenuation to the requirements of 15.209 is not required.
- 7 Resolution bandwidth approximately 1% of emissions bandwidth.
- 8 Video bandwidth 3 x Resolution bandwidth.
- 9 Receiver detector = Peak detector, Max Hold Enabled.
- 10 Only emissions within 20 dB of the limit are recorded.

Test Method: 1 The EUT was connected to a spectrum analyser via suitable attenuation or filter.
 2 The Spectrum analyser was tuned across the required frequency range in steps.
 3 Any emissions found were measured with the required analyser settings.

4.25.2 RF carrier set to the highest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.

Out-of-Band Emissions from UPCS bandedge	FREQ (MHz)	EMISSION LEVEL (dBm)	LIMIT (dBm)
> - 2.5MHz	643.5	-46.58	-39.5
	1285.2	-46.87	
- 1.25 MHz – 2.5 MHz		Note 10	-29.5
- 1.25 MHz		Note 10	-9.5
+ 1.25 MHz		Note 10	-9.5
+ 1.25 MHz – 2.5 MHz		Note 10	-29.5
> + 2.5MHz	5787.5	-46.08	-39.5
Limits	Out-of-Band Emissions from UPCS bandedge	Attenuation (dB) required below reference power of 112mW	
	± 1.25MHz	30	
	±1.25 MHz – 2.5 MHz	50	
	> ±2.5MHz	60	
	In band Emissions from centre of emission bandwidth	Attenuation (dB) required below permitted peak power for the EUT	
	1B – 2B	30	
	2B – 3B	50	

	3B – UPCS band edge	60
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Notes: 1 EUT fitted with temporary antenna connector.

2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a.

3 New / Fully Charged batteries used for battery powered products.

4 See Annex F for out of band emissions compliance plots.

5 See Annex G for in band emissions compliance plots.

6 As per 15.323(g) attenuation to the requirements of 15.209 is not required.

7 Resolution bandwidth approximately 1% of emissions bandwidth.

8 Video bandwidth 3 x Resolution bandwidth.

9 Receiver detector = Peak detector, Max Hold Enabled.

10 Only emissions within 20 dB of the limit are recorded.

Test Method: 1 The EUT was connected to a spectrum analyser via suitable attenuation or filter.

2 The Spectrum analyser was tuned across the required frequency range in steps.

3 Any emissions found were measured with the required analyser settings.

4.25.3 EMISSIONS OUTSIDE THE SUB-BAND – RADIATED – PART 15.109 & PART 15.209

RF carrier set to the lowest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6

	FREQ (MHz)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
1.705MHz - 30MHz		Note 9	30
30MHz - 88MHz		Note 9	100
88MHz - 216MHz	152.062 165.887	Note 9	150
216MHz - 960MHz		Note 9	200
960MHz - 1GHz		Note 9	500
1GHz - 20GHz	1607.28 1855.54 1905.23 1930.87	Note 9	500
Limits	1.705MHz to 30MHz		30µV/m @ 30m

	30MHz to 88MHz	100 μ V/m @ 3m
	88MHz to 216MHz	150 μ V/m @ 3m
	216MHz to 960MHz	200 μ V/m @ 3m
	960MHz to 1GHz	500 μ V/m @ 3m
	1GHz to 20GHz	500 μ V/m @ 3m

Notes: 1 Results quoted are extrapolated as indicated.

2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a.

3 Emission due to digital circuitry not directly associated with the radio transmitter.

4 Measurements >1GHz @ 3m as per Part 15.31f(1).

5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.

6 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.

7 New / Fully Charged batteries used for battery powered products.

8 See Annex H for scan plot 30MHz – 1GHz.

9 No significant emissions within 20 dB of the limit due to digital circuitry.

Test Method: 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.

2 Measuring distances as Notes 1 to 4 above.

3 EUT 0.8 metre above ground plane.

4 Emissions maximised by rotation of EUT, on an automatic turntable.

Raising and lowering the receiver antenna between 1m & 4m.

Horizontal and vertical polarisations, of the receive antenna.

EUT orientation in three orthogonal planes.

Maximum results recorded.

The test equipment used for the Spurious Emissions – Radiated – Part 15.109 tests is shown overleaf:

4.25.4 EMISSIONS OUTSIDE THE SUB-BAND – RADIATED – PART 15.109 & PART 15.209

RF carrier set to the highest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6

	FREQ (MHz)	FIELD STRENGTH (μ V/m)	LIMIT (μ V/m)
1.705MHz - 30MHz		Note 9	30

30MHz - 88MHz		Note 9	100
88MHz - 216MHz	152.112 165.912	Note 9	150
216MHz - 960MHz	394.032	Note 9	200
960MHz - 1GHz		Note 9	500
1GHz - 20GHz	1245.88 1926.32 24498.2	Note 9	500
Limits	1.705MHz to 30MHz	30 μ V/m @ 30m	
	30MHz to 88MHz	100 μ V/m @ 3m	
	88MHz to 216MHz	150 μ V/m @ 3m	
	216MHz to 960MHz	200 μ V/m @ 3m	
	960MHz to 1GHz	500 μ V/m @ 3m	
	1GHz to 20GHz	500 μ V/m @ 3m	

Notes: 1 Results quoted are extrapolated as indicated.

2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a.

3 Emission due to digital circuitry not directly associated with the radio transmitter.

4 Measurements >1GHz @ 3m as per Part 15.31f(1).

5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.

6 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.

7 New / Fully Charged batteries used for battery powered products.

8 See Annex H for scan plot 30MHz – 1GHz.

9 No significant emissions within 20 dB of the limit due to digital circuitry.

Test Method: 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.

2 Measuring distances as Notes 1 to 4 above.

3 EUT 0.8 metre above ground plane.

4 Emissions maximised by rotation of EUT, on an automatic turntable.

Raising and lowering the receiver antenna between 1m & 4m.

Horizontal and vertical polarisations, of the receive antenna.

EUT orientation in three orthogonal planes.

Maximum results recorded.

The test equipment used for the Spurious Emissions – Radiated – Part 15.109 tests is shown overleaf:

4.26 Frame period and jitter-PART 15.323(e)

4.26.1 Standard Applicable:

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these subbands shall be 20 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per millions (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

4.26.2 Measurement Requirement:

1. Frame frequency stability ≤ 50 ppm
2. TDMA frame frequency stability ≤ 10 ppm (That translates to frequency drift of 19.2 kHz/slot for 1920 MHz carrier)
3. Frame jitter ≤ 25 μ s

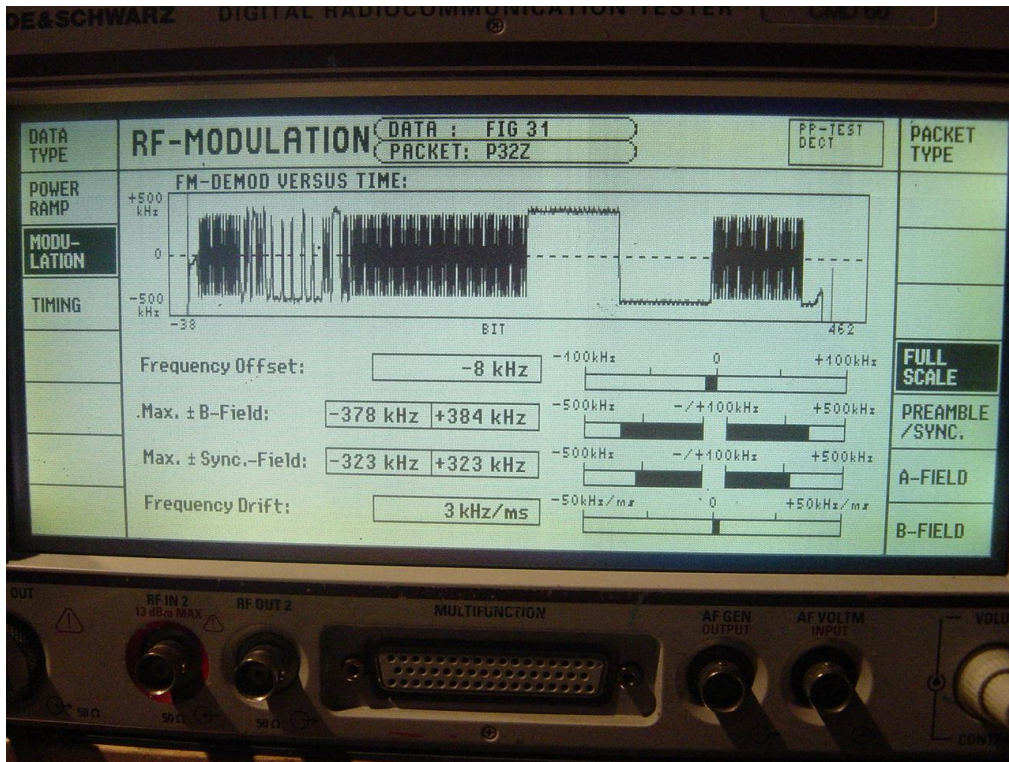
4.26.3 Test Results: Complies

Measurement Data:

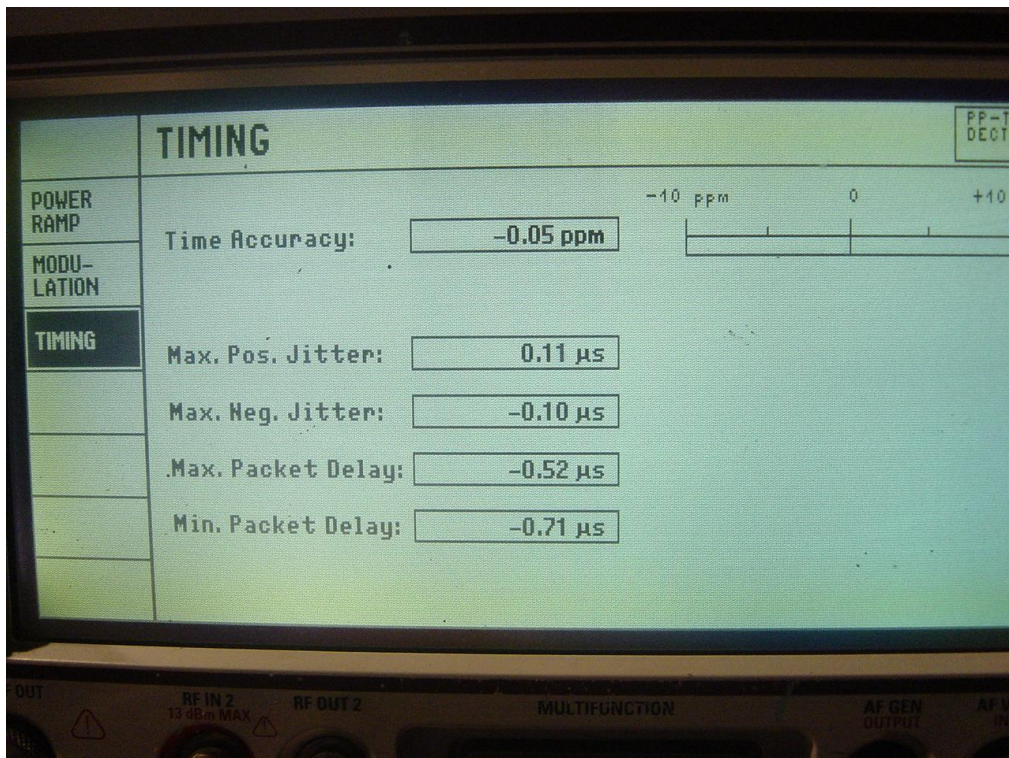
Channel No	Frequency (KHz/slot)		Jitter (us)	
	Drift	Limit	Result	Limit
FL	3	± 19.2	-0.10	± 25
FM	3	± 19.2	-0.10	± 25
FH	3	± 19.2	-0.10	± 25

Photos of worst-case display follow:

Frequency Drift



TDMA Frame Jitter



4.27 Carrier frequency stability-PART 15.323(f)

4.27.1 Standard Applicable:

The frequency stability of the carrier frequency of the intentional radiator shall be maintained within \pm 10 ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20°C . For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

4.27.2 Measurement Requirement:

- 1 Carrier frequency stability ≤ 10 ppm over 1 hour or interval between channel access monitoring, whichever is shorter (That translates to frequency drift of 19.2 kHz for 1920 MHz carrier)
- 2 Carrier frequency stability over -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and over 85% to 115% of rated supply voltage (voltage variation not required for battery operated device)

