FCC PART 15D

MEASUREMENT AND TEST REPORT

For

CETIS, INC.

5025 GALLEY ROAD, COLORADO SPRINGS, CO 80915, USA

FCC ID: ZTU9602MWD5-N

Report Type:	Product Type:
Original Report	DECT Telephone (Base Unit)

Test Engineer:	Eric Lee
Report Number:	RSZ120129008-00FP
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Reviewed By:	Alvin Huang RF Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *CETIS, INC.'s* product, model number: *9602MWD-N (FCC ID: ZTU9602MWD5-N)* or the "EUT" in this report is a base of *DECT Telephone,* which was measures approximately: 24.0 cm (L) x 7.5 cm (W) x 9.0 cm (H), rated with input voltage: DC 12V from adapter.

Adapter information: power supply
Model: ZX-12003001200150
Input: AC 100-240 V, 50/60Hz, 0.2A Max
Output: (1-8) DC 12.0V, 150mA
(2-7) DC 12.0V, 300mA

Note: The series product, model 9600MWD5-N, 9600MWD-N, 9602MWD5-N and 9602MWD-N, and model 9602MWD-N was selected to perform full test items. The differences among them were explained in the attached declaration letter.

** All measurement and test data in this report was gathered from production sample serial number: 1201059 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2012-01-29.*

Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.17 – 2006, and ANSI C63.4-2009

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart D, section 15.203, 15.207, 15.315, 15.317, 15.319 and 15.323 rules.

Related Submittal(s)/Grant(s)

FCC ID: ZTU9602MWD5-N, FCC Part 15D submission of Handset portion.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2006 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. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for TBR6 mode, which is provided by the manufacturer.

Equipment Modifications

No modification was made to the unit tested.

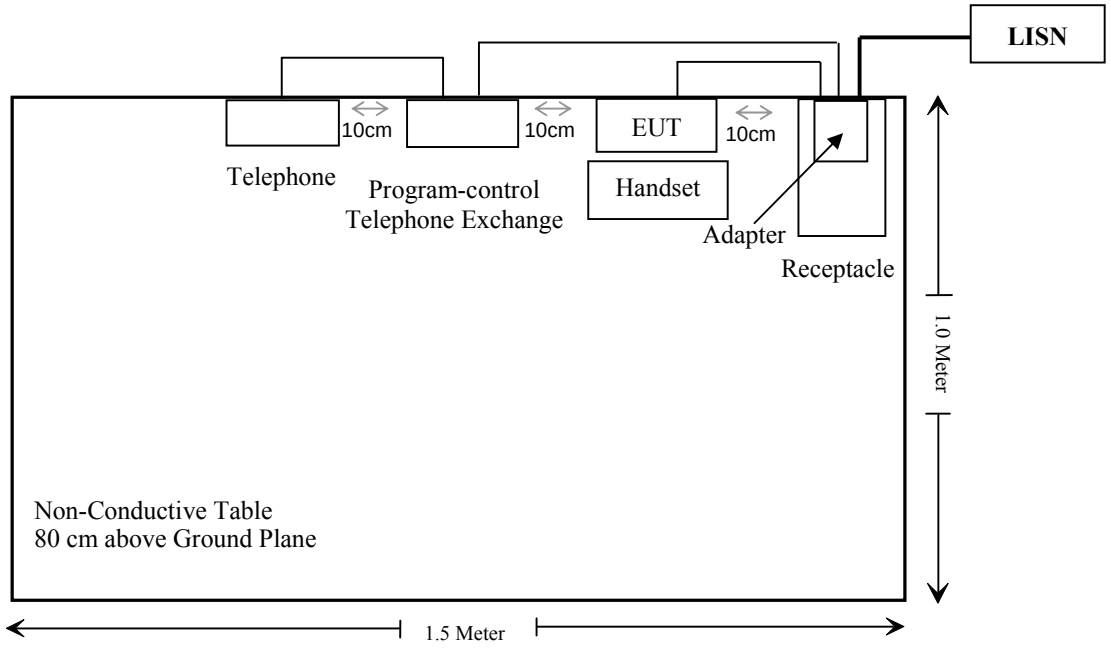
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Digital Radio-Communication Tester	CMD60	829902/026
OneKey	Program-control Telephone Exchange	TC-108H	N/A
TIANNIAO	Telephone	TL2201	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable RJ11 Cable	1.4	Telephone	Program-control Telephone Exchange
Unshielded Detachable RJ45 Cable	4.5	EUT	Adapter
Unshielded Detachable RJ11 Cable	4.5	Adapter	Program-control Telephone Exchange

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 15.319 (i)&2.1091	RF Radiation Exposure	Compliance
§ 15.317 § 15.203	Antenna Requirement	Compliance
§ 15.315 § 15.207	Conducted Emission	Compliance
§ 15.323 (a)	Emission Bandwidth	Compliance
§ 15.319 (c)	Peak Transmit Power	Compliance
§ 15.319 (d)	Power Spectral Density	Compliance
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliance
§ 15.319 (g)	Radiated Emission	Compliance
§ 15.323 (f)	Frequency Stability	Compliance
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliance

FCC§ 15.319 (i) &2.1091 - RF RADIATION EXPOSURE

Limit

According to FCC §15.319(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*(180/f\2\)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)
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 (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
1921.536	0	1	16.51	44.77	20	0.0089	1.0

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

FCC§15.317&§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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.

This product has two integrated antennas arrangement, which was soldered on PCB; fulfill the requirement of this section. Please refer to the internal photos.

Test Result: Pass

FCC§15.315 & §15.207 - CONDUCTED EMISSIONS

Applicable Standard

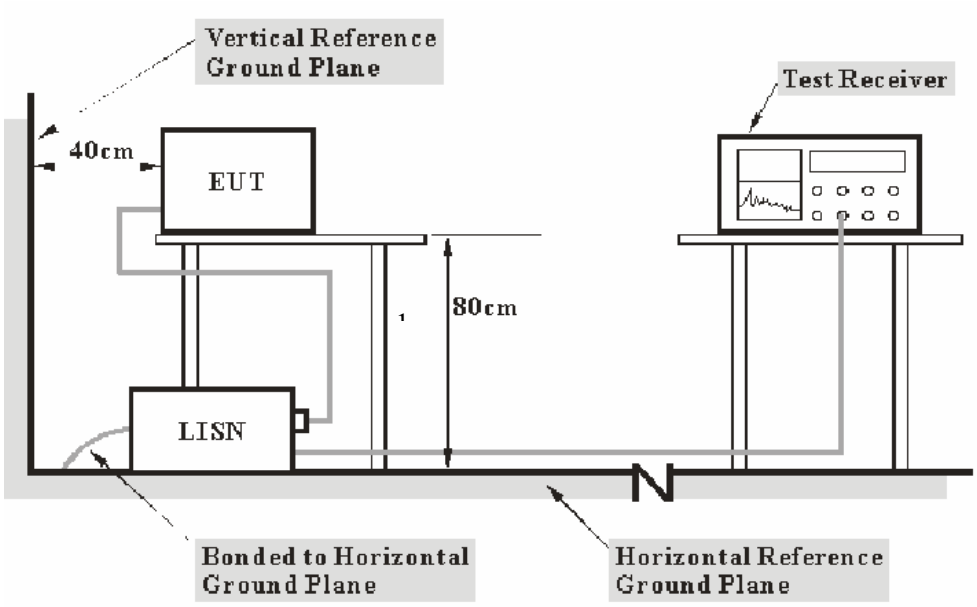
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 2.4 dB, and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC 15.315 and FCC 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2011-07-08	2012-07-07
BACL	CE Test software	BACL-CE	V1.0	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 .207, with the worst margin reading of:

10.64 dB at **0.350 MHz** in the **Line** conductor mode

Test Data

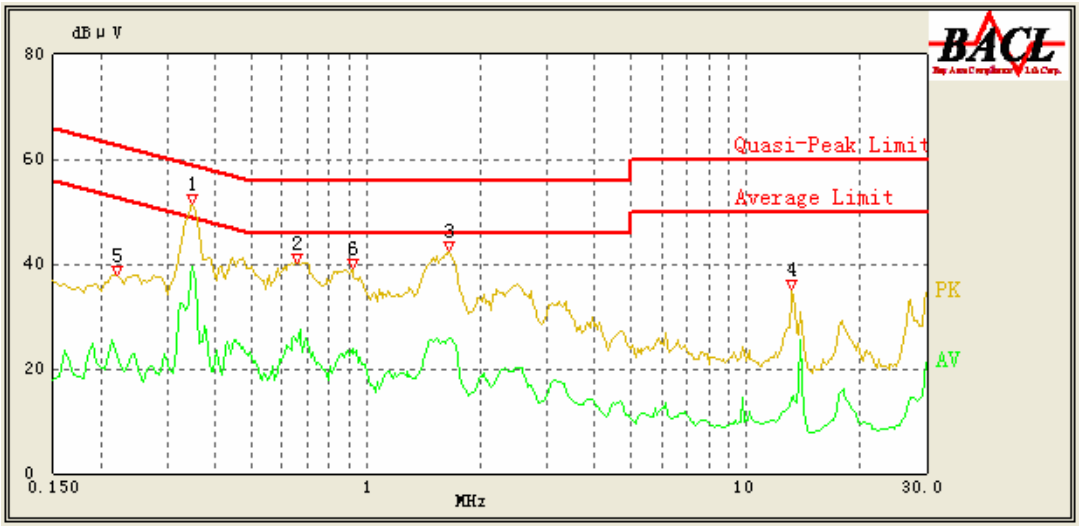
Environmental Conditions

Temperature:	20 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-03-09.

