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5.1.4 Out-of-Band Unwanted Emissions, Emissions FCC 15.323(d) and RSS-213 § 6.7.1**RESULT:****PASS**

Date of testing: 2008-06-18 and 2008-06-20

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Atmospheric pressure: 1010hPa

Requirements:

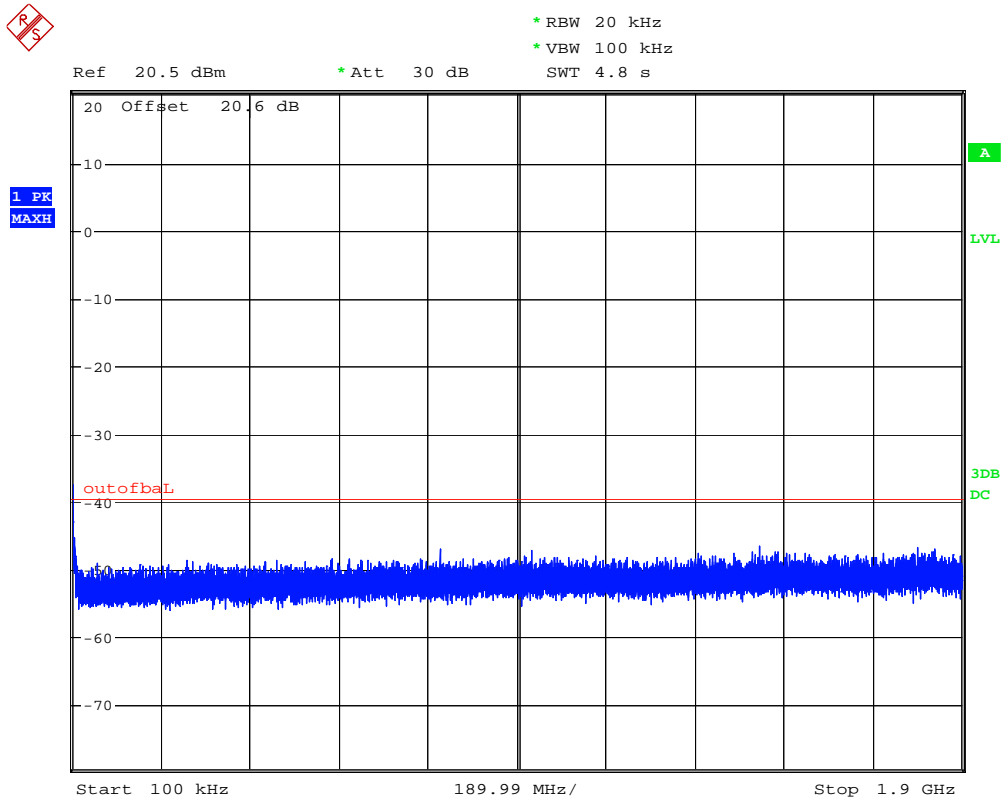
 $f \leq 1.25\text{MHz}$ outside band : limit -9.5dBm $1.25\text{MHz} \leq f \leq 2.5\text{MHz}$ outside band : limit -29.5 dBm $f \leq 2.5\text{MHz}$ outside band : limit -39.5 dBm

Test procedure:

ANSI C63.17-1998 § 6.1.6.1

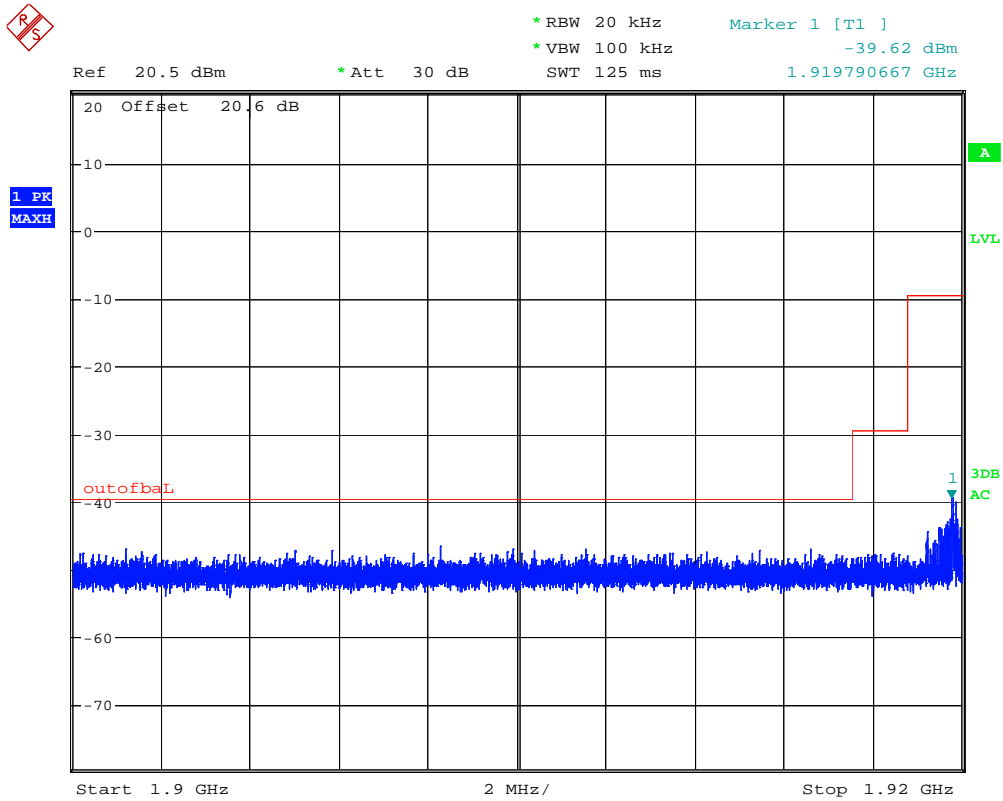
A spectrum analyzer was connected to the antenna port of the transmitter. For each channel investigated, the out-of-band measurements were performed.

Figure 18: Out-of-band emission of 1921.536MHz antenna port 0



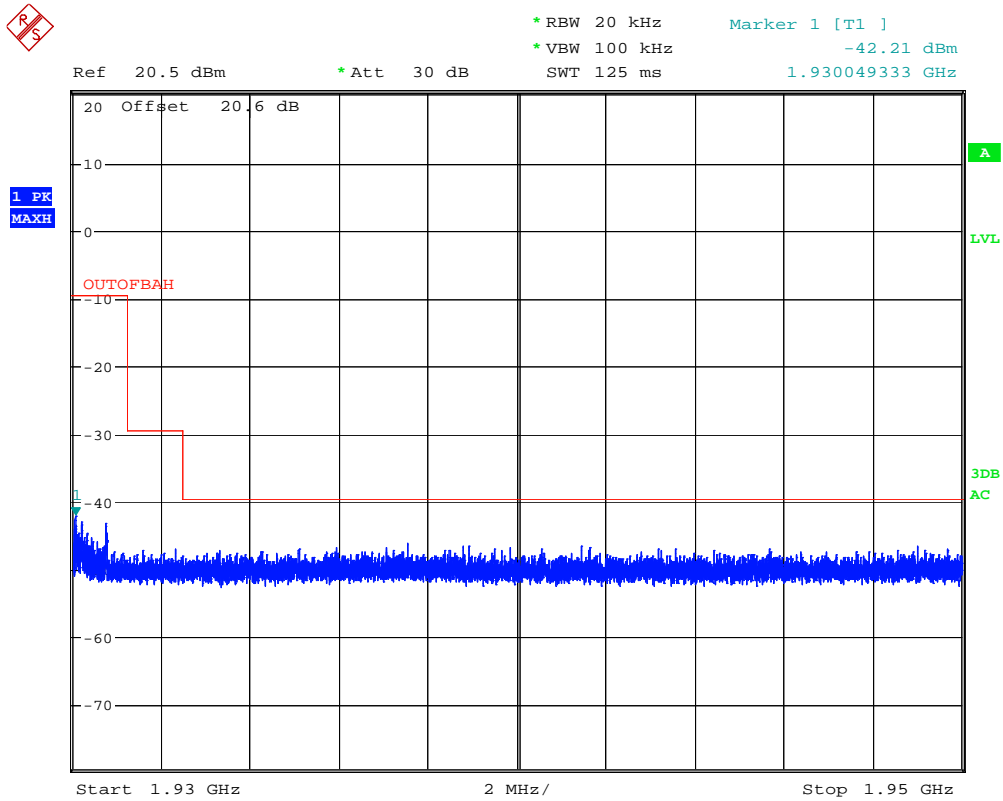
out of band emission
Date: 18.JUN.2008 17:47:01

Figure 19: Out-of-band emission of 1921.536MHz antenna port 0



out of band emission
Date: 18.JUN.2008 17:55:07

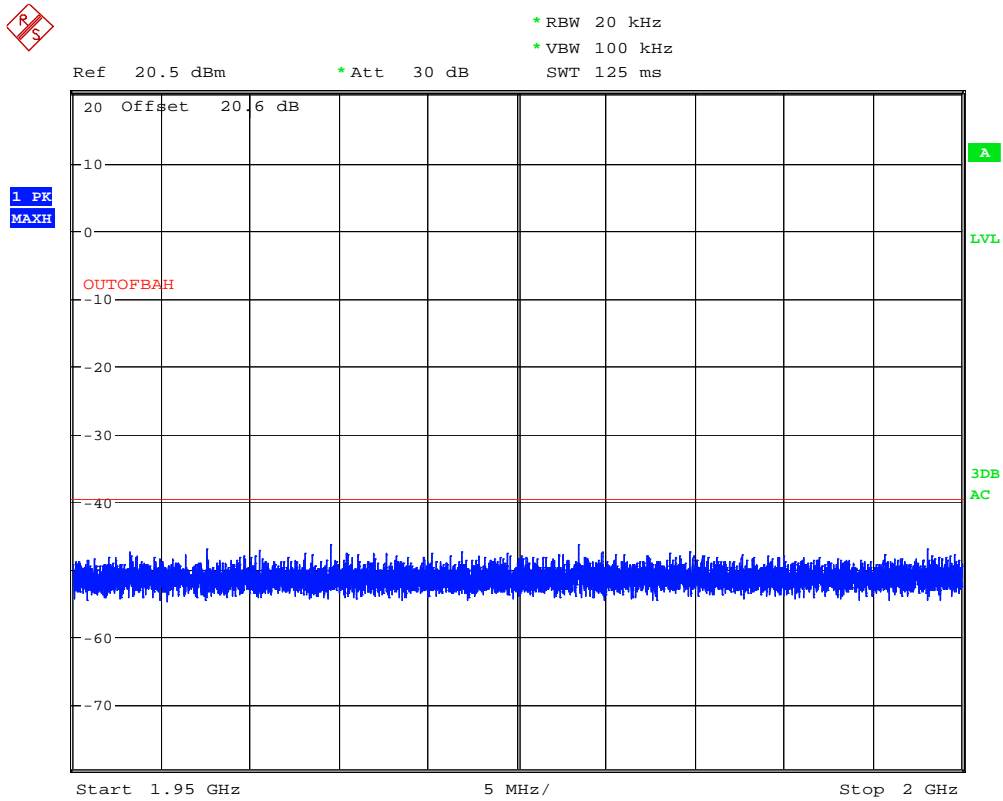
Figure 20: Out-of-band emission of 1928.448MHz antenna port 0