4.27.3 Test Results: Complies

Measurement Data:

a) Carrier Frequency Stability with Supply voltage

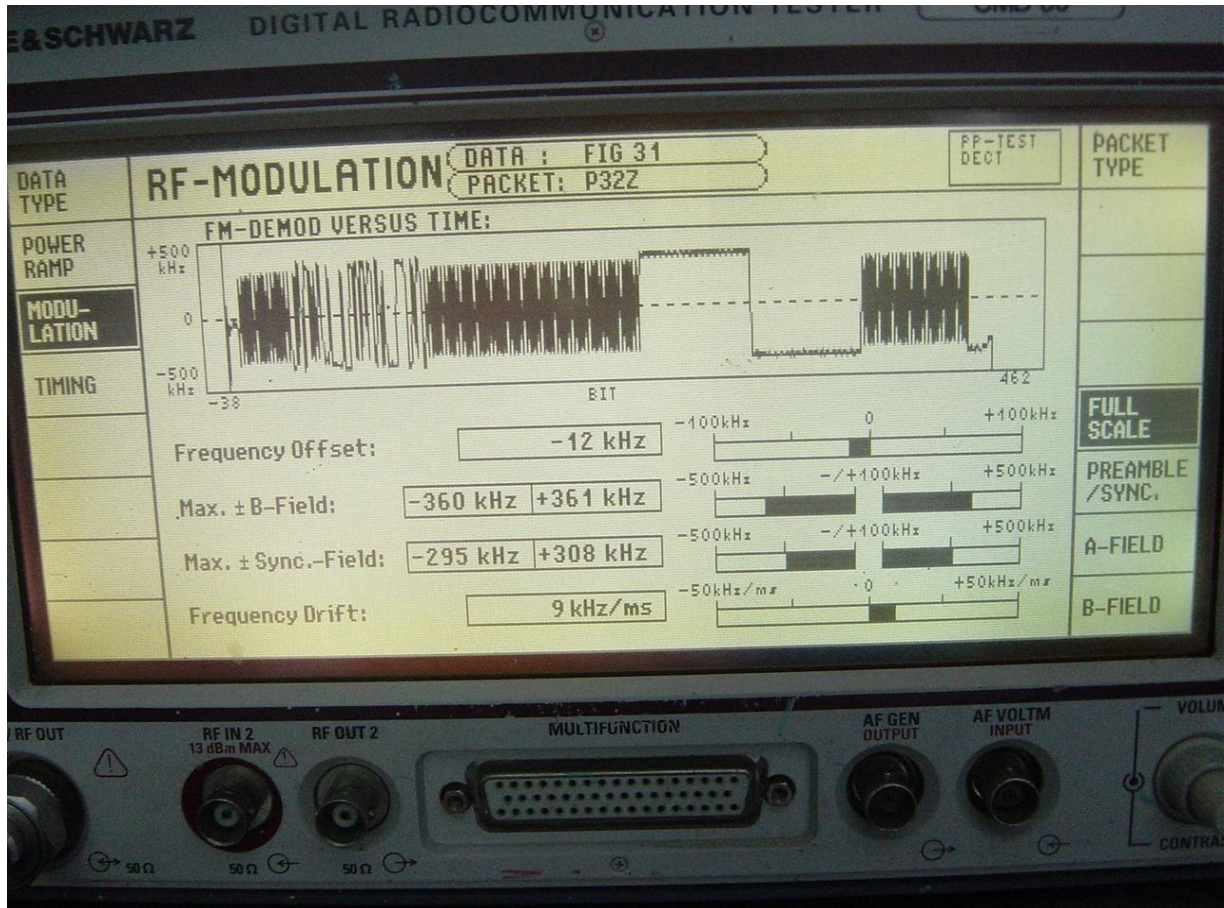
Channel No	Frequency Offset (kHz)			Limit (kHz)
	Voltage x 85%	Normal voltage	Voltage x 115%	
FL	5	4	3	± 19.2
FM	5	3	2	± 19.2
FH	5	2	2	± 19.2

b) Carrier Frequency Stability with Temperature and Time

Channel No	Frequency Offset (kHz)			Limit (kHz)
	-5°C	20°C	45°C	
FL	-11	-5	-5	± 19.2
FM	-12	-4	-5	± 19.2

FH	-11	-5	-5	±19.2
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Test was conducted for duration longer than 1 hour. Photo of worst-case display follows:



ANNEX A TEST PHOTOGRAPHS



ANNEX B APPEARANCE PHOTOGRAPHS

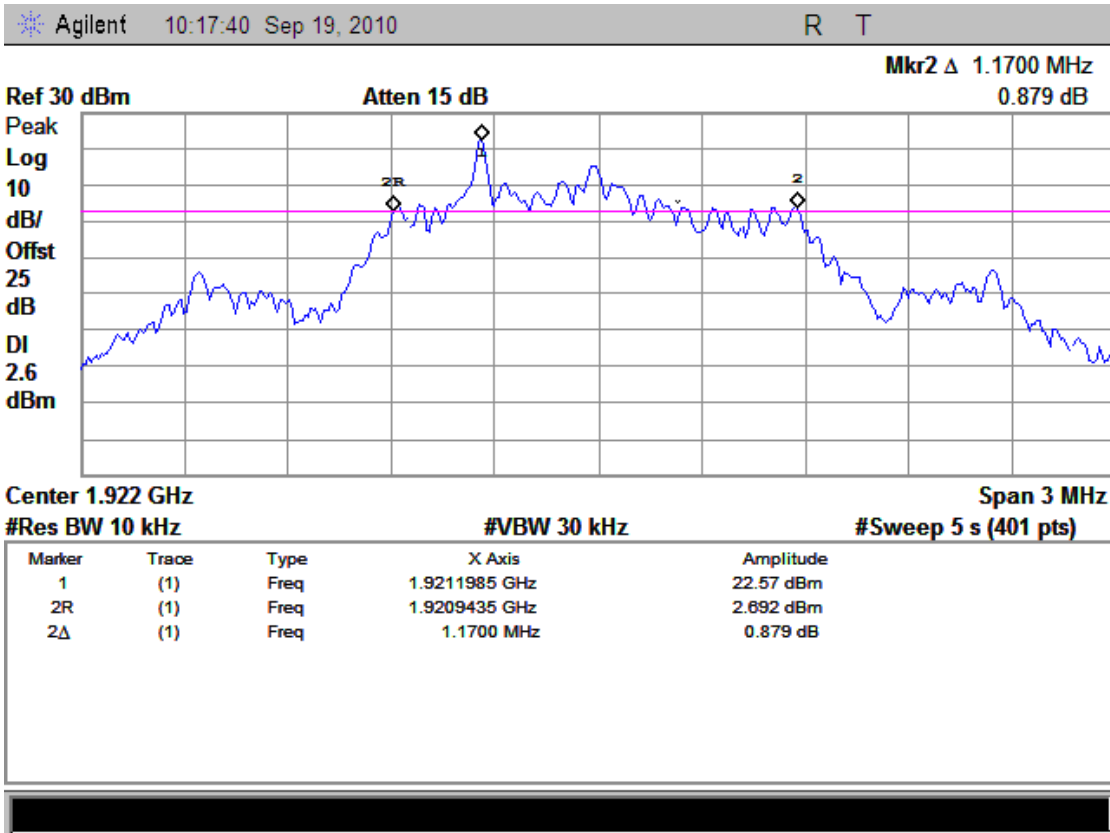


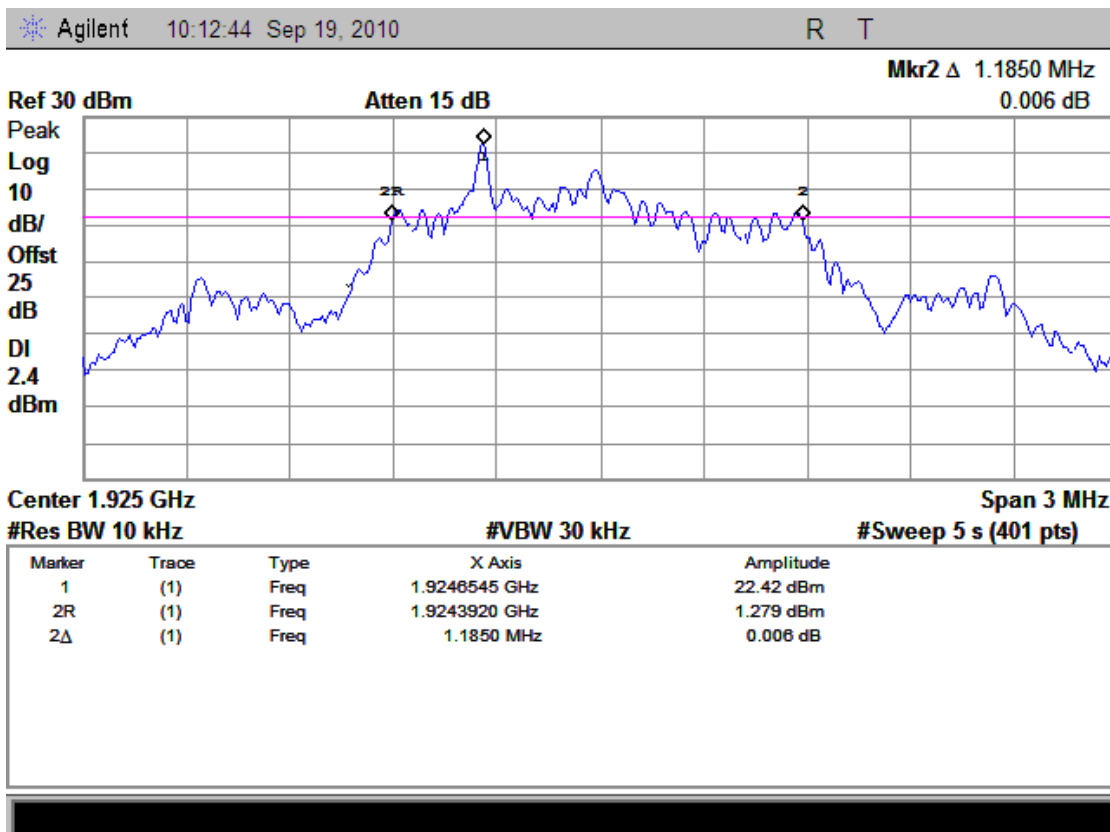
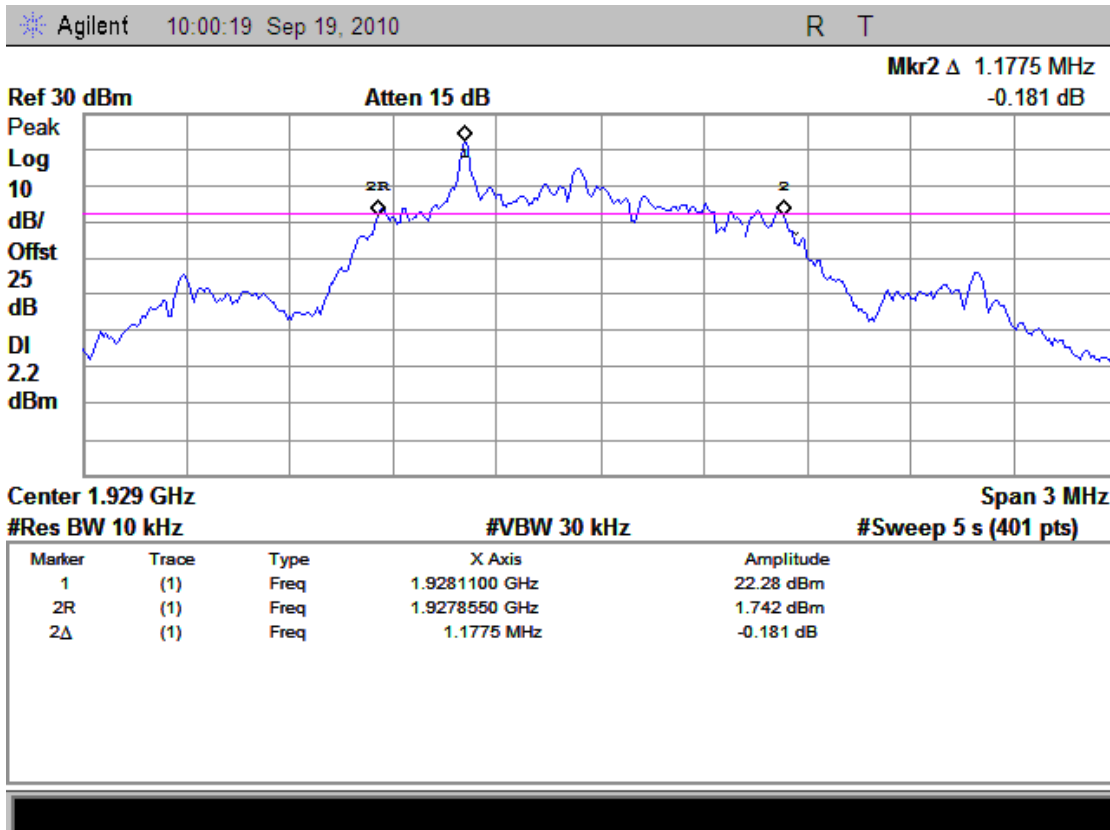




