FCC Part 15D

Measurement and Test Report

For

Medical Alarm Concepts

5215-C Militia Hill Road, Plymouth Meeting, PA 19462(Pennsylvania)

FCC ID: XWI200910B

Report Concerns: Original Report	**Equipment Type:** MediPendant (Base Station)
Model:	MED01
Report No.:	STR09108104I-1
Test/Witness Engineer:	John Shi
Test Date:	2009-10-30 to 2009-11-10
Issue Date:	2009-11-17
Prepared By:	**SEM.Test Compliance Service Co., Ltd** 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C.（518101）
Approved & Authorized By:	Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Medical Alarm Concepts
Address of applicant:	5215-C Militia Hill Road, Plymouth Meeting,PA 19462 (Pennsylvania)
Manufacturer:	Prosoyo Technology Limited
Address of manufacturer:	Tai Po Industrial Estate, Gang Zi District, Chang Ping, Dong Guan, Guang Dong, China

General Description of E.U.T

Items	Description
EUT Description:	MediPendant (Base Station)
Trade Name:	Medical alarm concepts
Model No.:	MED01
Rated Voltage:	Base Station DC6V Battery or Adapter 120V50Hz Output DC 6V
Max. Output Power	18.55dBm
Frequency range:	1921.536 ~ 1928.448MHz
Number of Channel:	5
Type of Antenna:	Integral Antenna
Size:	Base Station 12.2X7.8X4.0cm

Note: The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Medical Alarm Concepts in accordance with FCC Part 15, Subpart C, and section 15.203, 15.315, 15.317, 15.319 and 15.323 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.315, 15.317, 15.319 and 15.323 of the Federal Communication Commissions rules

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.17-2006, and ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

1.5 Test Facility

- **FCC – Registration No.: 994117**
  SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**
  The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Phone Line	1.70	Unshielded	Without Core
Power Cable	1.80	Unshielded	Without Core

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.319(i)	RF Radiation Exposure	Compliant
§ 15.317 § 15.203 § 15.319(e)	Antenna Requirement	Compliant
§ 15.315 § 15.207	Conducted Emission	Compliant
§ 15.323(a)	Emission Bandwidth	Compliant
§ 15.319(c)	Peak Transmit Power	Compliant
§ 15.319(d)	Peak Spectral Density	Compliant
§ 15.323(d)	Emission Inside and Outside the sub-band	Compliant
§ 15.319(g)	Radiated Emission	Compliant
§ 15.323(f)	Frequency Stability	Compliant
§ 15.323(c)(e) § 15.319(f)	Specific Requirements for UPCS	Compliant

3. RF RADIATION EXPOSEURE

3.1 Standard Applicable

According to § 1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

3.2 MPE Calculation Method

$S = (P*G) / (4*\prod*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

3.3 MPE Calculation Result

For Base Station Unit
Maximum peak output power at antenna input terminal: 18.55(dBm)
Maximum peak output power at antenna input terminal: 71.61434(mW)
Prediction distance: 20 (cm)
Prediction frequency: 1928.448 (MHz)
Antenna gain (typical): 0 (dBi)
Antenna gain (numeric): 1 (numeric)
The worst case is power density at prediction frequency at 20cm: 0.014247 (mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

0.014247 (mw/cm^2) < 1 (mw/cm^2)

Result: Compliant

4. ANTENNA REQUIREMENT

4.1 Standard Applicable

According to FCC 15.317 and 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
Accord to CFR 47 FCC 15.319(e) The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

4.2 Test Result

This product has a permanent antenna, fulfill the requirement of this section.
The antenna gain is less than 3 dBi provide by manufacture.

5. CONDUCTED EMISSIONS

5.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 0.5 dB.

5.2 Test Equipment List and Details

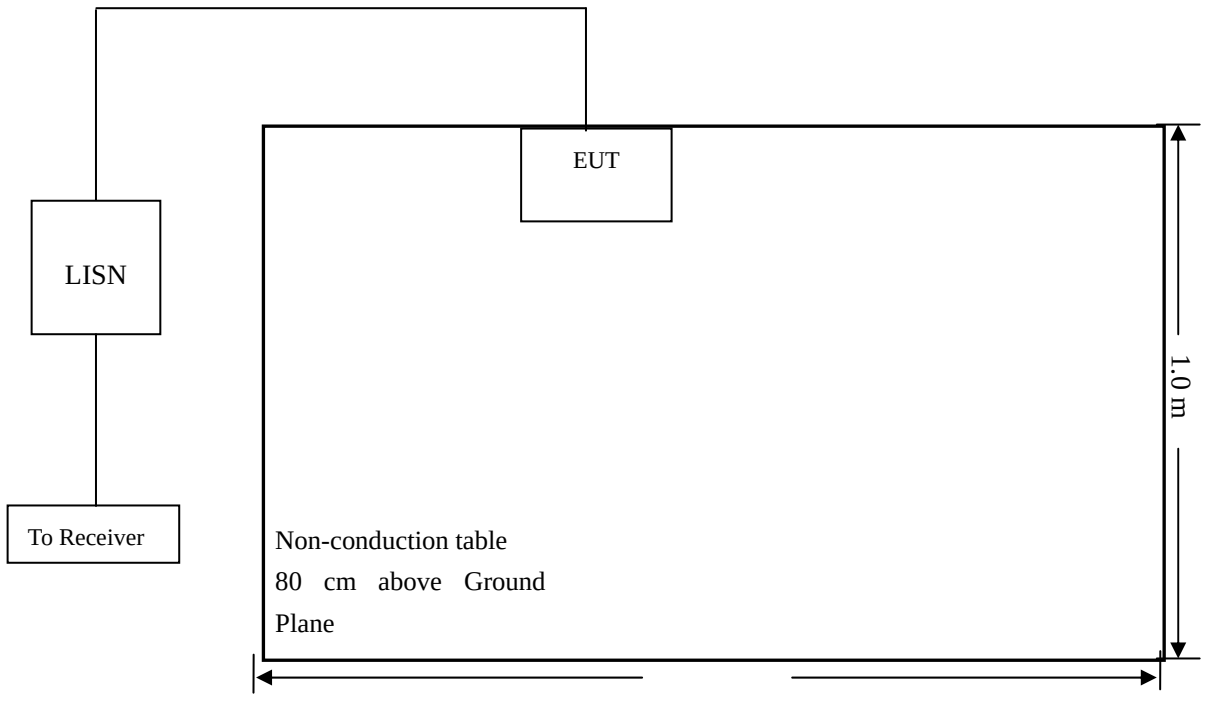
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11
Puls Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-08-12	2010-08-11
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2009-08-12	2010-08-11
L.I.S.N.	EMCO	3825/2	11967C	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

5.4 Basic Test Setup Block Diagram



5.5 Environmental Conditions

Temperature:	20° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

5.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-13.56 dBμV at **4.07 MHz** in the **Neutral QP** Detector, Base Station by Power Adaptor, 0.15-30MHz

5.7 Conducted Emissions Test Data

For Base Station Unit Power Adaptor:

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBμV	QP/Ave/Pk	Line/Neutral	dBμV	dB
4.07	42.44	QP	Neutral	56	-13.56
0.16	50.54	QP	Line	65.46	-14.92
0.16	48.54	QP	Neutral	65.46	-16.92
0.41	40.36	QP	Line	57.65	-17.29
4.12	38.36	QP	Line	56	-17.64
0.17	46.44	QP	Neutral	64.96	-18.52
0.20	44.99	QP	Line	63.61	-18.62
3.57	33.57	QP	Line	56	-22.43
5.59	37.29	QP	Neutral	60	-22.71

Note : The QP Value is less than the average limit, hereby the average is fit the average limit and no record.