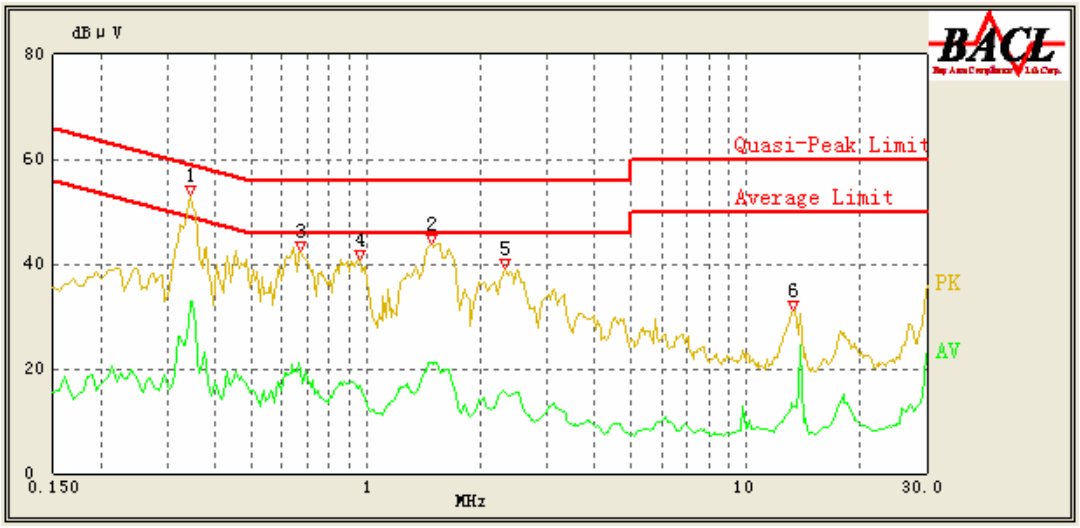
Test Mode: Transmitting

120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.350	39.65	10.23	50.29	10.64	Ave.
0.350	47.19	10.23	60.29	13.10	QP
0.655	36.90	10.24	56.00	19.10	QP
1.655	36.63	10.30	56.00	19.37	QP
1.660	25.74	10.30	46.00	20.26	Ave.
0.660	25.09	10.24	46.00	20.91	Ave.
0.920	34.18	10.24	56.00	21.82	QP
0.920	23.72	10.24	46.00	22.28	Ave.
0.220	34.25	10.23	64.00	29.75	QP
0.220	22.41	10.23	54.00	31.59	Ave.
13.320	14.89	11.28	50.00	35.11	Ave.
13.255	24.65	11.27	60.00	35.35	QP

120V/ 60 Hz, Neutral:



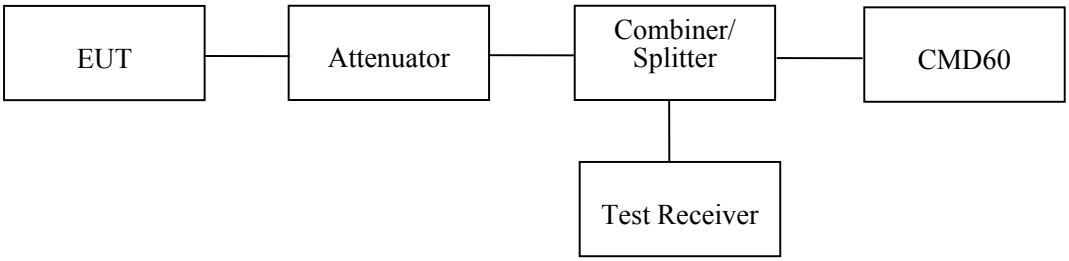
Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.345	46.41	10.23	60.43	14.02	QP
0.345	32.82	10.23	50.43	17.61	Ave.
1.480	35.81	10.28	56.00	20.19	QP
0.675	34.74	10.24	56.00	21.26	QP
1.480	21.27	10.28	46.00	24.73	Ave.
0.675	19.36	10.24	46.00	26.64	Ave.
2.315	28.36	10.36	56.00	27.64	QP
0.960	27.19	10.24	56.00	28.81	QP
0.960	16.71	10.24	46.00	29.29	Ave.
2.300	15.74	10.36	46.00	30.26	Ave.
13.265	13.63	11.27	50.00	36.37	Ave.
13.340	23.40	11.28	60.00	36.60	QP

FCC§15.323 (a) - EMISSION BANDWIDTH

Applicable Standard

Operation shall be contained within the 1920–1930 MHz band. The emission bandwidth shall be less then 2.5 MHz and greater than 50 kHz.

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



The width, in Hz, of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that is 26 dB down relative to the maximum level of the modulated carrier. It is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1% of the emission band-width of the device under measurement. [Extraction from 47 VFR 15, subpart D, 15.303 (C)].

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

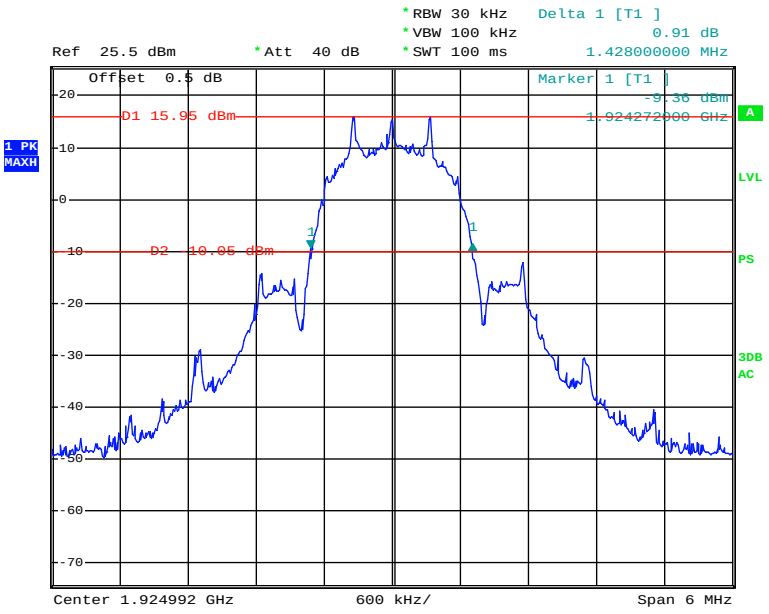
The testing was performed by Eric Lee on 2012-02-09

Test Mode: Transmitting

Channel	Center Frequency (MHz)	26 dB Emission Bandwidth (MHz)	Limit
Low	1921.536	1.428	50kHz < OBW <2.5MHz
Middle	1924.992	1.428	50kHz < OBW <2.5MHz
High	1928.448	1.380	50kHz < OBW <2.5MHz

Test Result: Pass, Refer to the attached plots.

Low Channel



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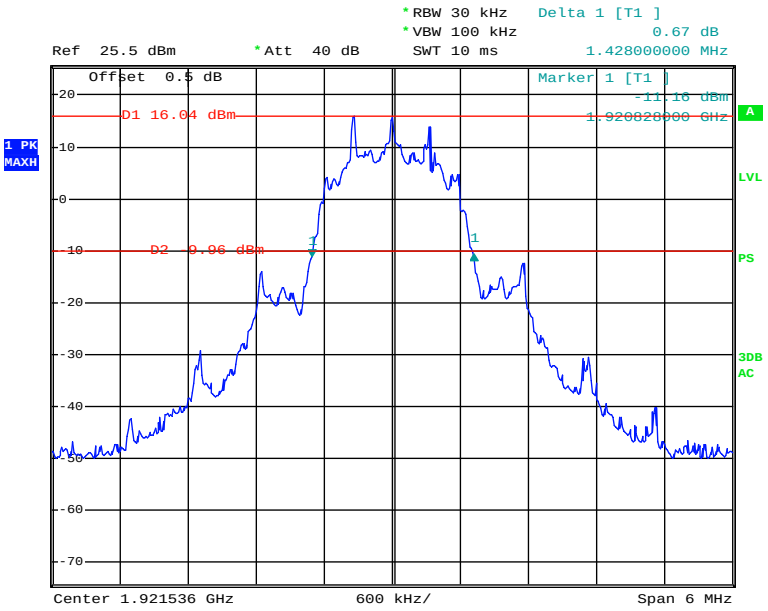
Middle Channel



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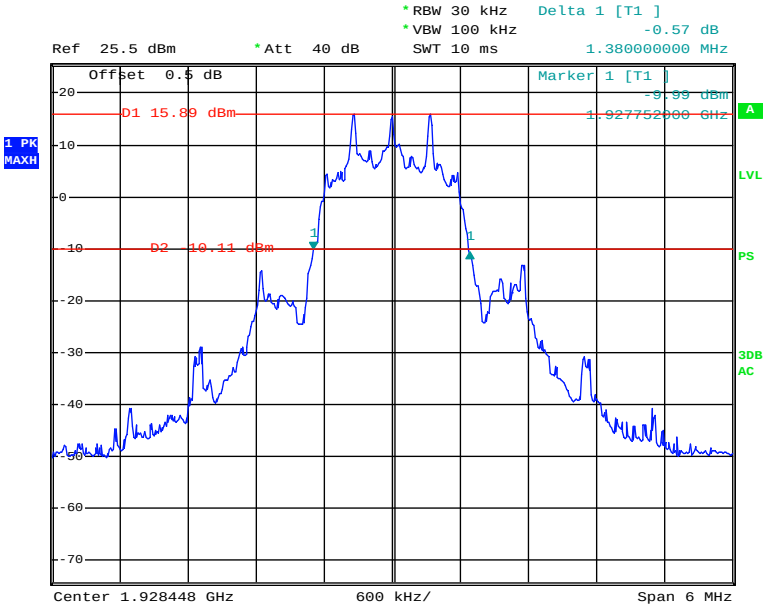
High Channel



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FCC§15.319 (c) - PEAK TRANSMIT POWER

Applicable Standard

The peak power output as measured over an interval of time equal to the frame rate or transmission burst of the device under all conditions of modulation. Usually this parameter is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used[47 CFR 15, subpart D, 15.303].

The peak transmit power is according to ANSI C63.17-2006 §6.1.2

Per FCC Part15.319 (c) Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in hertz. Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Per FCC Part15.319 (e), the peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

Calculation of Peak Transmit Power Limit:
Peak Transmit Power Limit = $100\mu W \times (EBW)^{1/2}$
EBW is the transmit emission bandwidth in Hz determined in the other test item:

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-02-08.

Test Result: Pass

Refer to the attached plots.

Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	16.51	20.77
1924.992	16.46	20.77
1928.448	16.28	20.70

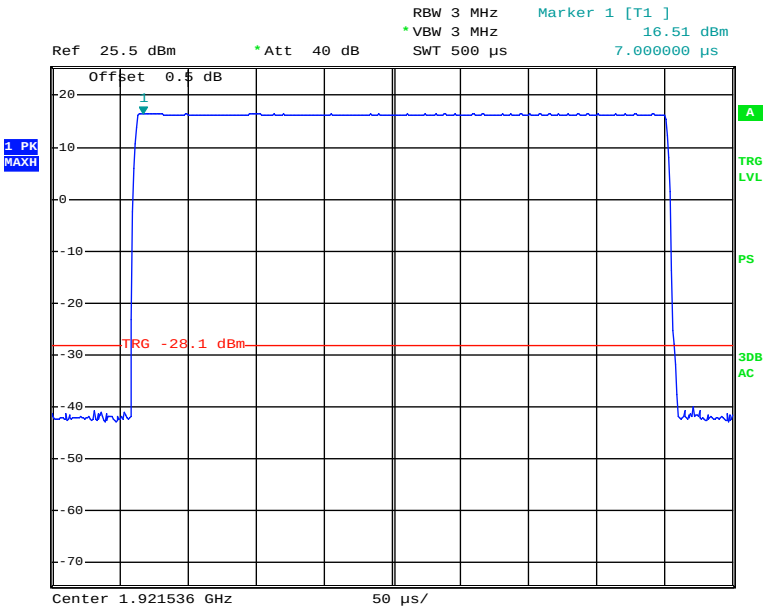
Note：

Low Channel: Pmax = 100μw x (EBW)1/2=100 μ W x $(1428000)^{1/2}$ = 20.77dBm

Middle Channel: Pmax =100μw x (EBW)1/2 =100 μ W x $(1428000)^{1/2}$ = 20.77dBm

High Channel: Pmax = 100μw x (EBW)1/2 =100 μ W x $(1380000)^{1/2}$ = 20.70dBm

Low Channel



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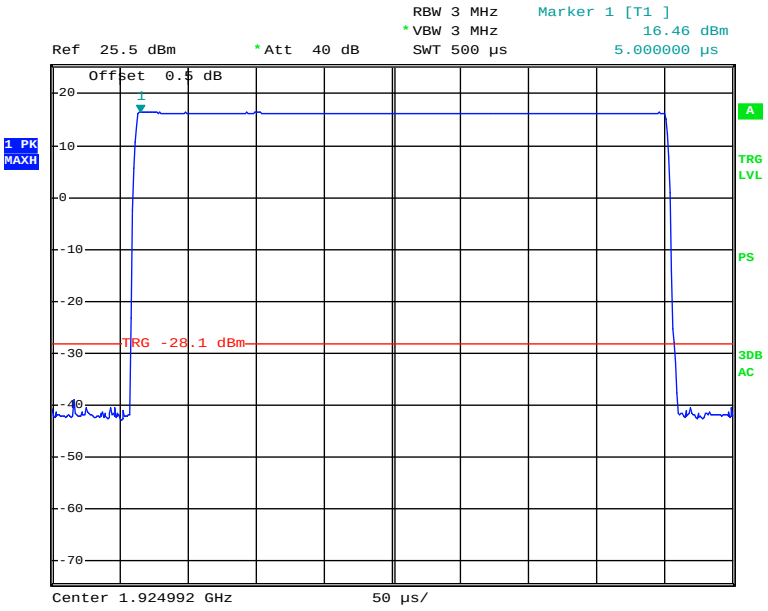
Middle Channel



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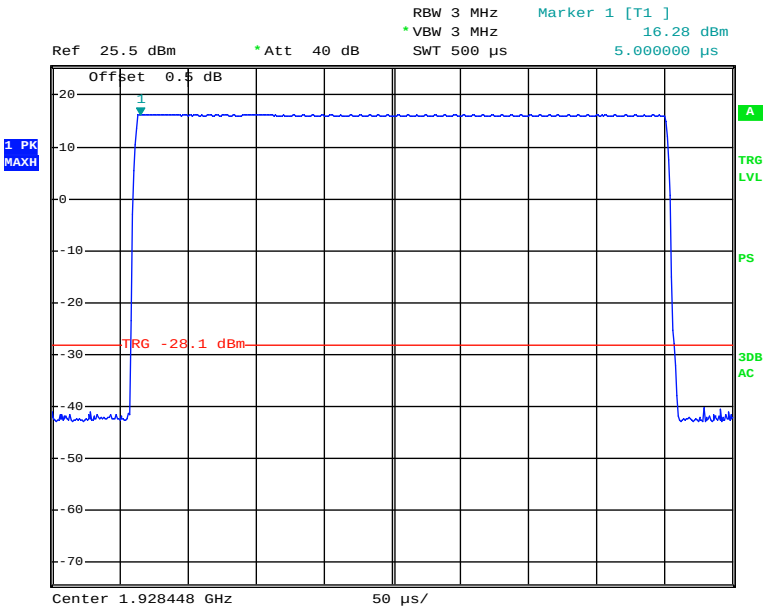
High Channel



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FCC§15.319 (d) - POWER SPECTRAL DENSITY

Applicable Standard

The power spectral density is according to ANSI C63.17-2006 §6.1.5

The average pulse energy in a 3 kHz bandwidth is divided by the pulse duration.

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

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-02-09.

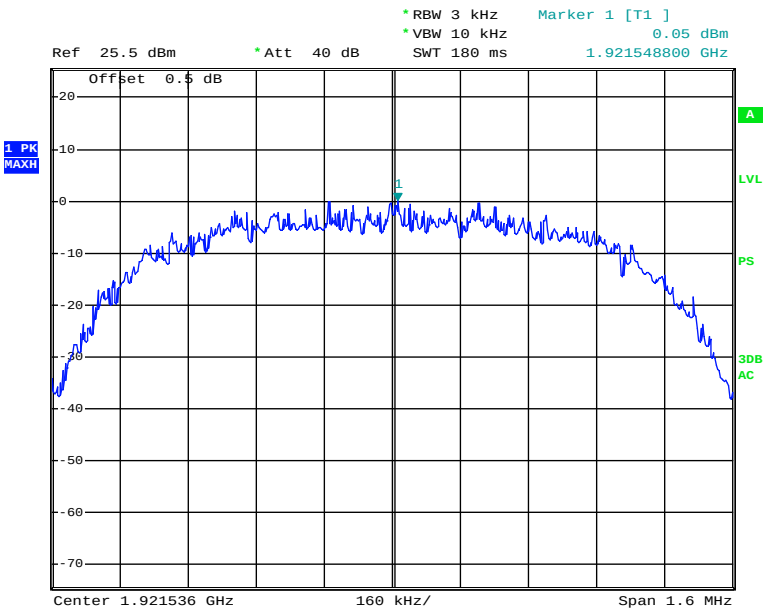
Test Mode: Transmitting

Test Result: Compliance.

Please refer to following tables and plots

Frequency (MHz)	Power Spectral Density		Limit (mW/3 kHz)	Result
	(dBm/3 kHz)	(mW/3 kHz)		
1921.536	-11.33	0.07	3	Pass
1924.992	-8.72	0.13	3	Pass
1928.448	-11.73	0.07	3	Pass

Low Channel



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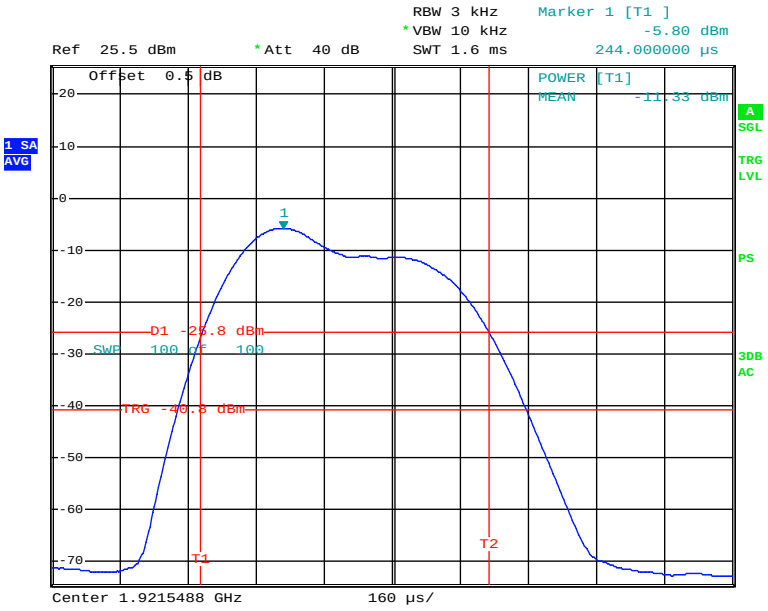

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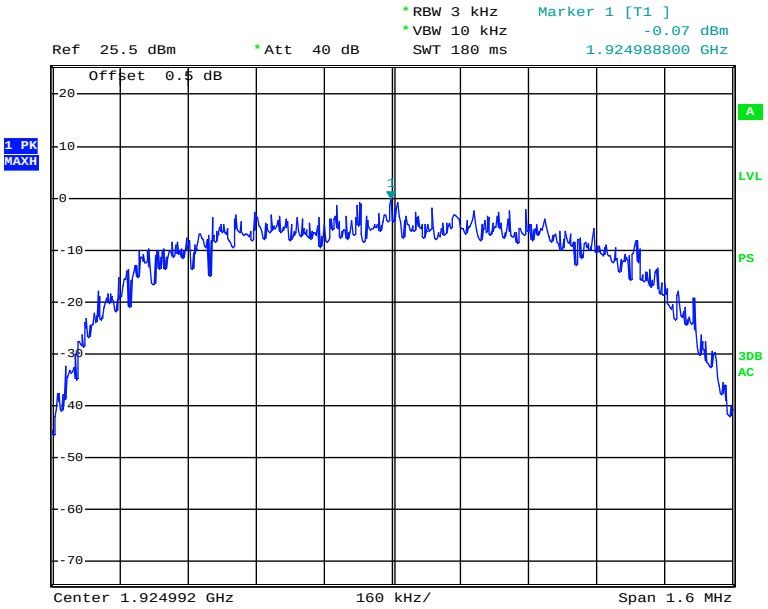
Middle Channel