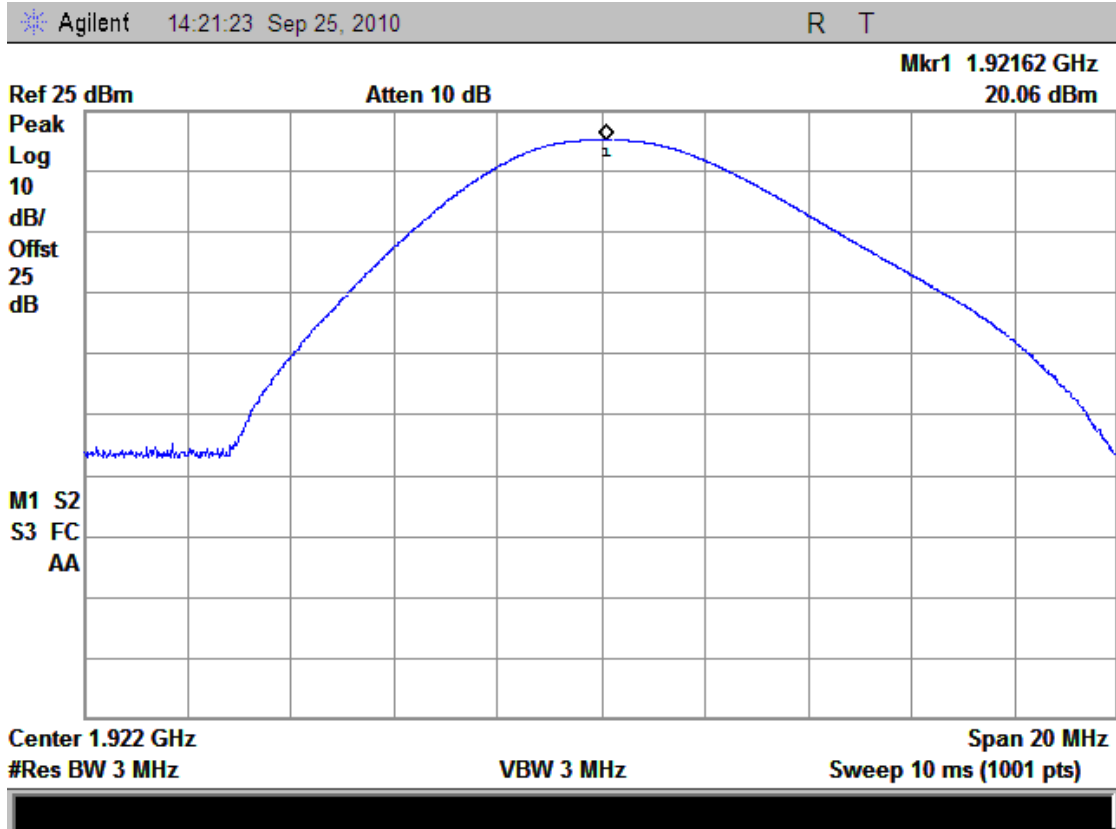


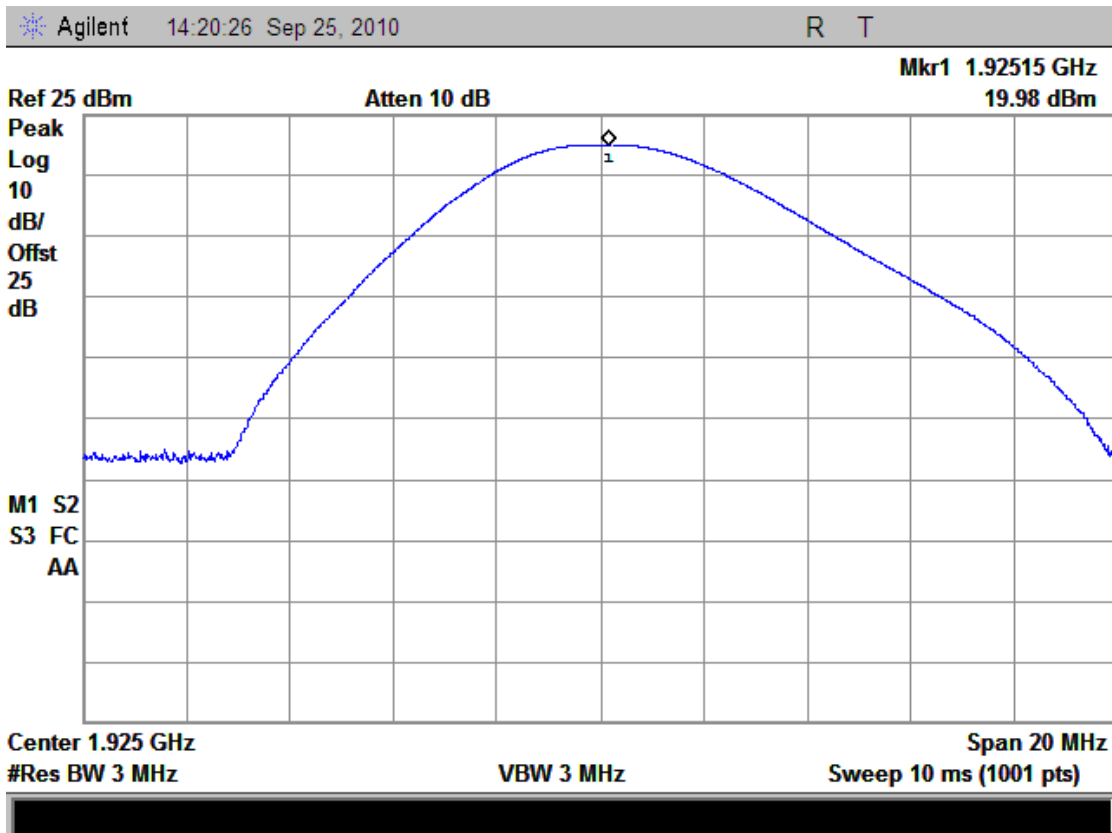
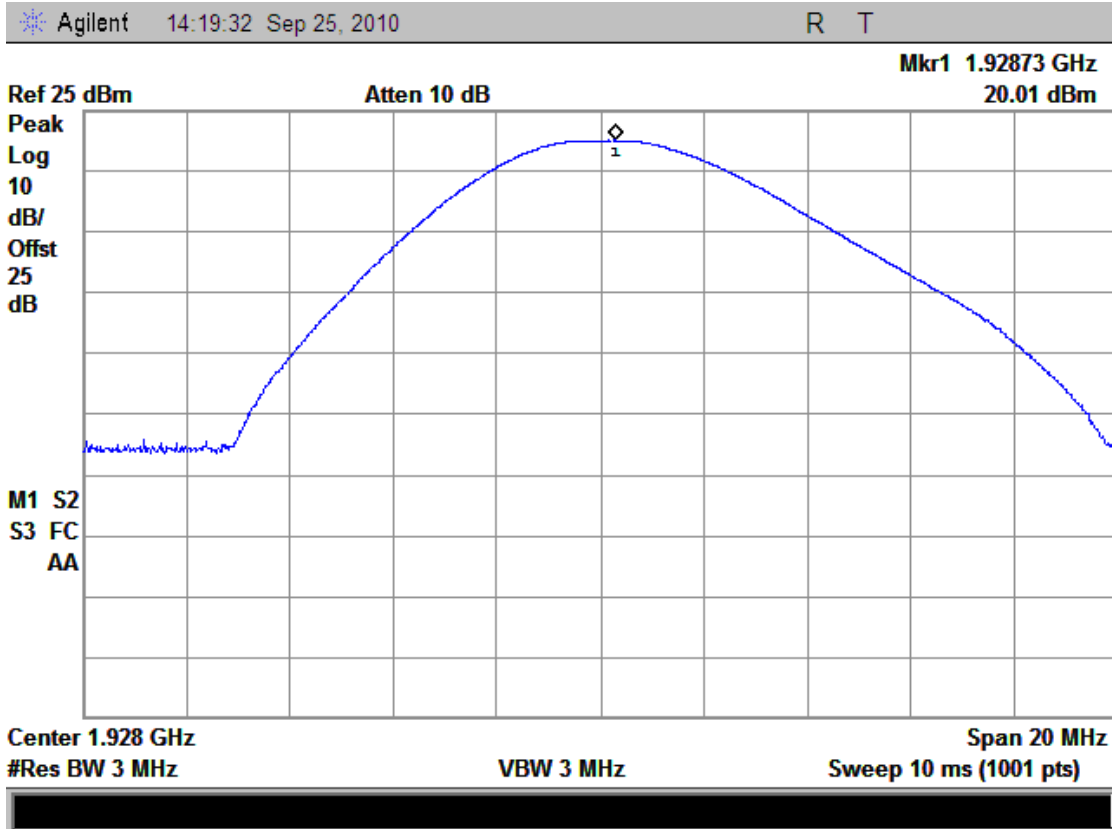
ANNEX C EMISSION BANDWIDTH