Plot of Conducted Emissions Test Data

Conducted Disturbance

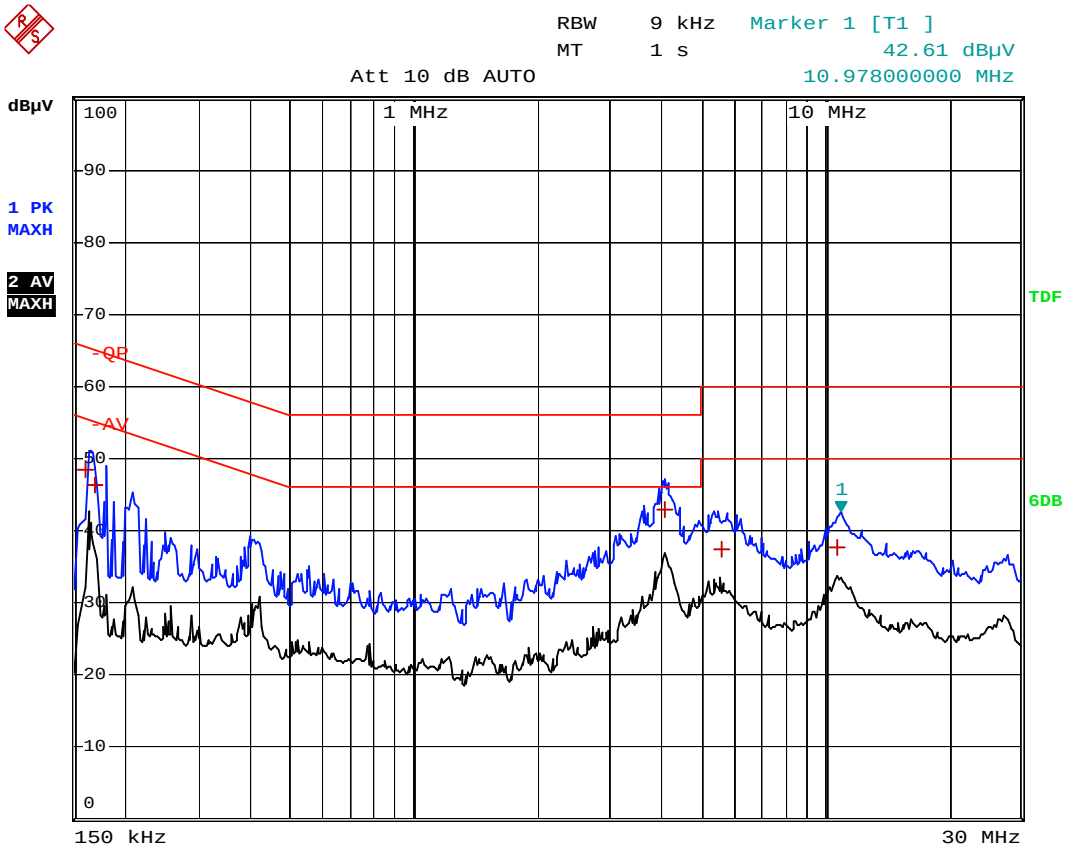
EUT: MediPendant(Base Station Unit)

M/N: MED01

Operating Condition: Operating

Test Specification: N

Comment: AC 120V/60Hz Adapter DC 6V



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Plot of Conducted Emissions Test Data

Conducted Disturbance

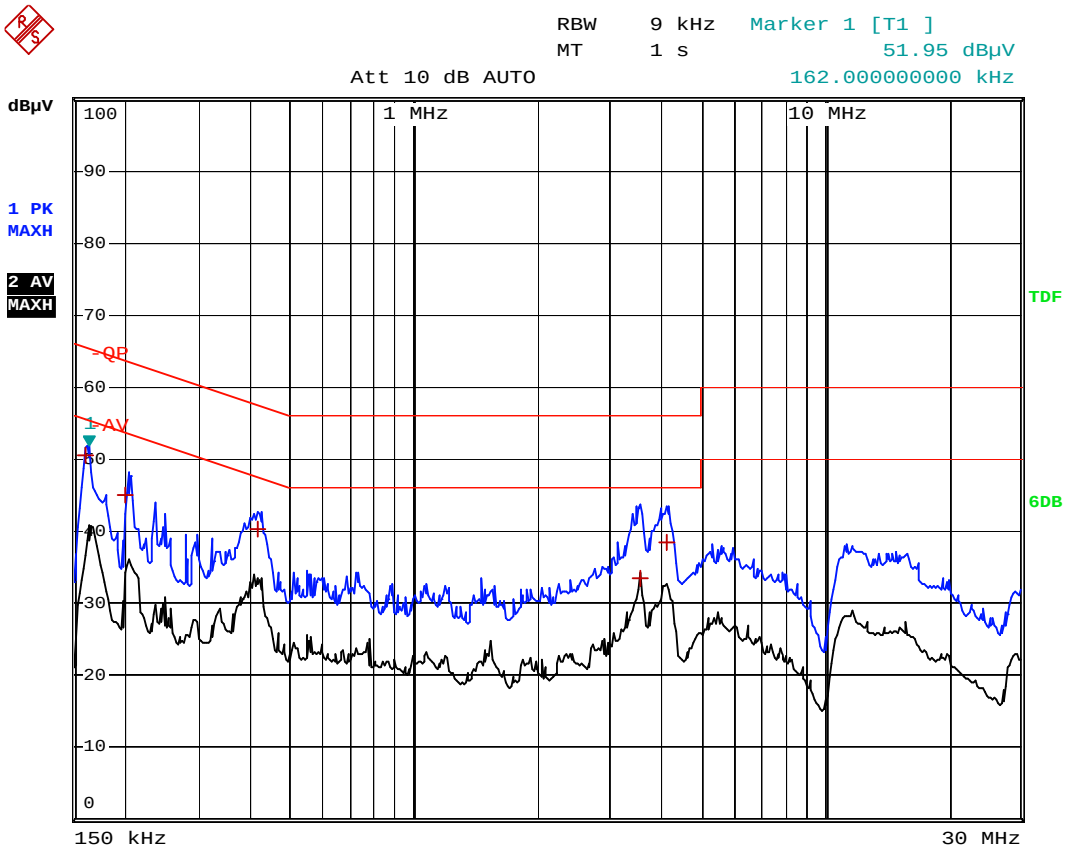
EUT: MediPendant(Base Station Unit)

M/N: MED01

Operating Condition: Operating

Test Specification: L

Comment: AC 120V/60Hz Adapter DC 6V



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6. EMISSION BANDWIDTH

6.1 Standard Applicable

According to FCC 15.323(a), operation shall be contained within the 1920-1930 MHz band.The emission bandwidth shall be less than 2.5 Mhz and greater than 50kHz.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

Operation shall be contained within the 1920-1930 MHz band. The emission bandwidth is measured in accordance with ANSIC C63.17 sub-clause 6.1.3.

