

FCC PART 15.407

TEST REPORT

For

Jupiter Technology (Wuxi) Co., Ltd.

NO.13 Minjiang Road, Wuxi State High&New Technology
Industry Development Zone, Jiangsu, P.R.China

FCC ID: W1OWS3007

Report Type: Original Report	Product Type: WHDI Wireless Video Transmitter
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Jupiter Technology (Wuxi) Co., Ltd.*'s product, model number: *WS3007 (FCC ID: WIOWS3007)* ("EUT") in this report is a *WHDI Wireless Video Transmitter*, which was measured approximately: 3.4 cm (L) x 1.8 cm (W) x 11.5 cm (H), the operating frequency is 5150~5250MHz, 5725~5825MHz, rated input voltage: DC 5V from USB port.

** All measurement and test data in this report was gathered from production sample serial number: 1305165 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2013-05-30.*

Objective

This type approval report is prepared on behalf of *Jupiter Technology (Wuxi) Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with RF radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

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 system was configured for testing in an engineering mode, which was provided by manufacture. For the operating frequency range 5150MHz~5250MHz, the test frequencies are 5190MHz and 5230MHz, those are requested by the applicant. For the operating frequency range 5725MHz~5825MHz, the test frequencies are 5755MHz and 5795MHz.

EUT Exercise Software

The test was performed under “AppCom_3.0.3.16”.

Equipment Modifications

No modification was made to the unit tested.

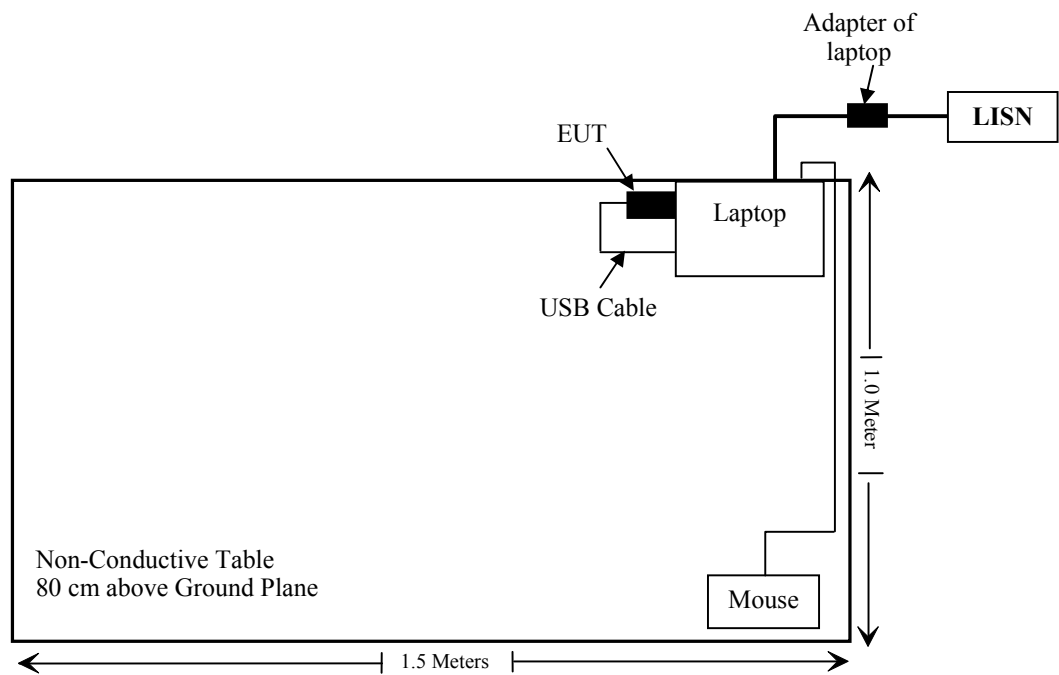
Local Support Equipment

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	V470	WB03069895
DELL	Mouse	MOC5UO	G1B0096D

External Cable

Cable Description	Length (m)	From/Port	To
Unshielded Undetachable Mosue Cable	1.5	Mouse	Laptop
Unshielded Undetachable USB Cable	0.75	Laptop	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407 (f), §2.1093	RF Exposure Evaluation	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1) (2) (3) (4)	OUT Of Band Emissions	Compliance
§15.407(a) (1)	26 dB Bandwidth	Compliance
§15.407(a)(1),	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(5)	Power Spectral Density	Compliance
§15.407(a)(6)	Peak Excursion Ratio	Compliance

FCC §15.407 (f) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v05

Result

According to FCC KDB 447498 D01 General RF Exposure Guidance v05 generic portable criteria

The distance between antenna and test point is 5 mm.

The max conducted output power is 5.59 dBm (3.622 mW) for band: 5725-5825 MHz and 5.55 dBm (3.589 mW) for band: 5150-5250 MHz.

The antenna gain is 0 dBi.

So the max output power (EIRP) is 5.59 dBm (3.622 mW) for band: 5725-5825 MHz and 5.55 dBm (3.589 mW) for band: 5150-5250 MHz.

According to the Appendix A of KDB 447498, the exclusion thresholds for 5200 MHz is 7 mW and for 5800 MHz is 6 mW.

Conclusion:

The time-averaged output power is $3.622\text{mW} < \text{the exclusion thresholds } 6\text{ mW}$ for band 5725-5825 MHz, and $3.589\text{mW} < \text{the exclusion thresholds } 7\text{ mW}$ for band 5150-5250 MHz, so stand-alone SAR evaluation is not required.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two patch ceramic antennas soldered on the PCB, which was permanently attached and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

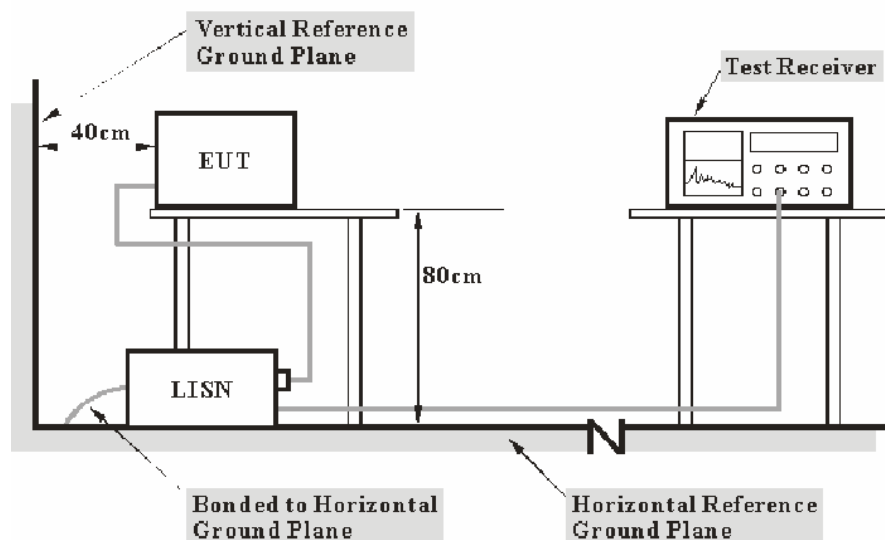
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

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 Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter of laptop 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
Rohde & Schwarz	Transient limiter	ESH3Z2	DE25985	2012-08-09	2013-08-09
Rohde & Schwarz	CE Test software	EMC 32	V8.53	-	-

* **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 Procedure

During the conducted emission test, the adapter of laptop was connected to 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 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:

2.9 dB at 0.450000 MHz in the Line conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data**Environmental Conditions**

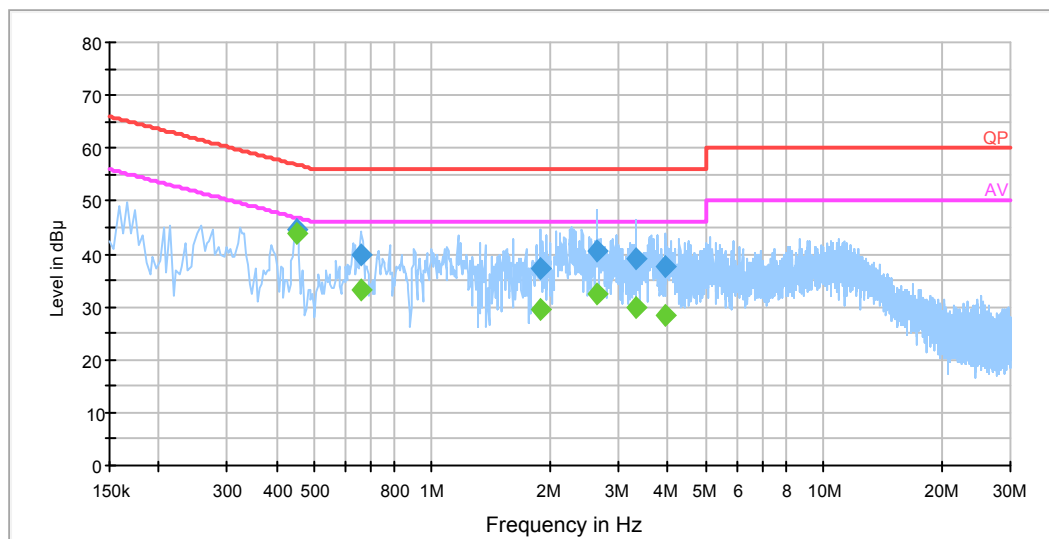
Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.1 kPa

The testing was performed by Simon Wang on 2013-07-30.