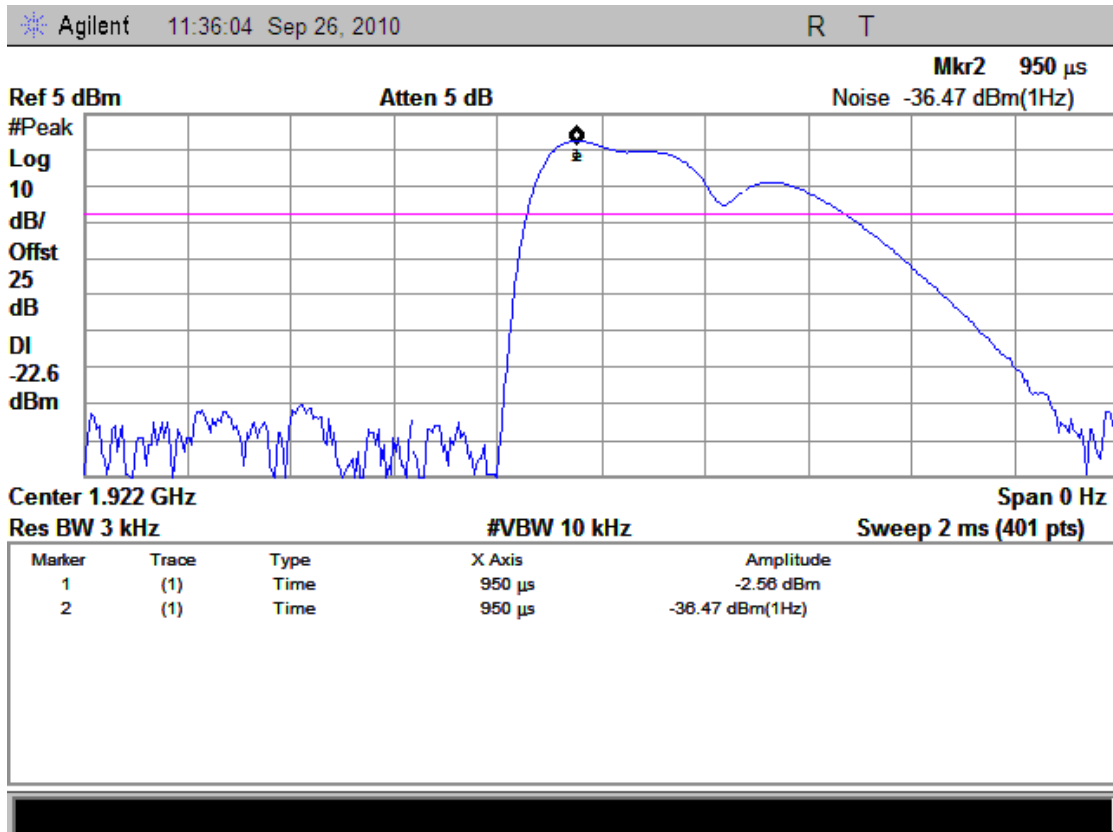


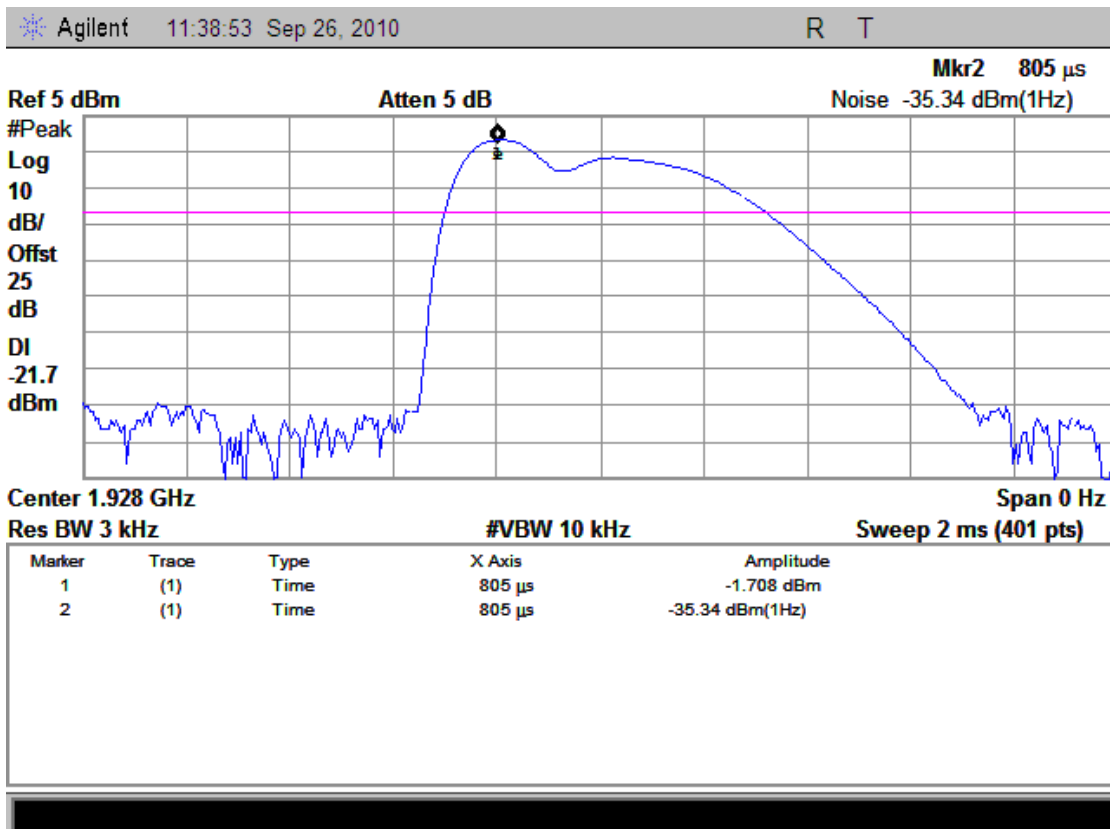
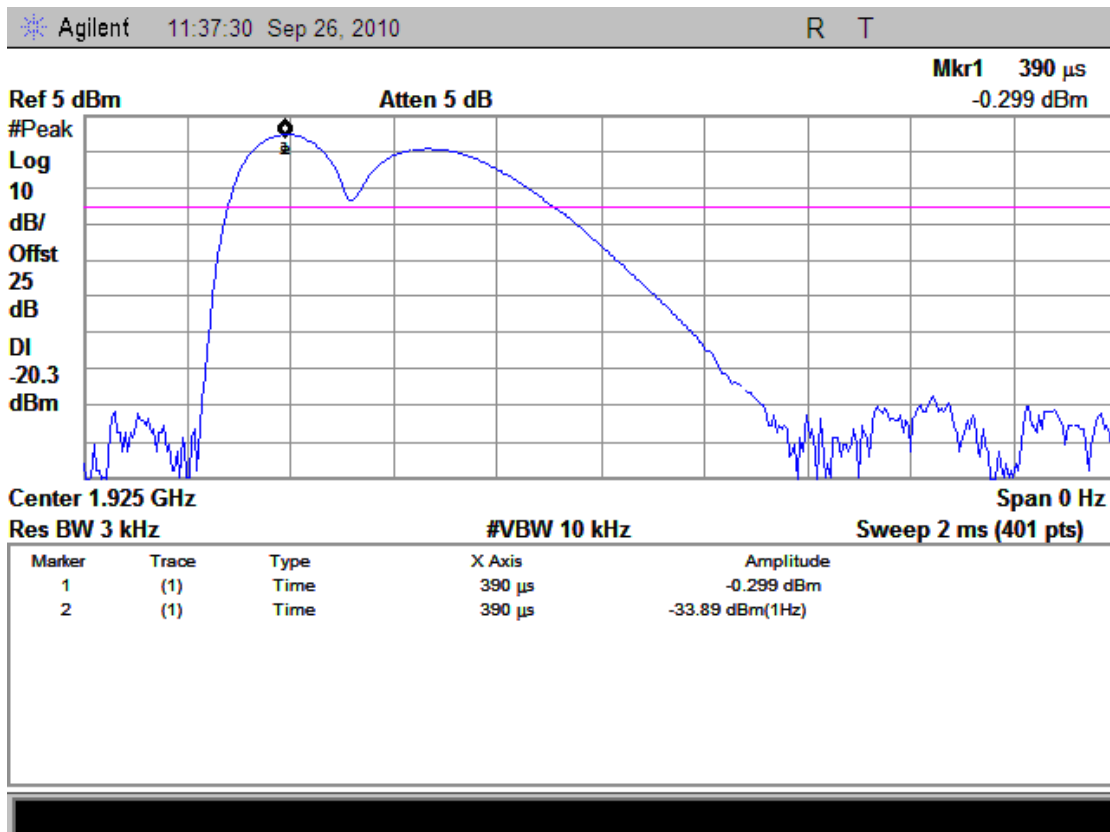
ANNEX D PEAK TRANSMIT POWER





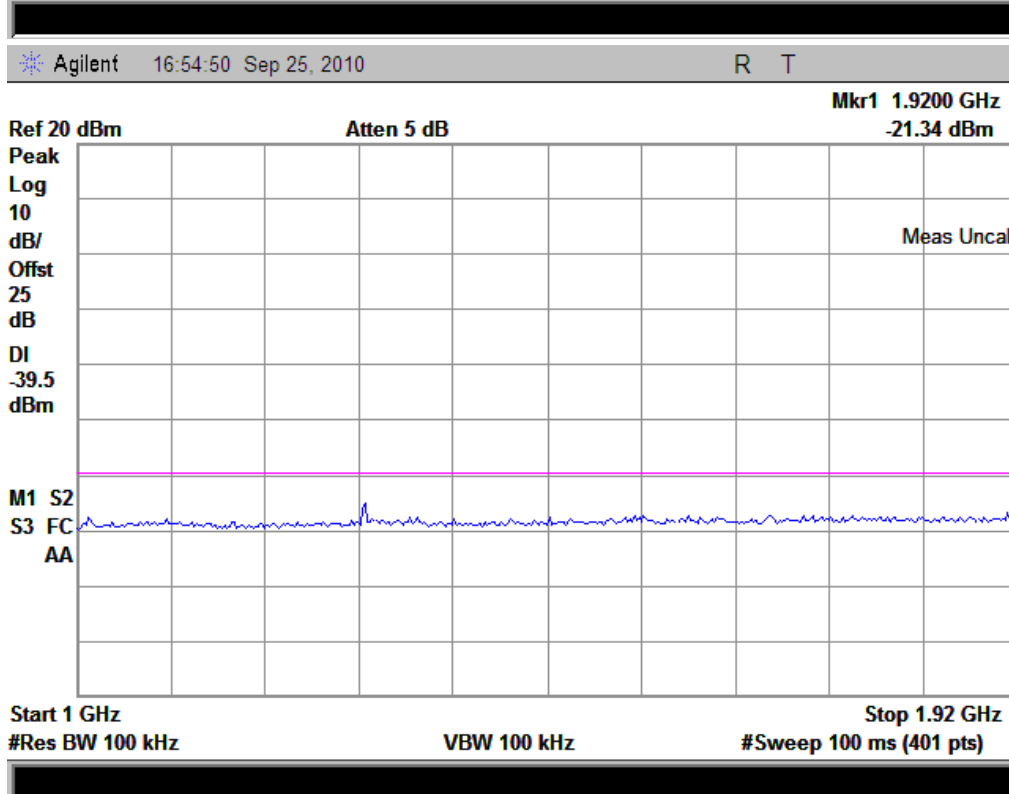
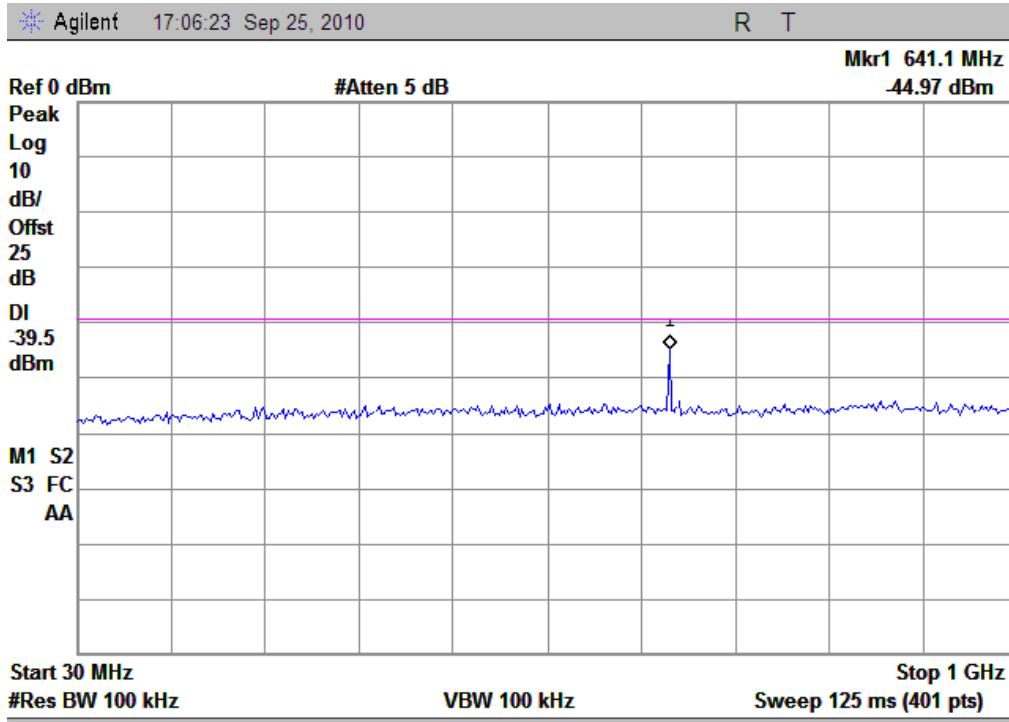
ANNEX E POWRE SPECTRAL DENSITY



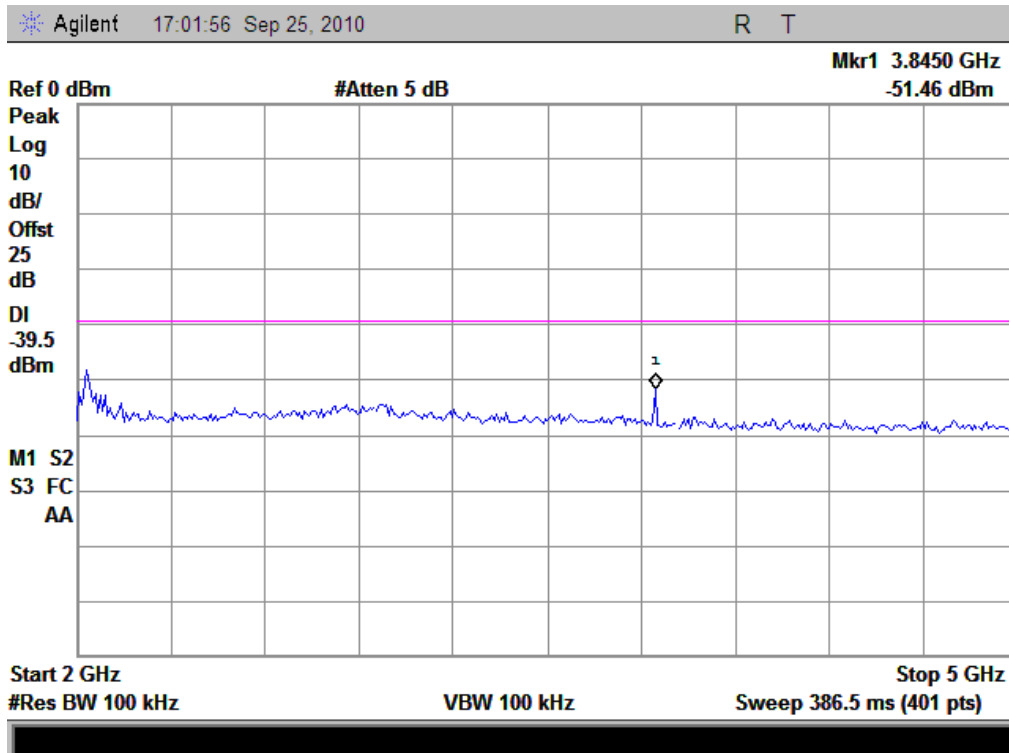
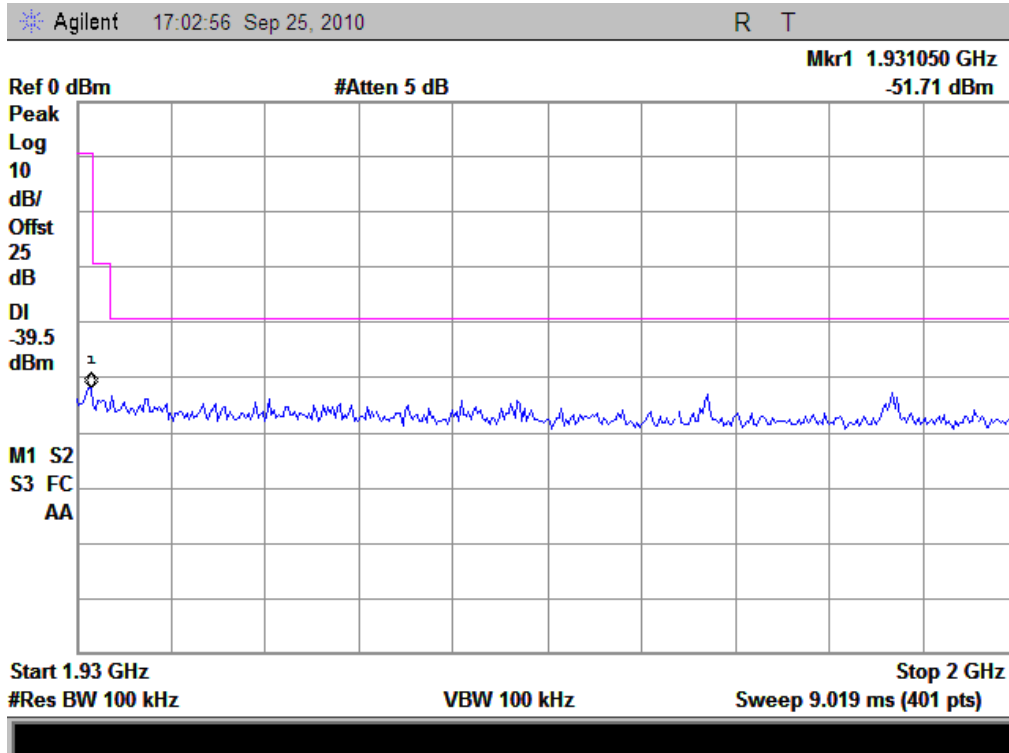


