

Produkte
Products

Prüfbericht - Nr.: 14017634 001		Seite 1 von 37	
<i>Test Report No.:</i>		<i>Page 1 of 37</i>	
Auftraggeber: <i>Client:</i>		Convergence Systems Limited 12/F., Chung Nam Building 1 Lockhart Road Wan Chai Hong Kong	
Gegenstand der Prüfung: <i>Test item:</i>		EPC Class 1 Gen 2 UHF RFID Handheld Reader	
Bezeichnung: <i>Identification:</i>		CS101-2	Serien-Nr.: <i>Serial No.</i>
			Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>		071210020	Eingangsdatum: <i>Date of receipt:</i>
			21.11.2007
Prüfört: <i>Testing location:</i>		TÜV Rheinland Hong Kong Ltd. 9/F., Oriental News Building, No.7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong. Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong	
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15, Subpart B FCC Part 15, Subpart C	
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland Hong Kong Ltd.	
geprüft / tested by:		kontrolliert / reviewed by:	
22.2.2008	Derek Leung Project Manager		22.2.2008
			Thomas Berns Manager
Datum	Name/Stellung	Unterschrift	Datum
<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>	<i>Date</i>
			Name/Stellung
			<i>Name/Position</i>
			Unterschrift
			<i>Signature</i>
Sonstiges / Other Aspects:		FCCID:UB4CS101C1GEN2	
Abkürzungen:	P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	Abbreviations:	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			



Content

List of Test and Measurement Instruments	4
Test Result Summary	5
General Product Information	6
Product Function and Intended Use.....	6
Ratings and System Details	6
Operation Descriptions.....	7
Submitted Documents	7
Related Submittal(s) Grants	7
Test Set-up and Operation Mode	8
Principle of Configuration Selection	8
Test Operation and Test Software.....	8
Special Accessories and Auxiliary Equipment	8
Countermeasures to achieve EMC Compliance.....	8
Test Methodology	9
Radiated Emission Test.....	9
TEST RESULTS	10
RFID Transmission Mode	10
Conducted Peak Output Power Section 15.247(b).....	10
Conducted Spurious RF Output Power Test Section 15.247(d)	11
Radiated Spurious Emission Test Section 15.209	12
Bandwidth Occupancy Section 15.247(a)(1)(i)	15
Number of Hopping Channels Section 15.247(a)(1)(i)	19
Carrier Frequency Separation Section 15.247(a)(1).....	20
Time of Occupancy (Dwell Time) Section 15.247(a)(1).....	22
Band-edge Compliance Section 15.247(d).....	31
RFID Transmission with WiFi Transmission Mode.....	34
Radiated Spurious Emission Test Section 15.209	34
PC Mode	37
Radiated Spurious Emission Test Section 15.109(a).....	37

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Appendix 1: Test Setup Photo

Appendix 2: EUT External Photo

Appendix 3: EUT Internal Photo

Appendix 4: FCCID Label and Label Location

Appendix 5: Block Diagram

Appendix 6: Specifications of EUT and antennas

Appendix 7: Schematic Diagrams

Appendix 8: Bill of Material

Appendix 9: User Manual

Appendix 10: Maximum Permissible Exposure Information

Appendix 11: Operational / Technical Description

List of Test and Measurement Instruments

Kind of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESU26	100050	6 Aug 2008
Biconical Antenna	Rohde & Schwarz	HK116	841489/015	8 Feb 2008
Log-periodic Antenna	Rohde & Schwarz	HL223	841516/017	3 Feb 2008
Active Loop Antenna	EMCO	6502	9107-2651	11 Dec 2007
Horn Antenna	EMCO	3116	2616	3 Jan 2008
Horn Antenna	EMCO	3115	9002-3347	3 Feb 2008
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30	12 Feb 2008

Test Result Summary

Clause	Test Item	Result
15.247(b)(2)	Conducted Peak RF Output Power Test - RFID Transmission Mode	Pass
15.247(d)	Conducted Spurious RF Output Power Test - RFID Transmission Mode	Pass
15.209	Radiated Spurious Emission Test - RFID Transmission Mode	Pass
15.247(a)(1)(i)	20dB Bandwidth Occupancy - RFID Transmission Mode	Pass
15.247(a)(1)(i)	Number of Hopping Channels - RFID Transmission Mode	Pass
15.247(a)(1)	Carrier Frequency Separation - RFID Transmission Mode	Pass
15.247(a)(1)(i)	Time of Occupancy - RFID Transmission Mode	Pass
15.247(d)	Band-edge compliance - RFID Transmission Mode	Pass
15.209	Radiated Spurious Emission Test - RFID Transmission with WiFi Transmission Mode	Pass
15.109	Radiated Spurious Emission Test - PC On Mode	Pass

General Product Information

Product Function and Intended Use

The equipment under test (EUT) CS101-2 RFID reader is an EPCglobal Class 1 Gen 2 handheld reader providing real-time tag processing for Class 1 (Read / Write) EPC- compliant tag. The RFID system RF output power is selectable from 15dBm to 30dBm and operates in 902 to 928MHz frequency band. The system contains WiFi 802.11 b/g connectivity. Detail specifications of the EUT refer to appendix 6.

Ratings and System Details

FCC ID	:	UB4CS101C1GEN2
Connectivity	:	WiFi, 802.11 b/g
Power supply	:	Lithium Polymer Rechargeable Battery (14.8 Volt)
Port(s)	:	(i) USB port (ii) RS232 port (iii) SD Card Slot

RFID System configuration:

Operating Frequency	:	902.75MHz to 927.25MHz
No. of channel	:	50 channels (channel 0 – 49)
Channel Spacing	:	500kHz
Antenna	:	Embedded Patch Antenna

Operation Descriptions

The CS101-2 RFID reader hops among 50 channels (Ch.0 - 49) from 902.75MHz to 927.25MHz in 500kHz steps in operating mode according to a generated pseudo-random sequence. The time of occupancy on each frequency is 0.4 seconds maximum within a 20 seconds period.

Each CS101-2 reader hops among its 50 available channels according to an independently generated pseudo-random sequence. The reader maintains no capability to coordinate RF channel occupancy among separate units. Within each hop, the RFID reader may be sending command to the tag or receiving backscatter from the tag, alternating between them as required by the EPC Gen 2 protocol. When the reader is sending command to the tag, the reader is sending out modulated signal. When the reader is receiving backscatter from the tag, the reader is sending out continuous wave signal.

The RFID system supports six preset profiles of operational configurations. The details of the settings of each profile are shown in table:

Profile	Tari (µs)	Reader to Tag Forward Link	Pulse Width (µs)	Tag to Reader Link Frequency (kHz)	Tag to Reader Reverse Modulation
0	25.00	PR-ASK	12.50	120	Miller, M=4
1	12.50	DSB-ASK	6.25	160	Miller, M=2
2	25.00	PR-ASK	12.50	250	Miller, M=4
3	25.00	PR-ASK	12.50	300	Miller, M=4
4	6.25	DSB-ASK	3.13	400	FM0
5	25.00	PR-ASK	12.50	250	Miller, M=2

Glossary:

Tari: time interval of symbol 0

Forward Link: modulation method of reader to tag link

Pulse Width: time width of RF pulse at power below average power level

Link Frequency: data rate of tag to reader link

Reverse Modulation: Encoding method of the tag to reader link (either FM0 or Miller subcarrier)

Submitted Documents

The submitted documents are listed as follow:

- Schematic diagrams
- Block diagrams
- User manual
- FCC ID label and location diagram
- Specification of EUT
- Specification of antenna
- Bill of material

Related Submittal(s) Grants

This report is one of the two applications for certification of the EUT. This report contains the measurement results of the RFID function. The testing report 14017180 001 contains the measurement results of the WiFi function.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The tests were performed under test mode by Window CE software to select different transmit channels, transmit profiles and data rates.

Test Operation and Test Software

The radiated emission tests have been performed on the following modes:

- (i) RFID transmission only;
- (ii) RFID transmission with WiFi transmission;
- (iii) PC mode (WiFi and RFID without transmission), bar-code scanner "On".

The conducted RF fundamental power and spurious emissions tests have been performed on the RFID transmission mode.

Testing software was used to enable the continuous transmission on the EUT for the testing in this report.

Special Accessories and Auxiliary Equipment

The EUT was tested together with the following additional accessory:

- none

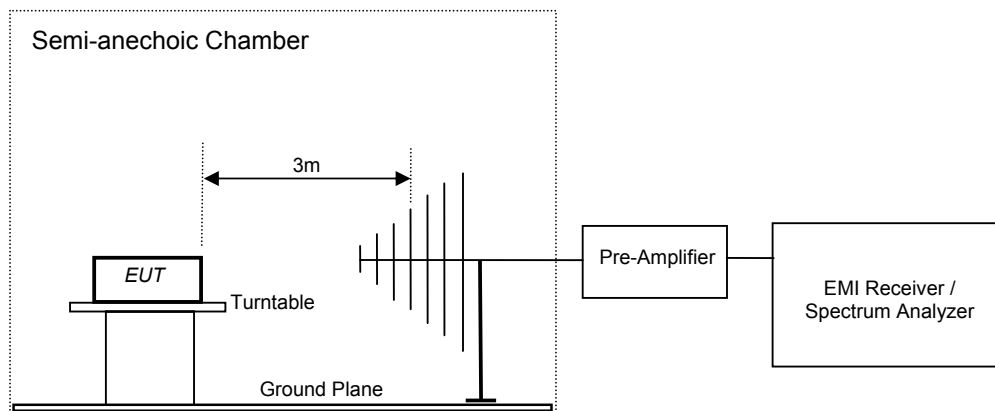
Countermeasures to achieve EMC Compliance

- none

Test Methodology

Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2003. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 or 10 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna, maximum emission was obtained by two antenna polarizations of loop faced and sided to the EUT. maximum emission was obtained by two antenna polarizations of loop faced and sided to the EUT.