6.4 Environmental Conditions

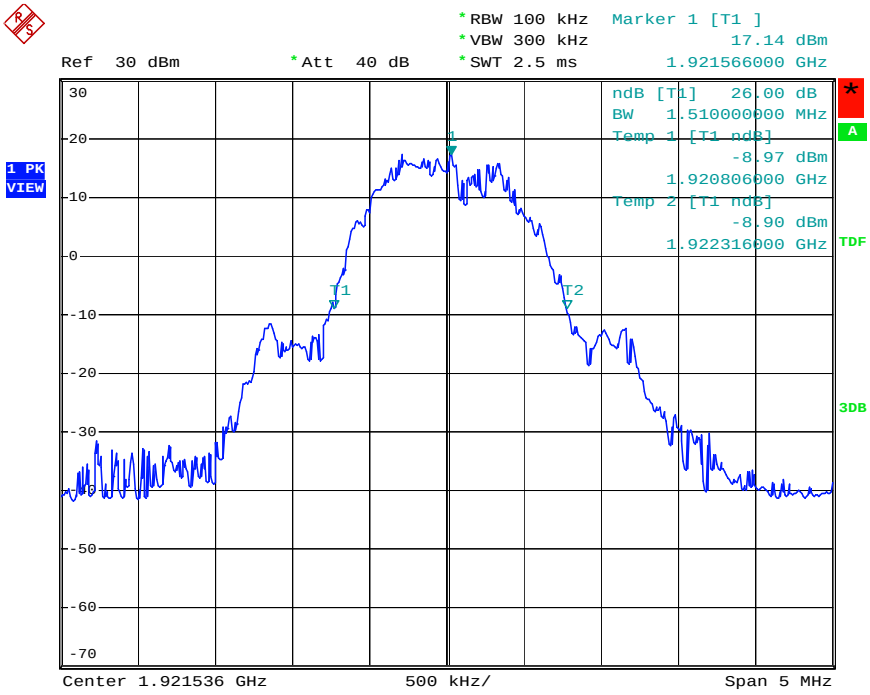
Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	FCC 15.323(a) Limit
Low Channel	1921.536	1.51	50kHz<EBW<2.5MHz
High Channel	1928.448	1.54	50kHz<EBW<2.5MHz

Please refer to the test plots:

Low Channel



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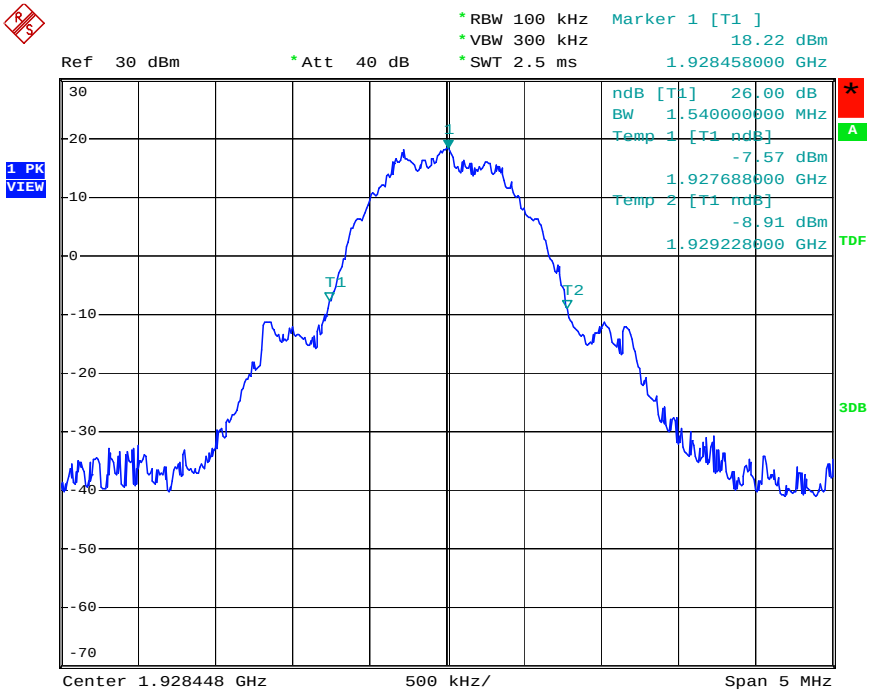
High Channel



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7. PEAK TRANSMIT POWER

7.1 Standard Applicable

According to FCC15.319(c), Peak transmit power shall not exceed 100microwatt multiplied by the square root of the emission bandwidth in hertz .
According FCC 15.319(e), the peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

7.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.3 Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

RBW	≥ Emission bandwidth
Video bandwidth	≥ RBW
Span	Zero
Center frequency	Nominal center frequency of channels
Amplitude scale	Log (linear may be used if analyzer has sufficient linear dynamic range and accuracy)
Detection	Peak detection
Trigger	Video
Sweep rate	Sufficiently rapid to permit the transmit pulse to be resolved accurately

7.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

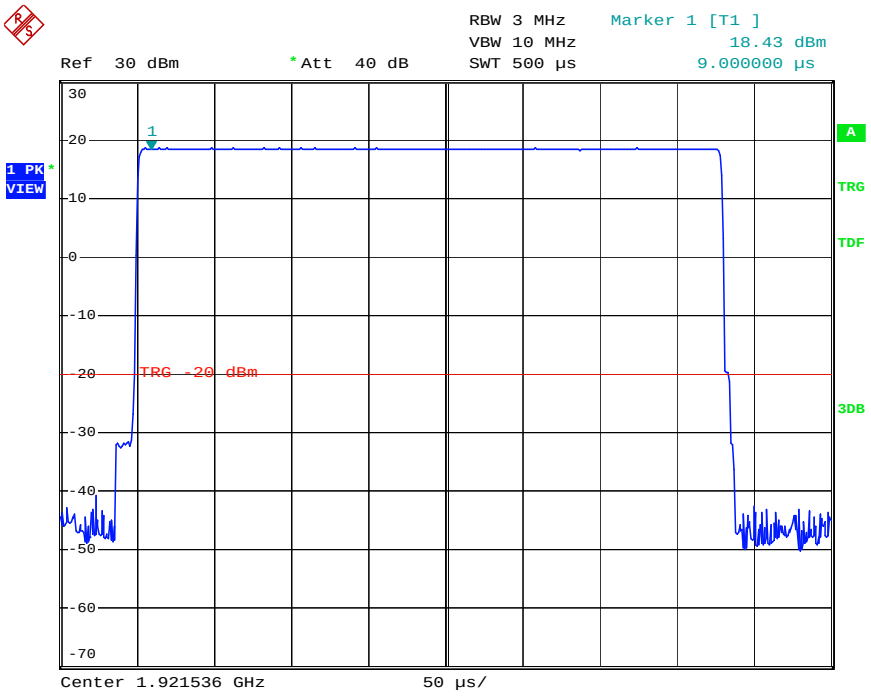
7.5 Summary of Test Results/Plots

EBW =1540000HZ

P_{max} =100 u W $(1540000)^{1/2}$ =20.94dBm

Channel	Frequency (MHz)	Peak Transmit Power (dBm)	FCC 15.319(c) Limit
Low Channel	1921.536	18.43	20.94
High Channel	1928.448	18.55	20.94