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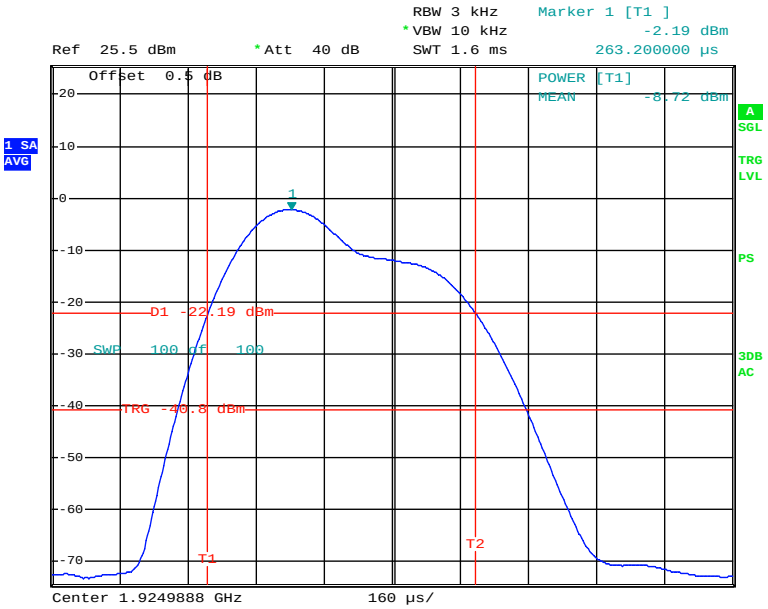
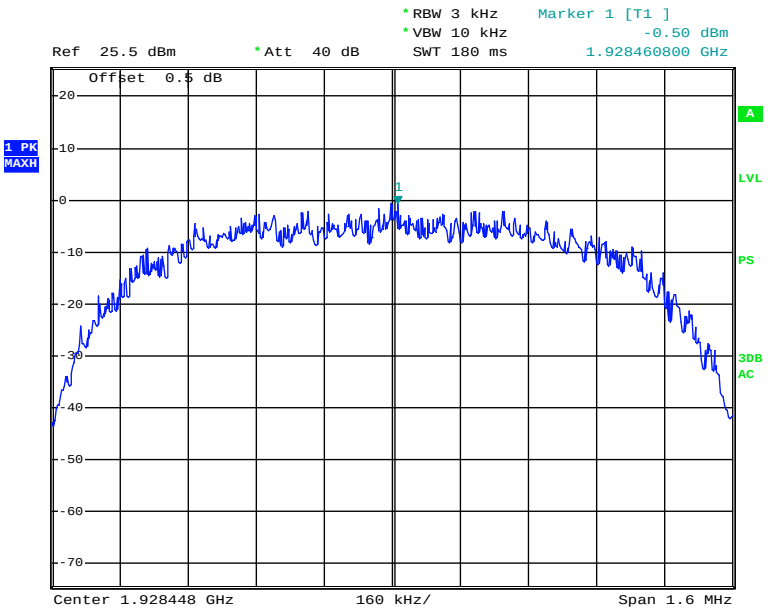


Date: 9.FEB.2012 15:02:18

High Channel



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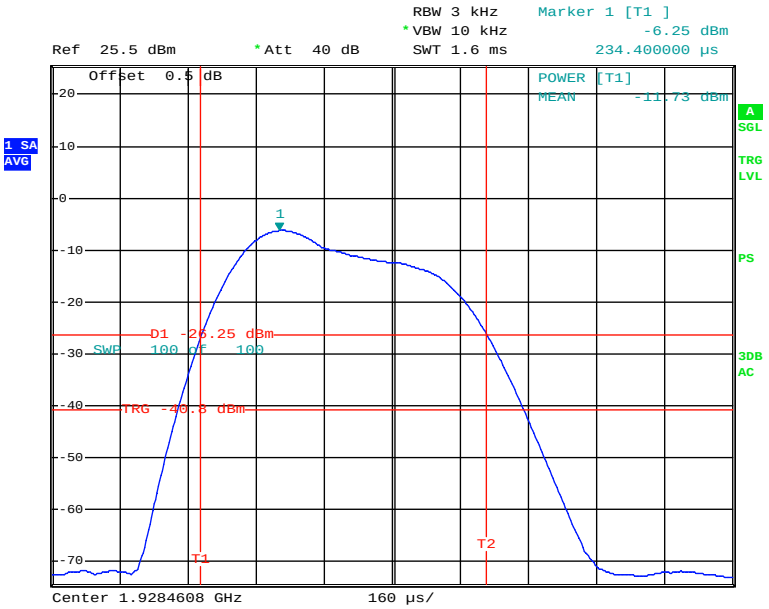


Date: 9.FEB.2012 15:06:27

FCC§15.323 (d) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND

Applicable Standard

Emissions inside the sub-band must comply with the following emission mask:

1. 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;
2. 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;
3. 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.

   Where B = emission bandwidth

Emission Outside the sub-band shall be attenuated below a reference power of 112 mW (20.5 dBm) as follows:

1. 30 dB between the sub-band and 1.25 MHz above or below the sub-band;
2. 50 dB between 1.25 and 2.5 MHz above or below the sub-band;
3. 60 dB at 2.5 MHz or greater above or below the sub-band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

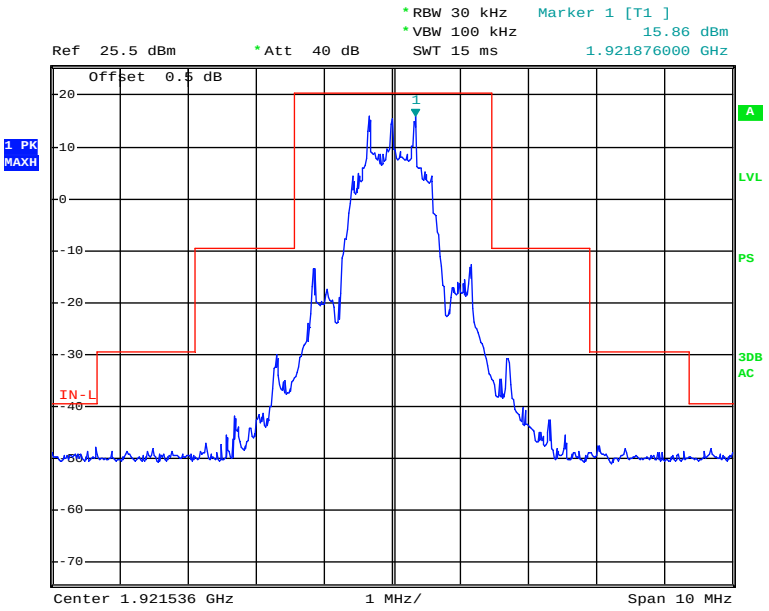
The testing was performed by Eric Lee on 2012-02-08 to 2012-03-05.

Test Mode: Transmitting

Test Result: Compliant.

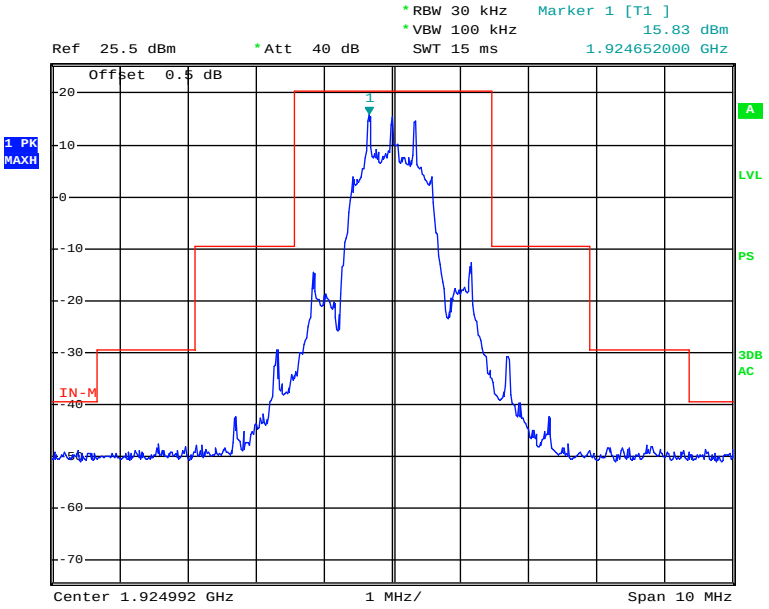
Please refer to following plots

Low Channel (Unwanted Emission inside the Sub-band)



Date: 9.FEB.2012 13:44:16

Middle Channel (Unwanted Emission inside the Sub-band)