TEST RESULTS

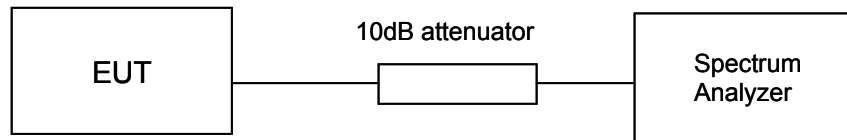
RFID Transmission Mode

Conducted Peak Output Power

Section 15.247(b)
RESULT:
Pass

Test Specification : FCC Part 15 Section 15.31
 Test Method : ANSI C63.4-2003
 Measurement Bandwidth (RBW) : 100kHz
 Detector : Peak
 Supply voltage : 14.8 Volt battery
 Requirement : <1 watt (30dBm) for system employing at least 50 hopping channels

Test Method:



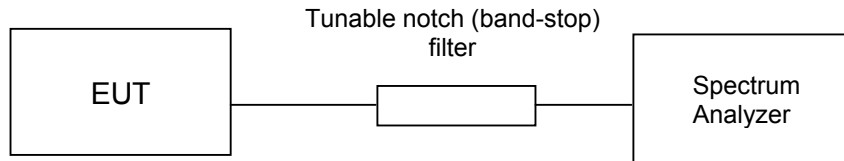
Test Result:

RFID-Tx Channel	RFID-Tx Channel Frequency (MHz)	RFID-Tx Profile	RF Output Power (dBm)	Limit (dBm)	Margin (dB)
0	902.75	0	25.7	30	-4.3
	902.75	1	26.9	30	-3.1
	902.75	2	27.1	30	-2.9
	902.75	3	27.1	30	-2.9
	902.75	4	24.4	30	-5.6
	902.75	5	27.1	30	-2.9
25	915.25	0	28.4	30	-1.6
	915.25	1	27.4	30	-2.6
	915.25	2	27.8	30	-2.2
	915.25	3	27.9	30	-2.1
	915.25	4	25.0	30	-5.0
	915.25	5	27.1	30	-2.9
49	927.25	0	28.6	30	-1.4
	927.25	1	28.0	30	-2.0
	927.25	2	27.9	30	-2.1
	927.25	3	27.9	30	-2.1
	927.25	4	25.9	30	-4.1
	927.25	5	28.2	30	-1.8

Conducted Spurious RF Output Power Test
Section 15.247(d)
RESULT:
Pass

Test Specification : FCC Part 15 Section 15.31
 Test Method : ANSI C63.4-2003
 Detector Function : Peak
 Supply Voltage : 14.8 Volt battery
 Measuring Frequency Range : 30kHz – 10GHz (Up to 10th harmonic of the highest fundamental frequency)
 Measurement bandwidth (RBW) : 30kHz-1GHz: 100kHz, above 1GHz: 1MHz
 Requirement : At least 20dB below that in the 100kHz 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 limit.

Test Method:



Test Result:

RFID - Tx Channel	RFID - Tx Channel Freq (MHz)	RFID - Tx Profile	Spurious Emission (MHz)	Spurious RF Power (dBm)	Limit (dBm)	Margin (dB)
0	902.75	0	1805.490	-68.8	10	-78.8
25	915.25	1	1830.490	-65.6	10	-75.6
			2745.800	-61.8	10	-71.8
49	927.25	2	1854.500	-61.6	10	-71.6
			2781.760	-46.2	10	-56.2
0	902.75	3	1805.510	-68.3	10	-78.3
25	915.25	4	1830.510	-68.3	10	-78.3
			2745.720	-58.7	10	-68.7
49	927.25	5	1854.500	-65.7	10	-75.7

All other emissions are below -70dBm.

Radiated Spurious Emission Test**Section 15.209****RESULT:****Pass**

Test Specification	:	FCC Part 15 Section 15.205, 15.209 & 15.247(d)
Test Method	:	ANSI C63.4-2003
Detector	:	QP for frequency below 1GHz, average for frequency above 1GHz
Supply Voltage	:	14.8 Volt battery
Measuring Frequency Range	:	9kHz (covered the lowest internal oscillator frequency of 32.768kHz) – 10GHz (Up to 10 th harmonic of the highest fundamental frequency)
Measurement Distance	:	10m for frequency <30MHz, 3m for frequency >30MHz.
Requirement	:	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. Attenuation below the general limits specified in Sections 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test result:

RFID - Tx Channel	RFID - Tx Frequency (MHz)	RFID - Tx Profile	Antenna Polarisation	Spurious Emission (MHz)	Spurious Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
0	902.75	0	V	119.900	36.0	43.52	-7.5
				133.222	37.3	43.52	-6.2
				179.935	34.5	#	#
				215.014	31.9	#	#
			399.650	40.8	#	#	
			H	*	*	*	*
10	907.75	1	V	119.900	35.8	43.52	-7.7
				133.222	36.9	43.52	-6.6
				179.935	34.7	#	#
				215.014	31.6	#	#
			399.666	41.2	#	#	
			H	*	*	*	*
25	915.25	2	V	119.900	35.8	43.52	-7.7
				133.222	36.8	43.52	-6.7
				179.935	34.7	#	#
				210.393	32.8	#	#
			399.666	41.1	#	#	
			H	*	*	*	*
30	917.75	3	V	119.900	35.7	43.52	-7.8
				133.222	36.8	43.52	-6.7
				179.935	34.8	#	#
				215.015	31.5	#	#
			399.666	41.5	#	#	
			H	*	*	*	*
40	922.75	4	V	119.900	35.6	43.52	-7.9
				133.222	36.8	43.52	-6.7
				179.935	34.7	#	#
				216.012	33.6	#	#
			399.666	42.3	#	#	
			H	*	*	*	*
49	927.25	5	V	119.900	35.5	43.52	-8.0
				133.222	36.7	43.52	-6.8
				179.935	34.6	#	#
				215.922	34.8	#	#
			399.666	41.2	#	#	
			H	*	*	*	*

Spurious emissions that do not fall into the restricted band of Section 15.205.

* All emissions are at least 20dB below the limits.

Limit of section 15.209:

Frequency of Emission (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	29.5*	30
30-88	100	40.0	3
88-216	150	43.52	3
216-960	200	46.0	3
Above 960	500	53.98	3

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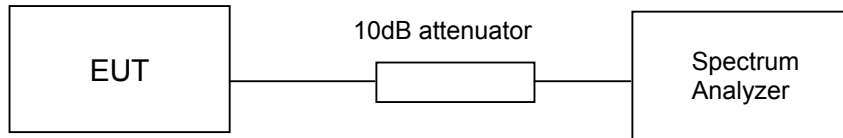
*The limit shows in the table above of frequency range 1.705MHz – 30MHz is correspond to $(29.5+9.5)=39.0\text{dB}\mu\text{V/m}$ at 10 meters measurement distance.

The emission limits show in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on the measurement employing an average detector.

Bandwidth Occupancy
Section 15.247(a)(1)(i)
RESULT:
Pass

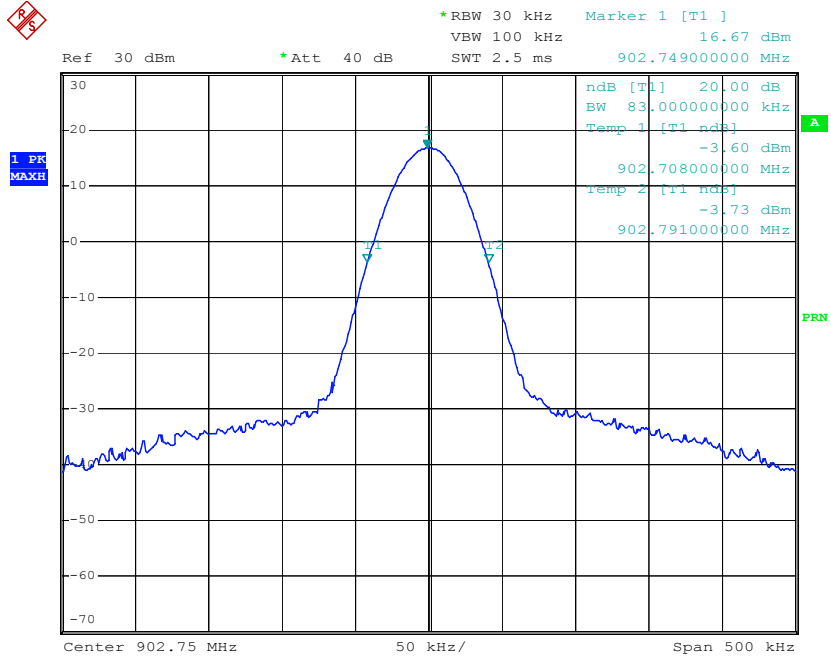
Test Specification : FCC Part 15 Section 15.247 (a) (1) (i)
 Detector Function : Peak
 Supply Voltage : 14.8 Volt battery
 Port of testing : Antenna port
 Requirement : For frequency hopping systems operating in the 902 – 928MHz; if the 20dB bandwidth is less than 250kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test Method:



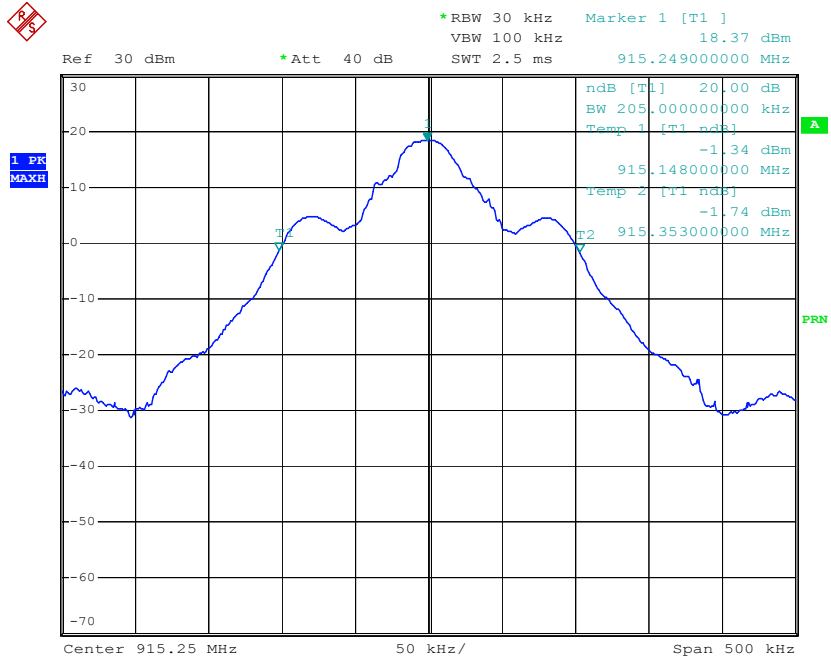
Test Result:

Frequency (MHz)	Tx Profile	20dB Bandwidth (kHz)
Channel 0 - 902.75	0	83
Channel 25 - 915.25	1	205
Channel 49 - 927.25	2	118
Channel 0 - 902.75	3	116
Channel 25 - 915.25	4	214
Channel 49 - 927.25	5	118



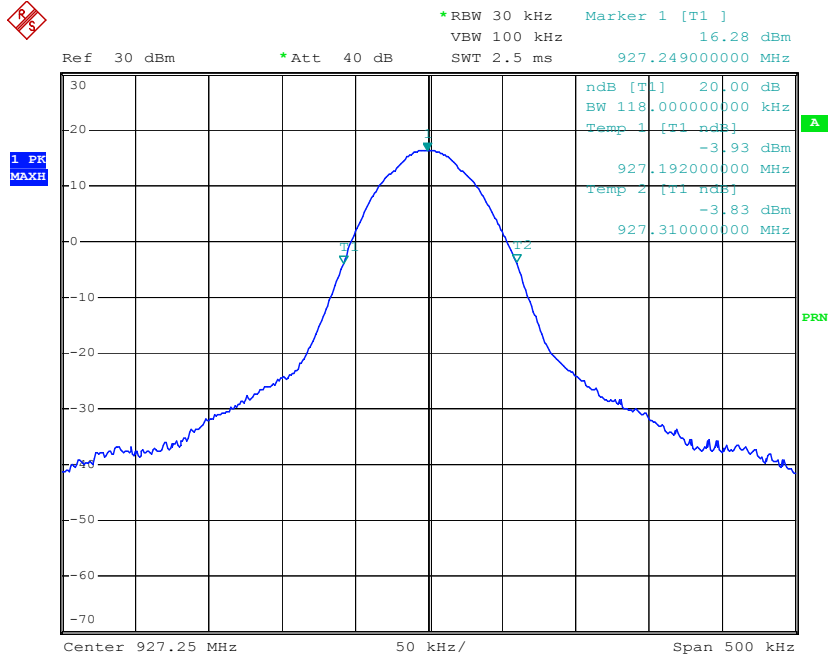
Date: 10.DEC.2007 20:29:21

20dB Bandwidth Measurement - Channel 0, Profile 0



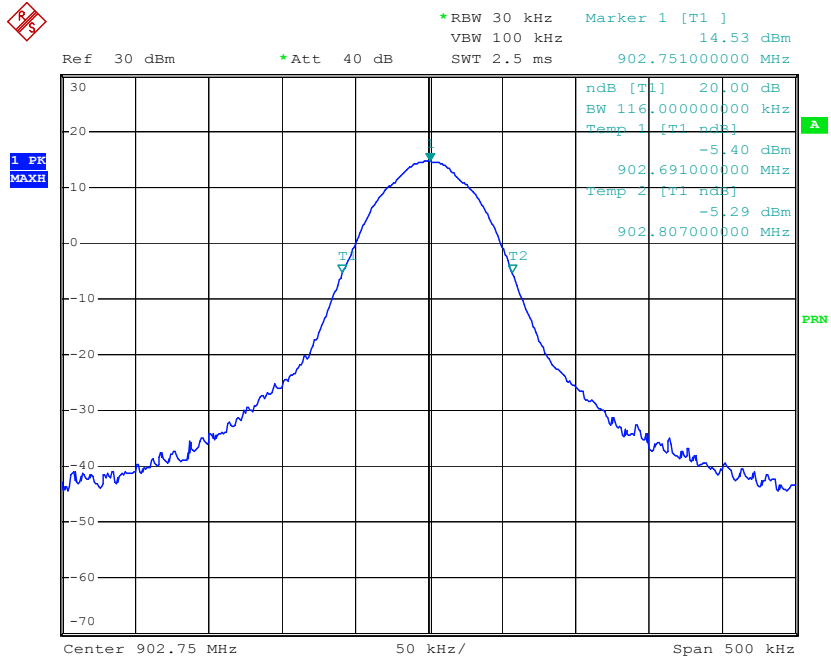
Date: 10.DEC.2007 20:36:26

20dB Bandwidth Measurement - Channel 25, Profile 1



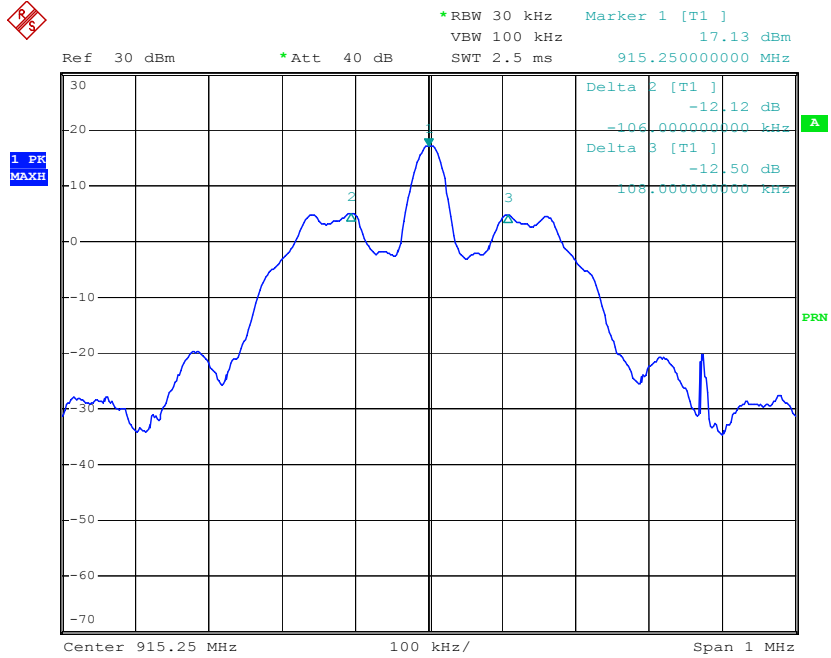
Date: 10.DEC.2007 20:38:18

20dB Bandwidth Measurement - Channel 49, Profile 2



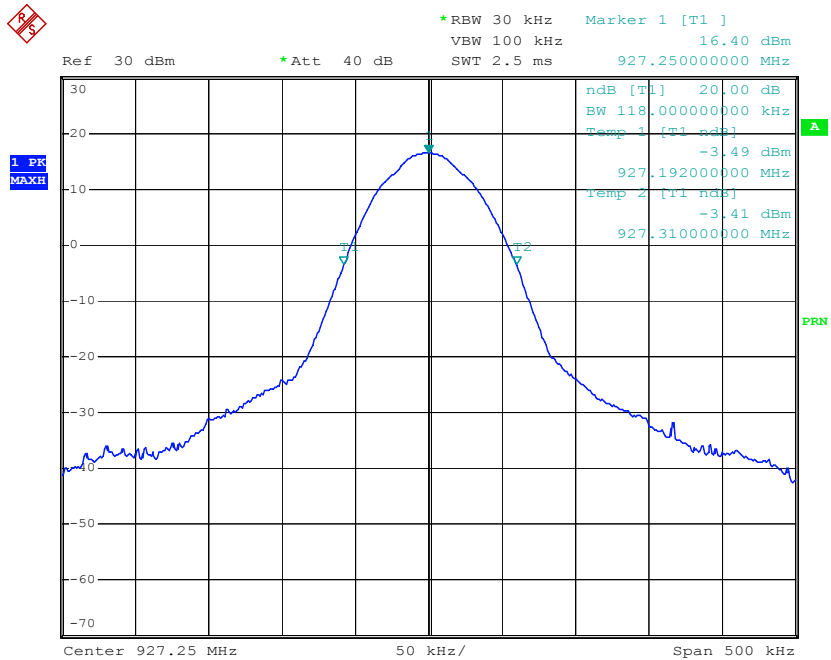
Date: 10.DEC.2007 20:40:11

20dB Bandwidth Measurement - Channel 0, Profile 3



Date: 10.DEC.2007 20:53:52

20dB Bandwidth Measurement - Channel 25, Profile 4



Date: 10.DEC.2007 20:49:14

20dB Bandwidth Measurement - Channel 49, Profile 5

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Number of Hopping Channels

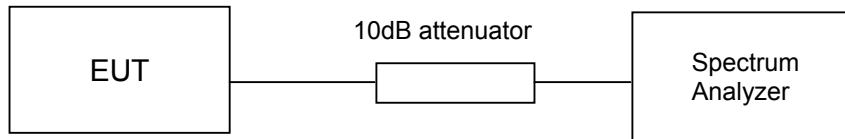
Section 15.247(a)(1)(i)

RESULT:

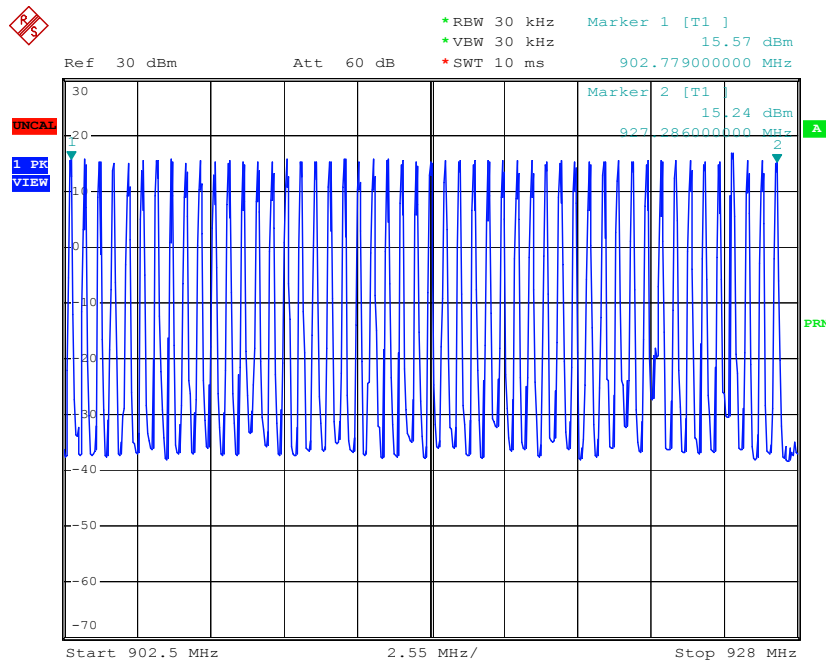
Pass

Test Specification : FCC Part 15 Section 15.247(a)(1)(i)
 Detector Function : Peak
 Supply Voltage : 14.8V battery
 Port of testing : Antenna port
 Requirement : For frequency hopping systems operating in the 902 – 928MHz; if the 20dB bandwidth is less than 250kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Test Method:



Test Result:



Date: 12.DEC.2007 20:16:23

Number of Hopping Channels – 50 channels

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Carrier Frequency Separation

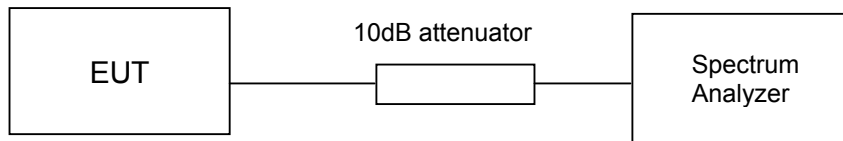
Section 15.247(a)(1)

RESULT:

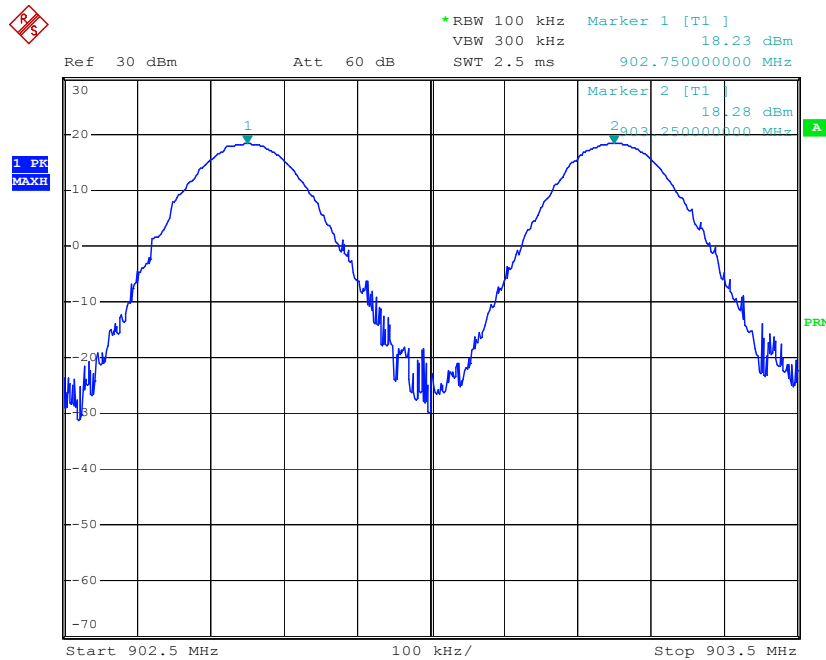
Pass

Test Specification : FCC Part 15 Section 15.247(a)(1)
 Detector Function : Peak
 Supply Voltage : 14.8V battery
 Port of testing : Antenna port
 Requirement : Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. The 20dB bandwidth of the EUT is 83kHz or higher (from the bandwidth measurement result), and the carrier frequency separation is 500kHz, so it complies with the requirement.

Test Method:



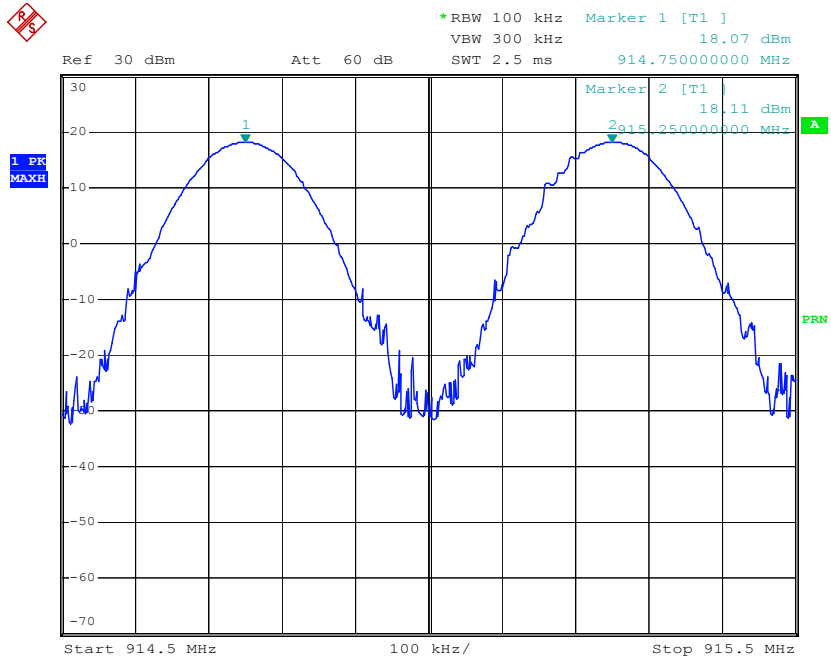
Test Result:



Date: 16.DEC.2007 11:14:08

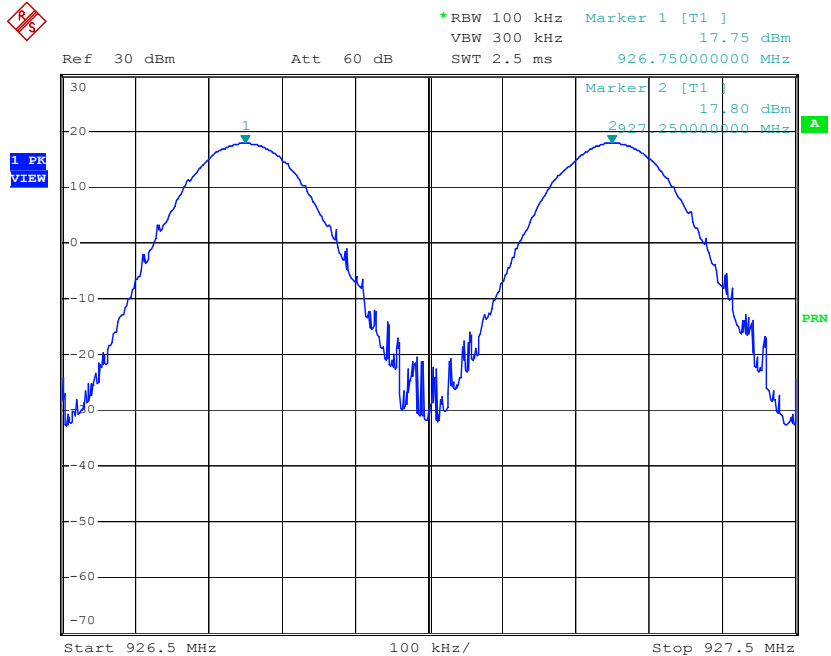
Channel 0 and 1 – Channel Separation

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Date: 16.DEC.2007 11:21:56

Channel 24 and 25 – Channel Separation



Date: 16.DEC.2007 11:19:22

Channel 48 and 49 – Channel Separation

Time of Occupancy (Dwell Time)

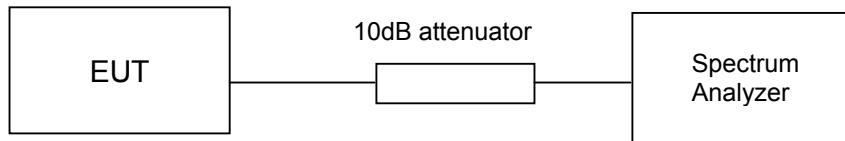
Section 15.247(a)(1)

RESULT:

Pass

Test Specification : FCC Part 15 Section 15.247 (a) (1) (i)
 Detector Function : Peak
 Supply Voltage : 14.8V battery
 Requirement : For frequency hopping systems operating in the 902 – 928MHz; if the 20dB bandwidth is less than 250kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

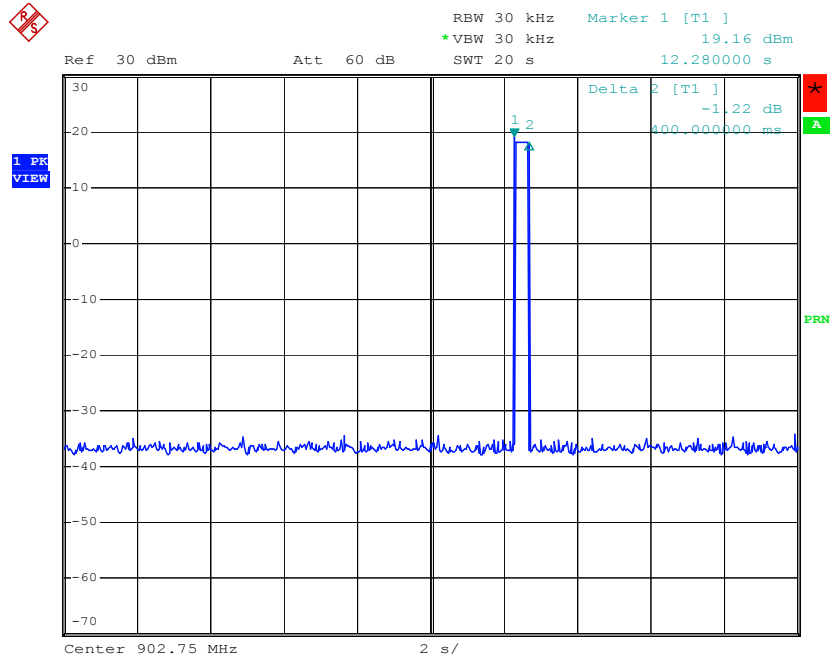
Test Method:



Test Result:

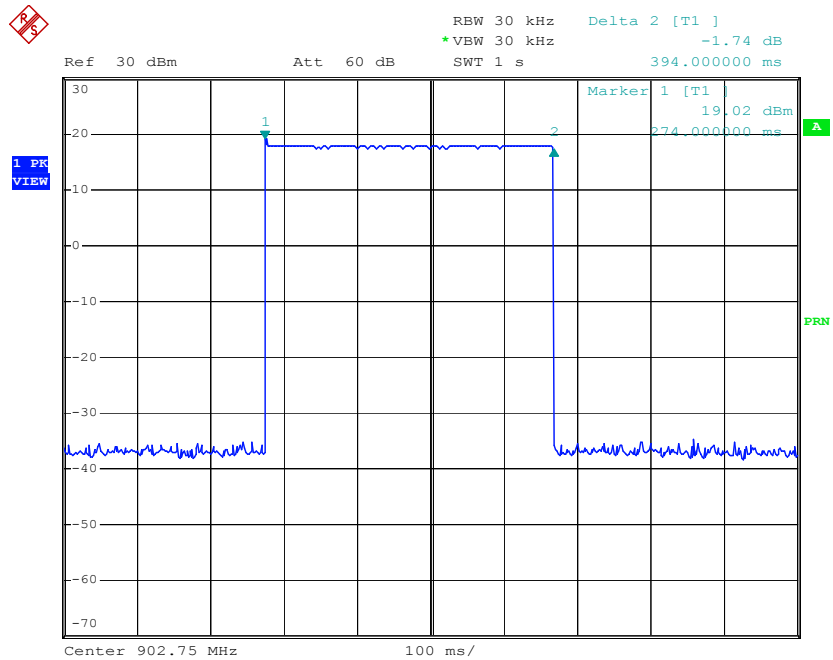
Channel	Profile	Dwell time (ms) within a 20 second period
0	0	394
25	0	394
49	0	394
25	1	394
25	2	394
25	3	392
25	4	392
25	5	396

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Date: 12.DEC.2007 20:25:13

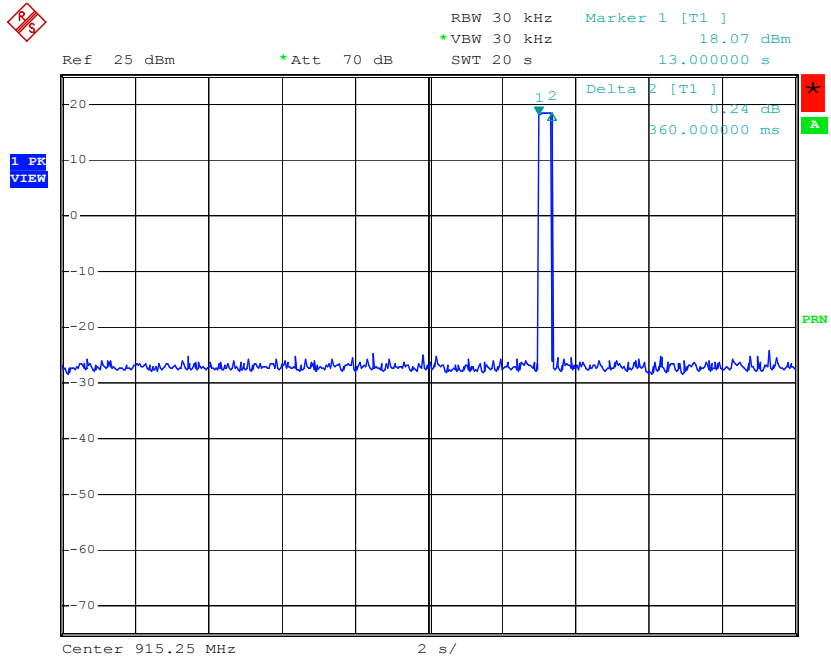
Channel: 0, Profile: 0, Scan time: 20 seconds



Date: 12.DEC.2007 20:27:10

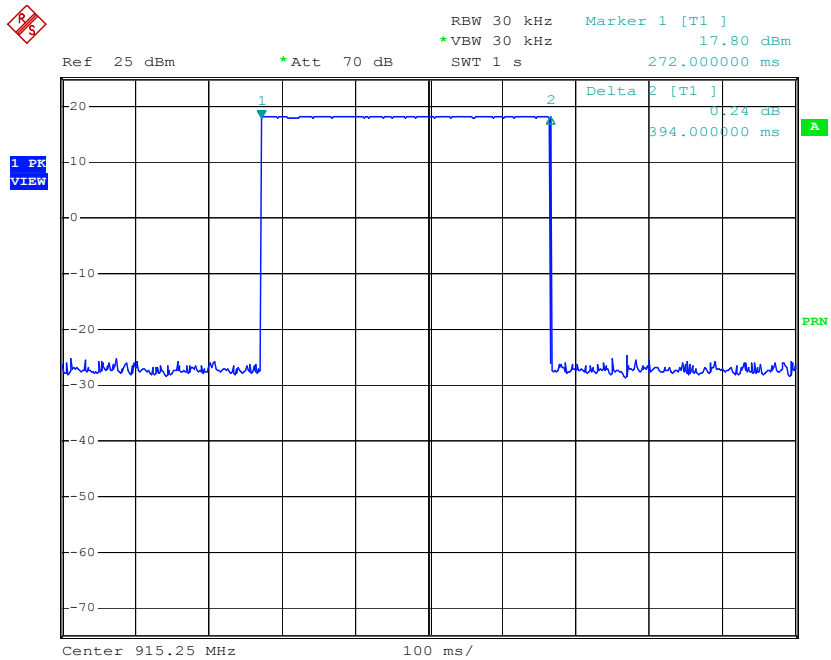
Channel: 0, Profile: 0, Scan time: 1 second

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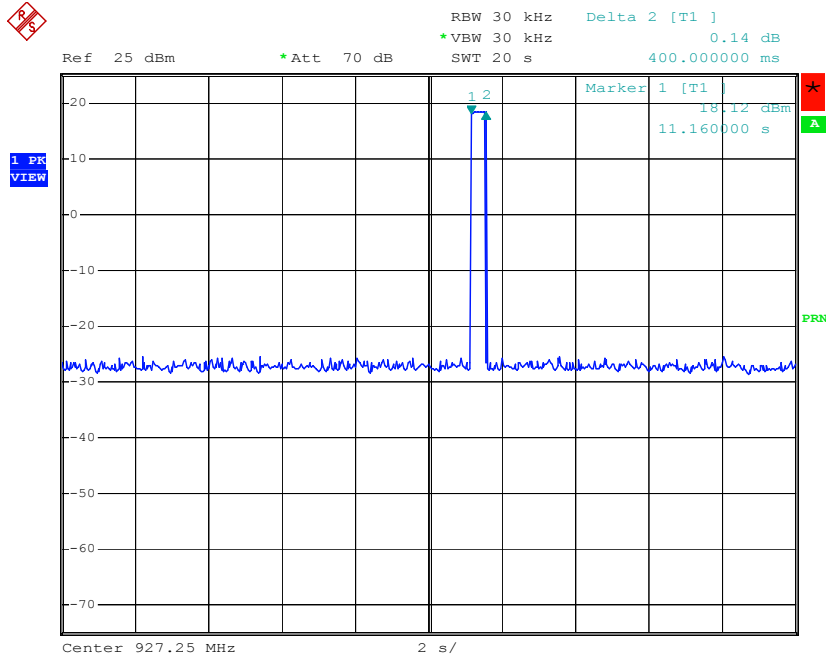
Date: 12.DEC.2007 20:36:03

Channel: 25, Profile: 0, Scan time: 20 seconds



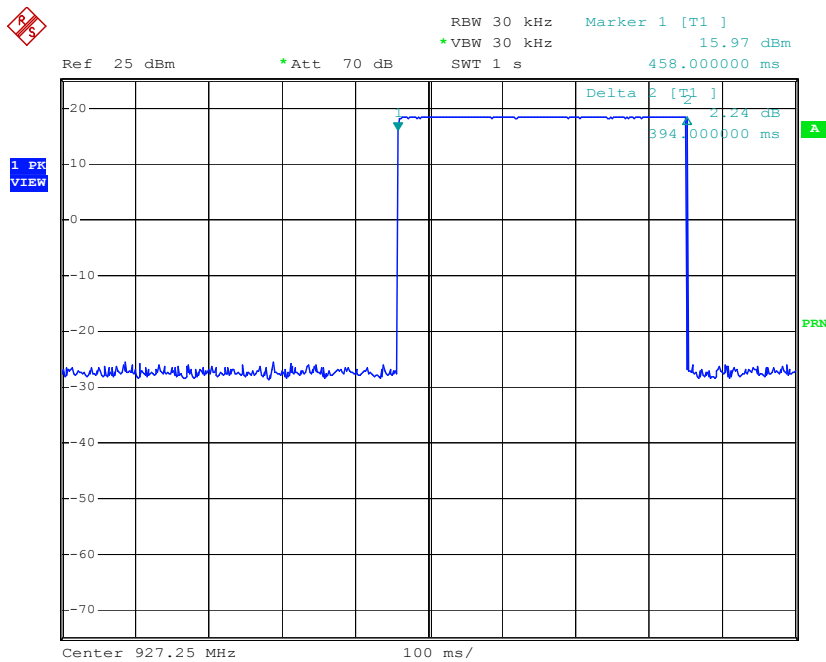
Date: 12.DEC.2007 20:39:09

Channel: 25, Profile: 0, Scan time: 1 second



Date: 12.DEC.2007 20:41:23

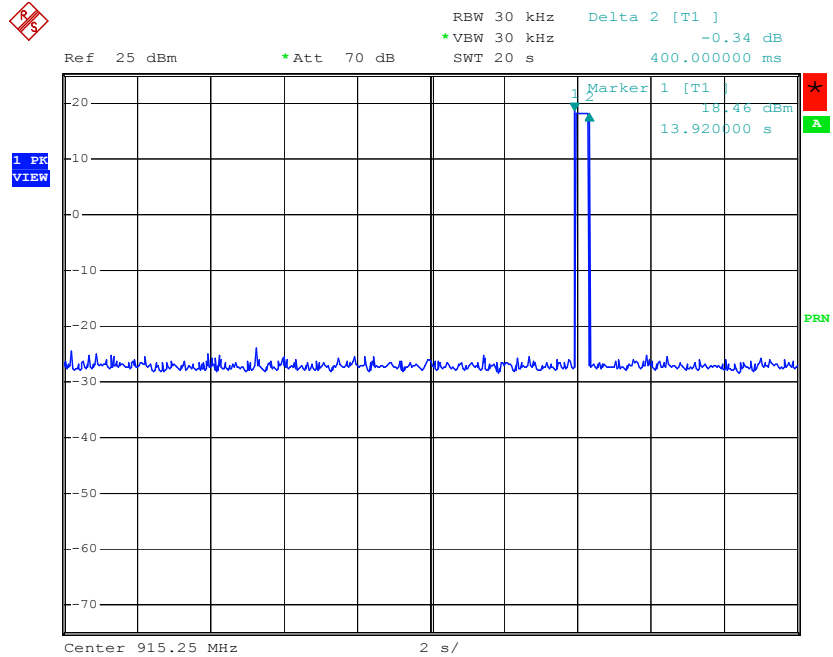
Channel: 49, Profile: 0, Scan time: 20 seconds