out-of-band emission

Date: 20.JUN.2008 11:35:26

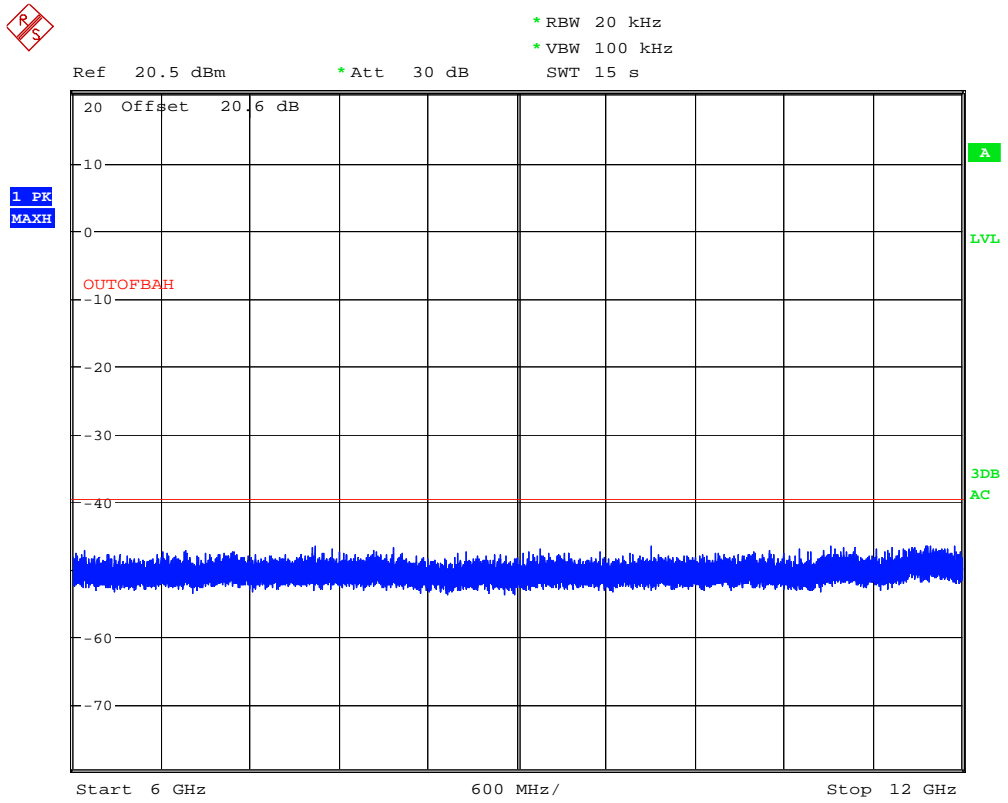
Figure 21: Out-of-band emission of 1928.448MHz antenna port 0



out-of-band emission

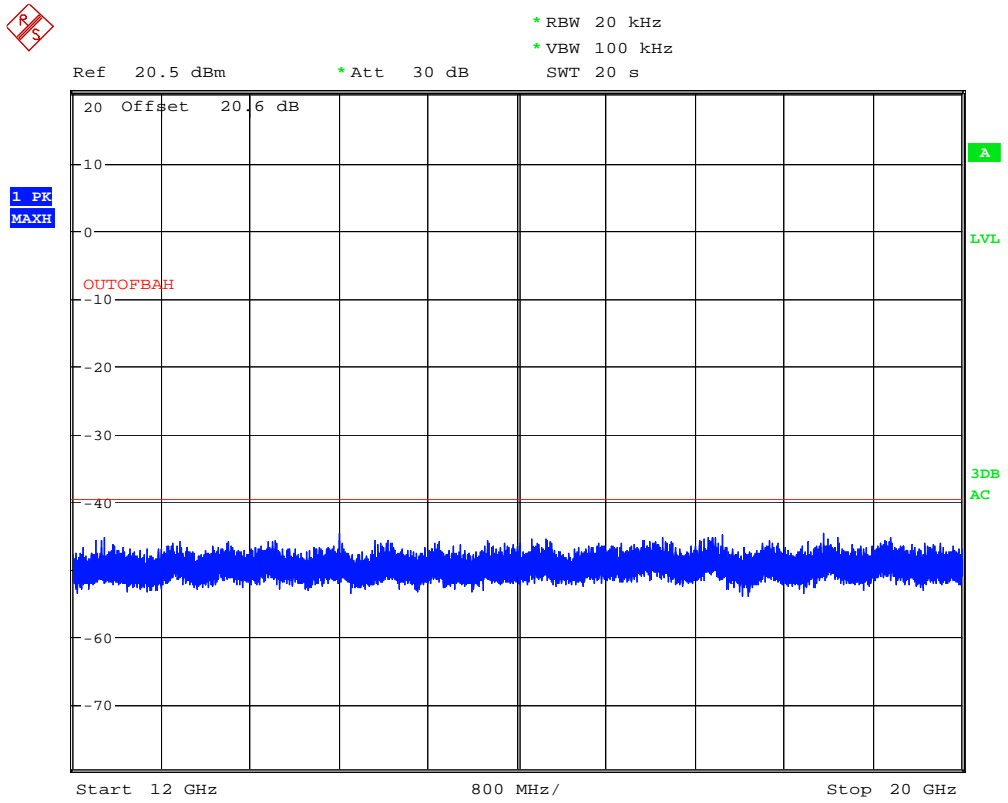
Date: 20.JUN.2008 11:36:42

Figure 23: Out-of-band emission of 1928.448MHz antenna port 0



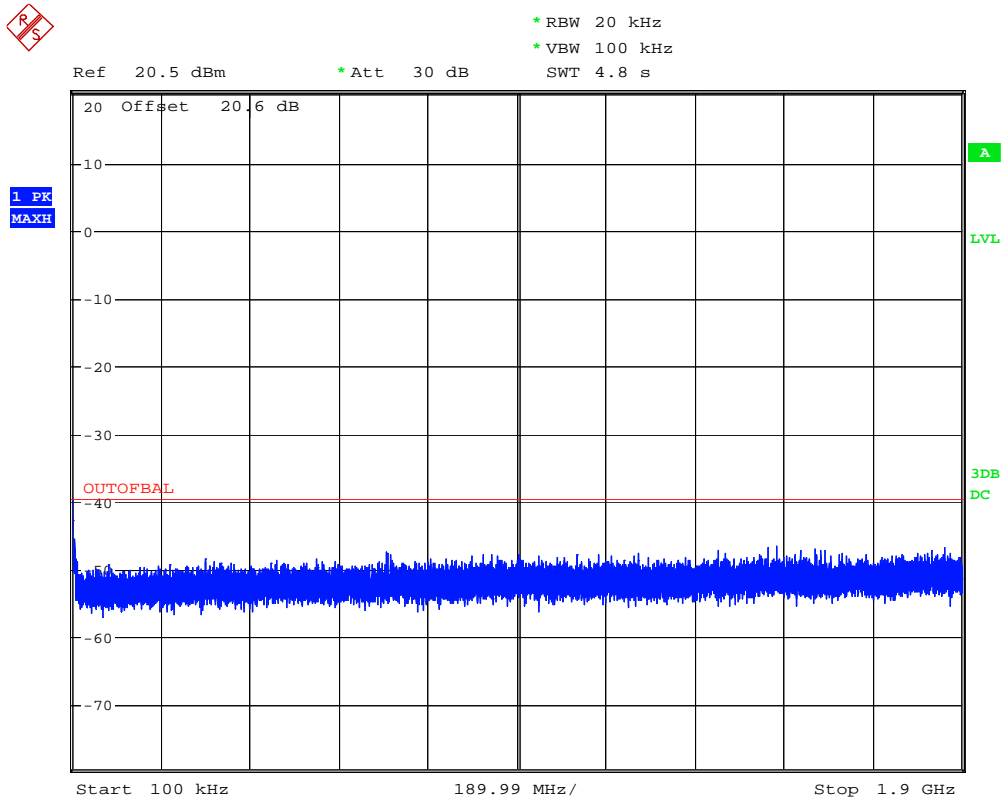
out-of-band emission
Date: 20.JUN.2008 11:41:09

Figure 24: Out-of-band emission of 1928.448MHz antenna port 0



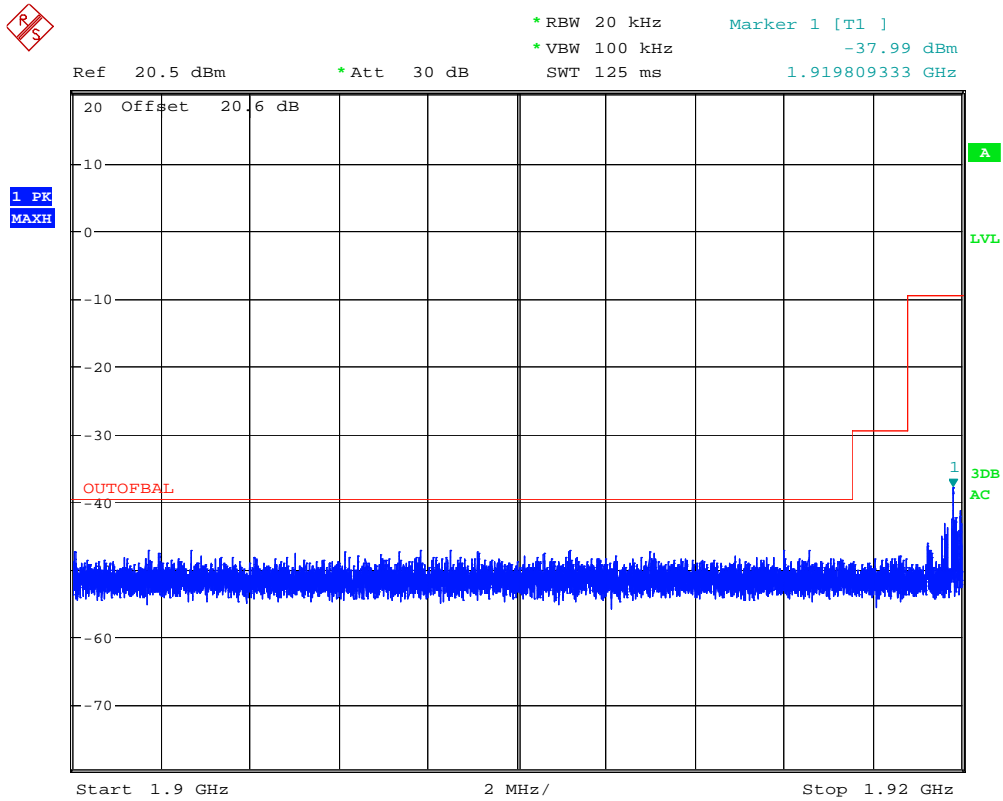
out-of-band emission
Date: 20.JUN.2008 11:43:00