Low Channel



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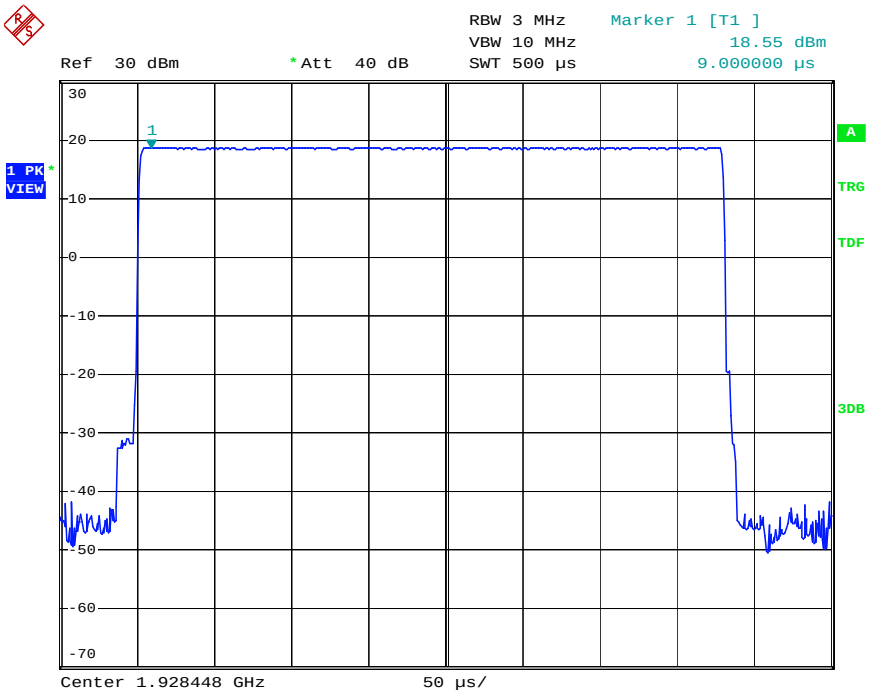
High Channel



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8. POWER SPECTRAL DENSITY

8.1 Standard Applicable

According to ANSI C63.17-2006 § 6.1.5. § 15. 319(d)
The average pulse energy in a 3kHz bandwidth is divided by the pulse duration. The power spectral density shall not exceed 3mW in any 3kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3kHz.

8.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

8.3 Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

RBW	3 kHz
Video bandwidth	≥ 3 × RBW
Span	Zero span at frequency with the maximum level (frequency determined in 6.1.3 if the same type of signal (continuous versus burst) was used in 6.1.3)
Center frequency	Spectral peak as determined in 6.1.3
Sweep time	For burst signals, sufficient to include essentially all of the maximum length burst at the output of a 3 kHz filter (e.g., maximum input burst duration plus 600 µs). For continuous signals, 20 ms.
Amplitude scale	Log power
Detection	Sample detection and averaged for a minimum of 100 sweeps
Trigger	External or internal

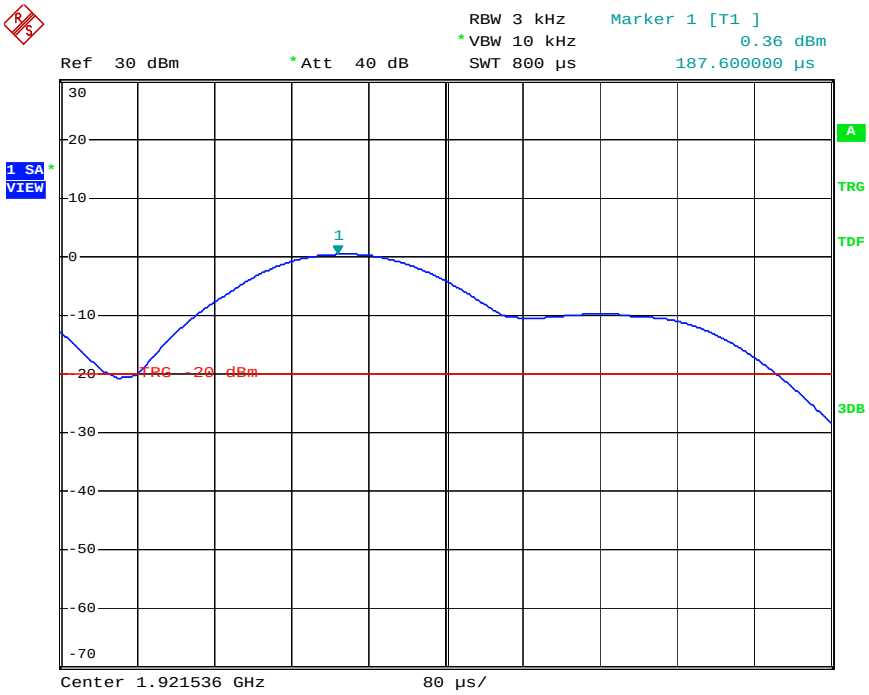
8.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

8.5 Summary of Test Results/Plots

Frequency MHz	Power Spectral Density		Limit mW/3kHz	Result
	dBm/3kHz	mW/3kHz		
1921.536	0.36	1.09	3	Pass
1928.448	0.47	1.11	3	Pass

Low Channel



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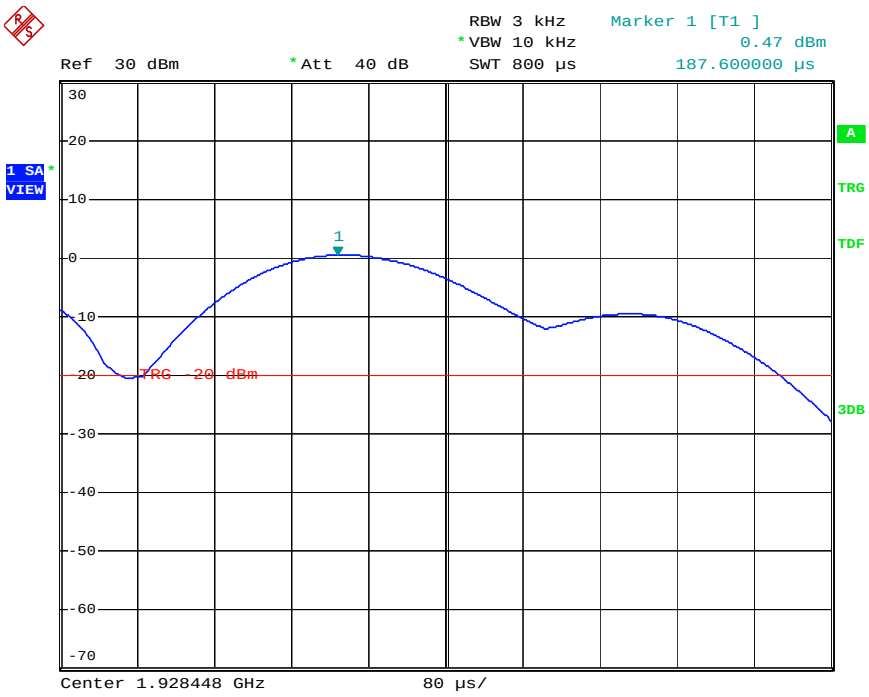
High Channel