Test Mode: Transmitting

AC 120 V, 60 Hz, Line:

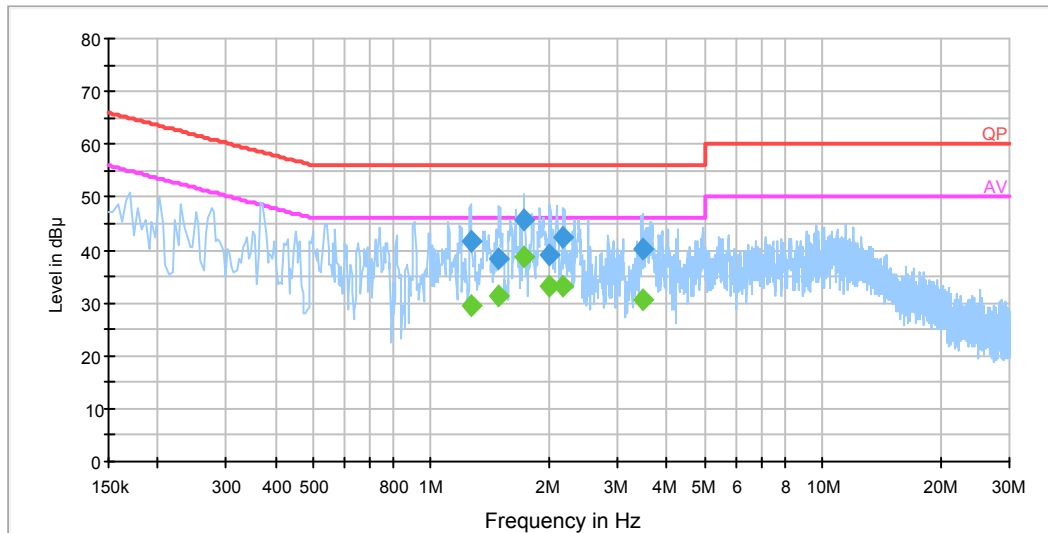
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.450000	44.0	19.5	46.9	2.9*	Ave
0.450000	44.6	19.5	56.9	12.3	QP
0.658000	33.0	19.5	46.0	13.0	Ave
2.642000	32.3	19.5	46.0	13.7	Ave
2.642000	40.7	19.5	56.0	15.3	QP
3.314000	29.9	19.6	46.0	16.1	Ave
0.658000	39.8	19.5	56.0	16.2	QP
1.898000	29.6	19.5	46.0	16.4	Ave
3.314000	39.0	19.6	56.0	17.0	QP
3.962000	28.4	19.6	46.0	17.6	Ave
1.898000	37.4	19.5	56.0	18.6	QP
3.962000	37.4	19.6	56.0	18.6	QP

AC120V, 60 Hz, Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
1.730000	38.7	19.5	46.0	7.3	Ave.
1.730000	45.6	19.5	56.0	10.4	QP
2.014000	33.1	19.6	46.0	12.9	Ave.
2.178000	33.0	19.6	46.0	13.0	Ave.
2.178000	42.2	19.6	56.0	13.8	QP
1.262000	41.5	19.5	56.0	14.5	QP
1.494000	31.2	19.5	46.0	14.8	Ave.
3.458000	30.5	19.6	46.0	15.5	Ave.
3.458000	40.2	19.6	56.0	15.8	QP
1.262000	29.6	19.5	46.0	16.4	Ave.
2.014000	39.0	19.6	56.0	17.0	QP
1.494000	38.5	19.5	56.0	17.5	QP

Note:

- 1) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude
- 4) *within measurement uncertainty!

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (2), (3), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band.

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.

For transmitters operating in the 5.725–5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz.

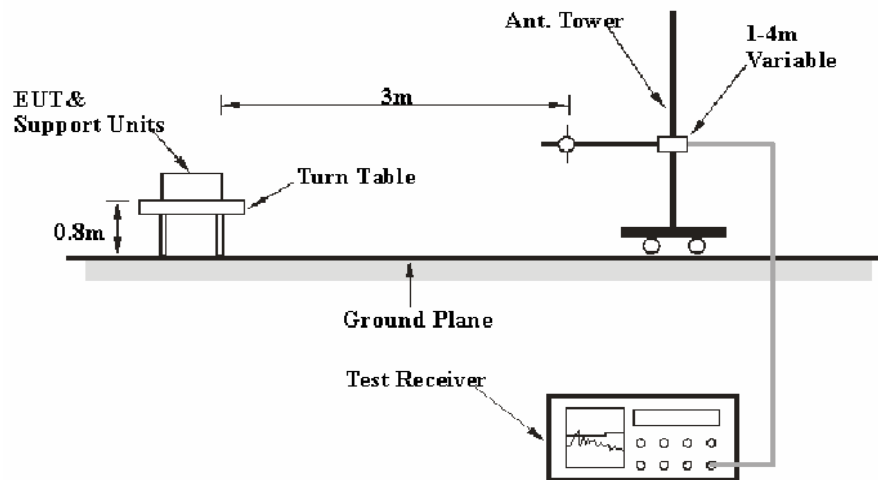
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) will not be taken into consideration for the test data recorded in the report

EUT Setup



The radiated emission tests were performed in the 1.5 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.407 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 spacing between the peripherals was 10 cm.

The adapter of laptop was connected to a 120 VAC/60 Hz power source,

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 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
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

Radiated Spurious Emission

During the radiated emission test, the adapter of laptop was connected to the AC floor outlet.

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

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

The EUT is set 1.5 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

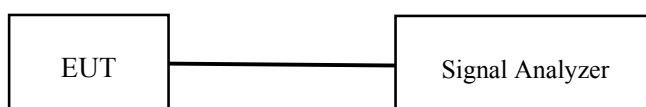
According to C63.4, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor = $20 \log (3\text{m}/1.5\text{m})$ dB

Extrapolation result = Corrected Amplitude (dBμV/m) -6dB

Conducted Spurious Emission at Antenna Port

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to $\geq 1\text{MHz}$, report the peak value out of the operating band.
3. Repeat above procedures until all frequencies measured were complete.



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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2013-05-09	2014-05-09
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

* **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 Title 47, Part 15, Subpart C, Section 15.205, 15.209 and 15.407, with the worst margin reading of:

2.80 dB at 11590 MHz in the Vertical polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	20 ~ 25 °C
Relative Humidity:	50 ~ 56 %
ATM Pressure:	100.1 kPa

The testing was performed by Simon Wang on 2013-07-30 and 2013-08-19.

Mode: Transmitting

30 MHz ~ 40 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5190 MHz									
5190	82.73	PK	69	1.4	H	11.92	94.65	/	/
5190	76.54	Ave.	69	1.4	H	11.92	88.46	/	/
5190	82.29	PK	26	1.2	V	11.92	94.21	/	/
5190	76.41	Ave.	26	1.2	V	11.92	88.33	/	/
641.24	48.83	QP	69	1.3	H	-7.5	41.33	46	4.67*
10380	28.85	Ave.	258	1.3	V	20.38	49.23	54	4.77*
513.01	50.91	QP	17	1.2	H	-10.1	40.81	46	5.19*
5422.4	32.12	Ave.	78	1	H	12.1	44.22	54	9.78
4716.6	30.47	Ave.	323	1.1	V	12.37	42.84	54	11.16
2686.6	32.24	Ave.	241	1.3	H	7.98	40.22	54	13.78
10380	39.17	PK	258	1.3	V	20.38	59.55	74	14.45
4716.6	41.33	PK	323	1.1	V	12.37	53.70	74	20.30
1523.6	32.24	Ave.	107	1.2	H	1.15	33.39	54	20.61
5422.4	39.62	PK	78	1	H	12.1	51.72	74	22.28
2686.6	41.22	PK	241	1.3	H	7.98	49.20	74	24.80
1523.6	42.39	PK	107	1.2	H	1.15	43.54	74	30.46
5230 MHz									
5230	81.78	PK	71	1.1	H	11.92	93.70	/	/
5230	76.18	Ave.	71	1.1	H	11.92	88.10	/	/
5230	81.42	PK	128	1.2	V	11.92	93.34	/	/
5230	75.73	Ave.	128	1.2	V	11.92	87.65	/	/
10460	29.33	Ave.	20	1.2	V	20.41	49.74	54	4.26*
641.24	48.67	QP	69	1.3	H	-7.5	41.17	46	4.83*
513.01	50.83	QP	17	1.2	H	-10.1	40.73	46	5.27*
4724.4	30.43	Ave.	196	1.1	V	12.37	42.80	54	11.20
5432.4	29.69	Ave.	114	1.1	V	11.99	41.68	54	12.32
10460	40.37	PK	20	1.2	V	20.41	60.78	74	13.22
2352.3	34.23	Ave.	45	1.2	H	5.48	39.71	54	14.29
5432.4	43.11	PK	114	1.1	V	11.99	55.10	74	18.90
1646.2	32.17	Ave.	37	1.3	H	1.77	33.94	54	20.06
4724.4	41.31	PK	196	1.1	V	12.37	53.68	74	20.32
2352.3	43.46	PK	45	1.2	H	5.48	48.94	74	25.06
1646.2	45.17	PK	37	1.3	H	1.77	46.94	74	27.06