Figure 25: Out-of-band emission of 1921.536MHz antenna port 1



out-of-band emission
Date: 20.JUN.2008 12:21:38

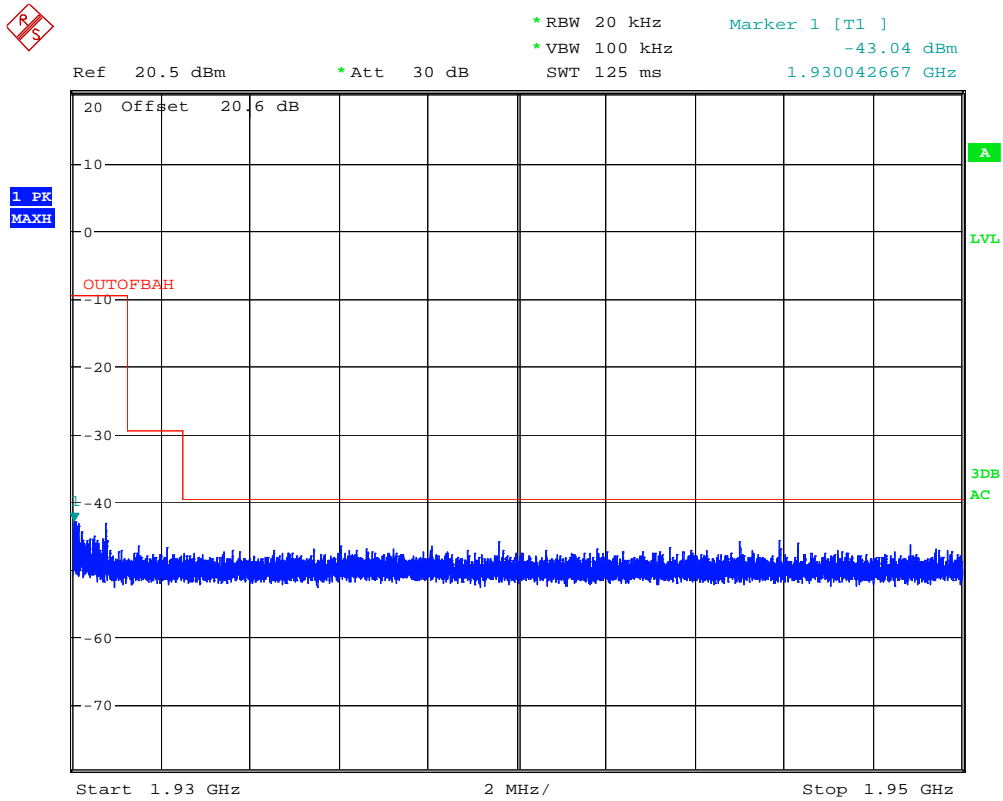
Figure 26: Out-of-band emission of 1921.536MHz antenna port 1



out-of-band emission

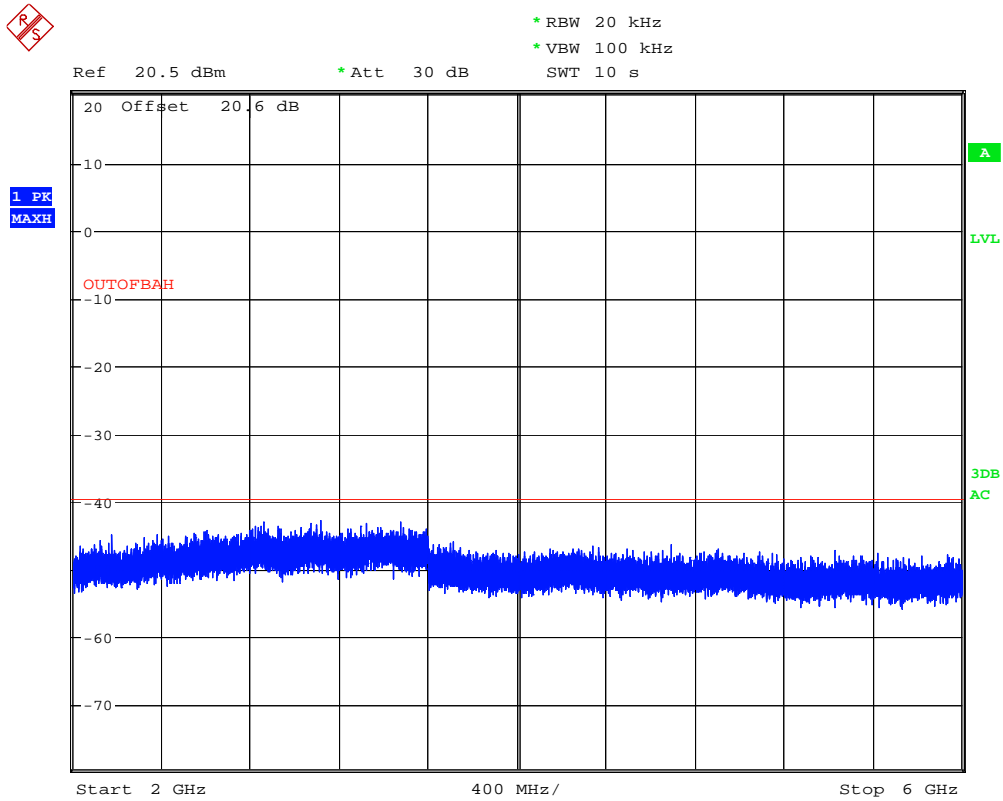
Date: 20.JUN.2008 12:18:02

Figure 27: Out-of-band emission of 1928.448MHz antenna port 1



out-of-band emission
Date: 20.JUN.2008 12:00:50

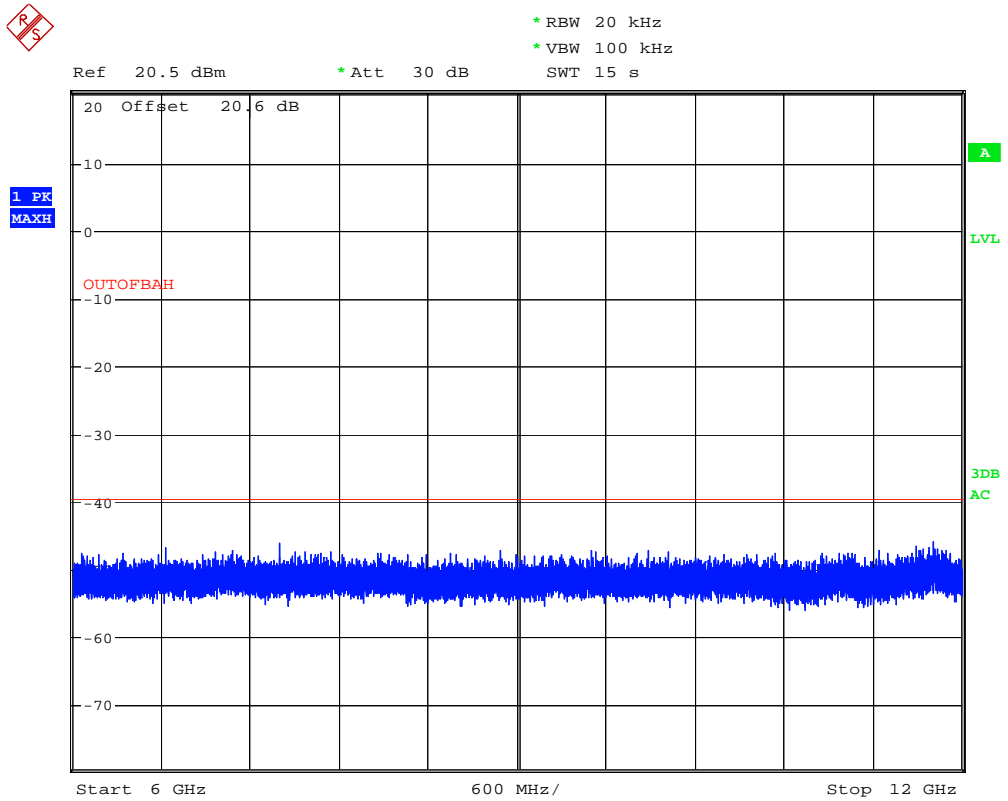
Figure 28: Out-of-band emission of 1928.448MHz antenna port 1



out-of-band emission

Date: 20.JUN.2008 12:05:28

Figure 29: Out-of-band emission of 1928.448MHz antenna port 1



out-of-band emission
Date: 20.JUN.2008 12:06:42

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5.1.5 Peak Power Spectral Density FCC 15.319(d) and RSS-213 § 6.6
RESULT:**PASS**

Date of testing: 2008-06-19

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Atmospheric pressure: 1010hPa

Requirements:

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

Test procedure:

ANSI C63.17-1998 subclause 6.1.5 .

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 3 kHz. The Video Bandwidth was set to 10 kHz, and the sweep time was set to 500sec..

Table 6: Peak Power Spectral Density at port 0

Frequency (MHz)	Limit (dBm)	Power Density (dBm)	Margin (dB)
1921.536	4.77	3.20	1.57
1928.448		3.29	1.48

Notes : 1) Power density = (Reading) + (Correction factor)