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9. EMISSION INSIDE AND OUTSIDE THE SUB-BAND

9.1 Standard Applicable

According to ANSI C63.17, clause 6.1.6.1.
Requirements, FCC 15.323(d):
Emissions outside the sub-band shall be attenuated below a reference power of 112 milliwatts as follows: 30 dB between the sub-band and 1.25 MHz above or below the sub-band; 50 dB between 1.25 and 2.5 MHz above or below the sub-band; and 60 dB at 2.5 MHz or greater above or below the sub-band. Emissions inside the sub-band must comply with the following emission mask: In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device; in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator; in the bands between 3B and the sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator.

9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

9.3 Test Procedure

The device under test has an integral antenna and the power was measured on a radiated basis.

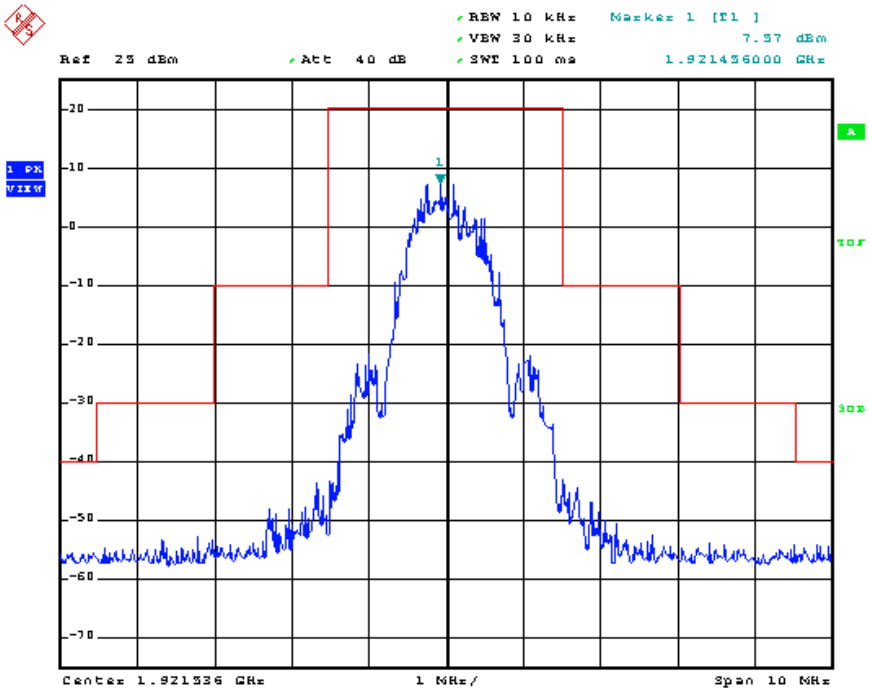
9.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

Unwanted Emissions Inside The Sub-band:

Low Channel



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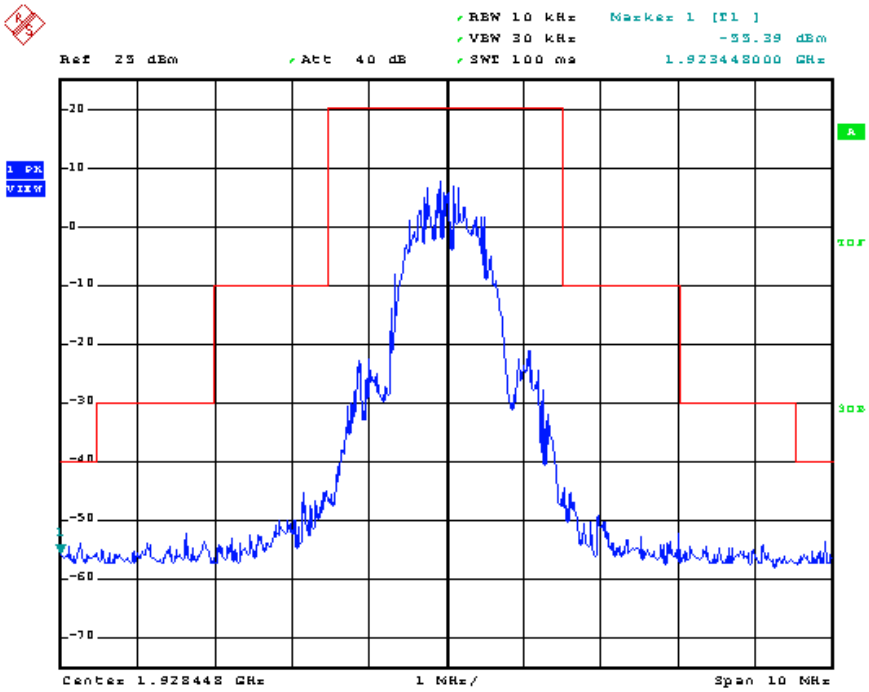
High Channel



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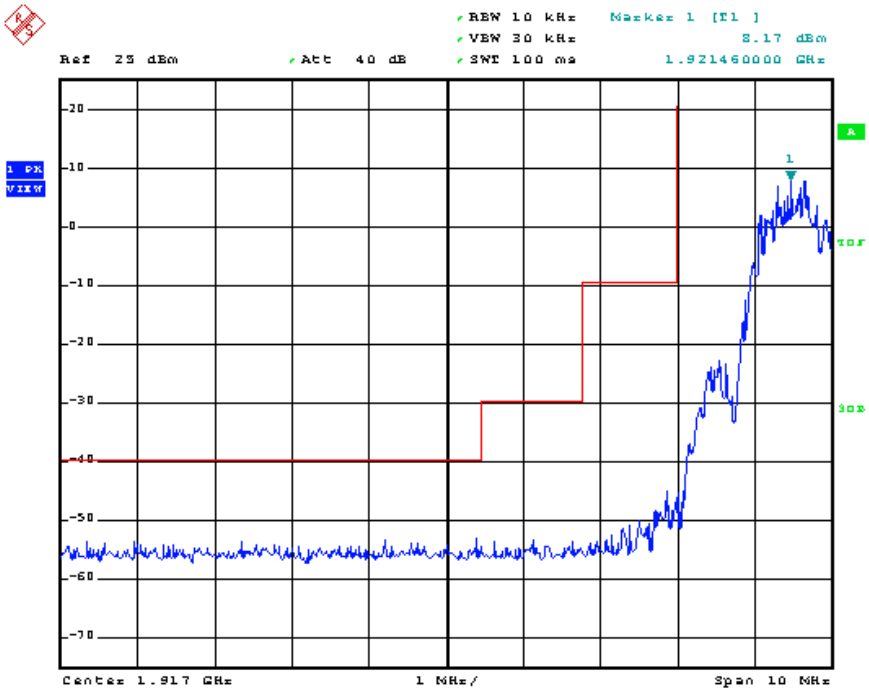
Unwanted Emissions Outside Sub-band:

Low Channel



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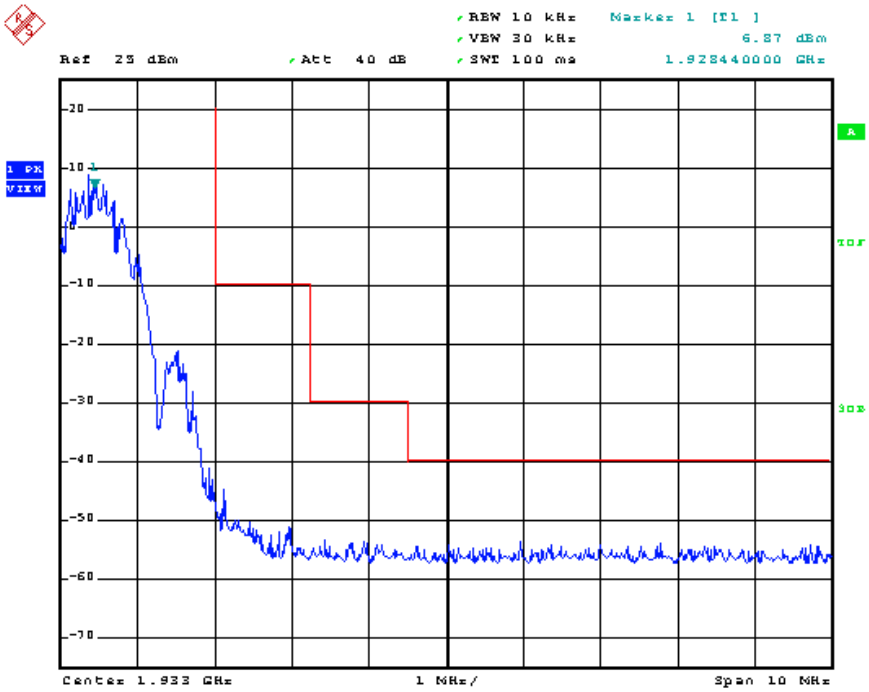
High Channel



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10. FIELD STRENGTH OF SPURIOUS EMISSIONS

10.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±3.0 dB.

10.2 Standard Applicable

According to §15.319(g), 15.205 15.209(b) &15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:
30 - 88 MHz 40 dBuV/m @3M
88 -216 MHz 43.5 dBuV/m @3M
216 -960 MHz 46 dBuV/m @3M
Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

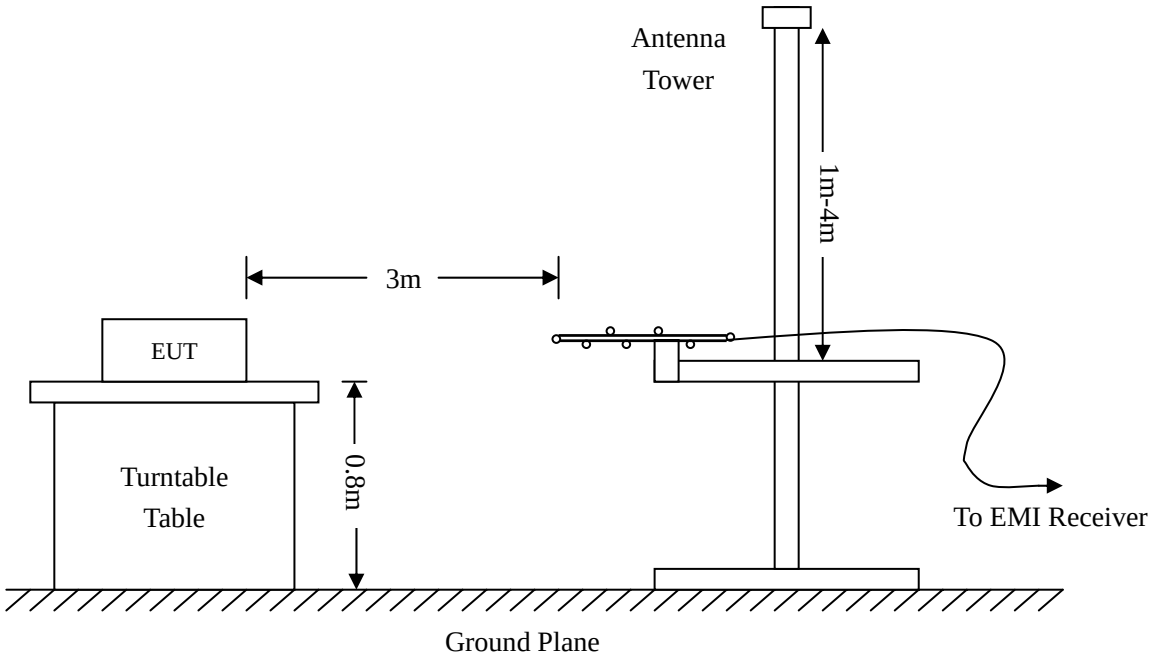
10.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

10.4 Test Procedure

The setup of EUT is according with per ANSI C63.17-2006 measurement procedure. The specification used was with the FCC Part 15.205 15.319(g) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.



10.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBµV means the emission is 6dBµV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

10.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.7 Summary of Test Results/Plots