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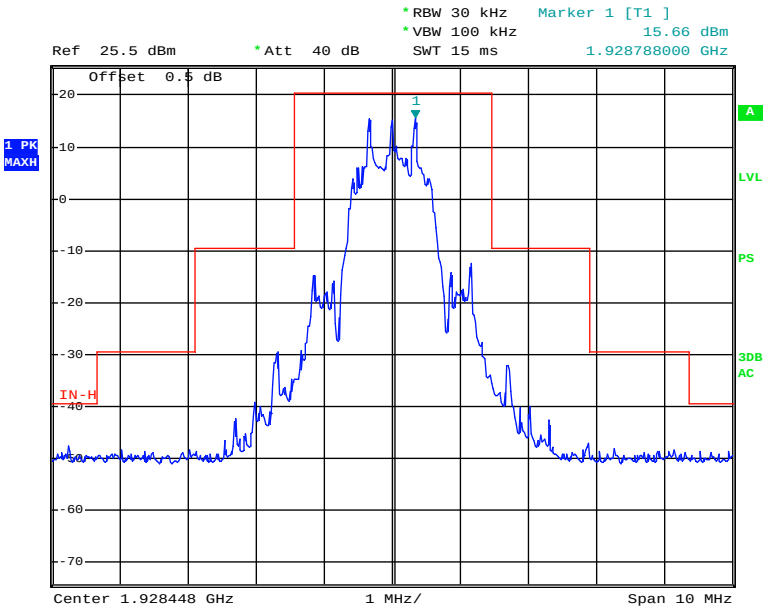
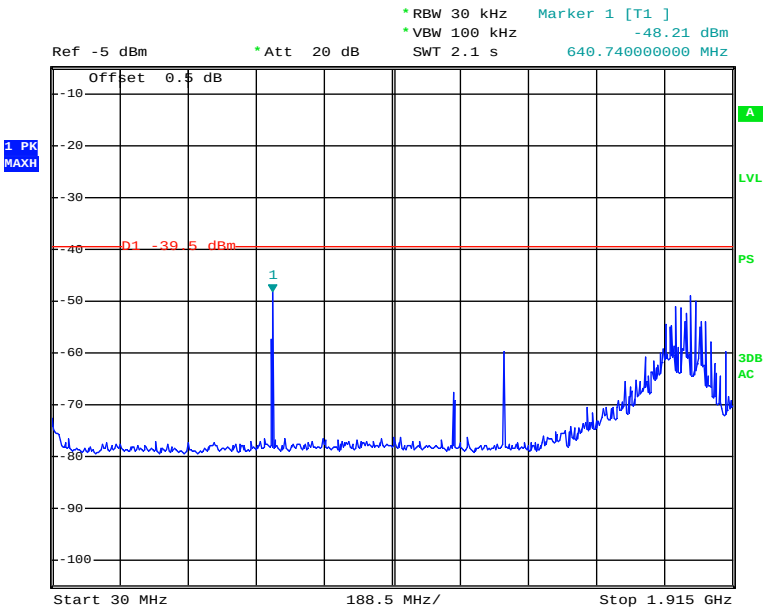
High Channel (Unwanted Emission inside the Sub-band)



Date: 9.FEB.2012 13:46:54

Low Channel (Unwanted Emission outside the Sub-band)



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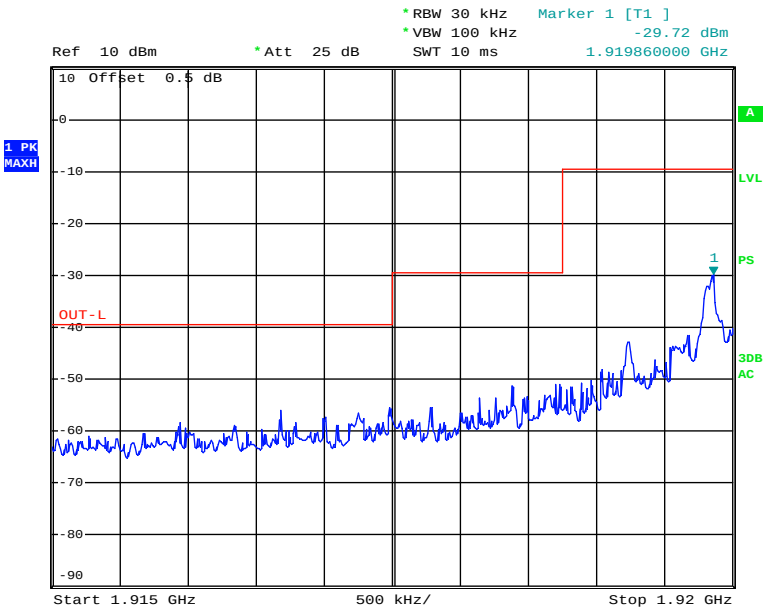

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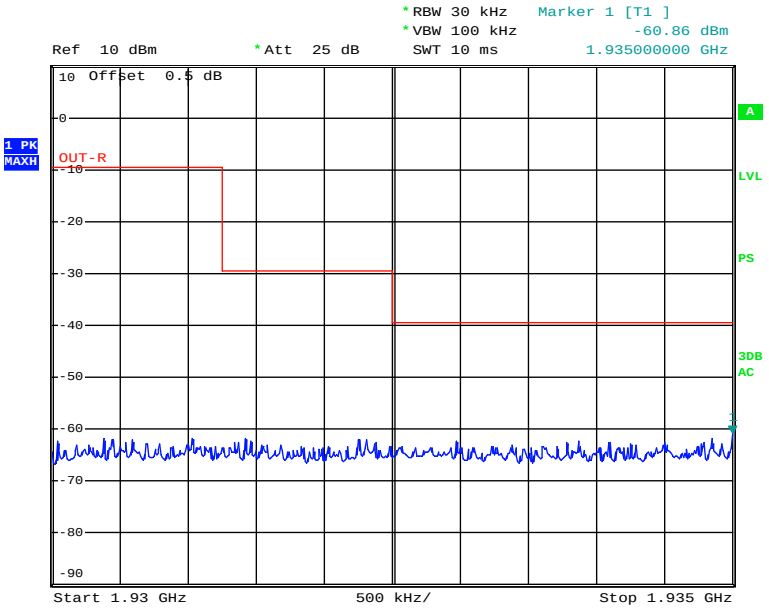

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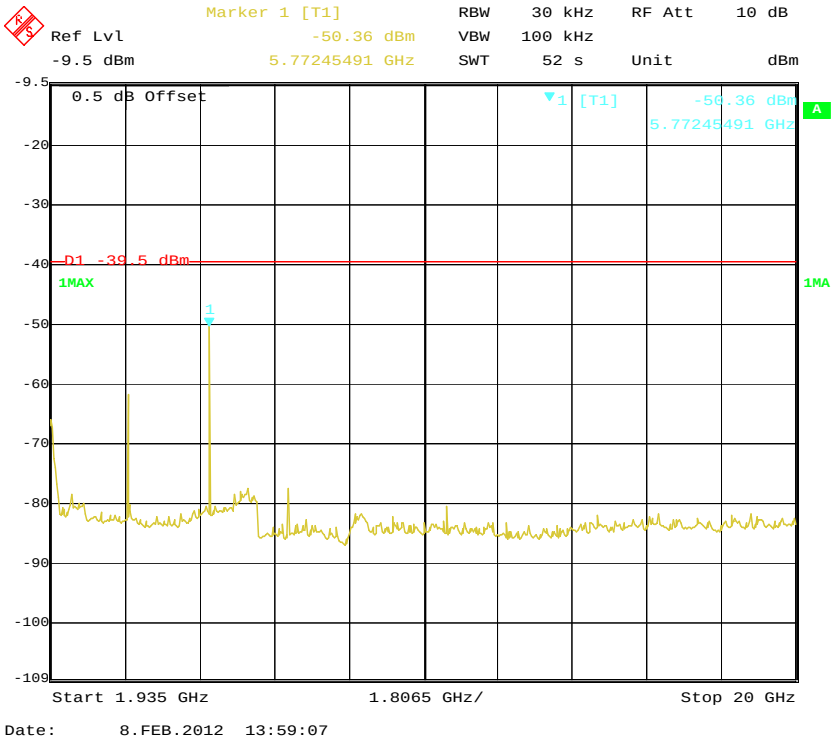
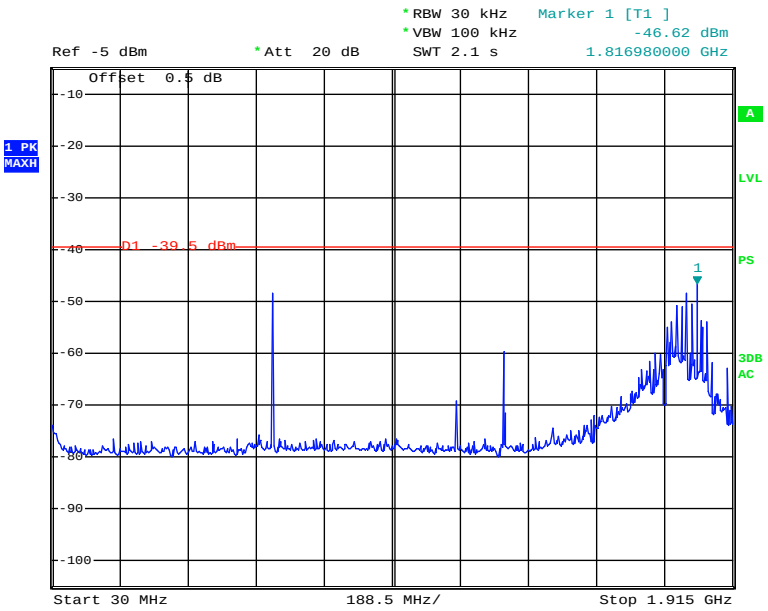


Middle Channel (Unwanted Emission outside the Sub-band)



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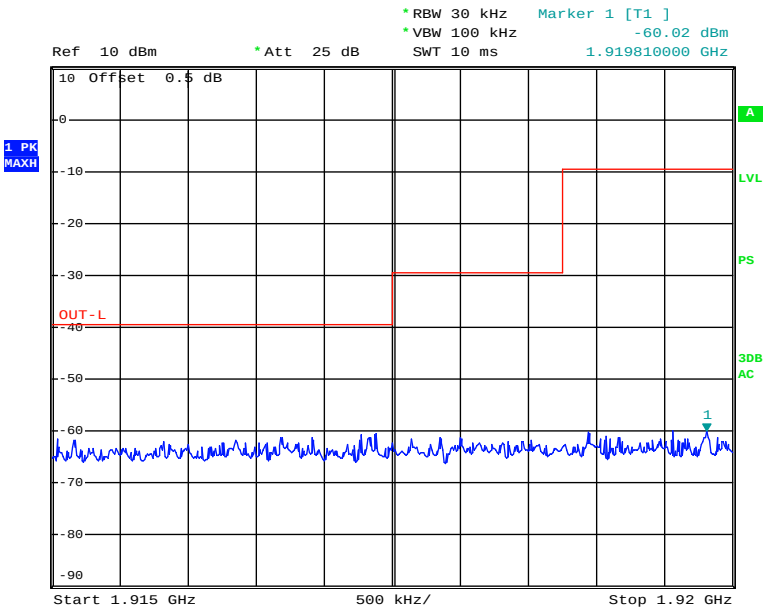