2) Correction factor = Cable loss

Figure 31: Power Spectral Density of 1921.536MHz antenna port 0

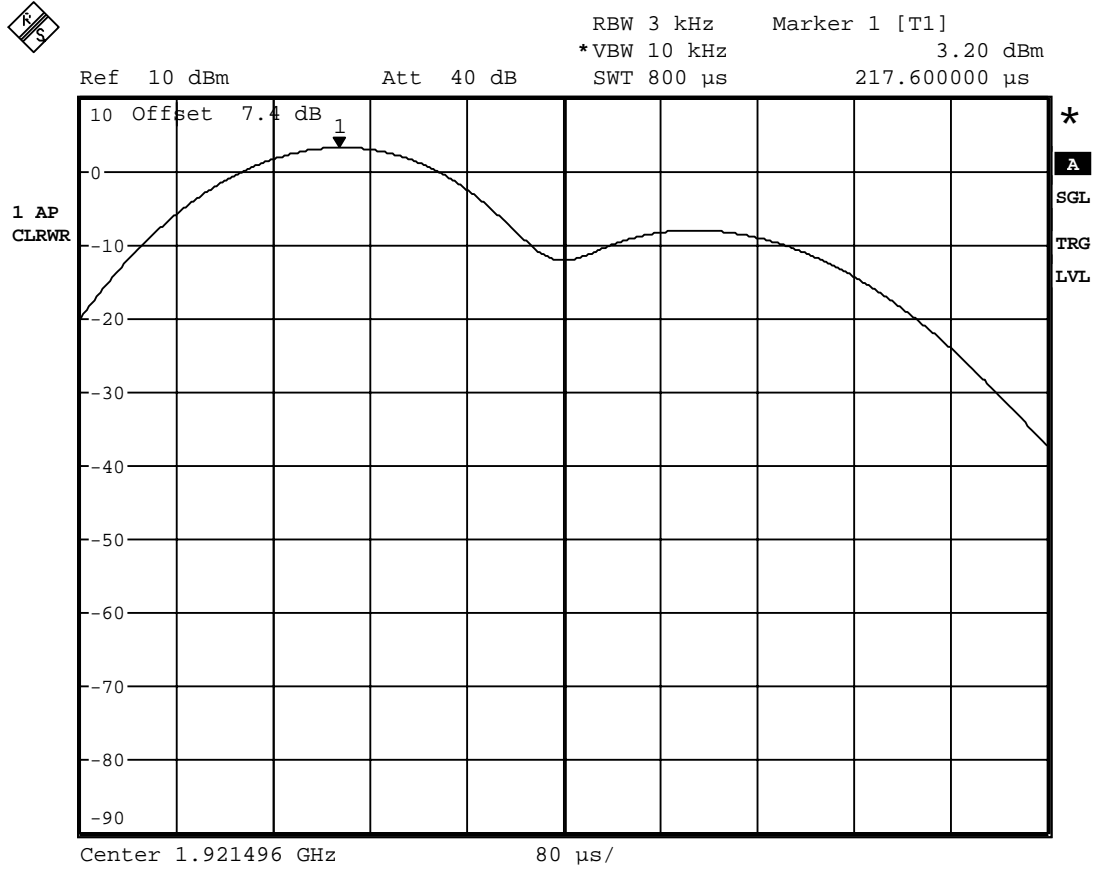


Figure 32: Power Spectral Density of 1928.448MHz antenna port 0

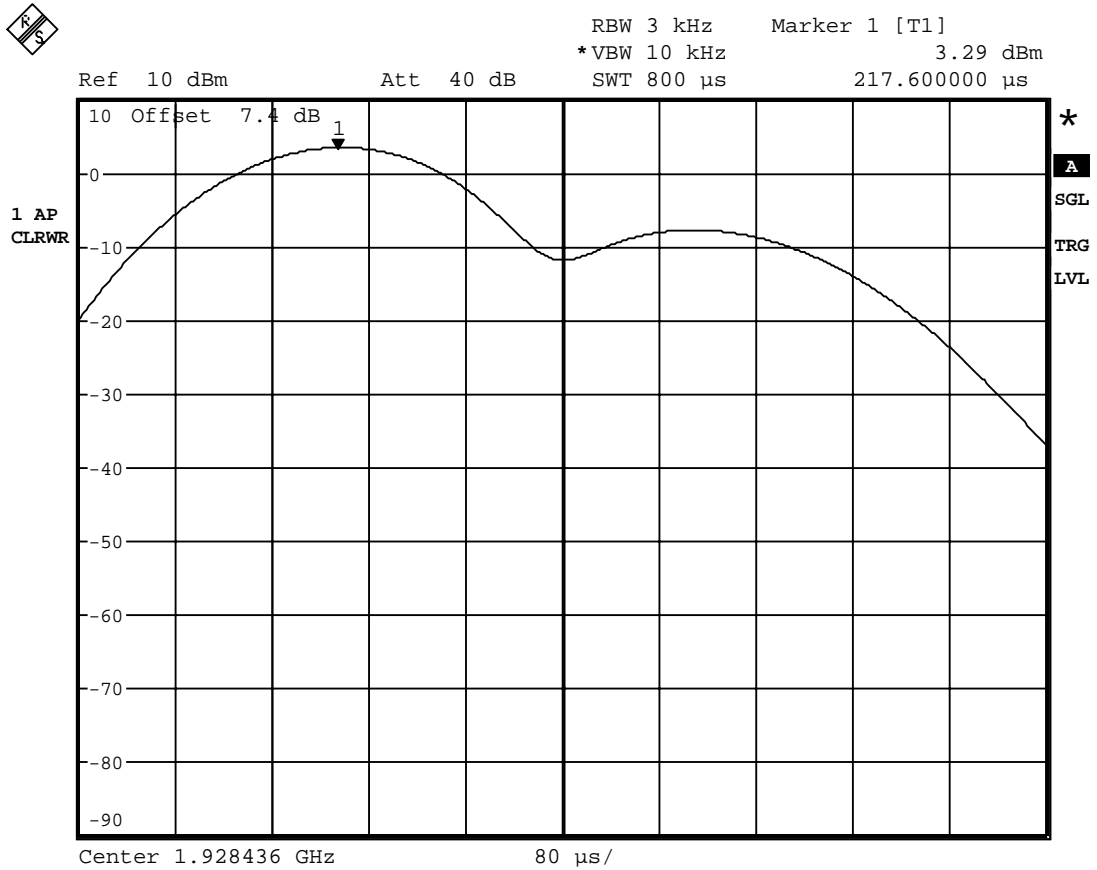
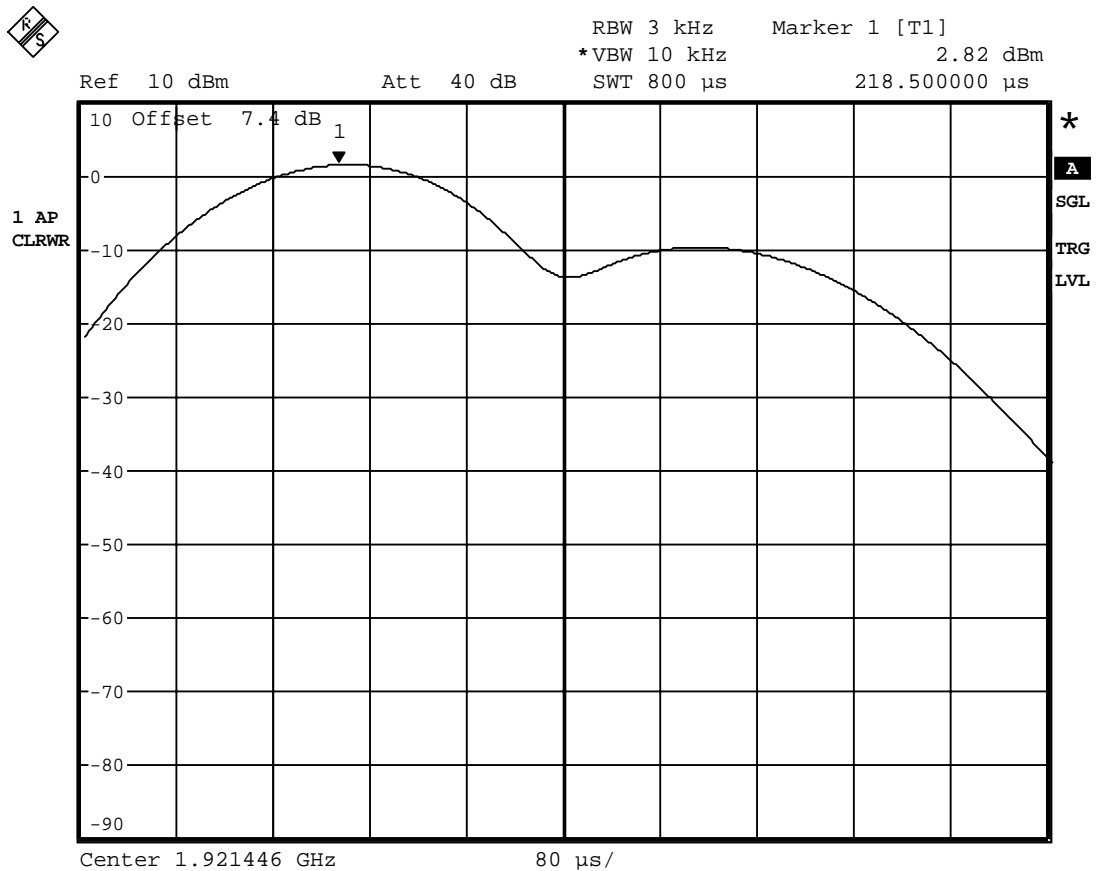


Table 7: Peak Power Spectral Density at port 1

Frequency (MHz)	Limit (dBm)	Power Density (dBm)	Margin (dB)
1921.536	4.77	2.82	1.95
1928.448		-3.76	8.53

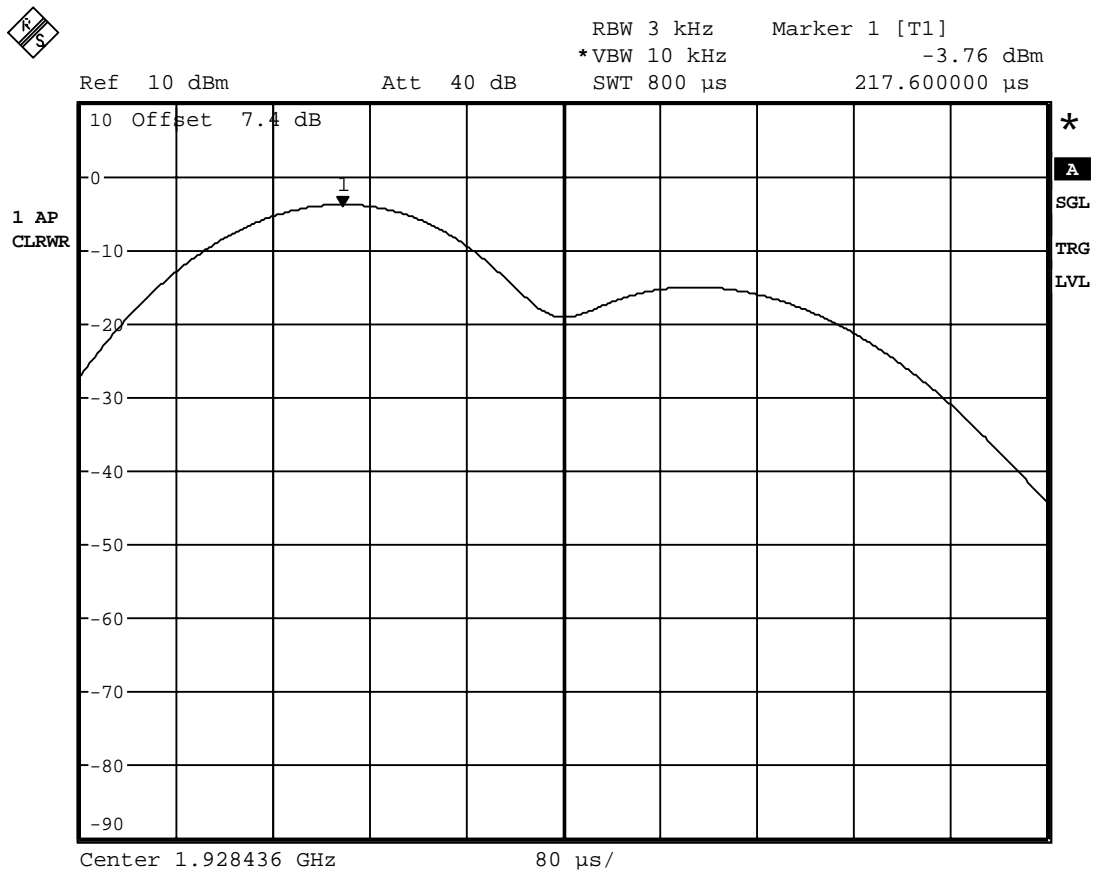
Notes : 1) Power density = (Reading) + (Correction factor)
2) Correction factor = Cable loss

Figure 33: Power Spectral Density of 1921.536MHz antenna port 1



:

Figure 34: Power Spectral Density of 1928.448MHz antenna port 1



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6. Test Results Conducted Emissions

6.1.1 Mains Terminal Continuous Disturbance Voltage FCC part 15.207

RESULT:**PASS**

Date of testing: 2008-07-01

Ambient temperature: 24.0°C

Relative humidity: 51%

Frequency range: (0.15 - 30)MHz

Kind of test site: Shielded Room

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.207(a).