Date: 12.DEC.2007 20:45:50

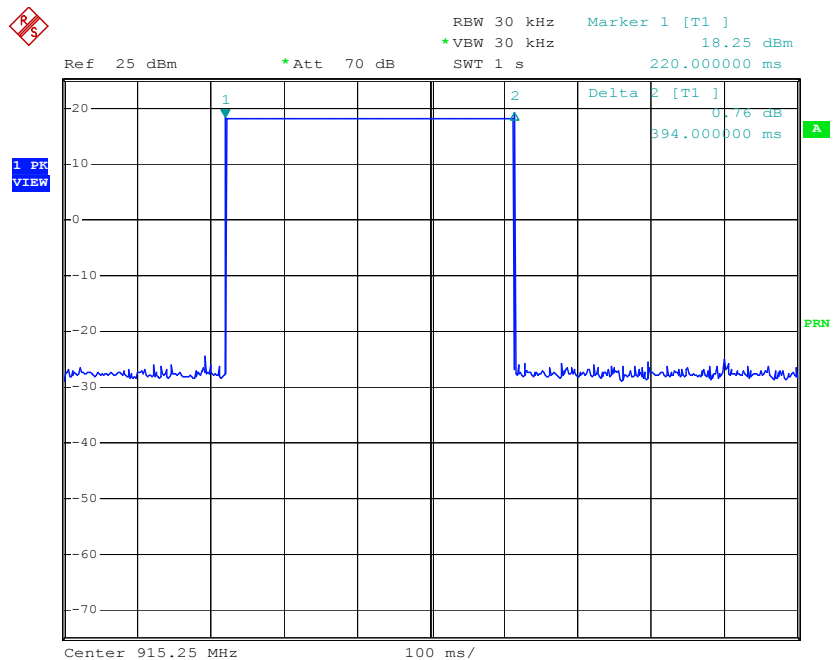
Channel: 49, Profile: 0, Scan time: 1 second

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Date: 12.DEC.2007 21:04:28

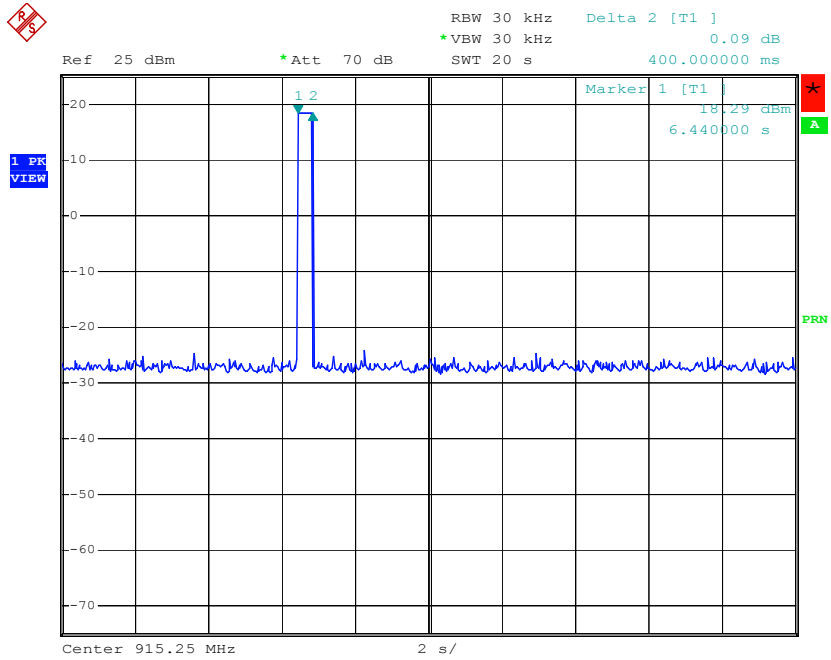
Channel: 25, Profile: 1, Scan time: 20 seconds



Date: 12.DEC.2007 21:06:37

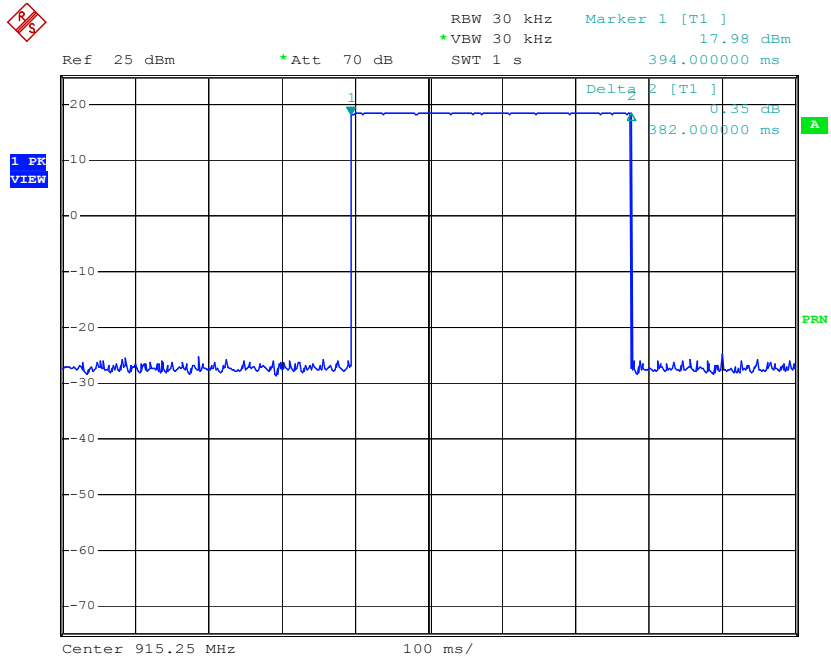
Channel: 25, Profile: 1, Scan time: 1 second

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Date: 12.DEC.2007 21:09:23

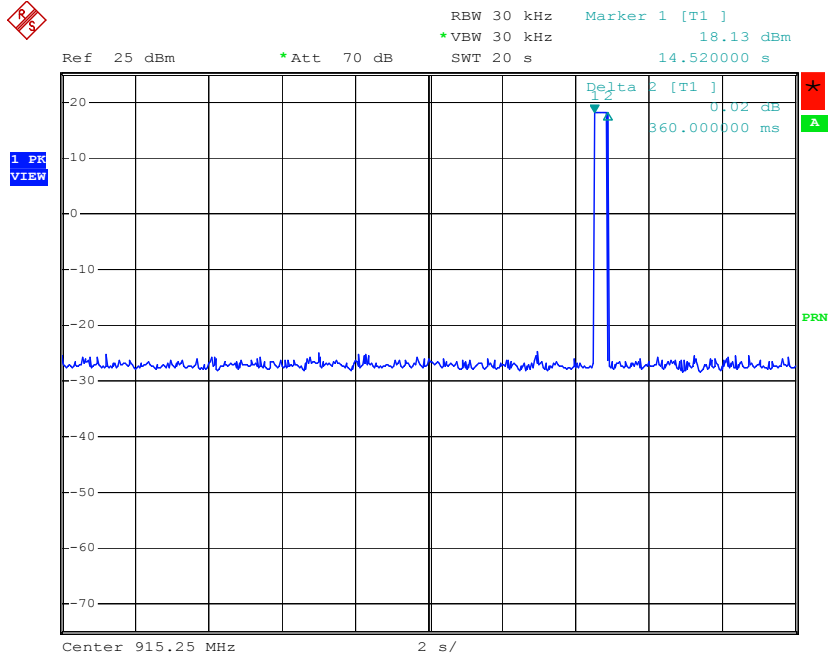
Channel: 25, Profile: 2, Scan time: 20 seconds



Date: 12.DEC.2007 21:10:52

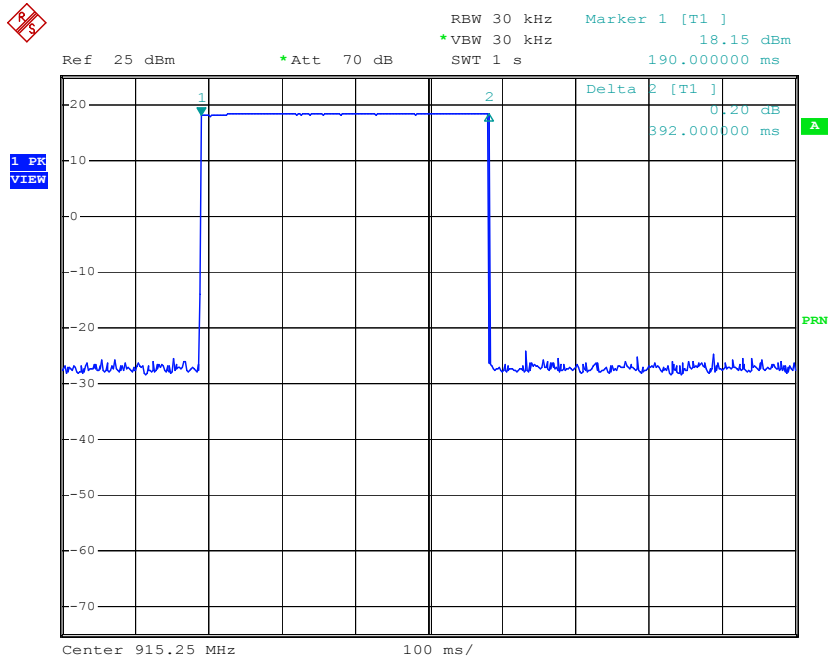
Channel: 25, Profile: 2, Scan time: 1 second