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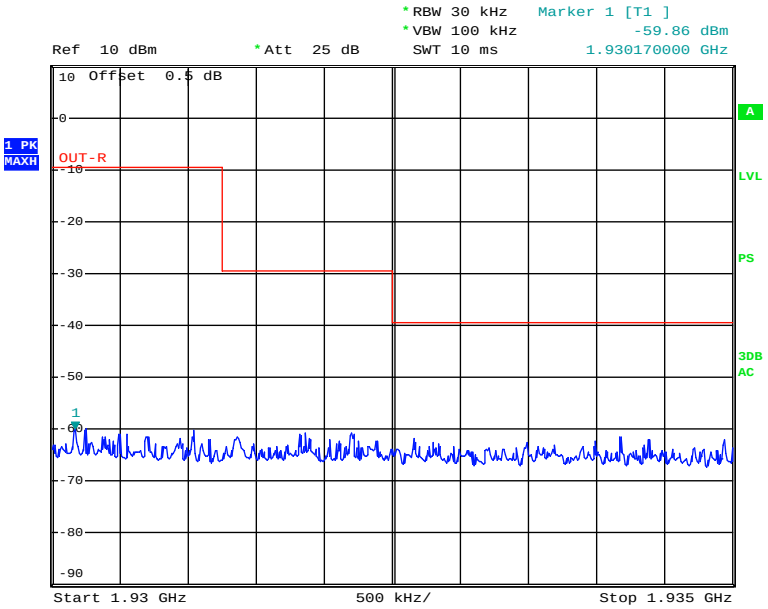

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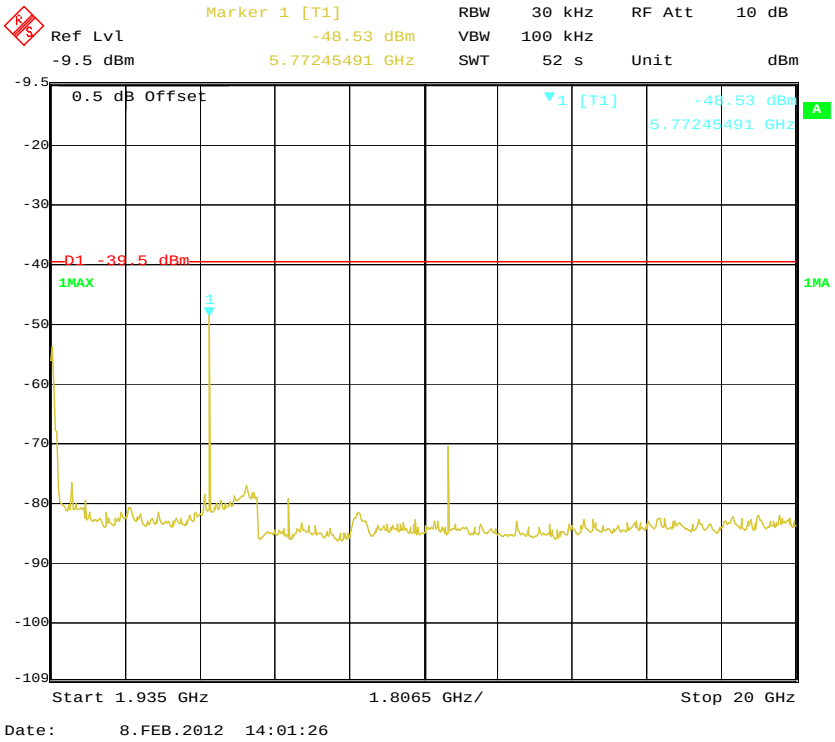
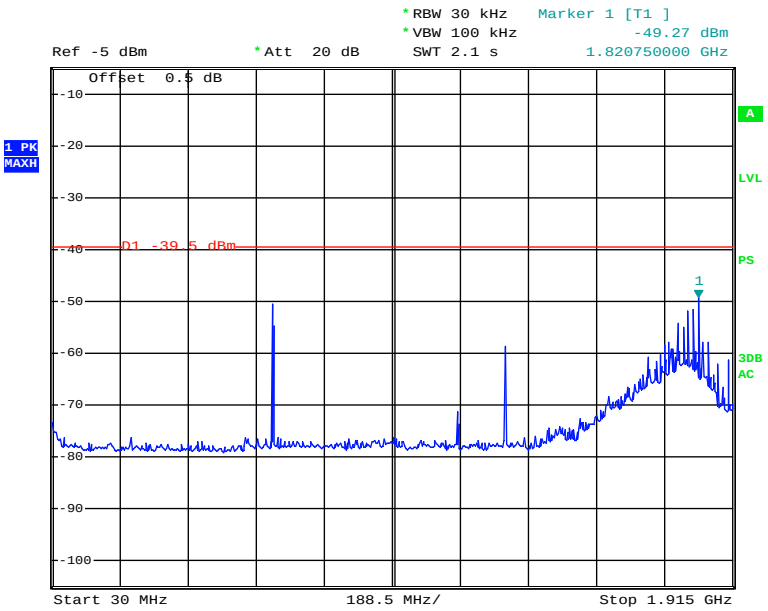
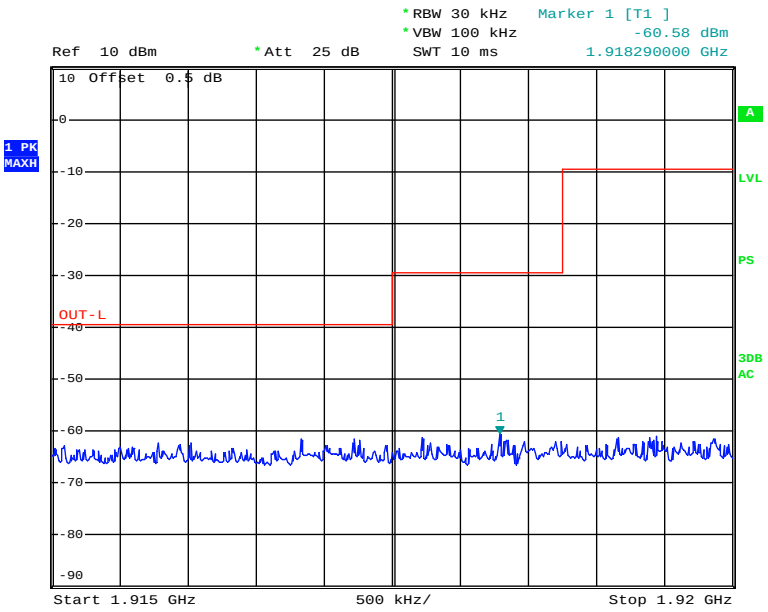


High Channel (Unwanted Emission outside the Sub-band)





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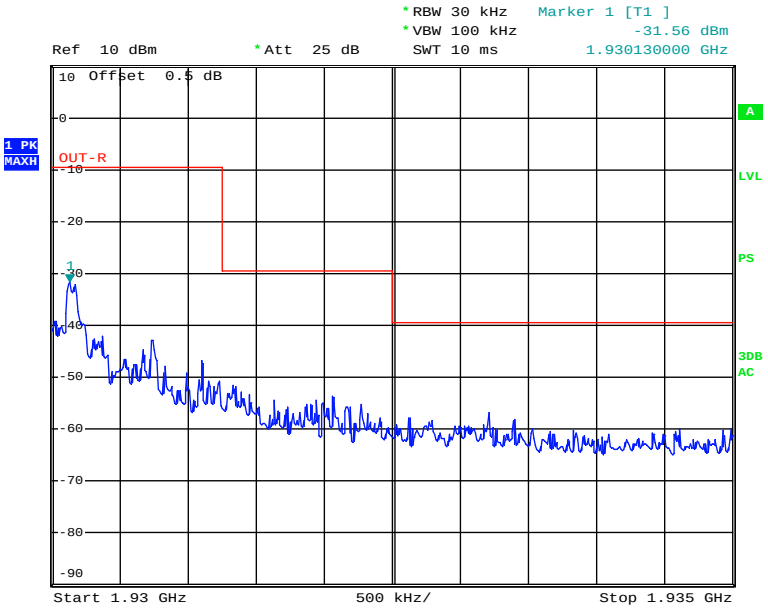

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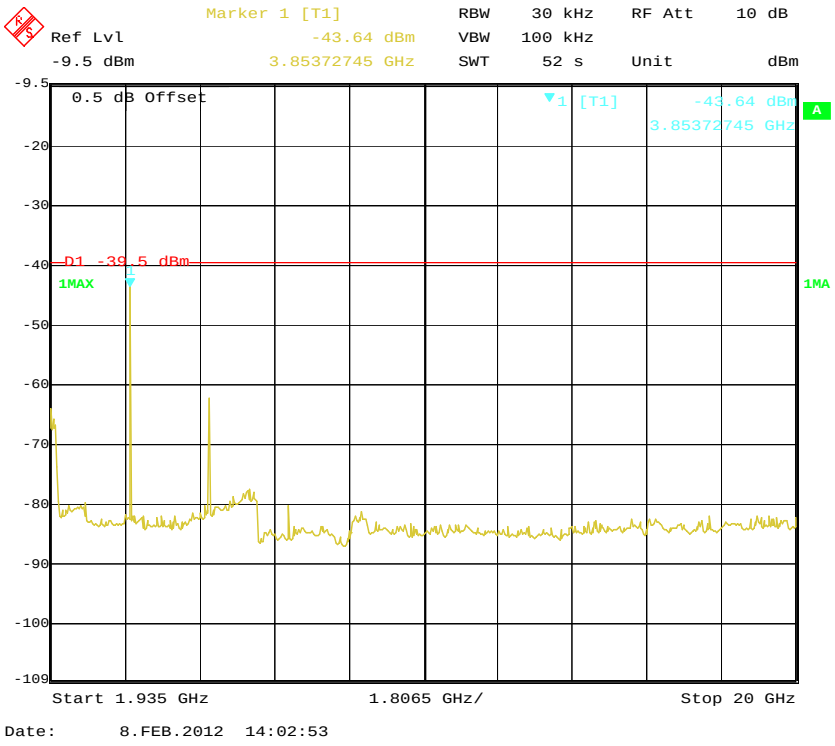