Test procedure:

ANSI C63.4-2003

The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

The frequency range from 150kHz to 30MHz was investigated. Emission levels under (Limit - 20dB) were not recorded.

Pre-scan has been performed for all channels, the worst case channels have been shown on this test report.

Disturbances other than those mentioned are small or not detectable. Discontinuous noise emission exceeding the limit for continuous disturbances has not been observed.

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Table 8: Conducted Emission, 150kHz - 30MHz, Transmitter spurious, Quasi Peak and Average Data, Phase N (N) and L1 (L)

Freq. [MHz]	Phase	Reading QP [dB(μV)]	Reading AV [dB(μV)]	Factor [dB]	Level QP [dB(μV)]	Level AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
0.16491	L1	21.3	7.9	9.6	30.9	17.5	65.2	55.2	34.3	37.7
0.39658	L1	22.2	21.1	9.7	31.9	30.8	57.9	47.9	26	17.1
1.19176	L1	32.6	30.7	9.7	42.3	40.4	56	46	13.7	5.6
1.19306	N	33.2	31.3	9.7	42.9	41	56	46	13.1	5
8.35041	N	19.2	16.3	10	29.2	26.3	60	50	30.8	23.7
22.13018	N	20.7	18.4	10.4	31.1	28.8	60	50	28.9	21.2
22.92458	L1	19.2	17.3	10.3	29.5	27.6	60	50	30.5	22.4

Final test data was taken for the operation mode generating the highest emission only.

Figure 35: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase N (N), Transmitter spurious

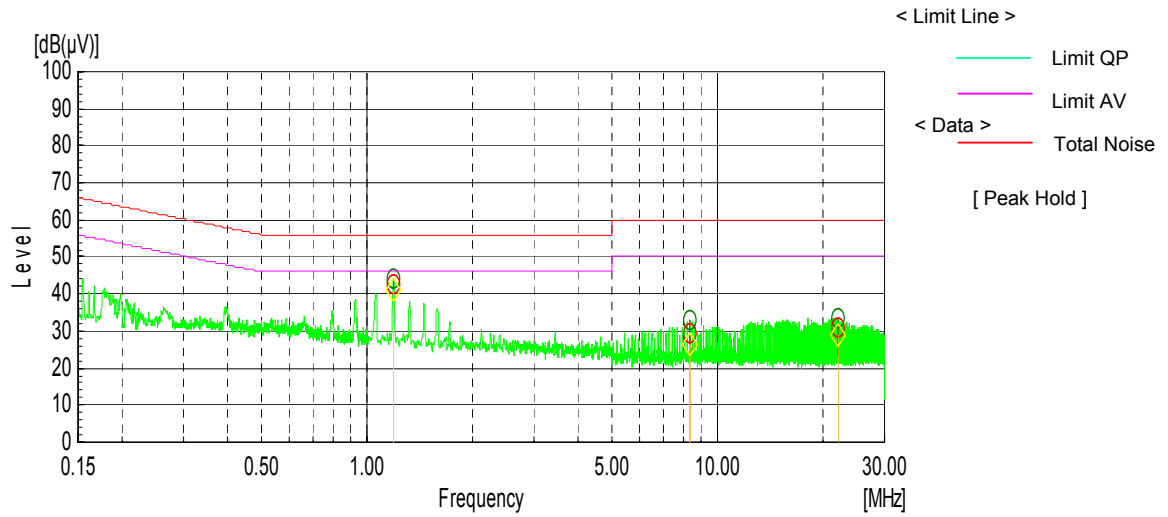
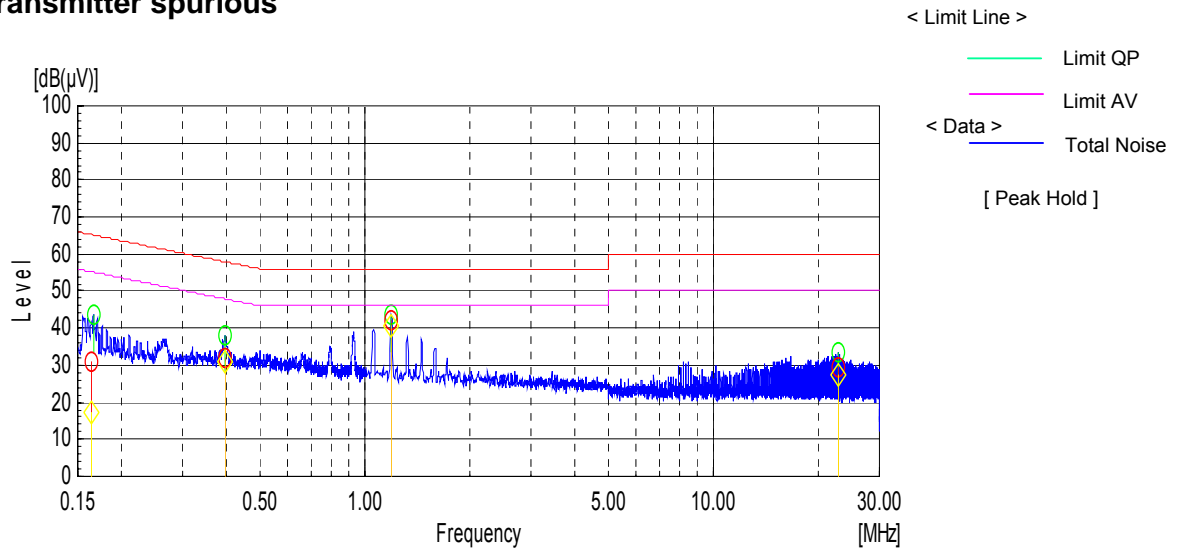


Figure 36: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase L1 (L), Transmitter spurious



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6.1.2 Mains Terminal Continuous Disturbance Voltage FCC part 15.107**RESULT:****PASS**

Date of testing: 2008-07-01

Ambient temperature: 24.0°C

Relative humidity: 51%

Classification: Class A

Frequency range: (0.15 - 30)MHz

Kind of test site: Shielded Room

Requirements:

The emissions shall not exceed the field strength specified in 15.107(a).

Test procedure:

ANSI C63.4-2003

The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

The frequency range from 150kHz to 30MHz was investigated. Emission levels under (Limit - 20dB) were not recorded.

EUT was configured with all ports active.

Disturbances other than those mentioned are small or not detectable. Discontinuous spurious emission exceeding the limit for continuous disturbances has not been observed.

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Table 9: Conducted Emission, 150kHz - 30MHz, Digital spurious, Quasi Peak and Average Data, Phase N (N) and L1 (L)

Freq. [MHz]	Phase	Reading QP [dB(μV)]	Reading AV [dB(μV)]	Factor [dB]	Level QP [dB(μV)]	Level AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
0.15075	L1	24.2	8.6	9.6	33.8	18.2	79	66	45.2	47.8
0.16753	N	21.5	7.8	9.6	31.1	17.4	79	66	47.9	48.6
1.20204	L1	31.7	30.5	9.7	41.4	40.2	73	60	31.6	19.8
1.20244	N	32.6	31.3	9.7	42.3	41	73	60	30.7	19
8.55719	L1	20	17.5	10	30	27.5	73	60	43	32.5
8.56831	N	3.5	-0.7	10	13.5	9.3	73	60	59.5	50.7
20.45979	N	21.7	18.6	10.3	32	28.9	73	60	41	31.1

Final test data was taken for the operation mode generating the highest emission only.

Figure 37: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase N (N), Digital spurious

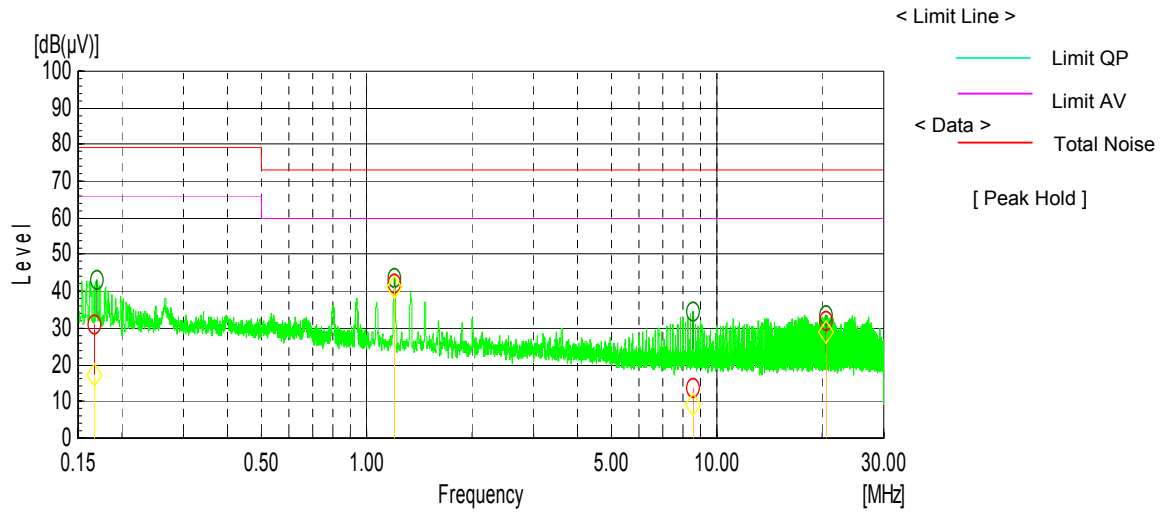
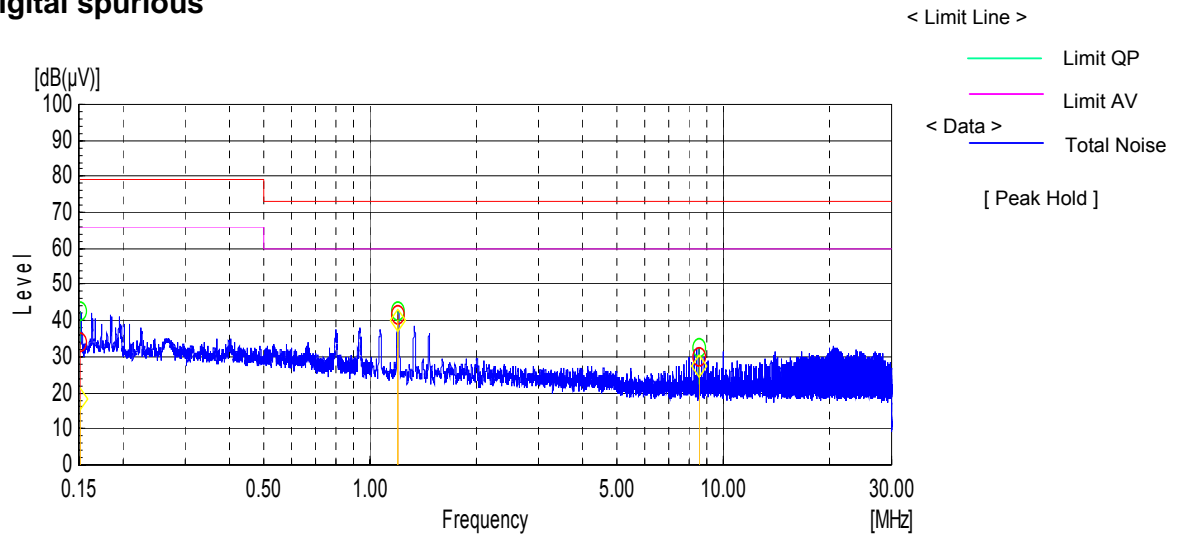


Figure 38: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase L1 (L), Digital spurious



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6.1.3 Mains Terminal Continuous Disturbance Voltage FCC part 15.107**RESULT:****PASS**

Date of testing: 2008-07-01

Ambient temperature: 24.0°C

Relative humidity: 51%

Classification: Class B

Frequency range: (0.15 - 30)MHz

Kind of test site: Shielded Room

Requirements:

The emissions shall not exceed the field strength specified in 15.107(a).