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Date: 12.DEC.2007 21:15:10

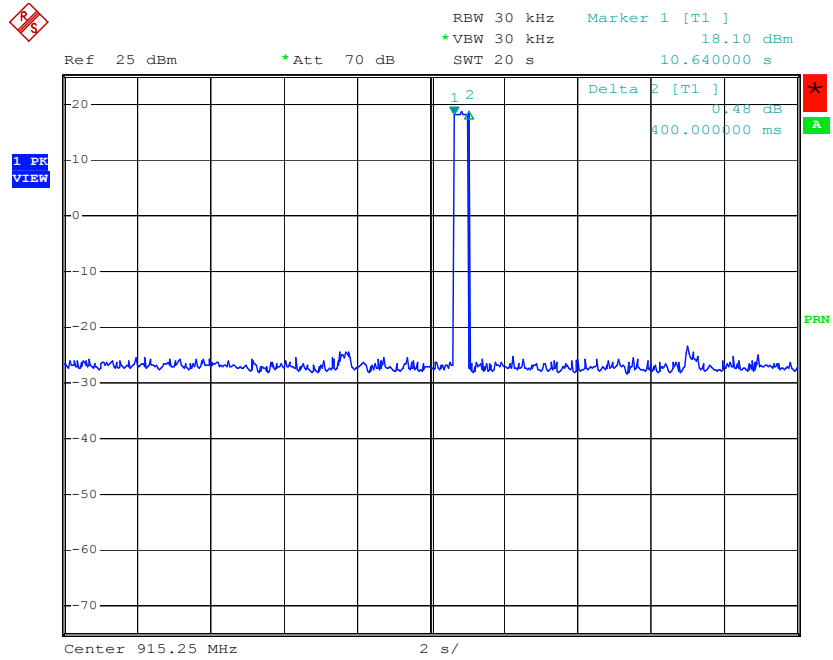
Channel: 25, Profile: 3, Scan time: 20 seconds



Date: 12.DEC.2007 21:13:00

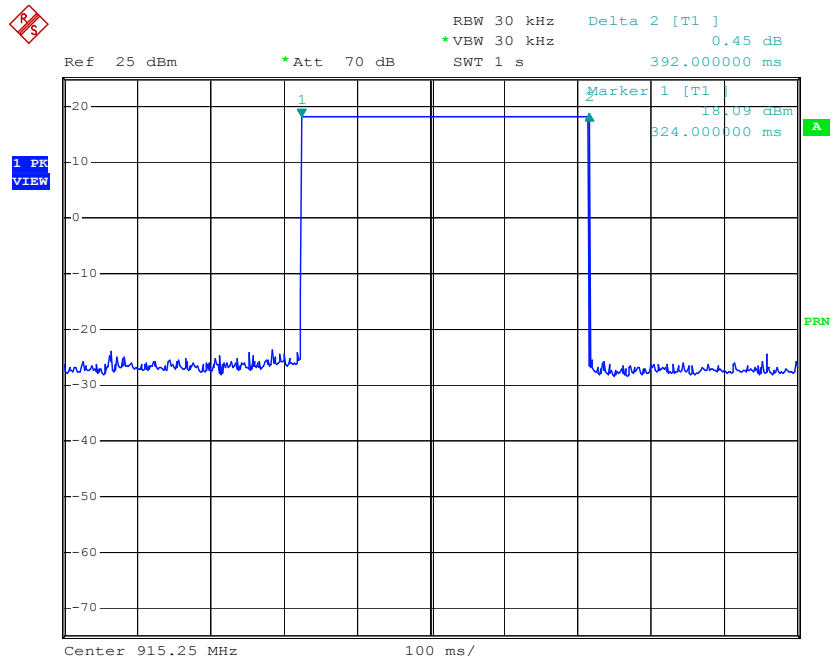
Channel: 25, Profile: 3, Scan time: 1 second

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Date: 12.DEC.2007 21:17:12

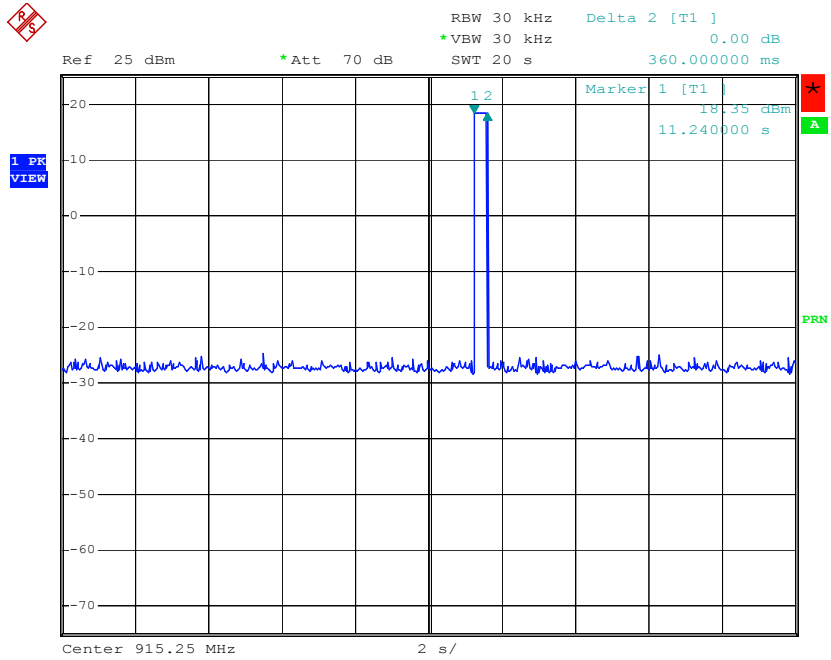
Channel: 25, Profile: 4, Scan time: 20 seconds



Date: 12.DEC.2007 21:22:09

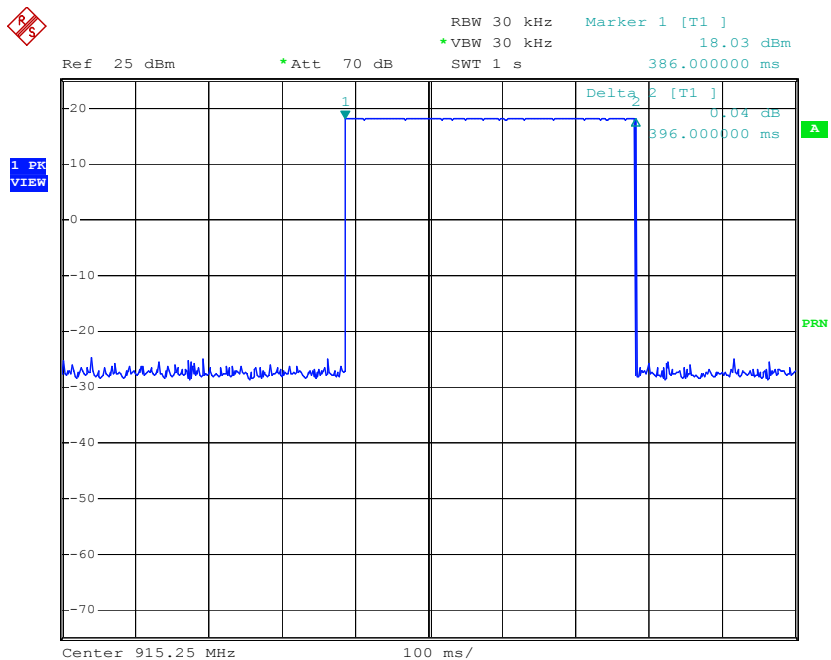
Channel: 25, Profile: 4, Scan time: 1 second

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Date: 12.DEC.2007 21:23:54

Channel: 25, Profile: 5, Scan time: 20 seconds



Date: 12.DEC.2007 21:24:52

Channel: 25, Profile: Scan time: 1 second

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Band-edge Compliance

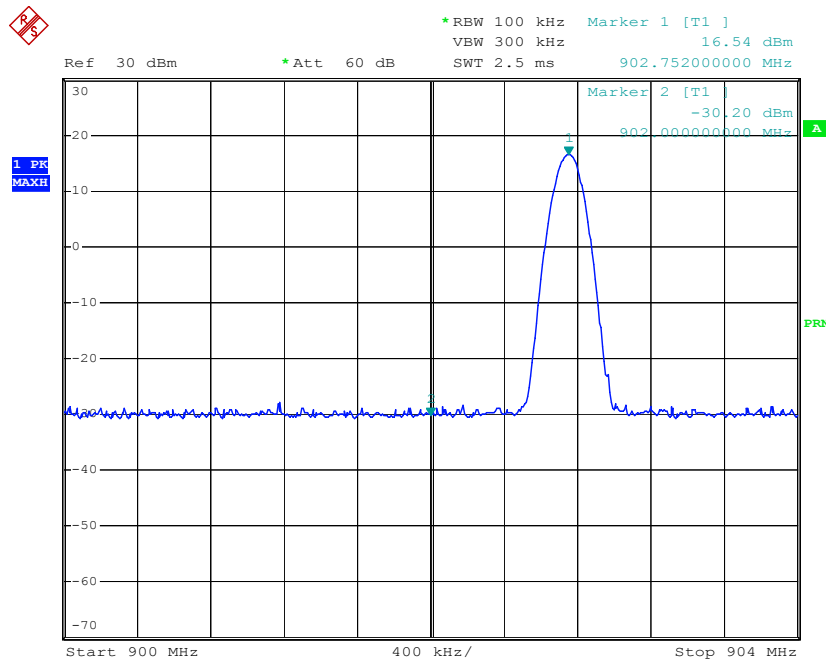
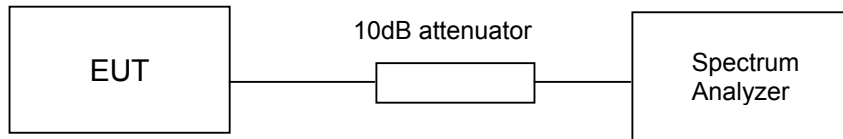
Section 15.247(d)

RESULT:

Pass

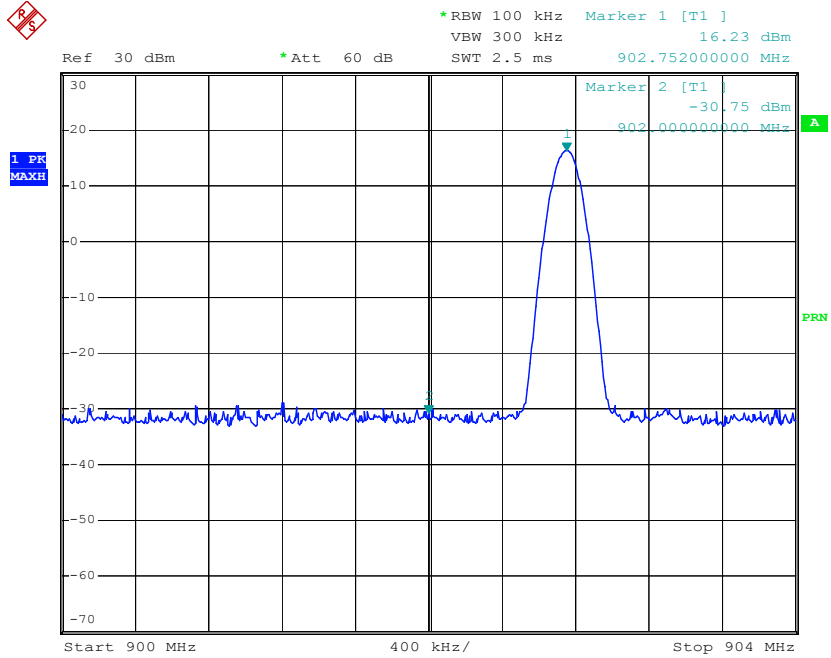
Test Specification : FCC Part 15 Section 15.247(d)
 Detector Function : Peak
 Supply Voltage : 14.8V battery
 Requirement : In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz 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.