ANNEX F EMISSIONS OUTSIDE THE SUB-BAND

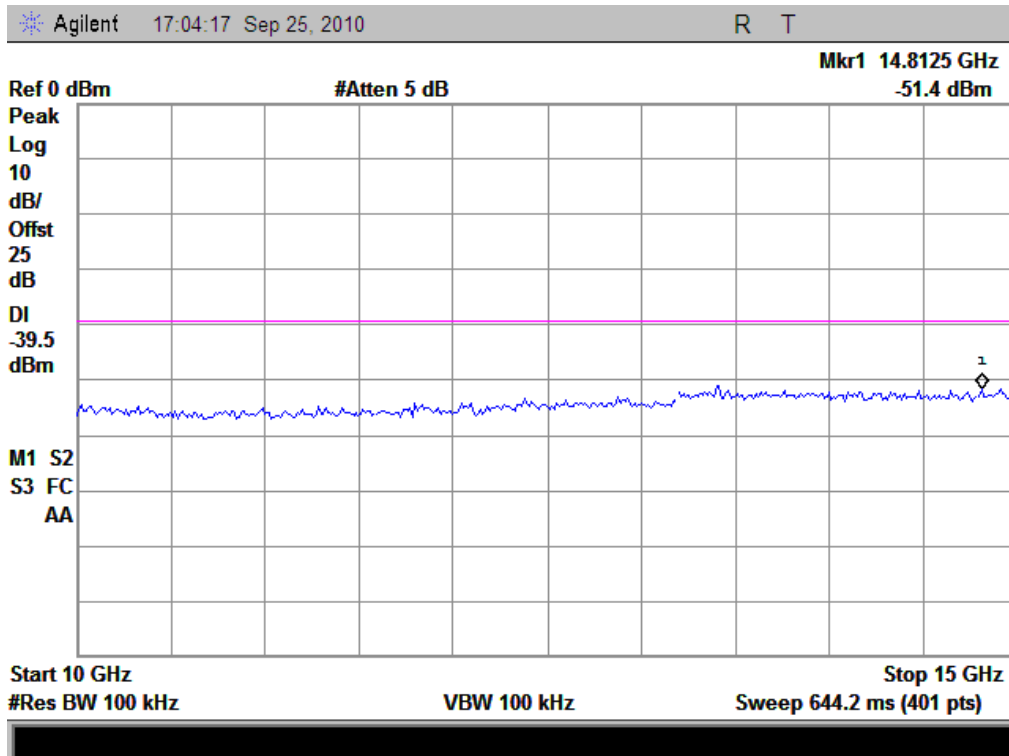
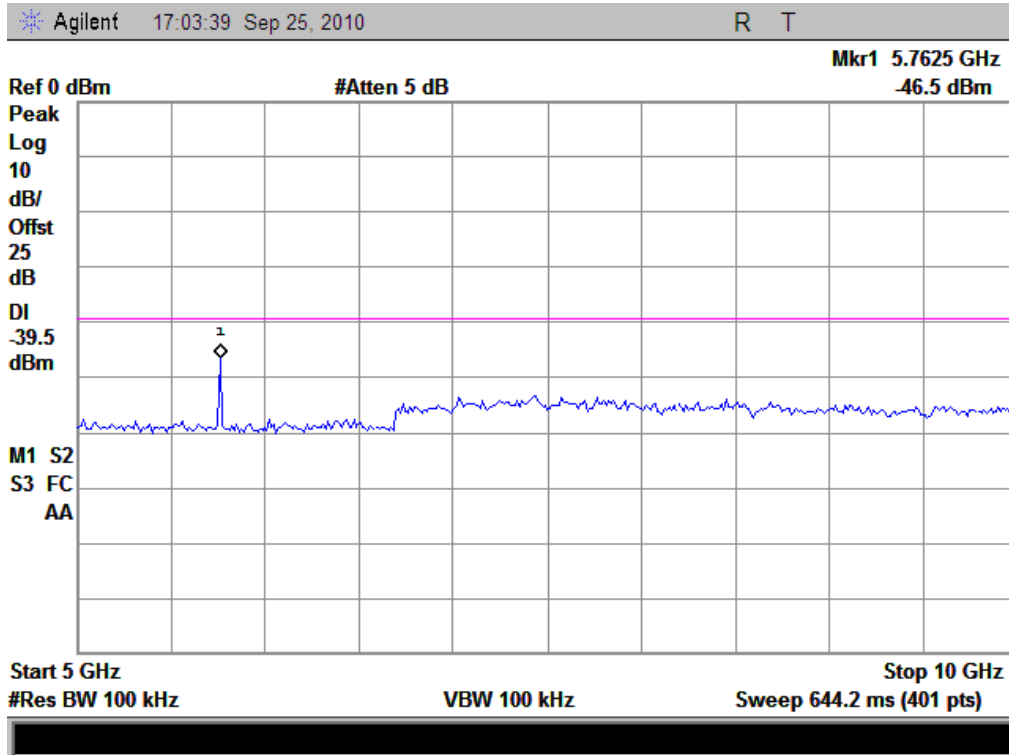
RF carrier set to the lowest carrier defined by the EUT



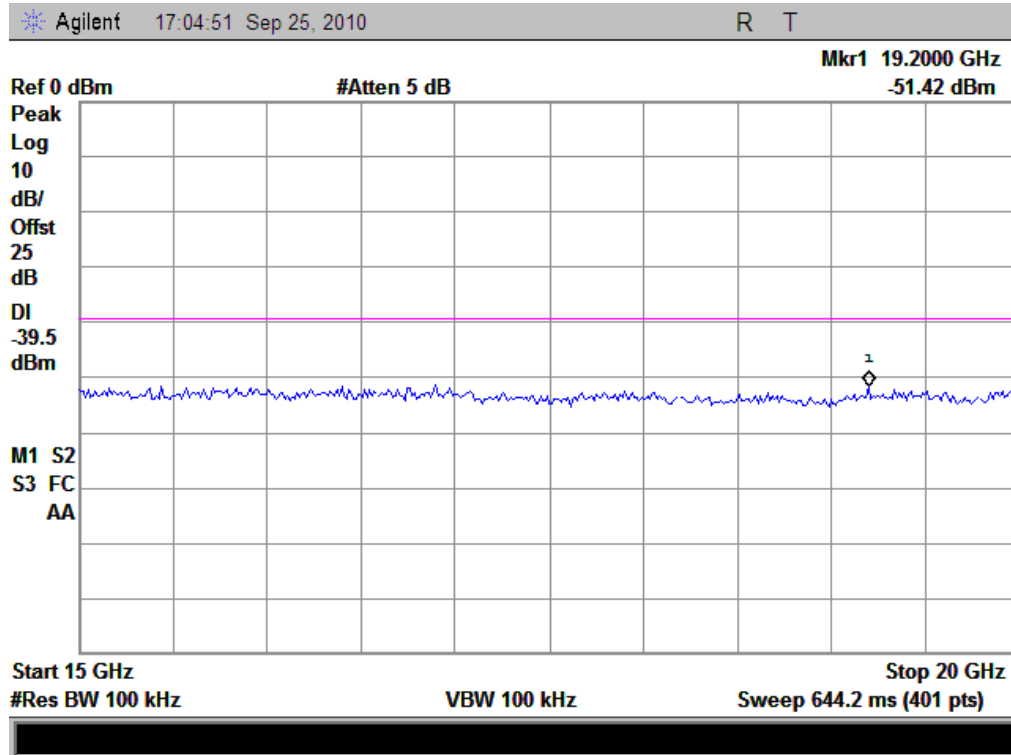
RF carrier set to the lowest carrier defined by the EUT



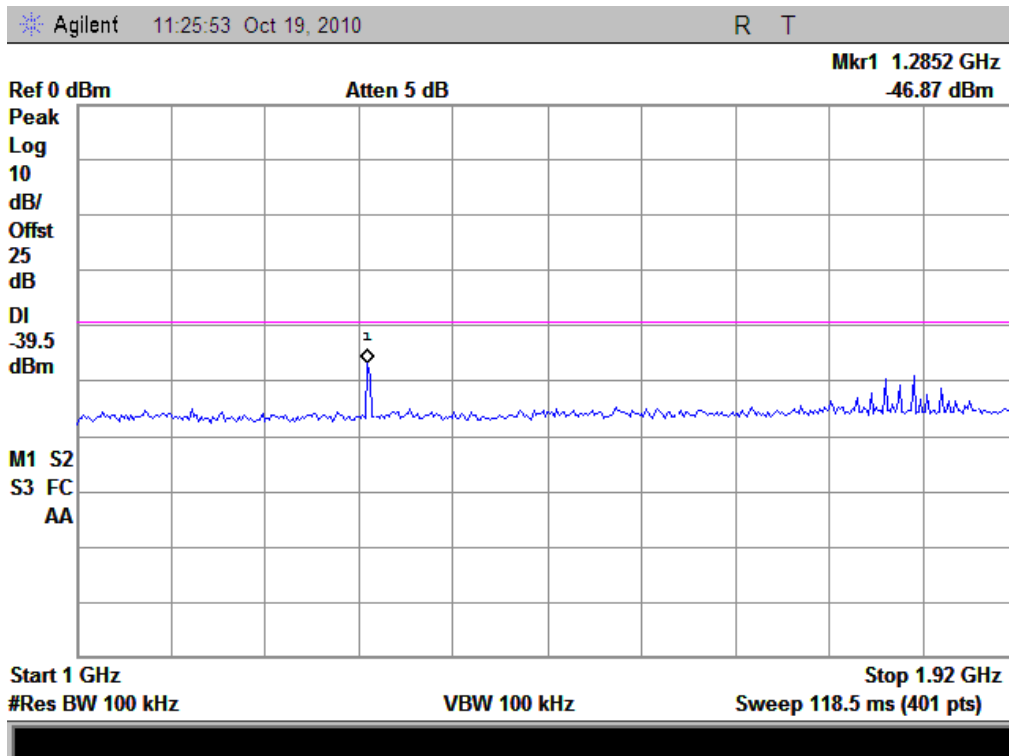
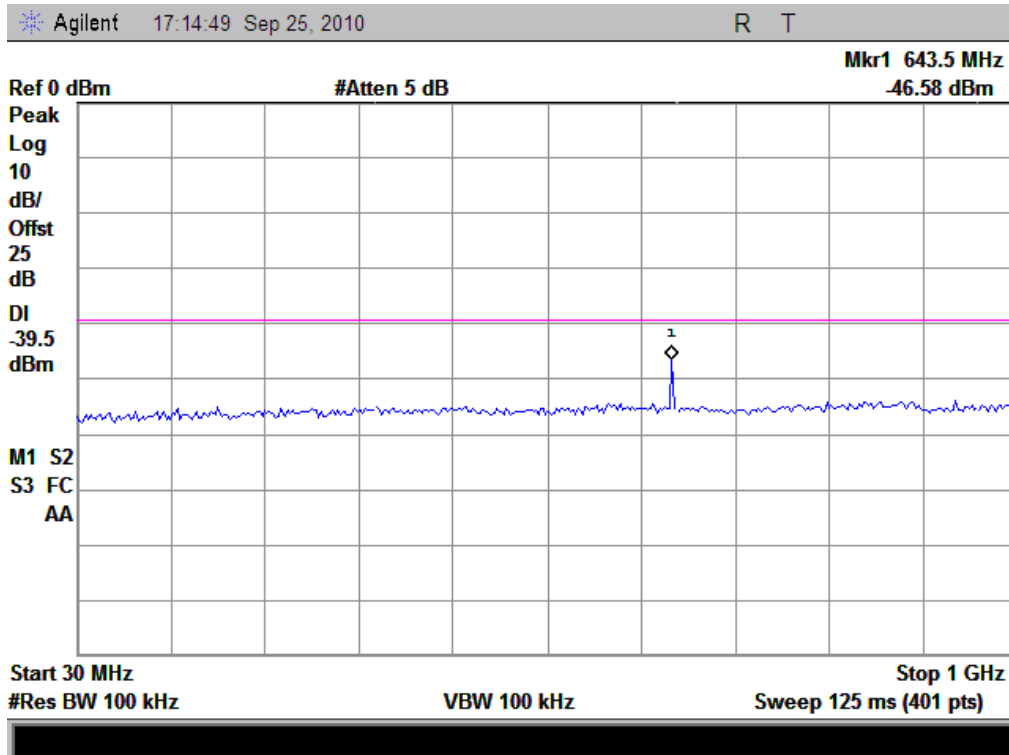
RF carrier set to the lowest carrier defined by the EUT