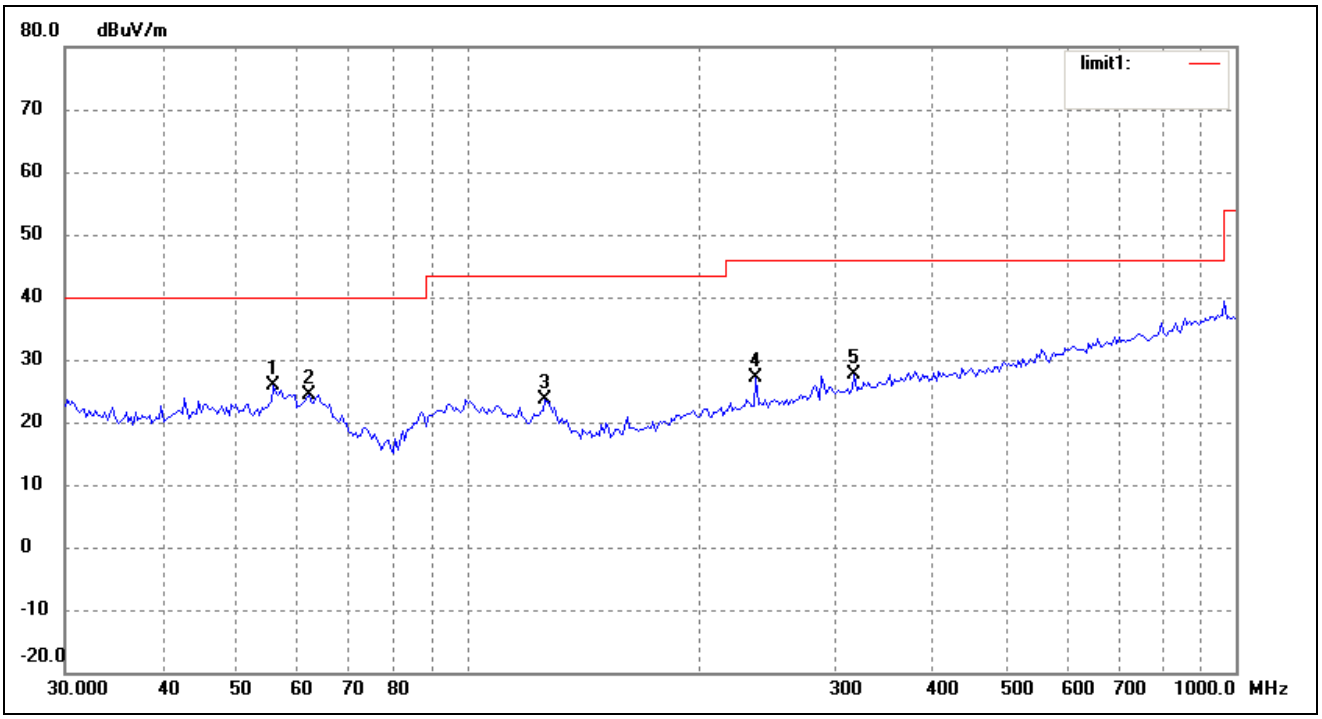
According to the data below, the FCC Part 15.205, 15.209 and 15.319(g)standards, and had the worst margin of:

-3.4dBµV at **3843.1 MHz** in the **Horizontal** polarization On Base Station for **High Channel**,

30 MHz to 25 GHz, 3 Meters

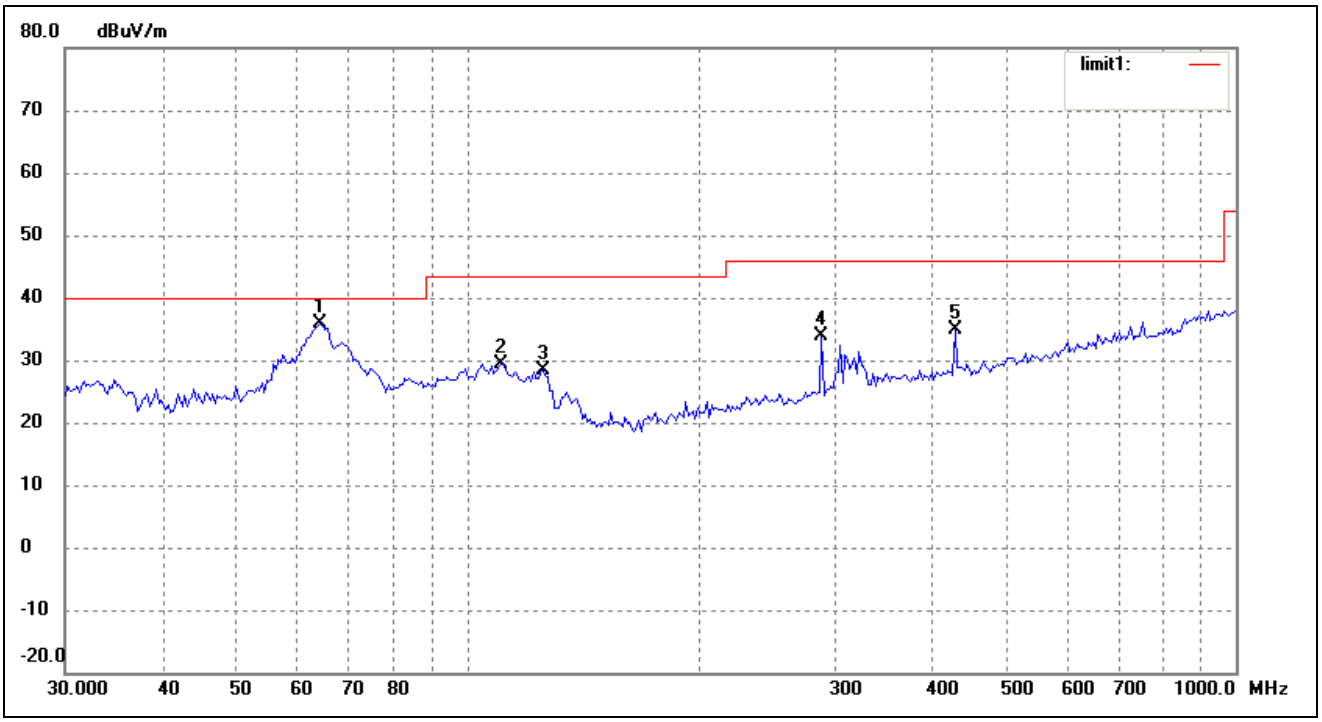
Base Station Unit Transmitting

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	56.0007	18.14	7.73	25.87	40.00	-14.13	212	100	peak
2	62.2128	17.78	6.67	24.45	40.00	-15.55	230	100	peak
3	126.3286	18.51	5.07	23.58	43.50	-19.92	360	100	peak
4	237.4760	18.37	8.68	27.05	46.00	-18.95	0	100	peak
5	318.8170	17.30	10.41	27.71	46.00	-18.29	230	100	peak

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	64.4331	30.04	5.81	35.85	40.00	-4.15	12	100	QP
2	110.5687	21.95	7.50	29.45	43.50	-14.05	23	100	peak
3	125.4457	23.24	5.19	28.43	43.50	-15.07	60	100	peak
4	289.0021	23.67	10.31	33.98	46.00	-12.02	10	100	peak
5	431.0316	22.15	12.64	34.79	46.00	-11.21	36	100	peak

Above 1GHz

Base Station Unit Transmitting

Frequency MHz	Detector	Meter Reading dBuV	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Duty Cycle dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
3843.1	AV	/	H	/	/	/	-28.4	27.2	54	-26.8
3843.1	AV	/	V	/	/	/	-28.4	24.2	54	-29.8
5764.6	AV	/	H	/	/	/	-28.4	23.8	54	-30.2
5764.6	AV	/	V	/	/	/	-28.4	22	54	-32
3843.1	PK	45.6	H	37.4	6.1	33.5	/	55.6	74	-18.4
3843.1	PK	46.3	V	34.1	5.2	33	/	52.6	74	-21.4
5764.6	PK	45.9	H	34.1	5.2	33	/	52.2	74	-21.8
5764.6	PK	40.4	V	37.4	6.1	33.5	/	50.4	74	-23.6
High Channel (1G to 25GHz)										
3856.8	AV	/	H	/	/	/	-28.4	29.5	54	-24.5
3856.8	AV	/	V	/	/	/	-28.4	27.8	54	-26.2
5785.3	AV	/	H	/	/	/	-28. 4	23.4	54	-30.6
5785.3	AV	/	V	/	/	/	-28.4	23.2	54	-30.8
3856.8	PK	51.6	H	34.1	5.2	33	/	57.9	74	-16.1
3856.8	PK	49.9	V	34.1	5.2	33	/	56.2	74	-17.8
5785.3	PK	41.8	H	37.4	6.1	33.5	/	51.8	74	-22.2
5785.3	PK	41.6	V	37.4	6.1	33.5	/	51.6	74	-22.4