Test procedure:

ANSI C63.4-2003

The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

The frequency range from 150kHz to 30MHz was investigated. Emission levels under (Limit - 20dB) were not recorded.

Pre-scan has been performed for all channels, the worst case channels have been shown on this test report.

Disturbances other than those mentioned are small or not detectable. Discontinuous spurious emission exceeding the limit for continuous disturbances has not been observed.

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Table 10: Conducted Emission, 150kHz - 30MHz, Receiver spurious, Quasi Peak and Average Data, Phase N (N) and L1 (L)

Freq. [MHz]	Phase	Reading QP [dB(μV)]	Reading AV [dB(μV)]	Factor [dB]	Level QP [dB(μV)]	Level AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
0.15001	N	23.7	8.7	9.6	33.3	18.3	66	56	32.7	37.7
0.39686	N	21.4	20.1	9.7	31.1	29.8	57.9	47.9	26.8	18.1
1.19203	N	29.1	27.4	9.7	38.8	37.1	56	46	17.2	8.9
1.19446	L1	29.2	27.3	9.7	38.9	37	56	46	17.1	9
8.4836	L1	19.6	16	10	29.6	26	60	50	30.4	24
8.48595	N	21.8	19.6	10	31.8	29.6	60	50	28.2	20.4
22.54425	L1	19	16.1	10.3	29.3	26.4	60	50	30.7	23.6

Final test data was taken for the operation mode generating the highest emission only.

Figure 39: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase N (N), Receiver spurious

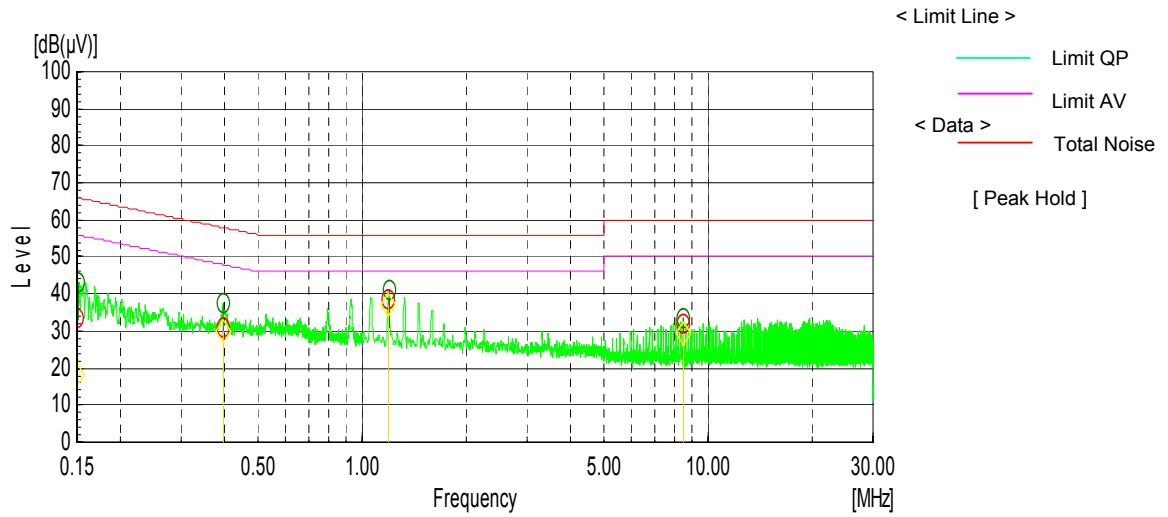
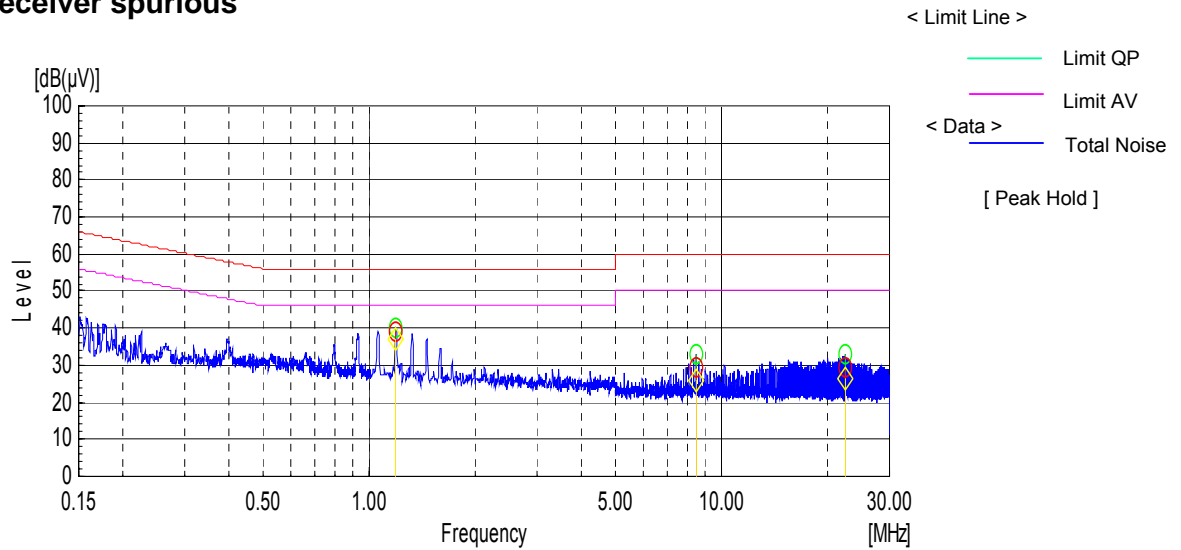


Figure 40: Spectral Diagrams, Conducted Emission, (0.15 - 30)MHz, Phase L1 (L), Receiver spurious



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7. Test Results Radiated Emissions

7.1.1 Radiated Emission out-of-band and spurious emission FCC part 15.323(d) and RSS-213 § 6.7

RESULT: PASS

Date of testing:	2008-08-14
Ambient temperature:	22.0°C
Relative humidity:	29%
Atmospheric pressure:	1010hPa
Frequency range:	9kHz – 19.3GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.323(d) and RSS-213 § 6.7.

Test procedure:

ANSI C63.17-1998

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned before final testing. This was done in order to determine its emissions spectrum profile. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements, at each frequency, in order to ensure that maximum emission amplitudes were attained.

The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9kHz to the 10th harmonic of the highest fundamental transmitter frequency (19.3 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. Emissions are measured using following settings:

RBW=10kHz, VBW=30kHz

The worst-case, maximum radiated emission was recorded and used as reference for the ERP measurement.

The EUT was then replaced by a substitution antenna, which was connected to a RF signal generator with a coaxial cable.

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The search antenna height, and search antenna polarity was set to levels that produced the maximum reading . The signal generator was adjusted to a level that produced the same radiated emission level than the one obtained in the previous step.

The signal generator level was recorded and corrected by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna. The signal generator corrected level is the ERP level

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

Table 11: Radiated Emission 30MHz – 19.3GHz, Horizontal & Vertical Antenna Orientations at 1921.536MHz,

Freq. [MHz]	Final Measurement Reading (dBuV)	Antenna Polarization	Antenna Height (cm)	SG output (dBm)	Output Power (dBm)	Limit (dBm)
1821.338	53.2	V	130	-32.0	-41.93	9.00
3857.084	57.7	V	119	-22.1	-43.15	13.3
9552.535	56	V	105	-60	-11.76	13.7
9595.075	56.7	H	108	-51.8	-11.78	13.7
9563.502	55.4	V	103	-58.3	-11.74	13.7
9623.363	55.7	V	103	-56.6	-11.74	13.6
9629.036	56.7	H	100	-52	-11.83	13.6
9656.32	55.9	H	112	-52.5	-11.81	13.6
9669.61	56.1	V	101	-57	-11.86	13.6
9763.37	56.4	V	107	-56	-11.98	13.4

Table 12: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, at 1928.448MHz

Freq. [MHz]	Final Measurement Reading (dBuV)	Antenna Polarization	Antenna Height (cm)	SG output (dBm)	Output Power (dBm)	Limit (dBm)
1908.448	56.5	V	100	-26.5	-42.04	9.5
3857.253	55.7	H	119	-25.8	-43.26	13.3
9552.625	55.9	V	105	-58.8	-11.79	13.7
9612.899	56.1	H	102	-53.9	-11.87	13.6
9626.331	56.6	H	103	-53.3	-11.93	13.6
9633.332	56.8	V	103	-55.5	-11.84	13.6
9669.47	56.3	H	111	-54	-11.98	13.6
9672.446	56.2	V	103	-57	-11.91	13.6
9717.907	56.6	H	112	-54.8	-11.97	13.4
9721.54	56.7	H	111	-54.2	-11.96	13.4

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8. Test Results Radiated Spurious Emission

8.1.1 Radiated Emission Receiver

RESULT:
PASS

Date of testing:	2008-08-13
Ambient temperature:	21.6°C
Relative humidity:	50%
Atmospheric pressure:	1006hPa
Frequency range:	30MHz - 1GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.109 class B and RSS-Gen Table 1.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10

The physical arrangement of the test system and associated cabling was varied in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made at 3meters. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 5th harmonic of the highest fundamental transmitter frequency (10 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode.

For emissions above 1000 MHz, emissions are measured using following settings:

Peak: RBW=1MHz, VBW=1MHz

Average: RBW=1MHz, VBW=10Hz

The highest emission amplitudes relative to the appropriate limit were recorded in this report.

Emissions other than those mentioned are small or not detectable.