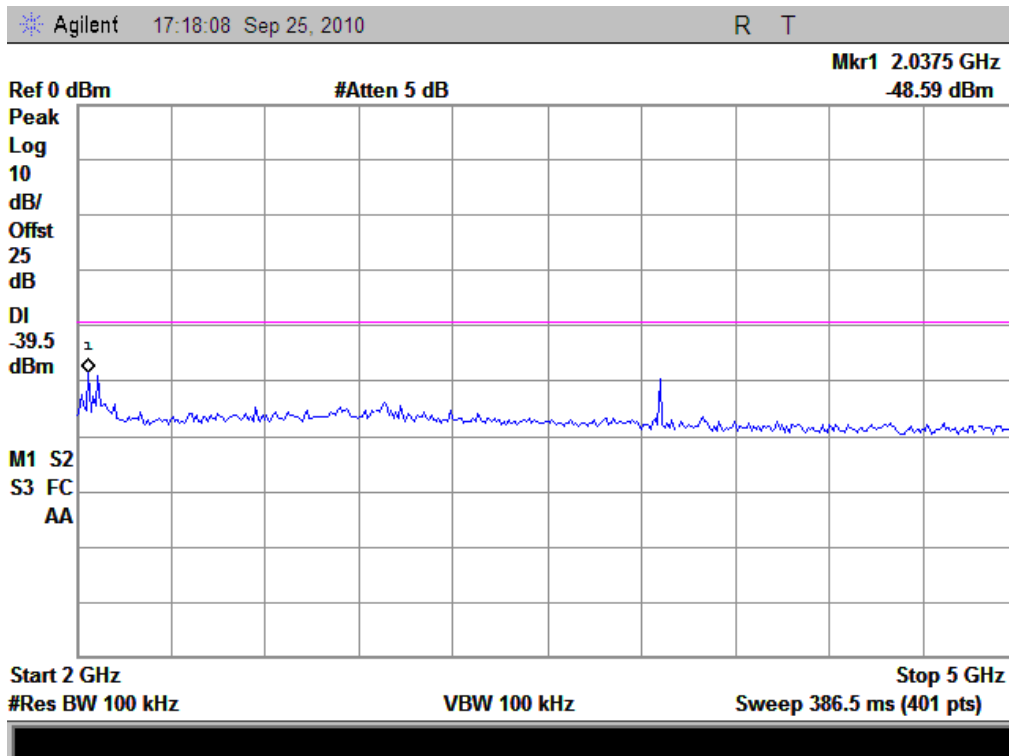
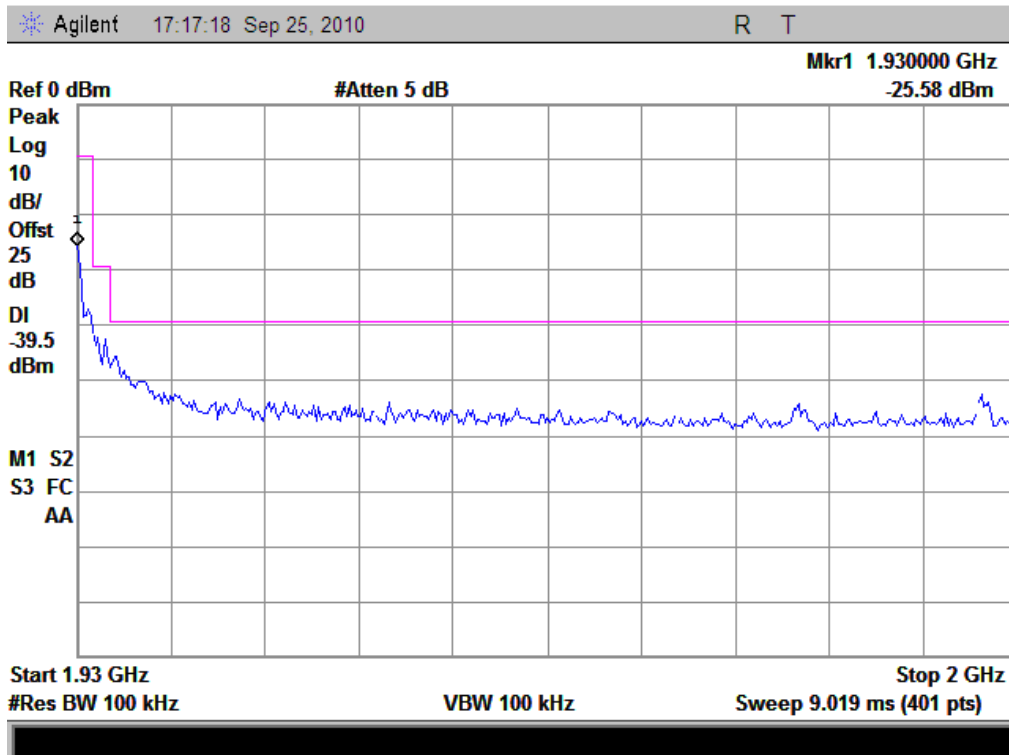
RF carrier set to the lowest carrier defined by the EUT



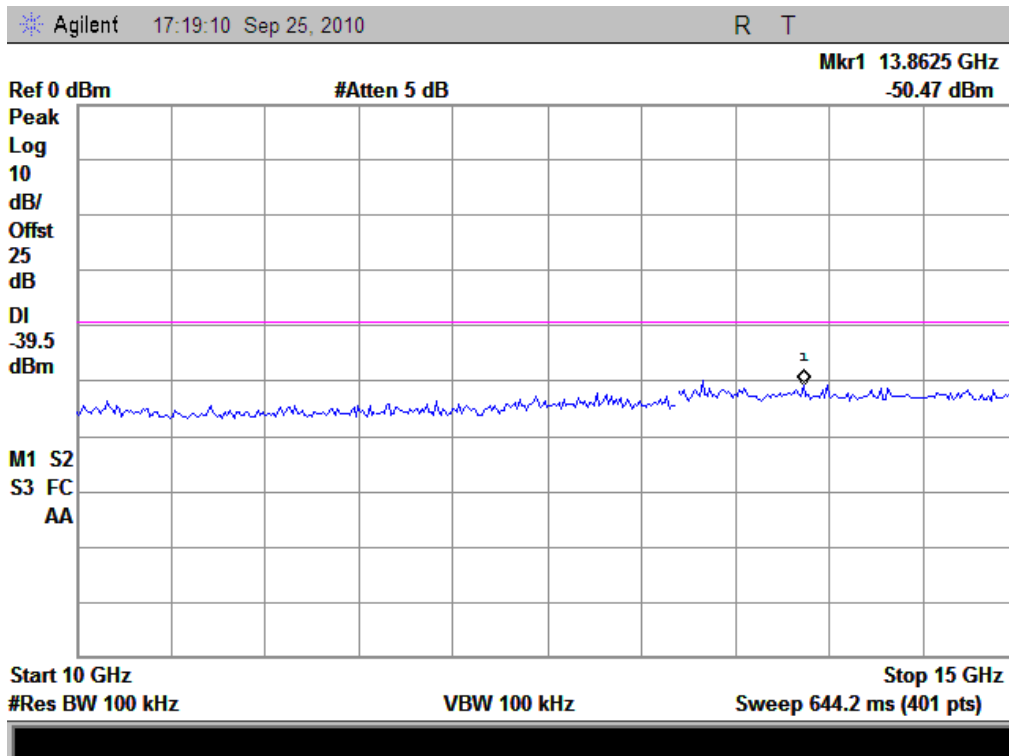
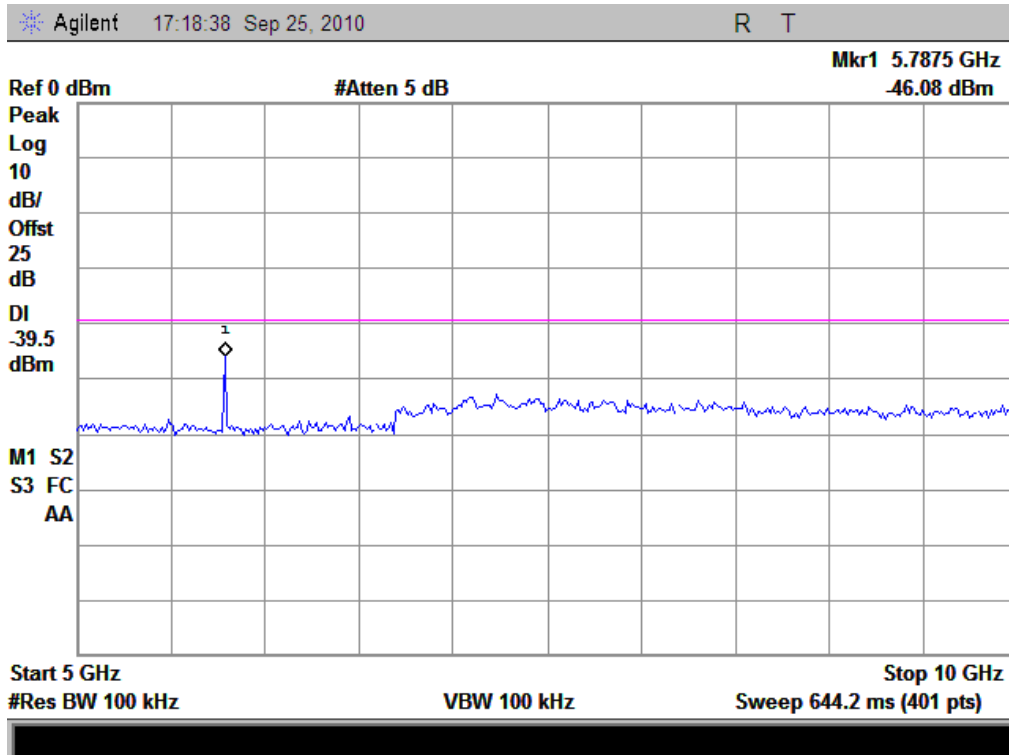
RF carrier set to the highest carrier defined by the EUT



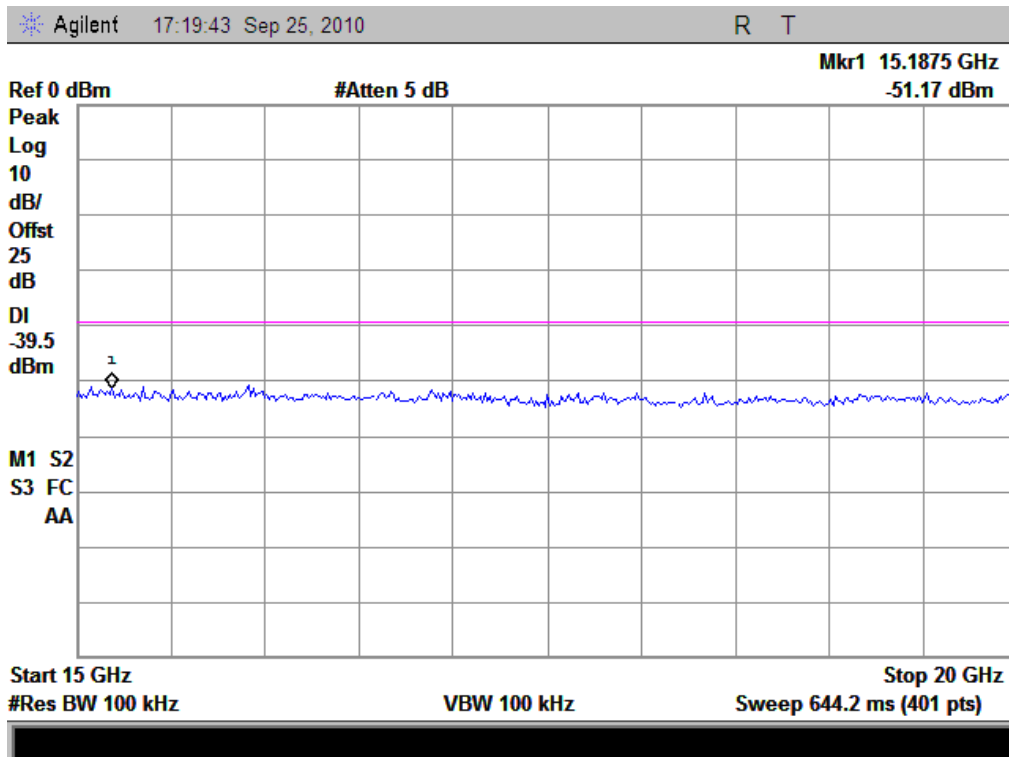
RF carrier set to the highest carrier defined by the EUT