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

Note: Ton = 382us = 0.382ms

Tp = 10ms

*Duty Cycle = (Ton/Tp)*100% = 3.82%*

Duty Cycle Factor = 20Log(Duty Cycle) = -28.4 dB

Average = Peak + Duty Cycle Factor

11. FREQUENCY STABILITY

11.1 Standard Applicable

According to §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℃degrees 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℃. 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.

11.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4402B-ESA	US41192821	2009-08-12	2010-08-11
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2009-08-12	2010-08-11
LW	DC Power Supply	APR-3003	N/A	2009-08-12	2010-08-11

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

11.3 Test Procedure

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-20°C	Normal
+50°C	Normal

11.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

11.5 Summary of Test Results/Plots

Base Station Unit

Test conditions		Frequency Error (kHz)	
		1921.536MHz	1928.448MHz
Tnom(20°C)	Vmin (102V)	+2.3	+2.6
	Vnom (120V)	+2.1	+2.4
	Vmax (138V)	+2.3	+2.5
Tmin(-20°C)	Vnom (120V)	-1.3	-1.1
Tmax(+50°)	Vnom (120V)	+5.5	+4.9
Max. frequency error (KHz)		+5.5	+4.9
Max. frequency error (ppm)		+2.86	+2.54
Limit (ppm)		±10.0	
Measurement uncertainty		$\pm 1 \times 10^{-5}$	

12. SPECIFIC REQUIREMENT FOR UPCS DEVICE

12.1 Automatic Discontinuation of Transmission, FCC Part 15.319(f)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. The provisions in this section 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:

Please according to the declaration provided by manufacturer

Test result:

Meet the requirement

12.2Monitoring Time FCC 15.323(c) (1)

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 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 7.3.4

Test result:

EUT monitors the combined time and spectrum window prior to initiation of transmission. Test result please according to FCC15.323(c)(4).

12.3 Lower Monitoring Threshold Part15.323 (c) (2)

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

Test Procedure:

Measurement method according to ANSI C63.17 2006 clause 7.3.1

Test result: Not Apply

12.4 Maximum Transmit Period FCC Part15.323 (c)(3)

If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, 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.

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 8.2.2

Test result:

Repetition of Access Criteria	Measured Maximum Transmission Time (Seconds)	Limit (Second)	Results
First	19800	28,800	Pass
Second	18000	28,800	Pass

12.5 System Acknowledgement, FCC Part15.323(c) (4)

Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments 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 acknowledgment, at which time the access criteria must be repeated.

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 8.1.1, 8.2.1

Test result:

Test	Time taken (second)	Limit(Second)	Results
Connection acknowledgement	0.0052	1	Pass
Change of access criteria for control information	5.35	30	Pass
Transmission cease time	5.80	30	Pass
Pulse length	0.01	0.01	Pass

12.6 Least Interfered Channel (LIC) Selection, FCC Part15.323 (c) (5)

If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed.

Calculation of monitoring threshold limits for isochroous devices:

Lower threshold: $T_L = -174+10\text{Log}_{10}B + M_u + P_{MAX}\text{-PEUT (dBm)}$

Upper threshold: $TU=-174+10\text{Log}10B+Mu+P_{MAX}\text{-PEUT(dBm)}$

Where: B=Emission bandwidth (Hz)

Mu =dB the threshold may exceed thermal noise (30 for TL&50for TU)

P_{MAX}=5Log 10B-10(dBm), P_{EUT}=Transmitted power (dBm)

Limit:

Monitor Threshold	B(MHz)	Mu (dB)	P MAX (dBm)	PEUT (dBm)	Threshold (dBm)
T_L	1.510	30	20.89	18.71	-80.03
T_U	1.540	50	20.93	18.74	-59.93

The EUT must not transmit until the interference level is less than or equal to:

Measured Threshold Level ≤ TU

Where: T U =Upper threshold level

Test procedure:

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

Test result:

Monitor threshold	Measured Threshold Level	Limit (dBm)
Lower Threshold (dBm)	N/A	-80.03
Upper Threshold (dBm)	N/A	-59.93

Note: The upper threshold is applicable as the EUT utilizes more than 40 duplex system channels

12.7 Random waiting FCC 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 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.

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 8.1.3

Test result:

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

12.8 Monitoring Bandwidth, FCC Part 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 50xSQRT (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

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 7.5

Test result:

Test Equation(μs)	BBandwidth)(MHz)	Pulse Width(μs)	Limit (μs)	Result
$50\ (1.25/B)^{1/2}$	1.510	45.83	50	Pass
$35\ (1.25/B)^{1/2}$	1.540	32.08	35	Pass

12.9 Monitoring Antenna, FCC Part15.323 (c) (8)

The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

Test procedure:

Measurement method according to ANSI C63.17 2006 paragraph 4

Test result:

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

12.10 Monitoring threshold relation FCC 15.323(c) (9)

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.

Test procedure:

Measurement method according to ANSI C63.17 2006 paragraph 4

Test result:

Comply. Test data please according to FCC 15.323(c)(5)

12.11 Duplex Connections, FCC Part15.323 (c) (10)

An initiating device may attempt to establish a duplex connection by monitors 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:

Measurement method according to ANSI C63.17 clause 8.3

Test result:

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

12.12 Alternative monitoring interval for co-located devices, FCC Part 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 1.25 MHz of the center frequency of 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:

Measurement method according to ANSI C63.17 2006 clause 8.4

Test result:

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

12.13 Fair Access, FCC Part 15.323 (c) (12)

The provisions of FCC Part15.323(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 result:

The manufacturer declares that this device does not use any mechanisms as provided by Part15.323 (c) (10) or (c) (11) to extend the range of spectrum occupied over space or time for the purpose of denying fail access to spectrum to other device.

12.14 Frame Repetition Stability, Part15 .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 sub-bands shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number.

Test procedure:

Measurement method according to ANSI C63.17 2006 clause 6.2.2, 6.2.3

Test result:

Frame Repetition Stability:

Frame Repetition Stability (ppm)	Limit (ppm)	Result (Pass/Fail)
-0.88	10	Pass

Frame Period and Jitter:

Max. pos. Jitter (us)	Max. neg. Jitter(us)	Frame Period (ms)	Limit	
			Frame Period (ms)	Jitter (μs)
0.01	0.00	10.0000	20 or10/X	25

Note: X is a positive whole number.

******* END OF REPORT *******