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5755 MHz									
5755	81.64	PK	134	1.2	H	13.87	95.51	/	/
5755	76.07	Ave.	134	1.1	H	13.87	89.94	/	/
5755	81.14	PK	96	1.2	V	13.87	95.01	/	/
5755	75.72	Ave.	96	1.3	V	13.87	89.59	/	/
11510	29.75	Ave.	49	1.1	V	20.09	49.84	54	4.16*
641.24	48.85	QP	69	1.3	H	-7.5	41.35	46	4.65*
513.01	51.06	QP	17	1.2	H	-10.1	40.96	46	5.04*
4313.4	31.14	Ave.	198	1.3	H	11.63	42.77	54	11.23
5436.3	30.15	Ave.	60	1.2	H	11.99	42.14	54	11.86
2264.2	32.27	Ave.	312	1.1	H	4.99	37.26	54	16.74
11510	36.68	PK	49	1.1	V	20.09	56.77	74	17.23
4313.4	42.88	PK	198	1.3	H	11.63	54.51	74	19.49
5436.3	41.79	PK	60	1.2	H	11.99	53.78	74	20.22
1356.6	31.71	Ave.	263	1.4	V	0.68	32.39	54	21.61
2264.2	42.54	PK	312	1.1	H	4.99	47.53	74	26.47
1356.6	43.26	PK	263	1.4	V	0.68	43.94	74	30.06
5795 MHz									
5795	79.11	PK	155	1.3	H	13.87	92.98	/	/
5795	73.84	Ave.	155	1.3	H	13.87	87.71	/	/
5795	80.47	PK	201	1.1	V	13.87	94.34	/	/
5795	76.69	Ave.	201	1.1	V	13.87	90.56	/	/
11590	30.79	Ave.	93	1	V	20.41	51.20	54	2.80*
641.24	49.29	QP	69	1.3	H	-7.5	41.79	46	4.21*
513.01	50.53	QP	17	1.2	H	-10.1	40.43	46	5.57*
5412.4	31.14	Ave.	45	1.4	H	12.1	43.24	54	10.76
4286.6	31.17	Ave.	136	1.3	V	11.29	42.46	54	11.54
11590	37.44	PK	93	1	V	20.41	57.85	74	16.15
2263.4	32.72	Ave.	74	1.1	V	4.99	37.71	54	16.29
1612.6	33.58	Ave.	166	1.2	H	1.77	35.35	54	18.65
5412.4	42.53	PK	45	1.4	H	12.1	54.63	74	19.37
4286.6	40.53	PK	136	1.3	V	11.29	51.82	74	22.18
2263.4	41.2	PK	74	1.1	V	4.99	46.19	74	27.81
1612.6	43.72	PK	166	1.2	H	1.77	45.49	74	28.51

Note:

Corrected Amplitude = Corrected Factor + Reading

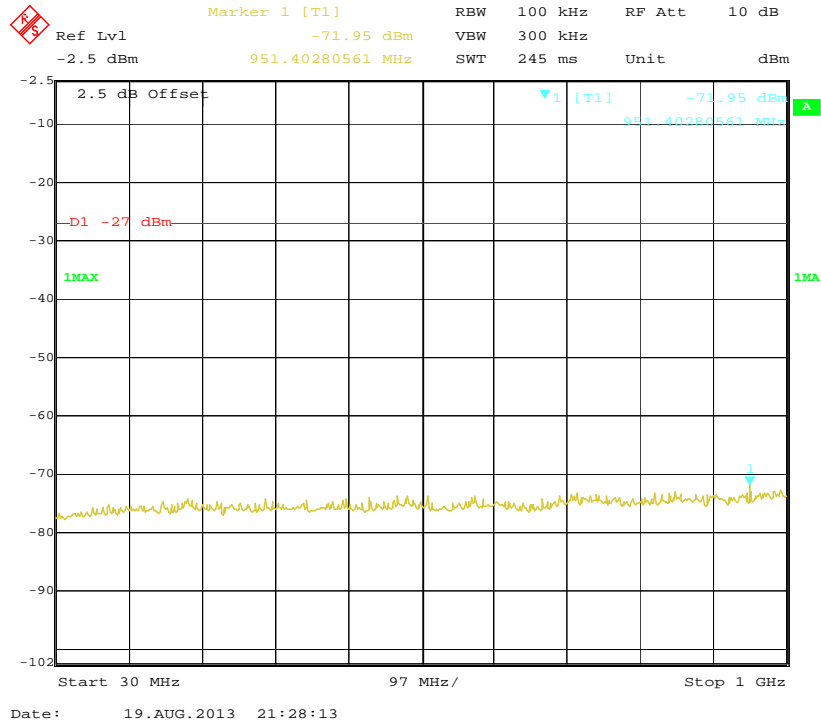
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit- Corr. Amplitude

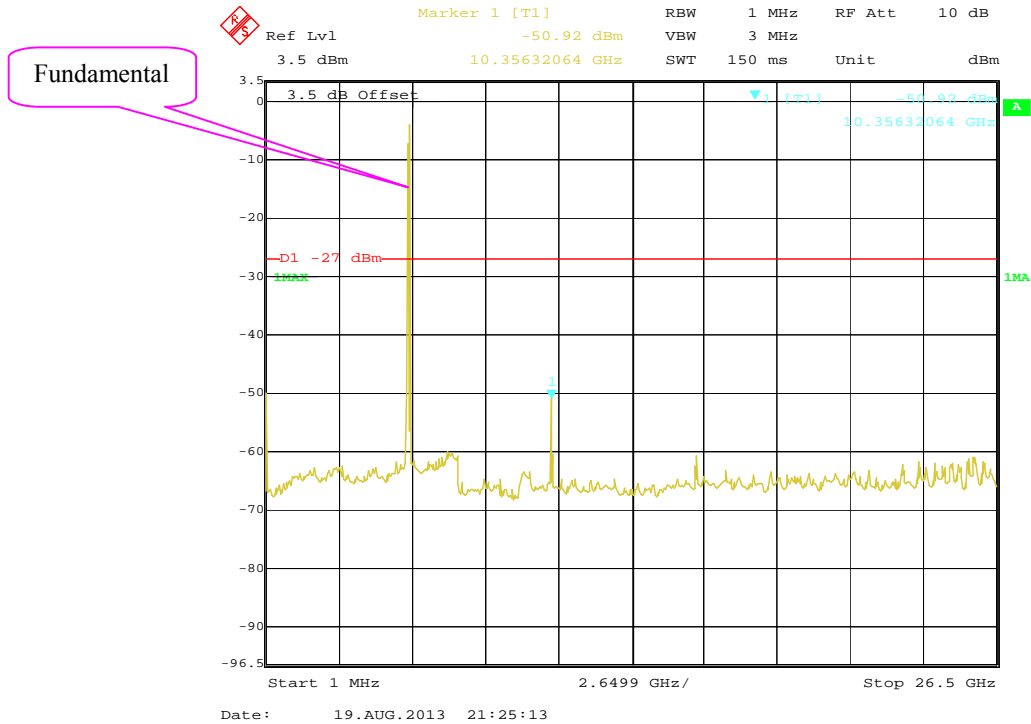
*Within measurement uncertainty!