Marker 1 [T1]
RBW 30 kHz
RF Att 10 dB
Ref Lvl
-43.64 dBm
VBW 100 kHz
-9.5 dBm
3.85372745 GHz
SWT 52 s
Unit dBm
0.5 dB Offset
1 [T1]
-43.64 dBm
3.85372745 GHz
A
D1 -39.5 dBm
1MAX
1MA
-9.5
-20
-30
-40
-50
-60
-70
-80
-90
-100
-109
Start 1.935 GHz
1.8065 GHz/
Stop 20 GHz
Date: 8.FEB.2012 14:02:53

FCC§15.319 (g) - RADIATED EMISSIONS

Applicable Standard

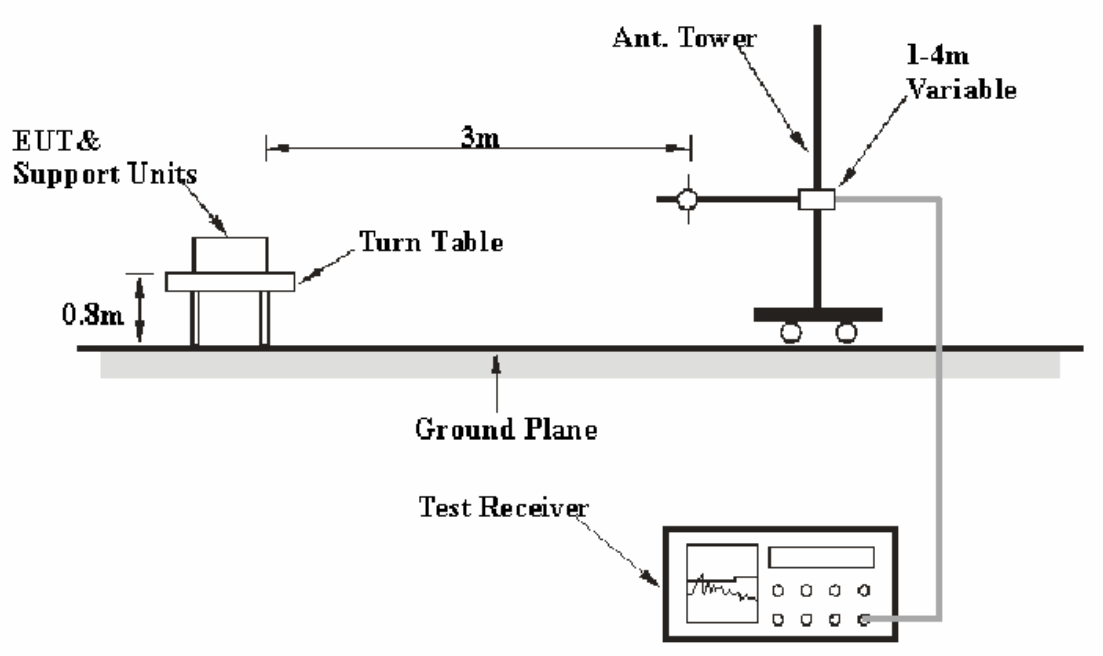
According to FCC§15.319(g), notwithstanding other technical requirements specified in this subpart, attenuation of emissions below the general emission limits in §15.209 is not required.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.17 - 2006. The specification used was the FCC 15§ 15.319(g).

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 20 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit - Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01057	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2011-10-14	2012-10-13
R&S	Auto test Software	EMC32	V6.30	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.319 (g), with the worst margin reading of:

1.2 dB at **34.006750 MHz** in the **Vertical** polarization

Test Data

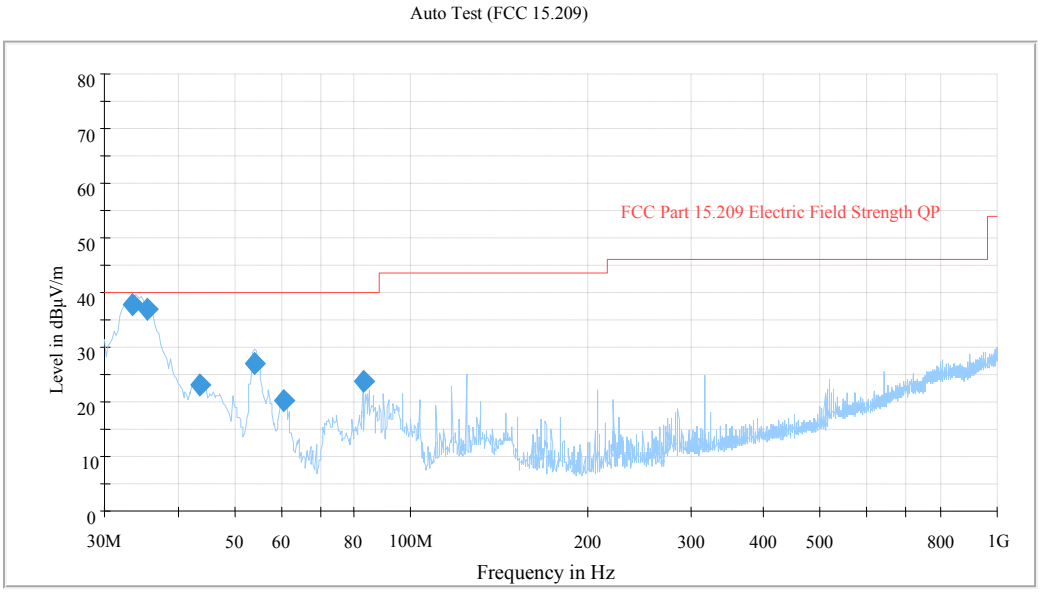
Environmental Conditions

Temperature:	20 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-02-09.

1) Below 1 GHz

Test mode: Transmitting, pre-scan with model 9600MWD5-N, 9600MWD-N, 9602MWD5-N, 9602MWD-N, and 9600MWD-N is Worst case, as below:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
34.006750	38.8	100.0	V	168.0	-8.2	40.0	1.2*
35.441250	38.4	109.0	V	185.0	-9.1	40.0	1.6*
54.074750	26.9	114.0	V	94.0	-17.9	40.0	13.1
43.591500	23.8	104.0	V	136.0	-14.3	40.0	16.2
60.843000	20.2	104.0	V	181.0	-18.6	40.0	19.8

*Within measurement uncertainty.

2) Above 1 GHz

Test Mode: Transmitting

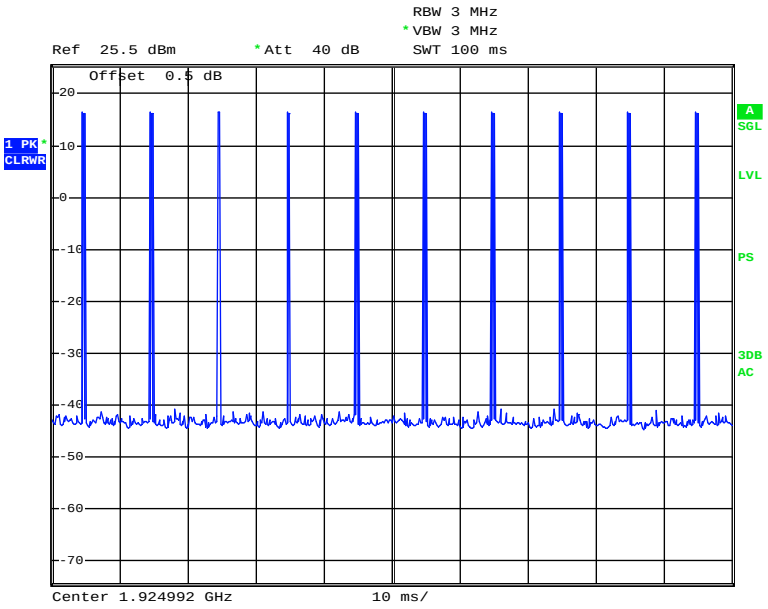
Freq. (MHz)	Meter Reading (dBµV)	Detector (PK/QP/Ave)	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBuV/m)	FCC Part 15.319(g)/209		
				Height (m)	Polar (H/V)	Antenna Loss				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel												
1921.536	78.35	PK	147	1.1	V	29.40	2.97	0	110.72	114	3.28*	Fundamental
1921.536	77.01	PK	135	1.0	H	29.20	2.97	0	109.18	114	4.82	Fundamental
3843.072	53.36	PK	193	1.2	V	33	3.73	26.87	63.22	74	10.78	Harmonic
3843.072	51.98	PK	149	1.0	H	33.9	3.73	26.87	62.74	74	11.26	Harmonic
5764.608	39.74	PK	223	1.2	H	37.4	4.57	26.68	55.03	74	18.97	Harmonic
5764.608	40.85	PK	12	1.0	V	36.2	4.57	26.68	54.94	74	19.06	Harmonic
Middle Channel												
1924.992	77.33	PK	247	1.1	V	29.40	2.97	0	109.70	114	4.30	Fundamental
1924.992	77.06	PK	253	1.2	H	29.20	2.97	0	109.23	114	4.77	Fundamental
3849.984	53.65	PK	152	1.0	V	33	3.73	26.87	63.51	74	10.49	Harmonic
3849.984	51.61	PK	45	1.0	H	33.9	3.73	26.87	62.37	74	11.63	Harmonic
5774.976	40.96	PK	26	1.0	H	37.4	4.57	26.68	56.25	74	17.75	Harmonic
5774.976	41.36	PK	252	1.3	V	36.2	4.57	26.68	55.45	74	18.55	Harmonic
High Channel												
1928.448	77.24	PK	250	1.0	V	29.40	2.97	0	109.61	114	4.39	Fundamental
1928.448	76.85	PK	168	1.1	H	29.20	2.97	0	109.02	114	4.98	Fundamental
3856.896	53.78	PK	12	1.0	V	33	3.73	26.87	63.64	74	10.36	Harmonic
3856.896	51.45	PK	51	1.1	H	33.9	3.73	26.87	62.21	74	11.79	Harmonic
5785.344	41.71	PK	121	1.0	V	36.2	4.57	26.68	55.80	74	18.20	Harmonic
5785.344	40.35	PK	47	1.1	H	37.4	4.57	26.68	55.64	74	18.36	Harmonic

*Within measurement uncertainty.