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Table 13: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
57.304	H	42	-23.1	18.9	40	21.1	395	338
59.149	V	57.1	-23.7	33.4	40	6.6	100	131
114.061	V	44	-25.5	18.5	43.5	25	106	178

Table 14: Radiated Emission Receiver 1GHz-10GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data

Freq. [MHz]	Antenna Orientation	Level AV [dB(μV/m)]	Level PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]
1902.922	V	23.4	37.4	54	74	30.6	16.6
1974.075	H	23.4	37.6	54	74	30.6	16.4

Notes : 1) All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

2) AV: average, PK: peak

3) The peak measured value complies with the average limit hence measurement of the AV value can be omitted.

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8.1.2 Radiated Emission Digital Spurious

RESULT:**PASS**

Date of testing: 2008-08-14

Ambient temperature: 21.6°C

Relative humidity: 50%

Atmospheric pressure: 1006hPa

Equipment classification: class A

Frequency range: 30MHz - 1GHz

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in 15.109 class A and ICES-003:2004.

Test procedure:

ANSI C63.4-2003

The physical arrangement of the test system and associated cabling was varied in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made at 3meters. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane.

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode.

The highest emission amplitudes relative to the appropriate limit were recorded in this report.

Emissions other than those mentioned are small or not detectable.

Figure 41: Spectral Diagram, Radiated Emission 30MHz - 1GHz, Horizontal Antenna Orientation

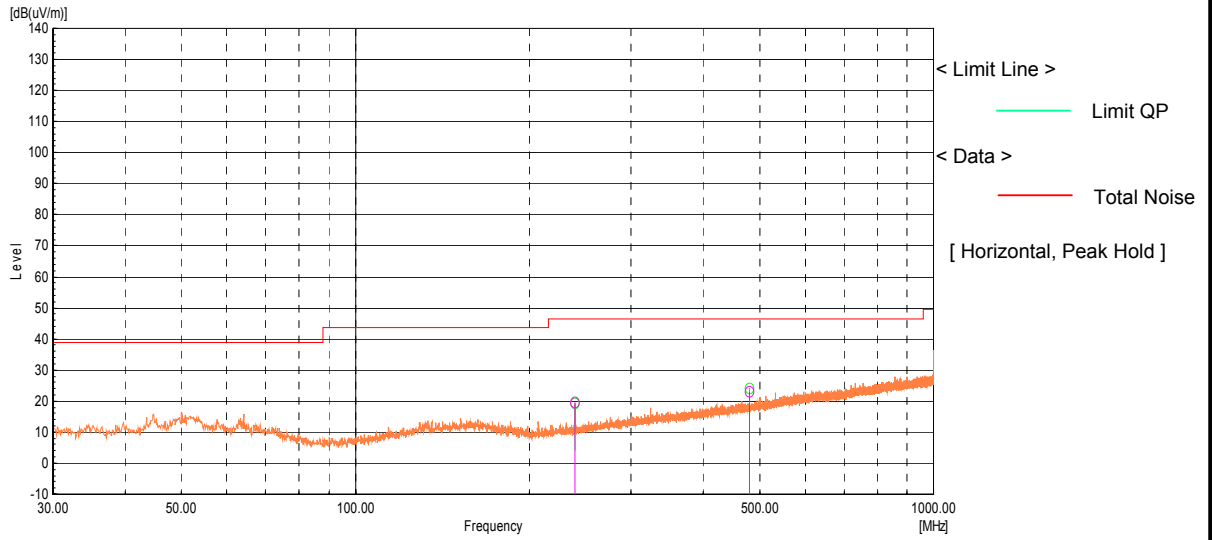
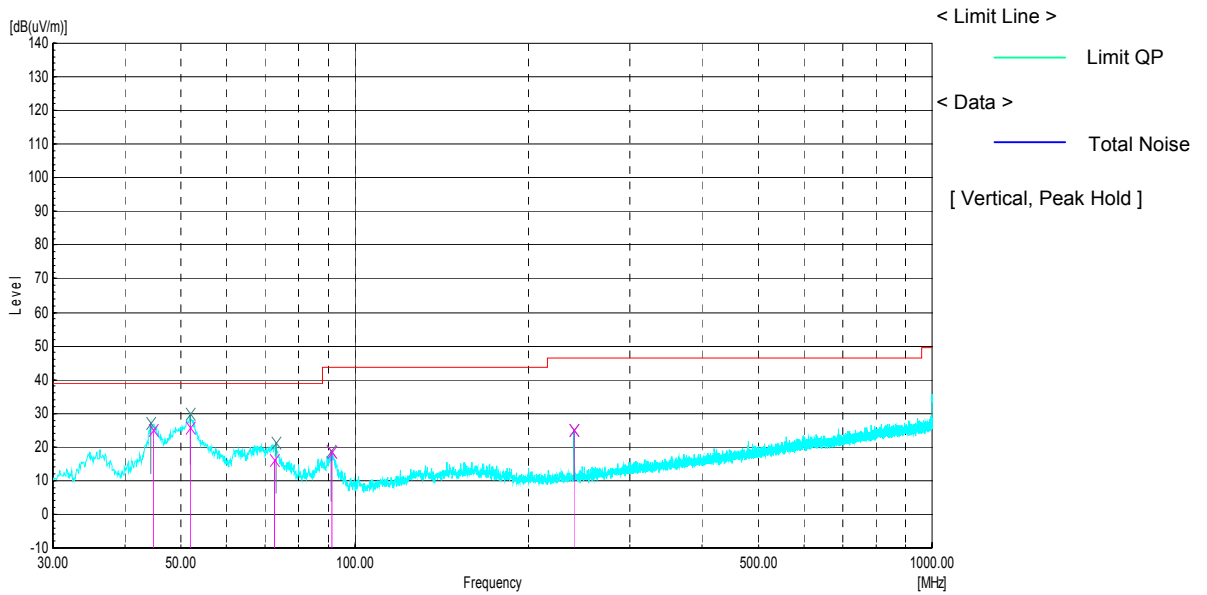


Figure 42: Spectral Diagram, Radiated Emission 30MHz - 1GHz, Vertical Antenna Orientation



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Table 15: Radiated Emission 30MHz - 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data

Freq. [MHz]	Antenna Orientation	Result (Measured) QP [dB(μV)]	Factor [dB(1/m)]	Level QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
44.838	V	48.3	-23.3	25	39	14	108	254
51.92	V	49.1	-23.3	25.8	39	13.2	151	174
72.558	V	42	-25.8	16.2	39	22.8	210	324
91.199	V	46.6	-28	18.6	43.5	24.9	148	269
240.006	V	48.8	-23.6	25.2	46.4	21.2	103	186
240.018	H	43.8	-24.1	19.7	46.4	26.7	375	233
480.002	H	39.3	-16.2	23.1	46.4	23.3	173	106

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9. Verification of Access Protocols

9.1.1 Automatic Discontinuation of Transmission FCC 15.319(f) and RSS-213 § 4.3.4(a)

RESULT: PASS

Date of testing: 2008-08-01

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Requirements:

Section 15.319(f)

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.

Test procedure:

The following tests simulate the reaction of the EUT in case of either absence of information to transmit or operational failure after a connection with the companion device is established. This may be met by reference to relevant portions of the DECT standards.

The following tests are performed after a connection is first established between the EUT and its companion device.

Table 16: Test case operational failure requirement

Test	EUT Reaction	Verdict
1 Power removed from the EUT	A	Pass
2 EUT Switch Off	N/A	Pass
3 Hook-On by companion device	B	Pass
4 Hook-On by EUT	N/A	Pass
5 Power Removed from Companion Device	B	Pass
6 Companion Device Switch Off	B	Pass

A - Connection breakdown, Cease of all transmissions

B - Connection breakdown, EUT transmits control and signaling information

C - Connection breakdown, Companion Device transmits control and signaling information

N/A - Not Applicable (the EUT does not have an on/off switch and can not perform Hook-

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9.1.2 Listen before transmit FCC 15.323(c)

RESULT:

PASS

Requirements:

Section 15.323(c)

Requirements for isochronous devices operating in the UPCS sub-band.

Test procedure:

This requirement is met as shown in section 9.1.4 to 9.1.15.

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9.1.3 Monitoring Time FCC 15.323(c)(1) and RSS-213 § 4.3.4(b)**RESULT:****N/A**

Requirements:

§ 15.323(c)(1)

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

Test procedure:

ANSI C63.17-1998 subclause 7.5.

The base EUT never initiates a communication link since the base station receives the request for communication from the companion device.

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9.1.4 Monitoring Threshold, Least Interfered Channel FCC 15.323(c)(2)(5) and RSS-213 § 4.3.4(b)

RESULT:**PASS**

Date of testing: 2008-07-09

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Monitoring Threshold Limits:

Lower Threshold:

TL = $15 \log B - 184 + 30 - \text{PEUT}$ (dBm)

Upper Threshold:

TU = $15 \log B - 184 + 50 - \text{PEUT}$ (dBm)*B* is measured Emission Bandwidth in Hz

PEUT is measured Transmitter Power in dBm

Value Calculated

Lower Threshold	-81.4
Upper Threshold	-61.4

Requirements:

The Lower Threshold is applicable for systems which have defined less than 40 duplex system access channels. The Upper Threshold is applicable for systems with more than 40 duplex system access channels and that implements the Least Interfered Channel Procedure (LIC).

Test procedure:

ANSI C63.17-1998 subclause 7.3.2.

Table 17: Lower and Upper Threshold

Least Interfered Channel Procedure NOT used:	
Lower Threshold	NA
Least Interfered Channel Procedure	
Upper Threshold	-62.2 dBm

Table 18: Least Interfered Channel (LIC) Procedure Test

ANSI C63.17	Observation	Verdict
b) F_1 TL + 13 dB F_2 at TL + 6 dB	Transmission always on F_2	Pass
c) F_1 TL + 6 dB F_2 at TL + 13 dB	Transmission always on F_1	Pass
d) F_1 TL + 7 dB F_2 at TL	Transmission always on F_2	Pass
e) F_1 TL F_2 at TL + 7 dB	Transmission always on F_1	Pass

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9.1.5 System Acknowledgment and Maximum Transmit Period 15.323(c)(3)(4) and RSS-213 § 4.3.4(b)

RESULT:**PASS**

Date of testing: 2008-08-06

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Requirements:

15.323(c)(3): 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.

15.323(c)(4): Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease.

Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.

Test procedure:

Acknowledgments: ANSI C63.17-1998 subclause 8.2.1

Transmission duration: ANSI C63.17-1998 subclause 8.2.2

During the initial transmission, the time/spectrum from the EUT to the companion device is monitored via a spectrum analyzer.