Conducted Spurious Emission at Antenna Port

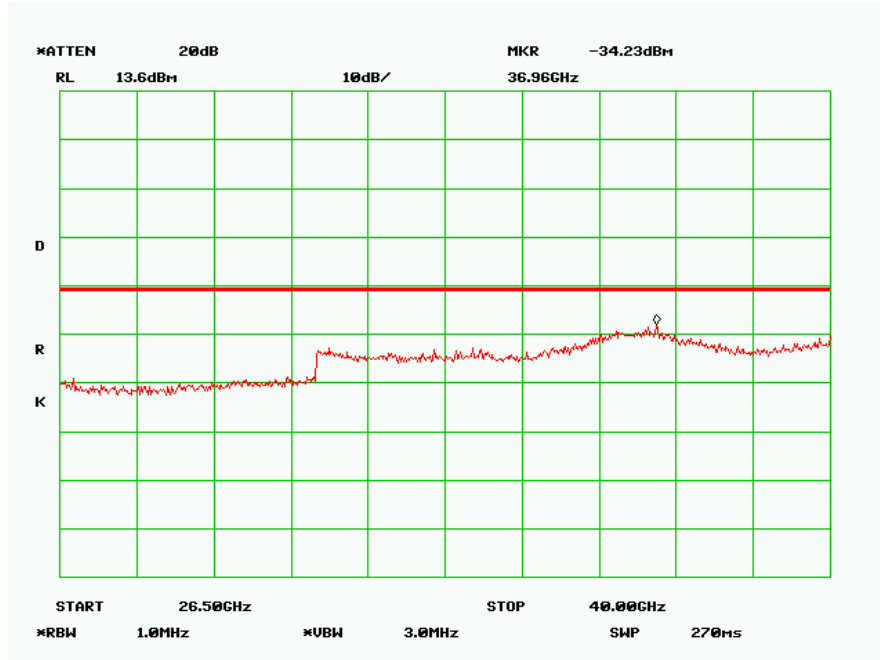
5190 MHz (30 MHz – 1 GHz), Chain 1



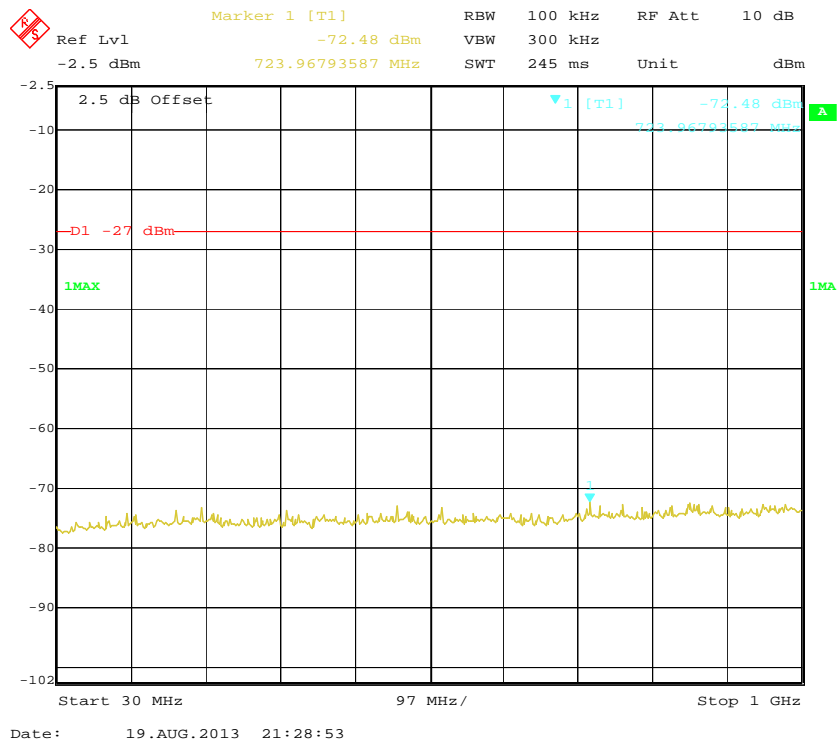
5190 MHz (1 GHz – 26.5 GHz), Chain 1



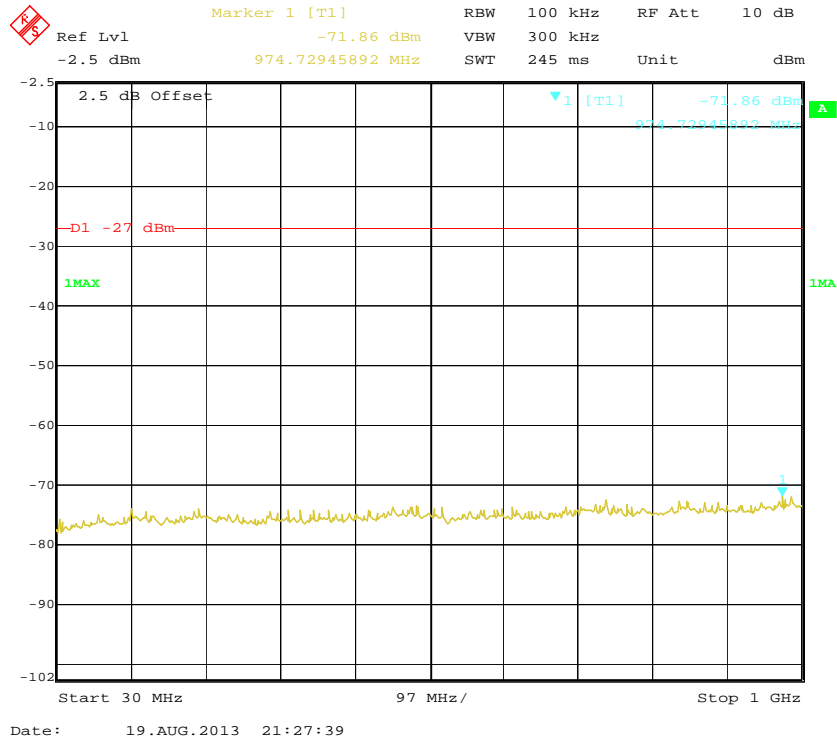
5190 MHz (26.5 GHz – 40 GHz), Chain 1



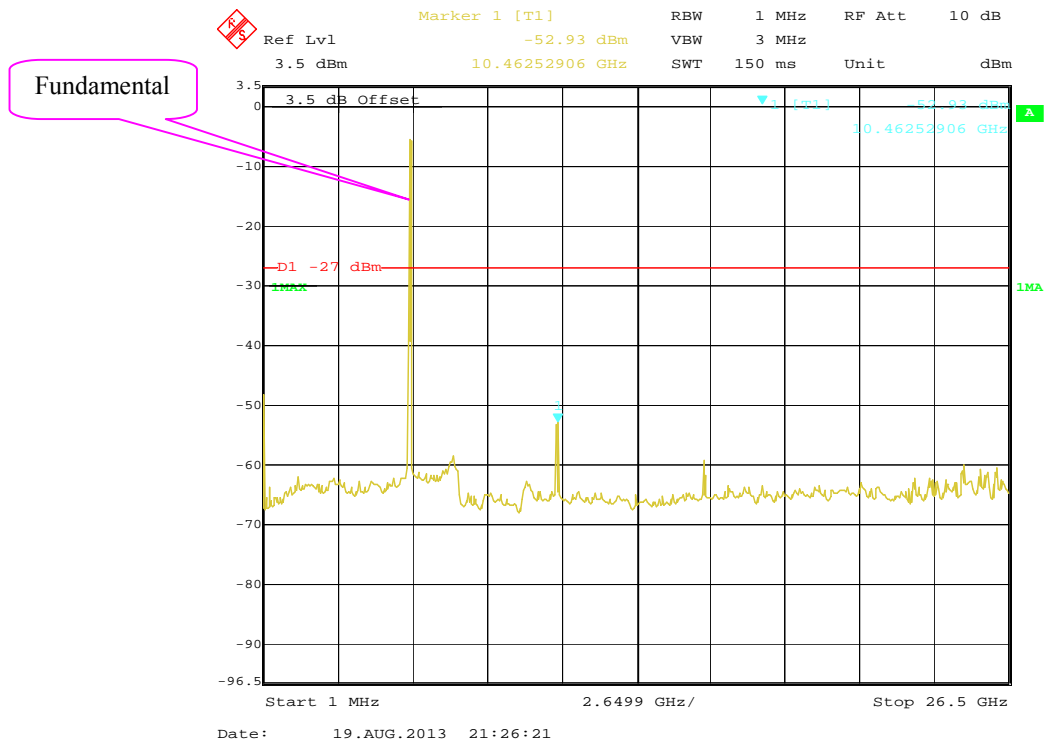
5190 MHz (30 MHz – 1 GHz), Chain 2



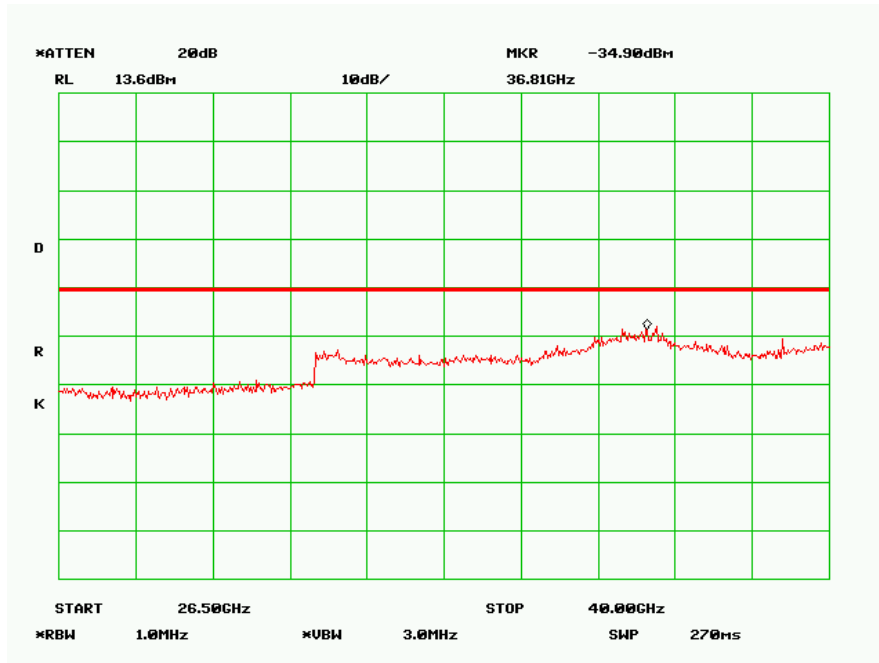
5230 MHz (30 MHz – 1 GHz), Chain 1