Field Strength of Radiated Emission Average							
Freq. (MHz)	Peak Corrected Amplitude. @3m (dBμV/m)	Polar H/V	Duty Cycle Factor (dB)	Corrected Amplitude. (dBμV/m)	FCC 15.319(g)		Comment
					Limit (dBμV/m)	Margin (dB)	
Low Channel							
1921.536	110.72	V	-27.89	82.83	94	11.17	Fundamental
1921.536	109.18	H	-27.89	81.29	94	12.71	Fundamental
3843.072	63.22	V	-27.89	35.33	54	18.67	Harmonic
3843.072	62.74	H	-27.89	34.85	54	19.15	Harmonic
5764.608	55.03	H	-27.89	27.14	54	26.86	Harmonic
5764.608	54.94	V	-27.89	27.05	54	26.95	Harmonic
Middle Channel							
1924.992	109.70	V	-27.89	81.81	94	12.19	Fundamental
1924.992	109.23	H	-27.89	81.34	94	12.66	Fundamental
3849.984	63.51	V	-27.89	35.62	54	18.38	Harmonic
3849.984	62.37	H	-27.89	34.48	54	19.52	Harmonic
5774.976	56.25	H	-27.89	28.36	54	25.64	Harmonic
5774.976	55.45	V	-27.89	27.56	54	26.44	Harmonic
High Channel							
1928.448	109.61	V	-27.89	81.72	94	12.28	Fundamental
1928.448	109.02	H	-27.89	81.13	94	12.87	Fundamental
3856.896	63.64	V	-27.89	35.75	54	18.25	Harmonic
3856.896	62.21	H	-27.89	34.32	54	19.68	Harmonic
5785.344	55.80	V	-27.89	27.91	54	26.09	Harmonic
5785.344	55.64	H	-27.89	27.75	54	26.25	Harmonic

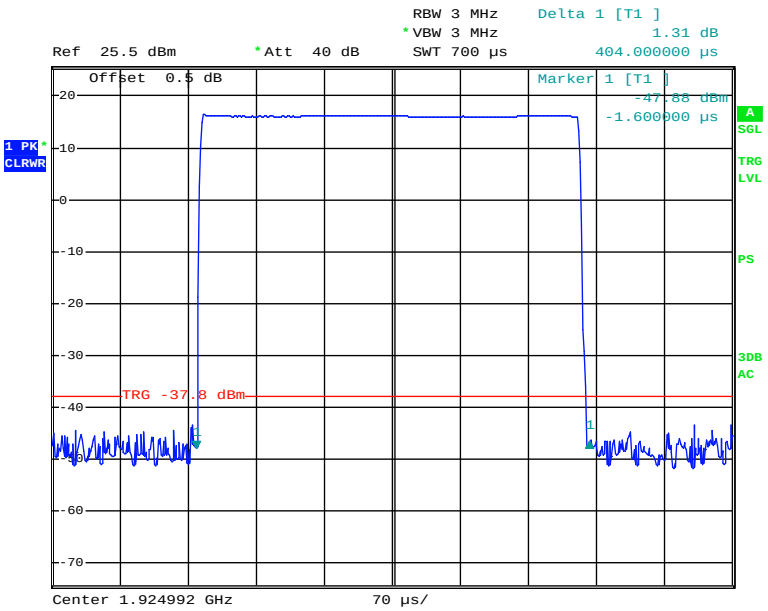
Note: Duty Cycle=Ton/Tp*100%
Ton=404μs =0.404ms
Tp=10.0ms
Duty Cycle= Ton/Tp =4.03%
Duty cycle factor = 20lg (Duty Cycle) = -27.89
AV=PK+20* lg(Duty Cycle)

Sweep time at 100ms:



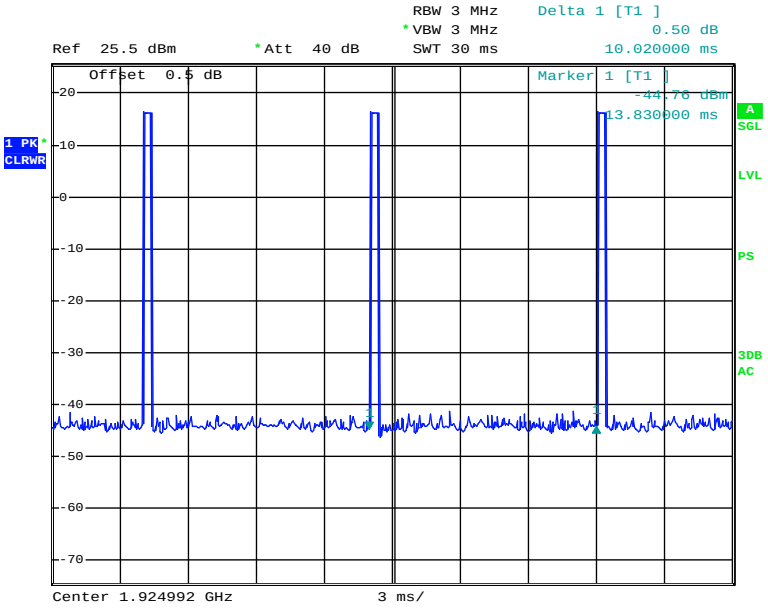
Date: 9.FEB.2012 11:27:23

T_{on}:



Date: 9.FEB.2012 11:25:36

T_p:



Date: 9.FEB.2012 11:26:43

FCC§15.323 (f) - FREQUENCY STABILITY

Applicable Standard

Per §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

This procedure should be carried out for each of the following test cases:

Temperature	Supply Voltage
20℃	85-115% of declared nominal voltage
-20℃	Normal
+50℃	Normal

[a] Use the lowest temperature at which the EUT is specified to operate if it is above -20 ℃.

Using the mean carrier frequency at 20℃ and at nominal supply voltage as the reference, the mean carrier frequency shall be maintained within ±10 ppm at the two extreme temperatures (or as declared by the manufacturer) and at normal temperature (typically 20℃) at the two extreme supply voltages.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2011-11-24	2012-11-23
R & S	Digital Radio-Communication Tester	CMD60	829902/026	2011-10-11	2012-10-10

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	20 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-02-09.

Test Result: Compliance.

Test Mode: Transmitting

Temperature (^{O}C)	Voltage (V_{AC})	Channel Frequency (MHz)	Measured Frequency Offset (kHz)	Measured Frequency Offset (ppm)	Limit (ppm)
20	102	1924.992	-6	-3.1	±10
	120	1924.992	-11	-5.7	±10
	138	1924.992	-9	-4.7	±10
-20	120	1924.992	-10	-5.2	±10
50	120	1924.992	-13	-6.8	±10

FCC§15.323 (c) (e) & §15.319(f) – SPECIFIC REQUIREMENTS FOR UPCS DEVICE

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

Monitoring 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).

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

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 (Second)	Limit (Second)	Results
First	25200	28,800	Pass
Second	21600	28,800	Pass

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)	Result
Connection acknowledgement	0.1	1	Pass
Change of access criteria for control information	22.5	30	Pass
Transmission cease time	1.2	30	Pass
Pulse length	0.000404	0.01	Pass

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: $T_L = -174+10Log_{10}B + M_u + P_{MAX}-P_{EUT}$ (dBm)
Upper threshold: $T_U = -174+10Log_{10}B + M_u + P_{MAX}-P_{EUT}$ (dBm)
Where: B=Emission bandwidth (Hz)
M_u =dB the threshold may exceed thermal noise (30 for T_L & 50 for T_U)
P_{MAX} =$5Log_{10}B-10$(dBm)
P_{EUT} =Transmitted power (dBm)

Limit:

Monitor Threshold	B (MHz)	M_U (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
T_L	1.428	30	20.76	16.51	-78.20
T_U	1.428	50	20.76	16.51	-58.20

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

Measured Threshold Level ≤ T_U
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	-78.20
Upper Threshold (dBm)	N/A	-58.20

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

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.

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)	B(bandwidth)(MHz)	Pulse width(μs)	Limit(μs)	Result
50 $(1.25/B)^{1/2}$	1.428	46.78	50	Pass
35 $(1.25/B)^{1/2}$	1.428	32.75	35	Pass

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.

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:

Not apply based on 15.323 (c) (5)

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 that this provision is not utilized by the EUT.

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.

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.

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)
3.25	10	Pass

Frame Period and Jitter:

Max. pos. Jitter (us)	Max. neg. Jitter (us)	Frame period (ms)	Limit	
			Frame Period (ms)	Jitter (µs)
0.04	-0.07	10.00000	20 or10/X	25us

Note: X is a positive whole number.

PRODUCT SIMILARITY DECLARATION LETTER

Cetis, Inc.
Address: 5025 Galley Road, Colorado Springs CO, 80915, USA
Tel: 719-638-8821
Fax: 719-638-8815

5/20/2013

Product Similarity Declaration

To Whom It May Concern,

We, Cetis, Inc., hereby declare that our DECT Telephone was tested by BACL, and for our marketing purpose, we would like to list another four models on reports and certificate, all the models have the same schematic, the differences between these models for details as below:

Production name	Trade name	Model no.	Description
DECT Telephone	Cetis	9600MWD5-N	5 quick dial keys with single line
DECT Telephone	Cetis	9600MWD-N	10 quick dial keys with single line
DECT Telephone	Cetis	9602MWD5-N	5 quick dial keys with Double line
DECT Telephone	Cetis	9602MWD-N	10 quick dial keys with Double line

No other differences are made to them.
Please contact me if you have any question.

Signature:

Brock Munsell

Chief Technology Officer

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