Test Method:



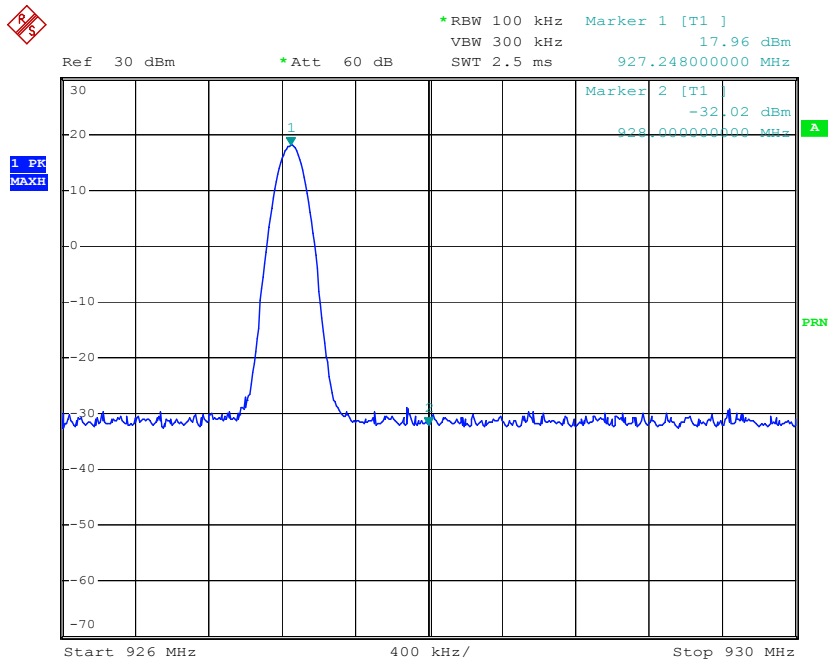
Date: 10.DEC.2007 19:47:18

Band-edge Measurement - Channel 0, Profile 0



Date: 10.DEC.2007 19:48:45

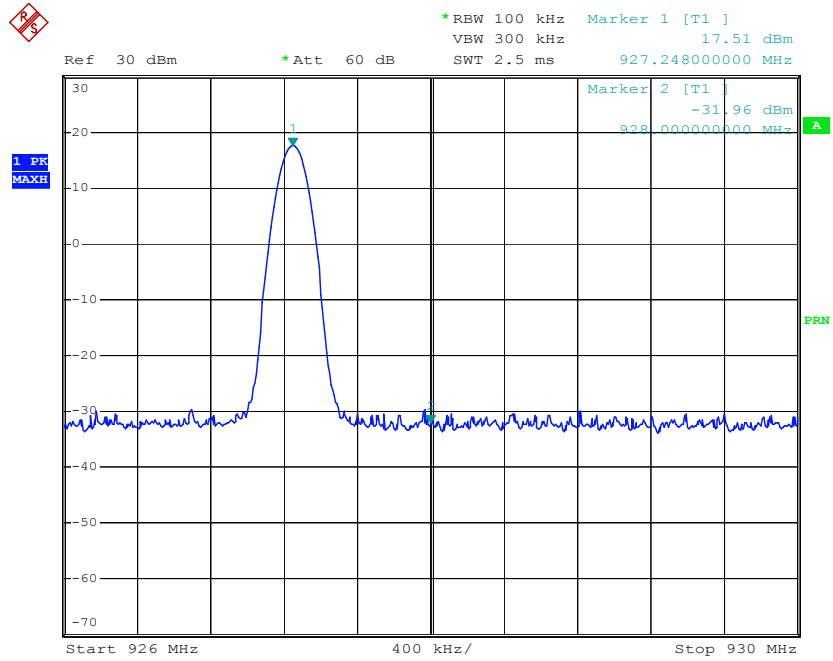
Band-edge Measurement - Channel 0, Profile 5



Date: 10.DEC.2007 19:52:04

Band-edge Measurement - Channel 49, Profile 0

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Date: 10.DEC.2007 19:53:26

Band-edge Measurement - Channel 49, Profile 5

RFID Transmission with WiFi Transmission Mode
Radiated Spurious Emission Test
Section 15.209
RESULT:
Pass

Test Specification : FCC Part 15 Section 15.205, 15.209 & 15.247(d)
 Test Method : ANSI C63.4-2003
 Measurement Location : Semi Anechoic Chamber
 Supply Voltage : 14.8V battery
 Measuring Frequency Range : 9kHz (Covered the lowest internal oscillator frequency of 32.768kHz) – 25GHz (Up to 10th harmonic of the highest fundamental frequency)
 Measurement Distance : 10m for frequency <30MHz, 3m for frequency >30MHz.
 Detector : QP for frequency below 1GHz, Average for frequency above 1GHz
 Requirement : 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. Attenuation below the general limits specified in Sections 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test result:

RFID Channel	RFID Tx Profile	WiFi Tx Channel	Wifi Data Rate (Mbps)	Antenna Polarisation	Spurious Emission (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
0	0	1	11	V	73.256	30.6	43.52	-12.9
					179.849	38.9	#	#
					199.833	42.3	#	#
					206.494	40.1	#	#
					532.888	36.2	#	#
					599.500	35.1	#	#
					1598.600	47.6	53.98	-6.4
				1805.400	45.6	#	#	
				H	3610.000	48.5	53.98	-5.5
					1598.000	47.1	53.98	-6.9
1805.400	46.9	#	#					
0	4	6	54	V	3616.900	43.3	53.98	-10.7
					73.257	31.1	43.52	-12.4
					179.849	39.3	#	#
					199.833	42.8	#	#
					206.494	40.2	#	#
					532.888	36.2	#	#
					599.499	35.2	#	#
				1598.000	48.0	53.98	-6.0	
				H	3611.000	49.7	53.98	-4.3
					1598.000	48.3	53.98	-5.7
2813.000	35.1	53.98	-18.9					
					3611.000	43.2	53.98	-10.8

RFID Channel	RFID Tx Profile	WiFi Channel	Wifi Data Rate (Mbps)	Antenna Polarisation	Spurious Emission (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
25	1	11	1	V	73.256	32.2	43.52	-11.3
					179.849	40.3	#	#
					199.833	42.6	#	#
					206.509	39.9	#	#
					532.888	36.2	#	#
					599.499	35.4	#	#
					1598.800	45.6	53.98	-8.4
					1830.400	45.2	#	#
				3661.000	51.0	53.98	-3.0	
				H	1598.900	47.0	53.98	-7.0
1830.400	48.5	#	#					
2799.200	33.7	53.98	-20.3					
3660.900	44.4	53.98	-9.6					
25	4	6	54	V	73.272	31.7	43.52	-11.8
					179.849	40.1	#	#
					199.833	42.8	#	#
					206.479	40.2	#	#
					532.888	36.4	#	#
					599.499	35.7	#	#
					1598.469	42.5	53.98	-11.5
					1830.521	46.0	#	#
				H	1598.585	47.9	53.98	-6.1
					1830.521	47.8	#	#
2794.030	33.7	53.98	-20.3					
49	4	6	54	V	73.256	30.9	43.52	-12.6
					179.849	39.1	#	#
					199.833	42.8	#	#
					206.494	40.1	#	#
					532.888	36.3	#	#
					599.500	35.0	#	#
					1598.000	47.6	53.98	-6.4
					1854.000	48.4	#	#
				H	3708.000	49.4	53.98	-4.6
					1598.000	47.8	53.98	-6.2
49	5	6	2	V	179.849	39.0	#	#
					199.833	42.9	#	#
					306.494	40.0	#	#
					532.888	36.1	#	#
					599.500	35.0	#	#
					1598.900	46.9	53.98	-7.1
					1854.500	48.6	#	#
					3708.900	50.7	53.98	-3.3
				H	1598.500	47.4	53.98	-6.6
					1854.400	49.1	#	#
	2793.500	34.1	53.98	-19.9				
	3709.100	43.7	53.98	-10.3				

Spurious emissions that do not fall into the restricted band of Section 15.205.

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Limit of section 15.209:

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	29.5*	30
30-88	100	40.0	3
88-216	150	43.52	3
216-960	200	46.0	3
Above 960	500	53.98	3

*The limit shows in the table above of frequency range 1.705MHz – 30MHz is correspond to $(29.5+9.5)=39.0\text{dB}\mu\text{V/m}$ at 10 meters measuring distance.

The emission limits show in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on the measurement employing an average detector.

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PC Mode

Radiated Spurious Emission Test

Section 15.109(a)

RESULT:

Pass

Test Specification : FCC Part 15 Section 15.109
 Test Method : ANSI C63.4-2003
 Measurement Location : Semi Anechoic Chamber
 Supply Voltage : 14.8V battery
 Measuring Frequency Range : 30MHz– 2GHz
 Measuring Distance : 3m
 Detector : QP for frequency below 1GHz, Average for frequency above 1GHz

Test Result:

Antenna Polarisation	Spurious Emission (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	106.577	36.1	43.52	-7.4
	113.239	36.3	43.52	-7.2
	119.900	36.4	43.52	-7.1
	213.156	30.1	43.52	-13.4
	266.444	33.2	46.0	-12.8
	466.277	35.7	46.0	-10.3
	599.500	37.3	46.0	-8.7
	799.334	40.1	46.0	-5.9
H	799.334	40.5	46.0	-5.5

Limit of section 15.109:

Frequency of Emission (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)
30-88	100	40.0
88-216	150	43.52
216-960	200	46.0
Above 960	500	53.98