Table 19: Acknowledgments

ANSI C63.17	Observation	Verdict
Initial transmission without acknowledgements	Only for initiating device	N/A
Transmission time after loss of acknowledgements	5.9s	Pass

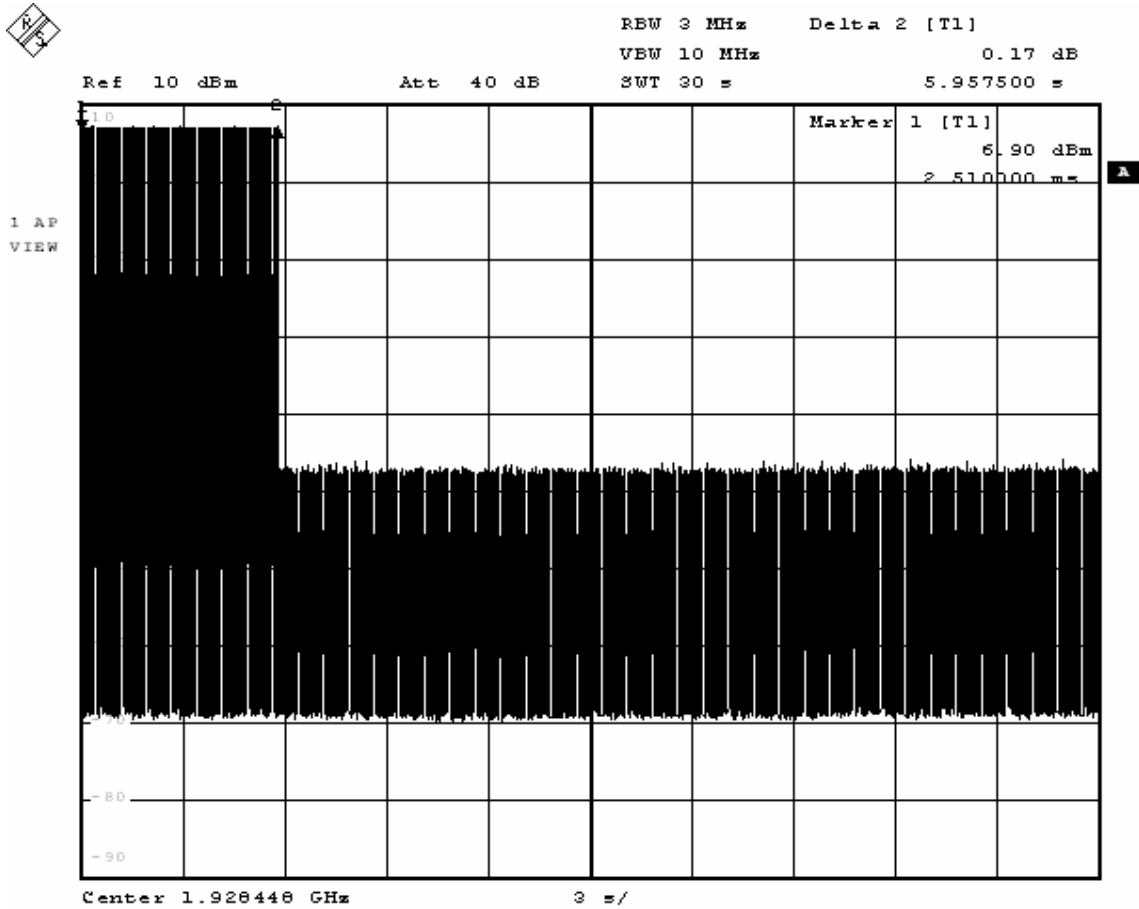
Table 20: Transmission Duration

ANSI C63.17	Observation	Verdict
Transmission duration on same time and spectrum window	Only for initiating device that controls which time slot is used	N/A

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Figure 43: Acknowledgments plots



Comment A: acknowledgement
Date: 6.AUG.2008 19:30:30

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*Page 75 of 91***9.1.6 Channel Confirmation Period 15.323(c)(5) and RSS-213 § 4.3.4(b)****RESULT:****PASS**

Requirements:

15.323(c)(5): A device utilizing the provisions of this paragraph shall have monitored all access channels defined for its system within the last 10 s and shall verify, within the 20 ms (40 ms for devices designed to use a 20 ms frame period) immediately preceding actual channel access, that the detected power of the selected time and spectrum windows is no higher than the previously detected value.

Test procedure:

ANSI C63.17-1998 subclause 7.3.2.1

Refer to the test item Monitoring time and Least Interfered Channel section 9.1.11 and 9.1.4.

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**9.1.7 System Acknowledgment and Maximum Transmit Period
15.323(c)(5) and RSS-213 § 4.3.4(b)(5)****RESULT:****PASS**

Requirements:

15.323(c)(5): The power measurement resolution for this comparison must be accurate to within 6 dB.

Test procedure:

ANSI C63.17-1998 subclause 7.3.2.1

The power measurement resolution for the testing performed according to part 15.323(c)(5) was accurate by at least 6dB.

9.1.8 Segment Occupancy 15.323(c)(5) and RSS-213 § 4.3.4(b)(5)**RESULT:****PASS**

Requirements:

15.323(c)(5): No device or group of cooperating devices located within 1 meter of each other shall occupy more than three 1.25 MHz channels during any frame period.

RSS-213 § 4.3.4(b)(5): No device or group of cooperating devices located within 1 meter of each other shall during any frame period occupy more than 6 MHz of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the system.

Test procedure:

Declaration from client: The device complies with the DECT standards issued by ETSI, EN 300 175-2 and EN 300 175-3. Therefore during any frame period, the cooperating devices will not occupy more than one channel bandwidth.

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Requirements:

15.323(c)(6): 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 windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

Test procedure:

ANSI C63.17-1998 subclause 8.1.3

The option describe in part 15.323(c)(6) is not available on the EUT.

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9.1.10 Monitoring Bandwidth 15.323(c)(7) and RSS-213 § 4.3.4(b)(7)
RESULT:**PASS**

Date of testing: 2008-07-27

Ambient temperature: 25.0 °C

Relative humidity: 24 %

Requirements:

15.323(c)(7): The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}$ (1.25/ emission bandwidth in MHz) microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds.

RSS-213 § 4.3.4(b)(7): The monitoring system bandwidth must be equal to or greater than the occupied bandwidth of the intended transmission. Note: Testing of the monitoring system bandwidth is not required if the designed bandwidth from the manufacturer is available and given in the test report.

Test procedure:

ANSI C63.17-1998 subclause 7.4

Table 21: Monitoring Bandwidth

ANSI C63.17	Observation	Verdict
Simple Compliance test	No transmissions	Pass
More Detailed Test, at -6 dB points	N/A	N/A
More Detailed Test, at -12 dB points	N/A	N/A

Note:

- Test was performed with the level at upper level threshold+ 4dB
- The tested EUT uses the same receiver for monitoring and communication, this test is therefore not required. However the test has been performed nonetheless and the test is passed.

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**9.1.11 Monitoring Reaction Time 15.323(c)(7) and RSS-213
 §4.3.4(b)(7)**
RESULT:**PASS**

Date of testing: 2008-07-27

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Requirements:

15.323(c)(7): The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds. If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds but shall not be required to be less than 35 microseconds.

Test procedure:

ANSI C63.17-1998 subclause 7.5

Table 22: Monitoring Reaction Time

Pluse width ANSI C63.17	Observation	Verdict
largest of 50 μs or $50 \times \text{SQRT}(1.25/B)$	No transmission	Pass
largest of 35 μs or $35 \times \text{SQRT}(1.25/B)$, and with interference level raised 6 dB	No transmission	Pass

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*Page 80 of 91***9.1.12 Monitoring Threshold Relaxation 15.323(c)(9) and RSS-213
§4.3.4(b)(9)****RESULT:****PASS**

Requirements:

15.323(c)(9): Devices that have a power output lower than the maximum permitted under this subpart may increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

Test procedure:

ANSI C63.17-1998 subclause 4

EUT could increase the upper threshold by 1 dB based on a maximum rated transmit power found in table 2 and 3.

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9.1.13 Duplex System LBT 15.323(c)(10) and RSS-213 §4.3.4(b)(10)**RESULT:****N/A**

Requirements:

15.323(c)(10): An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit 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.

Test procedure:

ANSI C63.17-1998 subclause 8.2.3

The EUT does not contain this option

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9.1.14 Alternative Monitoring Interval 15.323(c)(11) and RSS-213 §4.3.4(b)(11)**RESULT:****N/A**

Requirements:

15.323(c)(11): 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 the 1.25 MHz frequency channel(s) already occupied by that device or co-located co-operating devices. 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.

Test procedure:

ANSI C63.17-1998 subclause 8.2.4

The EUT does not contain this option

9.1.15 Fair Access 15.323(c)(12) and RSS-213 §4.3.4(b)(12)**RESULT:****N/A**

Requirements:

15.323(c)(12): 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 to other devices.

Test procedure:

This EUT does not use any mechanisms as allowed by Part 15.323(c)(10) or (c)(11) to deny fair access to spectrum to other devices.

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9.1.16 Frame Period 15.323(e) and RSS-213 §4.3.4(c)
RESULT:
PASS

Date of testing: 2008-08-08

Ambient temperature: 24.0 °C

Relative humidity: 24 %

Requirements:

15.323(e): 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 or 10 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 million (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.

Test procedure(Frame Repetition Stability):

ANSI C63.17-1998 subclause 6.2.3 and 6.2.4

A spectrum analyzer was used in order to determine the time duration between the rising edges of two consecutive frames over a period of at least 100 frames period. The results was use to calculate the 3X standard deviation of the frequency stability

Table 23: Frame Repetition Stability

Maximum Frame Repetition Stability (Hz/ppm)	Limit(ppm)	Verdict
< 0.0001Hz/3ppm	10	Pass

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Test procedure (Timing Jitter):

ANSI C63.17-1998 subclause 6.2.3 and 6.2.4

The CMD60 was logged by a computer programmed to get accurate readings over the noted time period or number of readings. The peak-to-peak difference was recorded and the mean value and deviation in ppm was calculated.

Table 24: Timing Jitter

Frame Period (ms)	Maximum Jitter(μs)	Limit Max Jitter(μs)	Verdict
10.0	-0.04	25	Pass

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9.1.17 Frequency Stability 15.323(f) and RSS-213 §6.2

RESULT: PASS

Date of testing: 2008-08-13

Ambient temperature: 24.0 °C
Relative humidity: 46 %

Requirements:
15.323(f): The frequency stability of the carrier frequency of the intentional radiator shall be maintained within +/-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° to +50 °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

Test procedure:
ANSI C63.17-1998 subclause 6.2.2

Table 25: Frequency Stability

Frequency stability	Low temp-20°C	Nominal Temp	High Temp 50°C
	2 kHz	2 kHz	13 kHz
	1.0 ppm	1.0 ppm	6.7 ppm

Frequency stability	Low Voltage	High Voltage
	13 kHz	13 kHz
	6.7 ppm	6.7 ppm

Limit:±10ppm

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9.2 MPE Calculation

9.2.1 Calculation RF exposure

RESULT:
PASS

The calculated of MPE limit at given distance

Equation of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

where: S = Power density

P = Power input to the antenna

G = Antenna gain

R = Distance to the center of radiation of the antenna

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

Frequency Range (MHz)	Power Density (mW/cm ²)	Averaging Time (minutes)
1500 - 100000	1.0	30

where f = Frequency (MHz)

Calculation:

P Max power input to the antenna: 19.0 dBm / 79.4 mW

R Distance: 20 cm

S MPE limit for uncontrolled exposure: 1 mW/cm²

G Antenna gain: 2.2 numerical

Calculated Power density: **0.0346 mW/cm²**

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