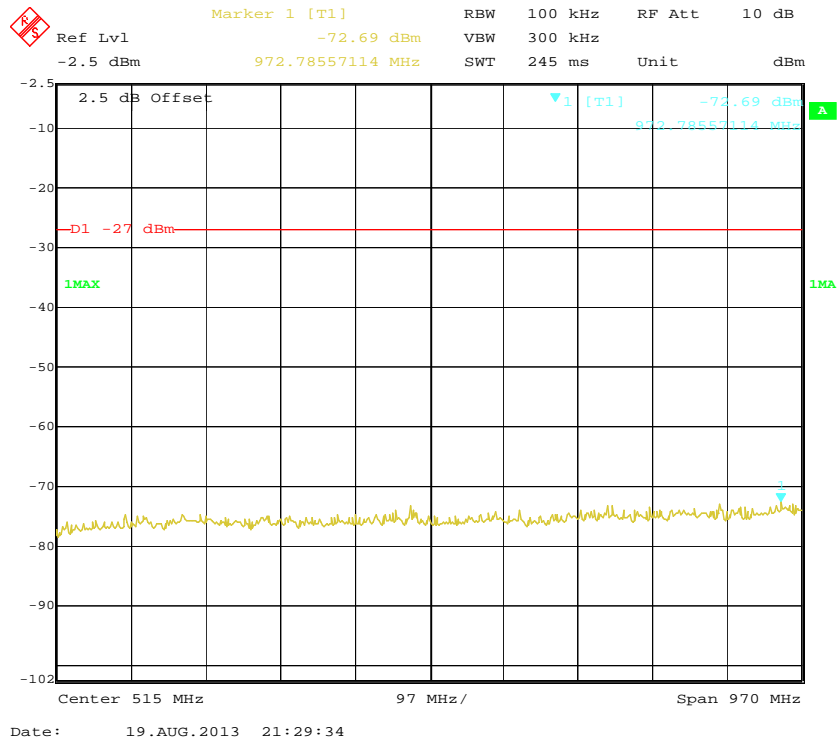
5230 MHz (1 GHz – 26.5 GHz), Chain 1



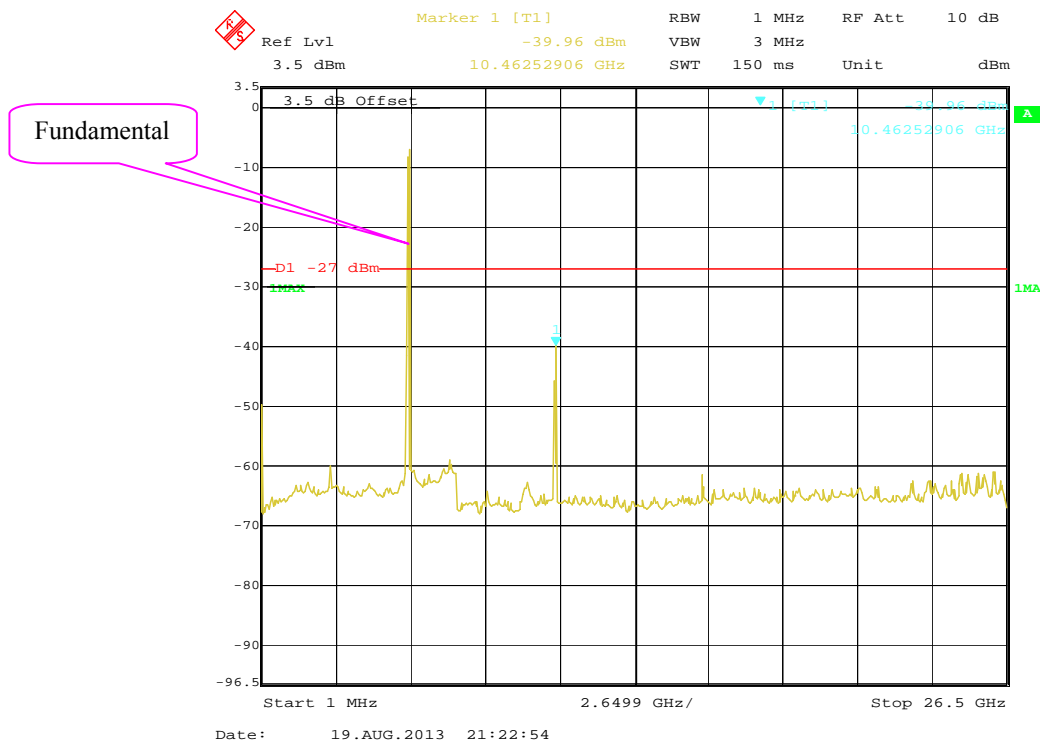
5230 MHz (26.5 GHz – 40 GHz), Chain 1



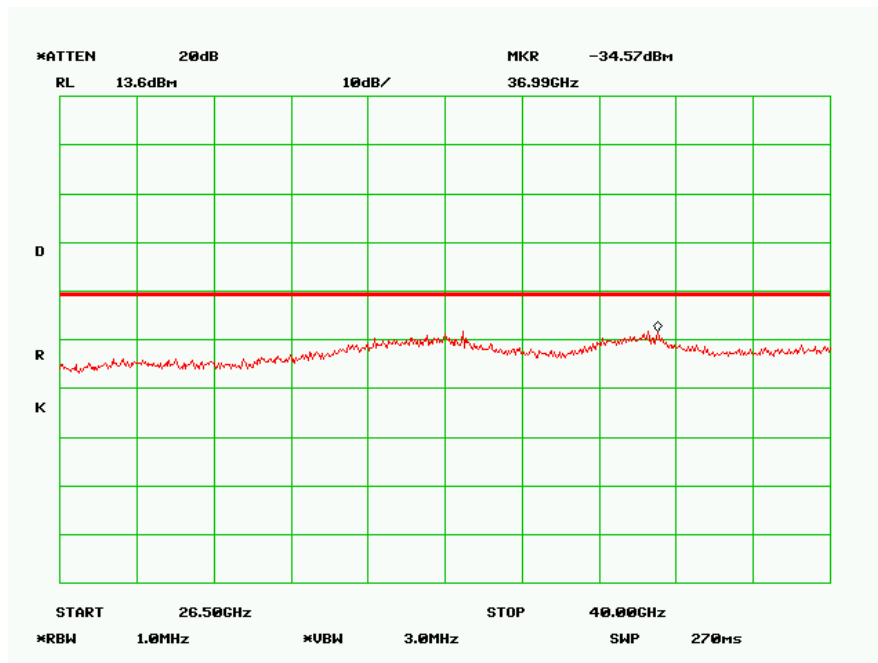
5230 MHz (30 MHz – 1 GHz), Chain 2



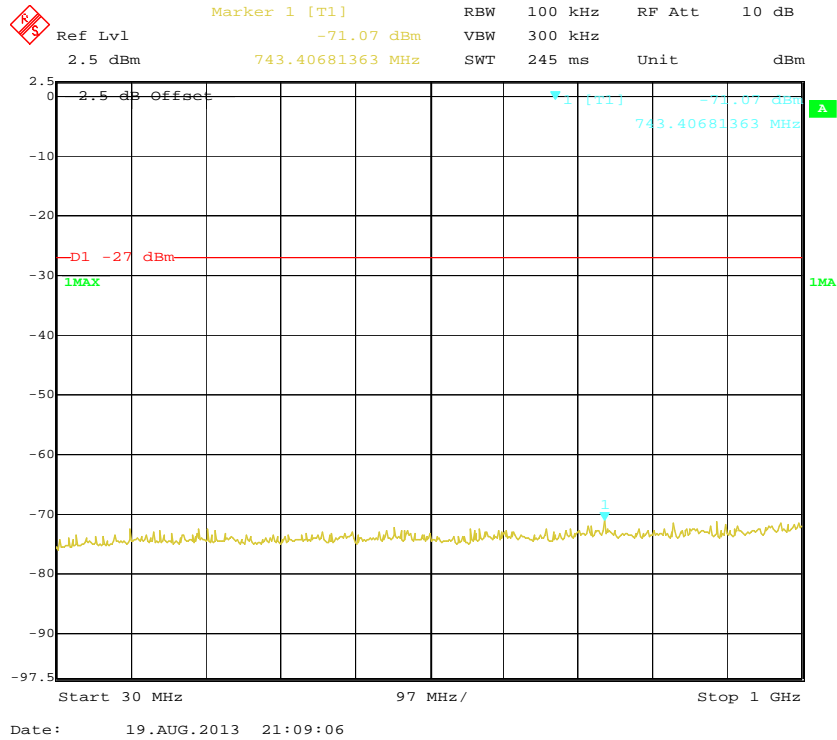
5230 MHz (1 GHz – 26.5 GHz), Chain 2



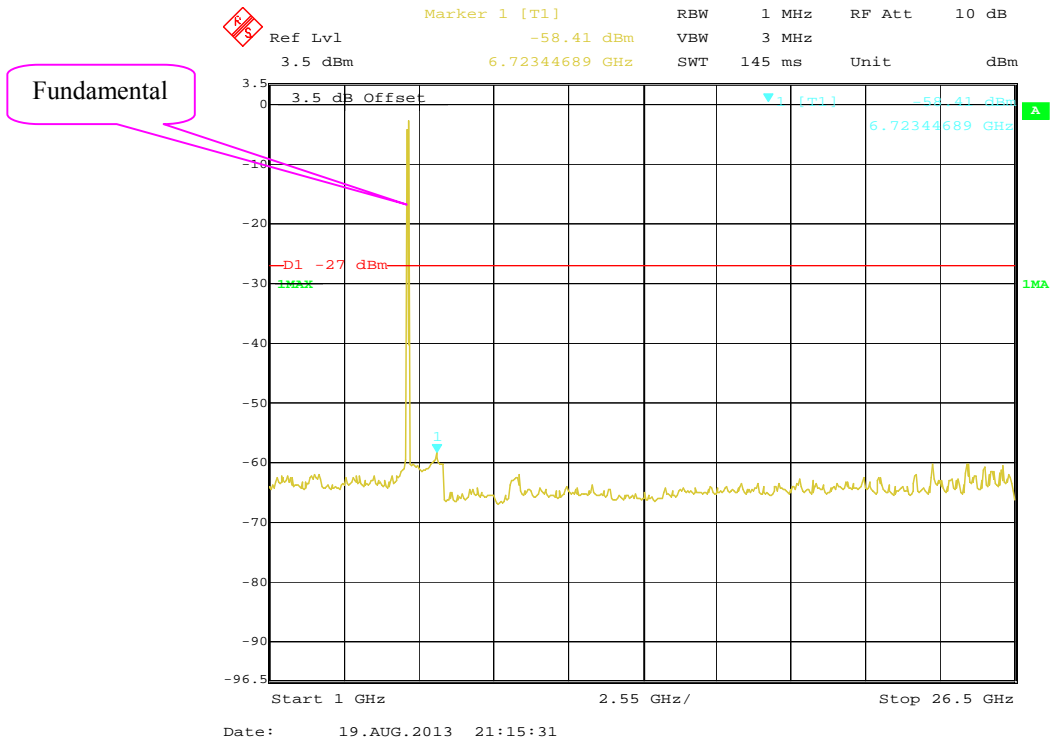
5230 MHz (26.5 GHz – 40 GHz), Chain 2



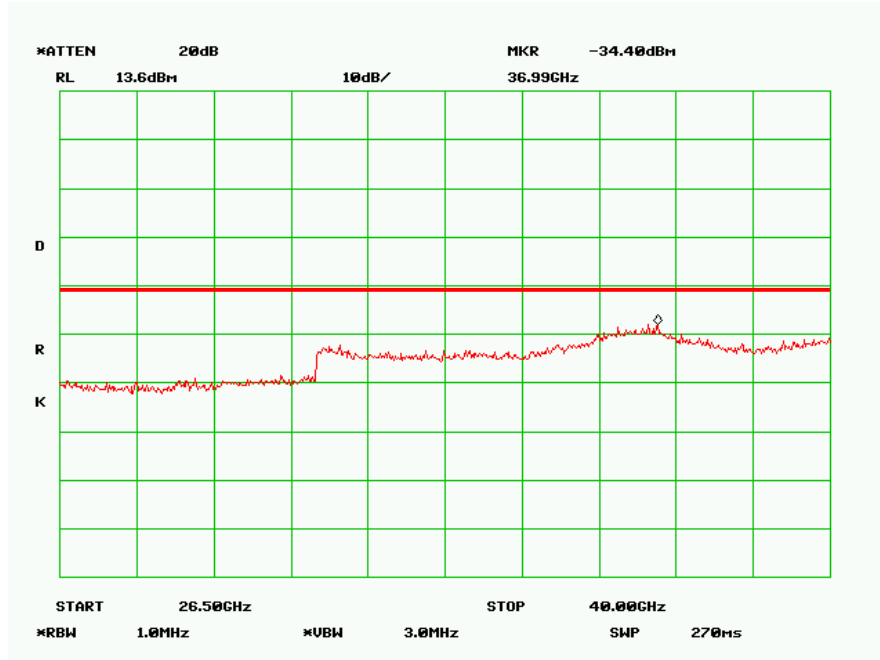
5755 MHz (30 MHz – 1 GHz), Chain 1