RF carrier set to the highest carrier defined by the EUT



RF carrier set to the highest carrier defined by the EUT

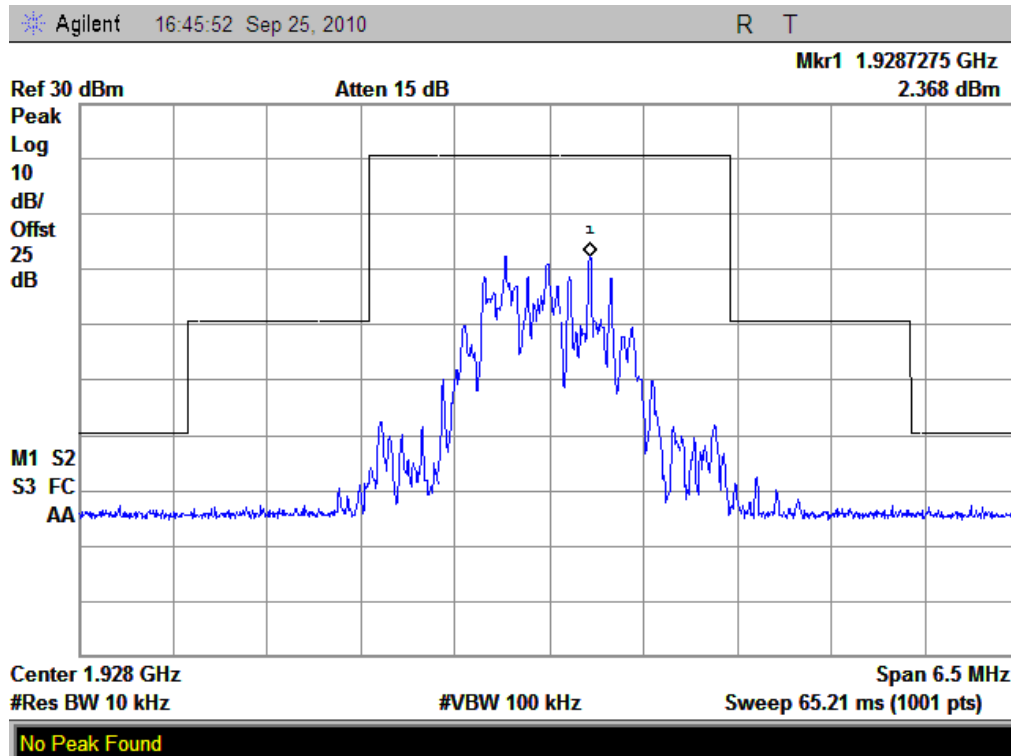


ANNEX G EMISSIONS INSIDE THE SUB-BAND-CONDUCTED

RF carrier set to the lowest carrier defined by the EUT

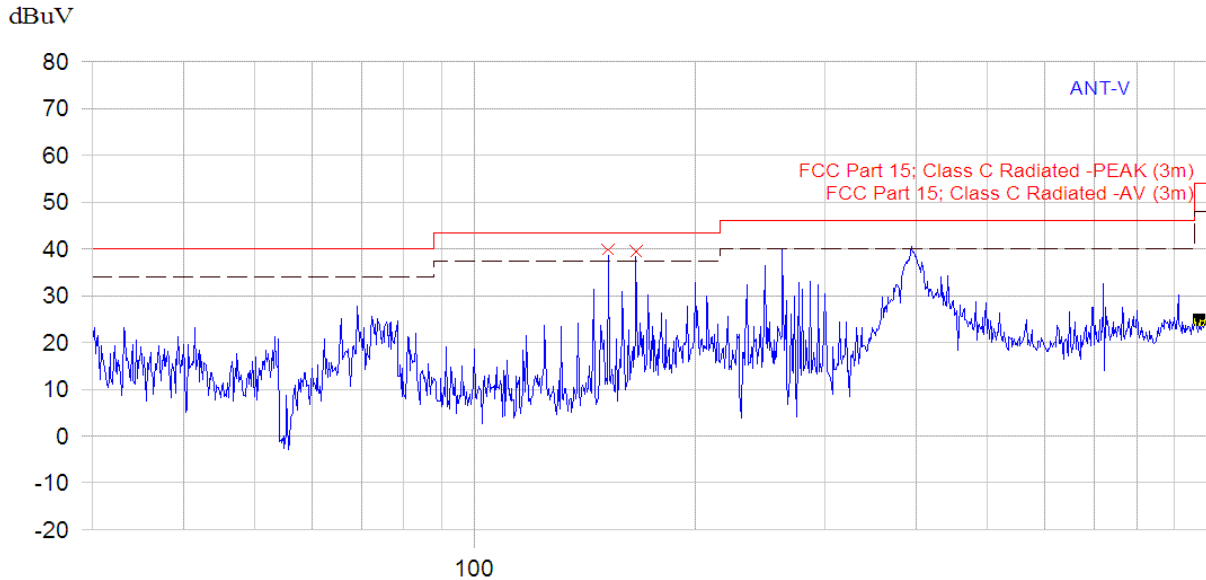


RF carrier set to the highest carrier defined by the EUT



ANNEX H SPURIOUS EMISSIONS –RADIATED

218.19.21.95



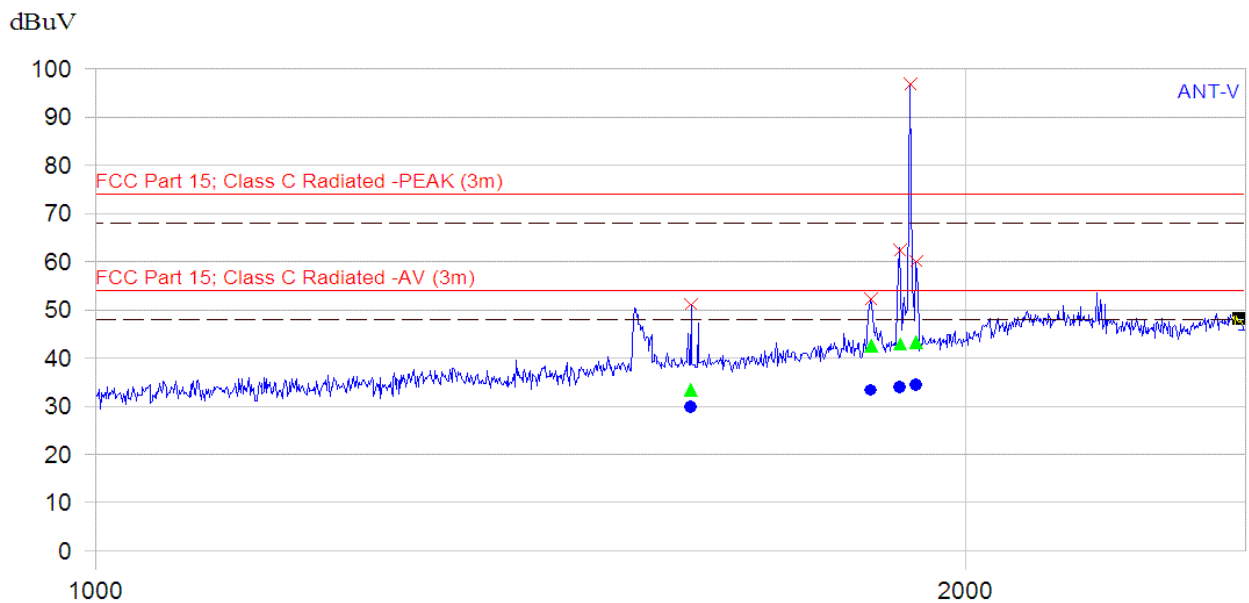
9/25/2010 6:00:54 PM

(Start = 30.00, Stop = 1000.00) MHz

	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	152.062	39.8			ANT	
2	165.887	39.4			ANT	

RF carrier set to the lowest carrier defined by the EUT 30MHz-1GHz

1793.41.00.32

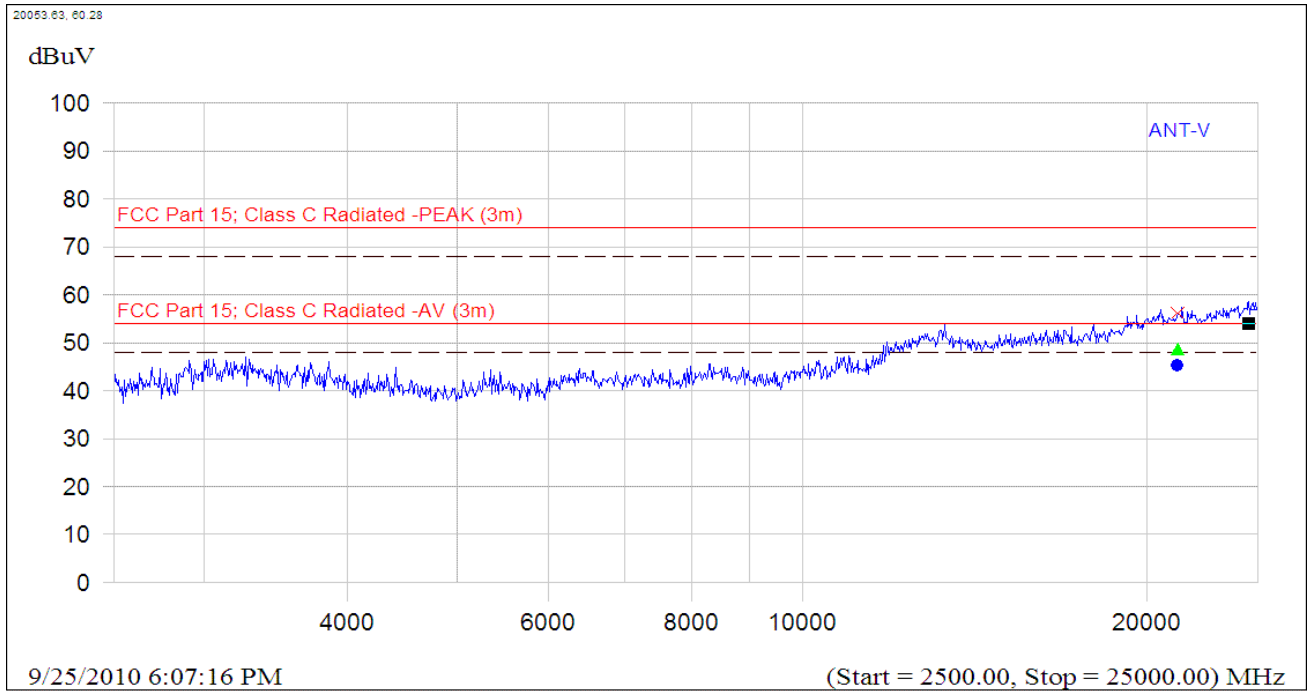


9/25/2010 6:07:16 PM

(Start = 1000.00, Stop = 2500.00) MHz

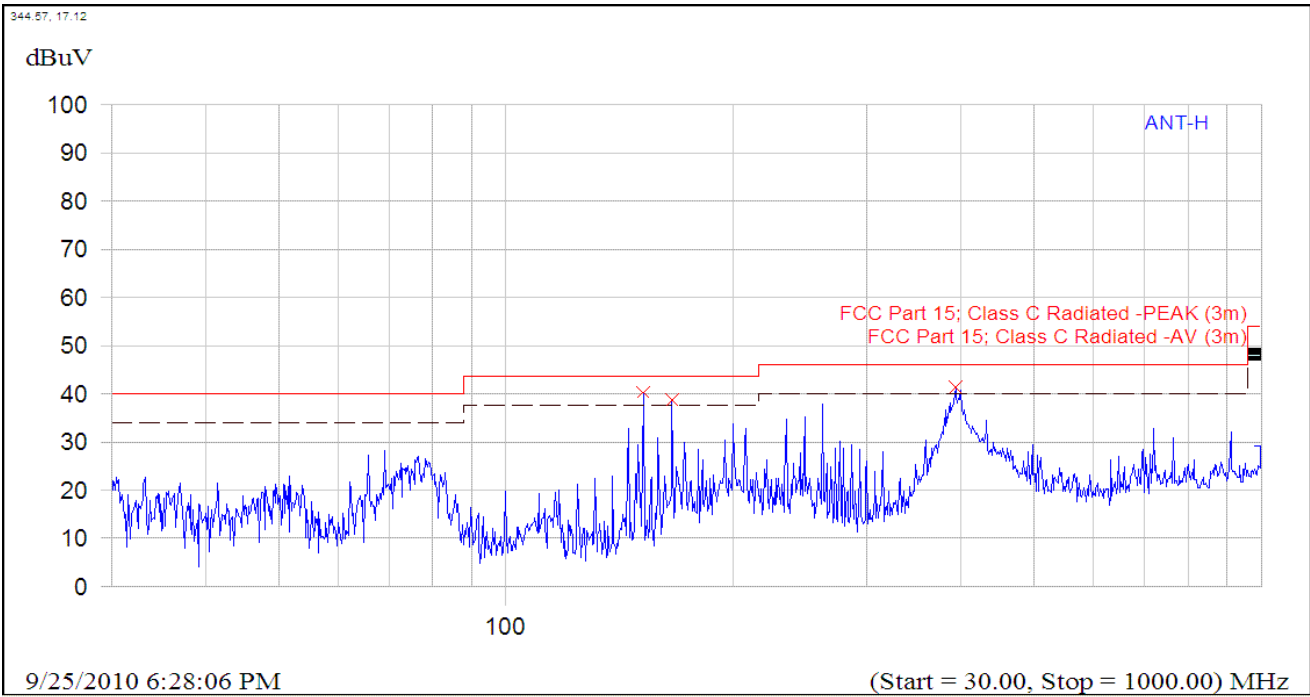
	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	1607.280	51.1	33.3	29.8	ANT-V	
2	1855.540	52.2	42.6	33.3	ANT-V	
3	1905.230	62.2	42.9	33.9	ANT-V	
4	1930.870	60.0	43.3	34.4	ANT-V	
5	1921.532	96.7			ANT-V	