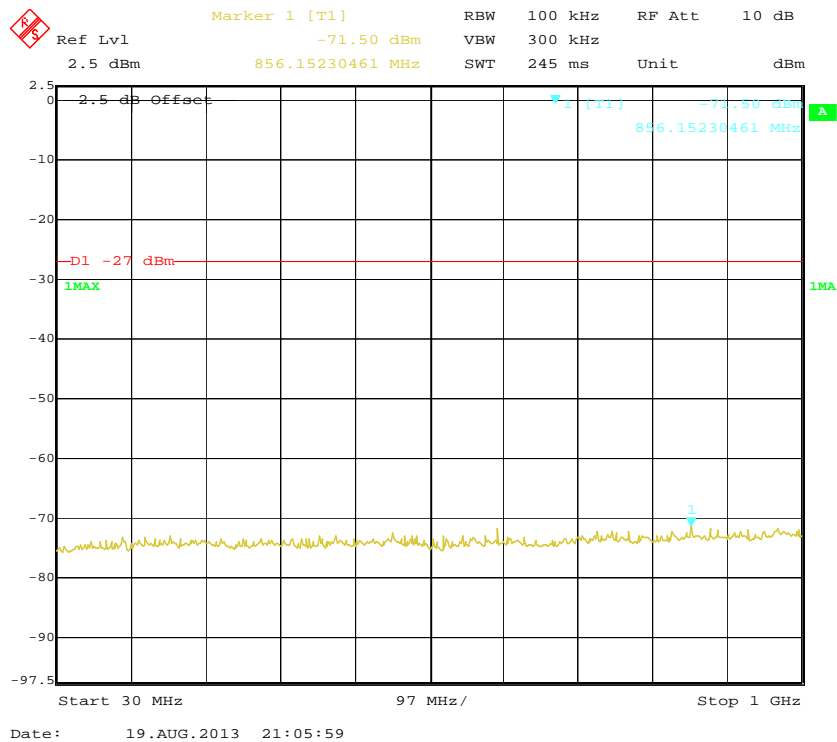
5755 MHz (1 GHz – 26.5 GHz), Chain 1



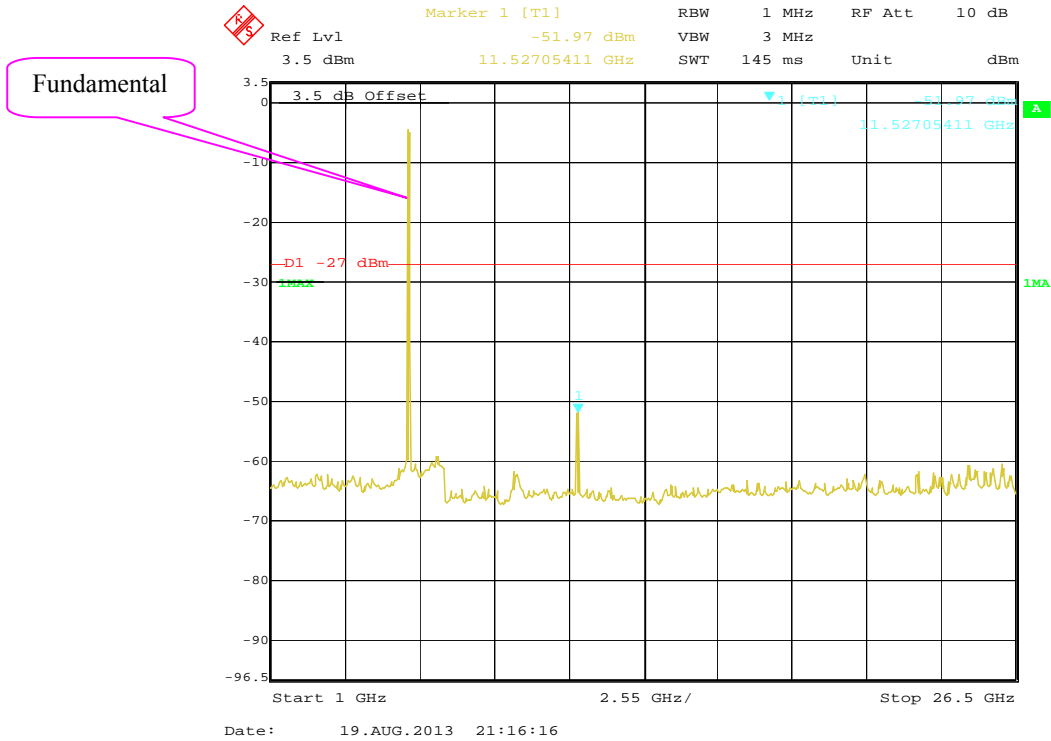
5755 MHz (26.5 GHz – 40 GHz), Chain 1



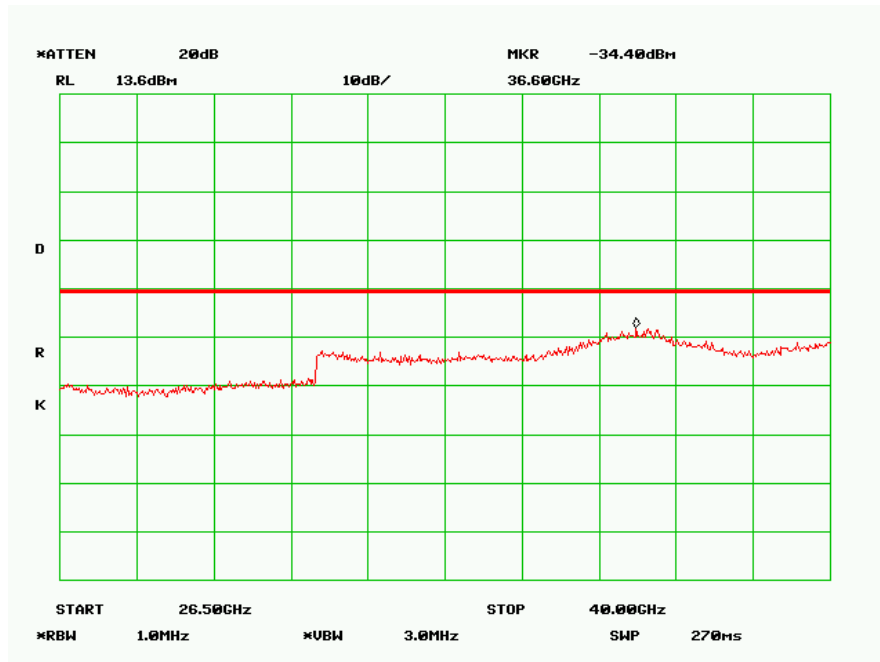
5755 MHz (30 MHz – 1 GHz), Chain 2



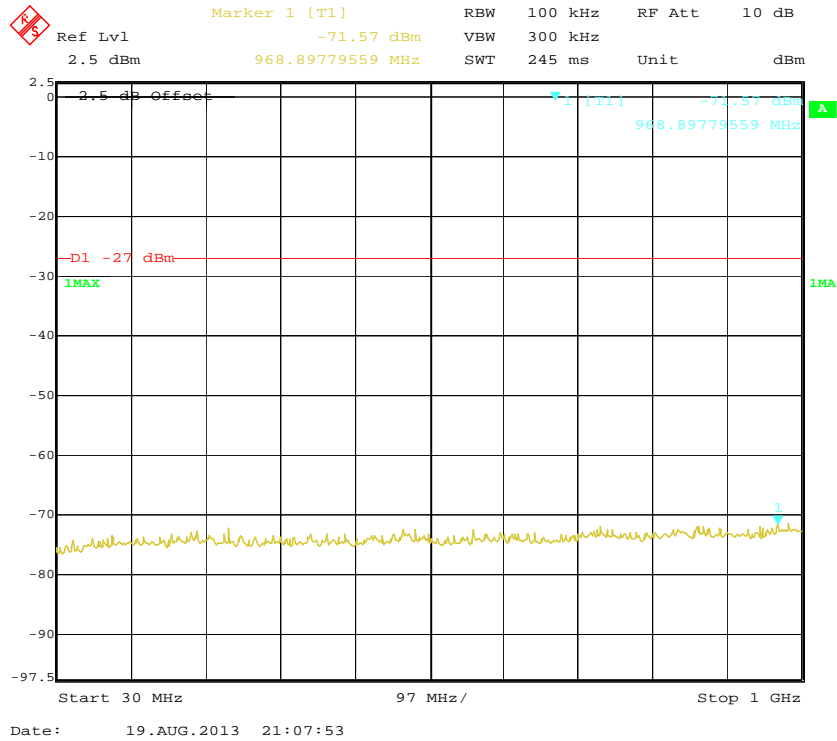
5755 MHz (1 GHz – 26.5 GHz), Chain 2



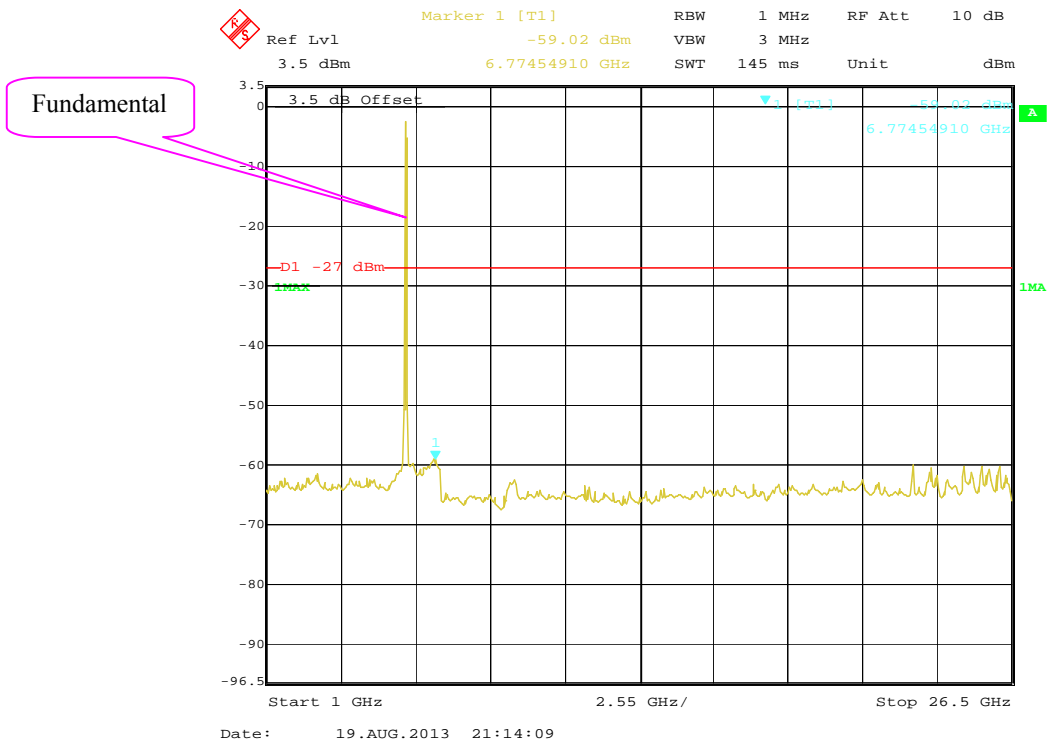
5755 MHz (26.5 GHz – 40 GHz), Chain 2



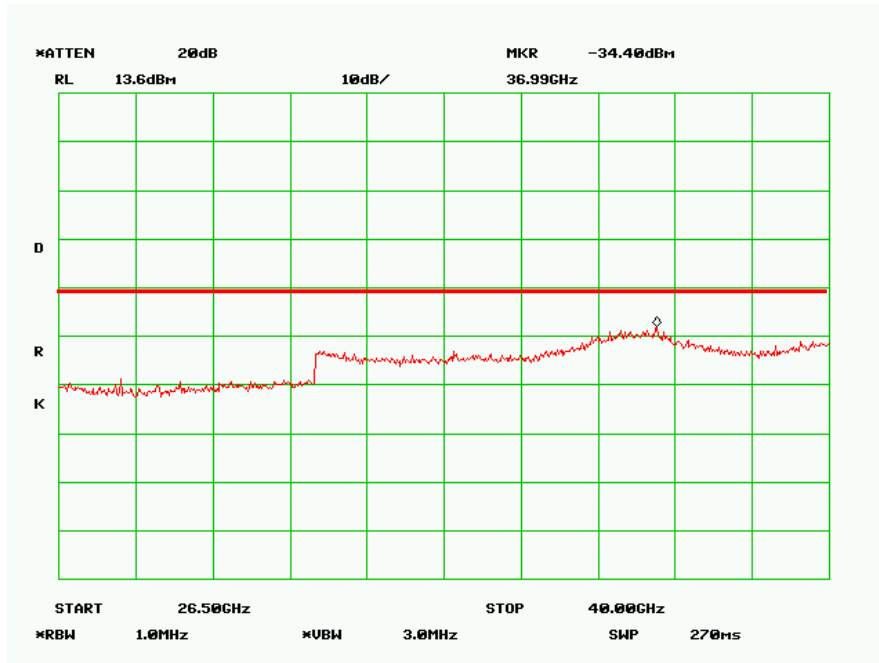
5795 MHz (30 MHz – 1 GHz), Chain 1



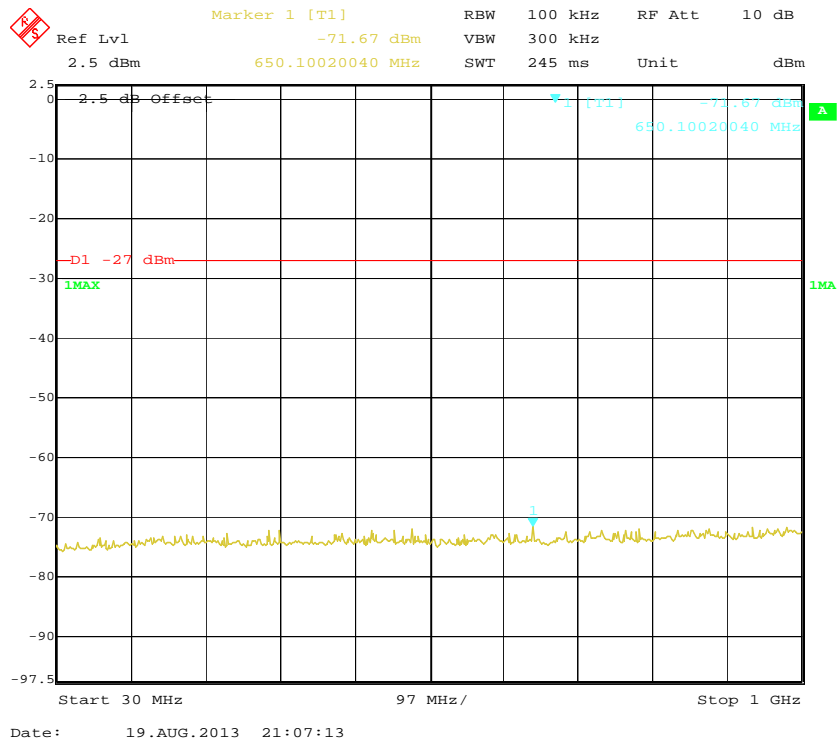
5795 MHz (1 GHz – 26.5 GHz), Chain 1



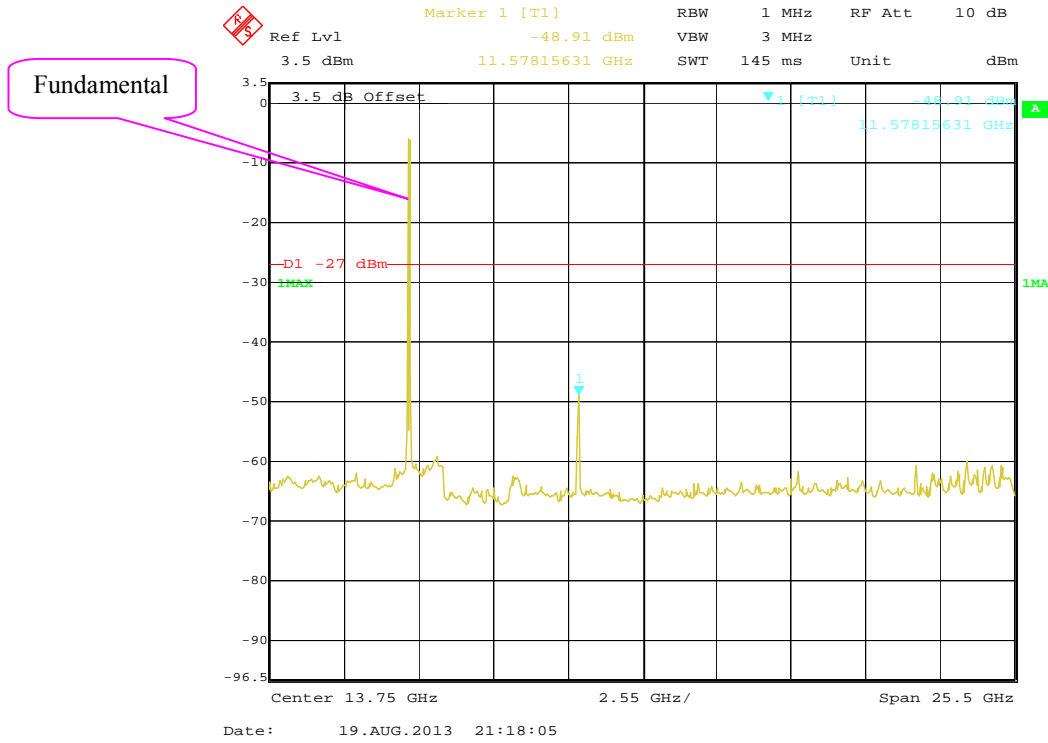
5795 MHz (26.5 GHz – 40 GHz), Chain 1



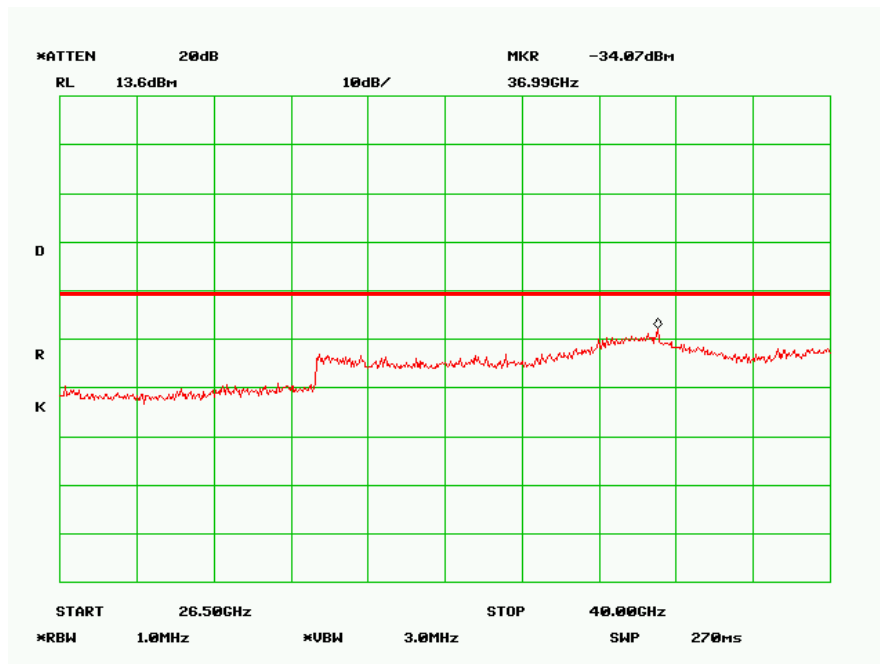
5795 MHz (30 MHz – 1 GHz), Chain 2



5795 MHz (1 GHz – 26.5 GHz), Chain 2



5795 MHz (26.5 GHz – 40 GHz), Chain 2



FCC §15.407(b) (1) (2) (3) (4) – OUT OF BAND EMISSIONS**Applicable Standard**

FCC §15.407 (b) (1), (2), (3), (4);