RF carrier set to the lowest carrier defined by the EUT 1GHz-2.5GHz



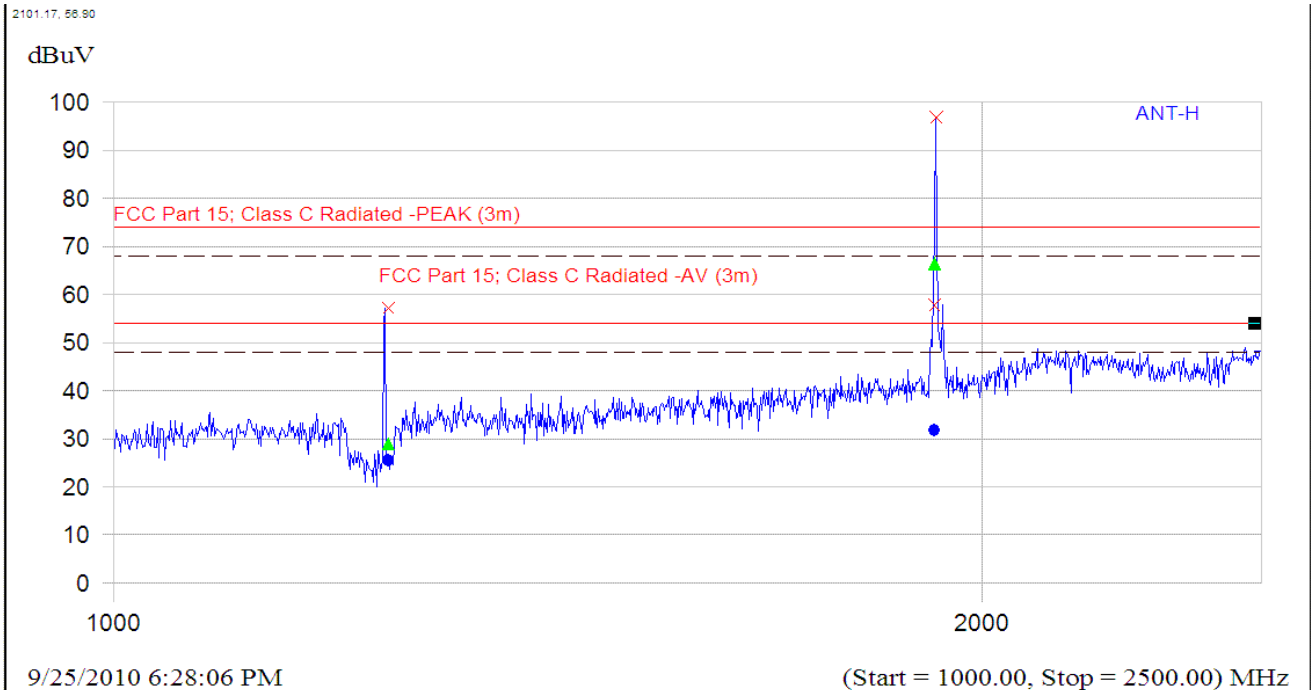
Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
21308.400	56.1	48.7	45.2	ANT-V	

RF carrier set to the lowest carrier defined by the EUT 2.5GHz-25GHz



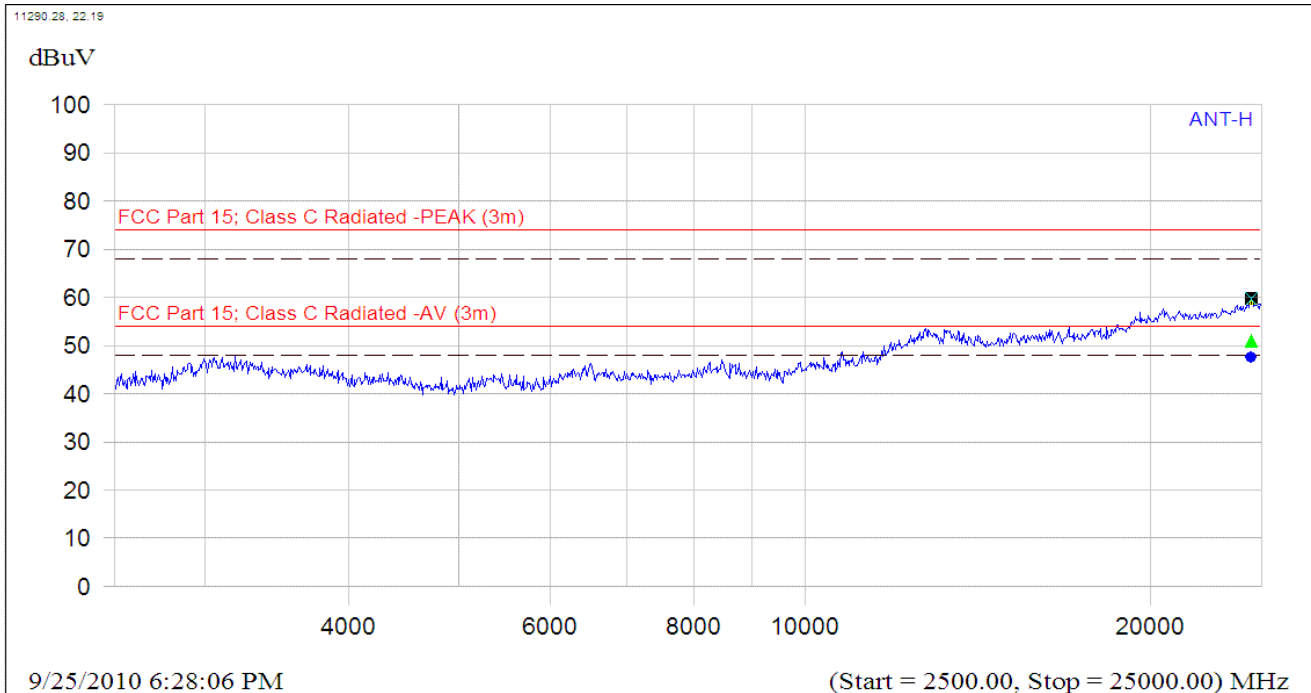
Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
152.112	40.2			ANT-H	
165.912	38.7			ANT-H	
394.032	41.3			ANT-H	

RF carrier set to the highest carrier defined by the EUT 30MHz-1GHz



	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	1926.320	57.8	66.3	31.8	ANT-H	
2	1928.448	96.8			ANT-H	
3	1245.880	57.1	28.9	25.4	ANT-H	

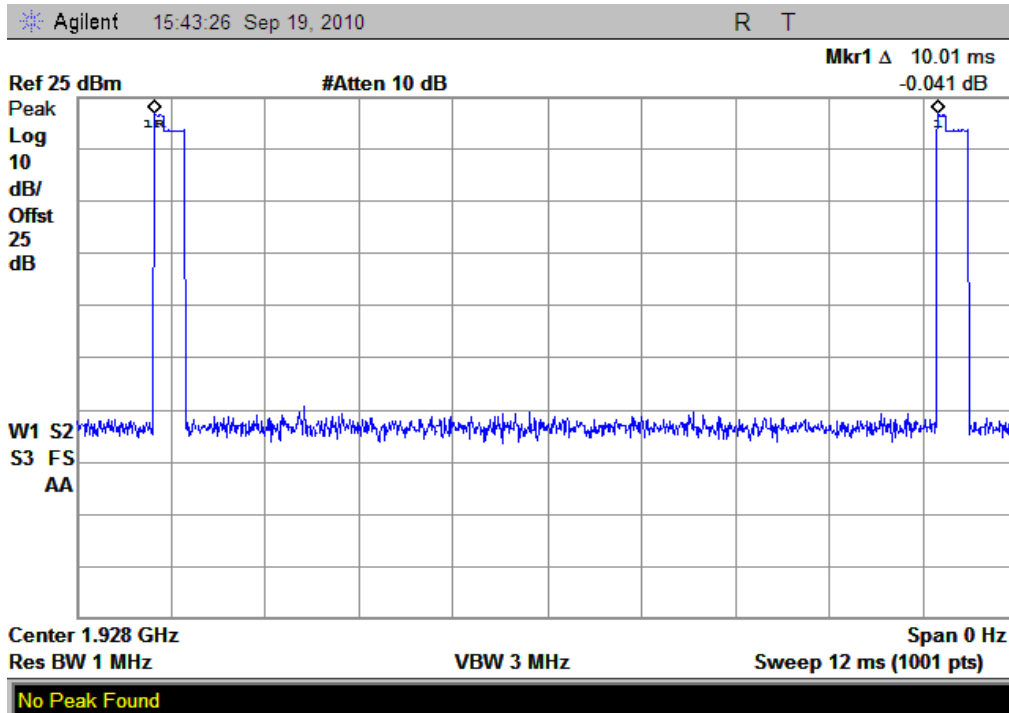
RF carrier set to the highest carrier defined by the EUT 1GHz-2.5GHz



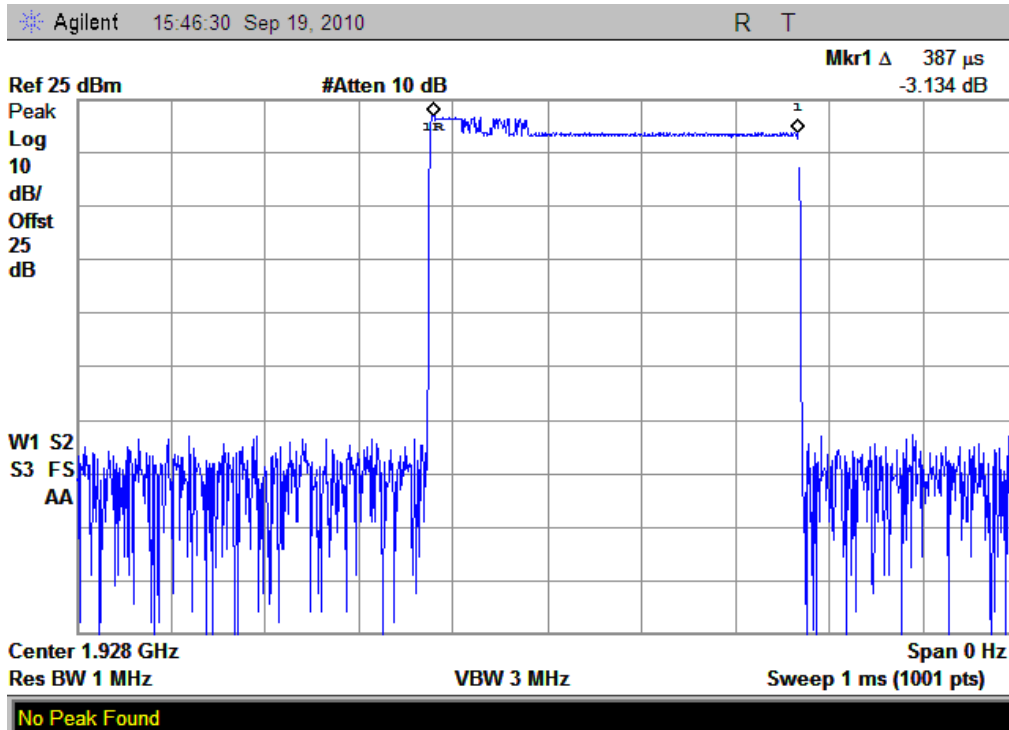
	Frequency MHz	Peak dBuV	QP dBuV	Avg dBuV	Trace Name	Comment
1	24498.200	59.6	50.9	47.5	ANT-H	

RF carrier set to the highest carrier defined by the EUT 2.5GHz-25GHz

ANNEX I WIDEBAND FRAME PERIOD



$T_{Frame} = 10.01ms$



$T_{on} = 387us$

* END OF REPORT **