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band.

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.

For transmitters operating in the 5.725–5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibration or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 1 MHz and VBW to 3MHz of spectrum analyzer.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

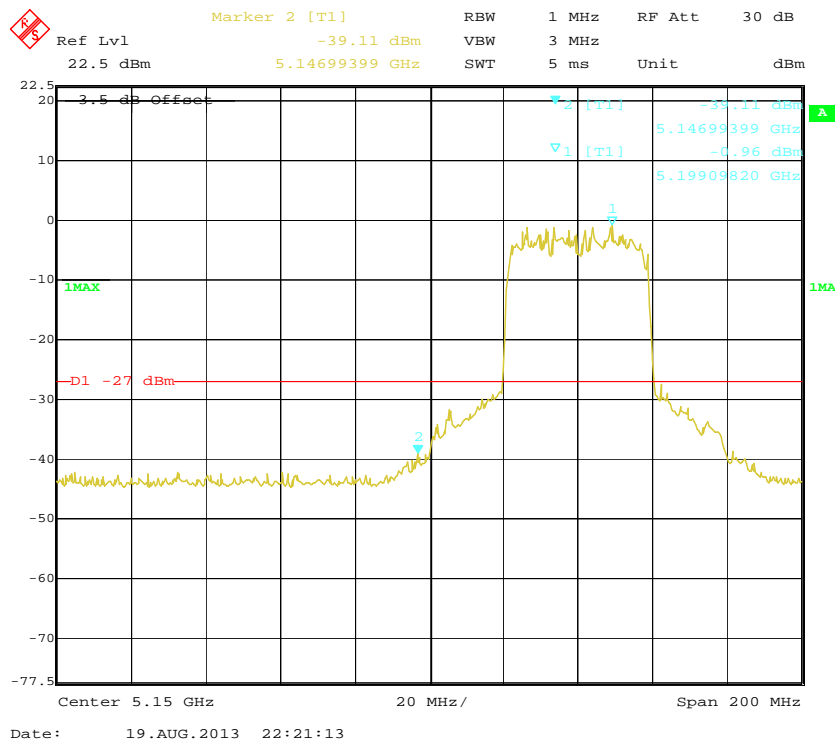
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

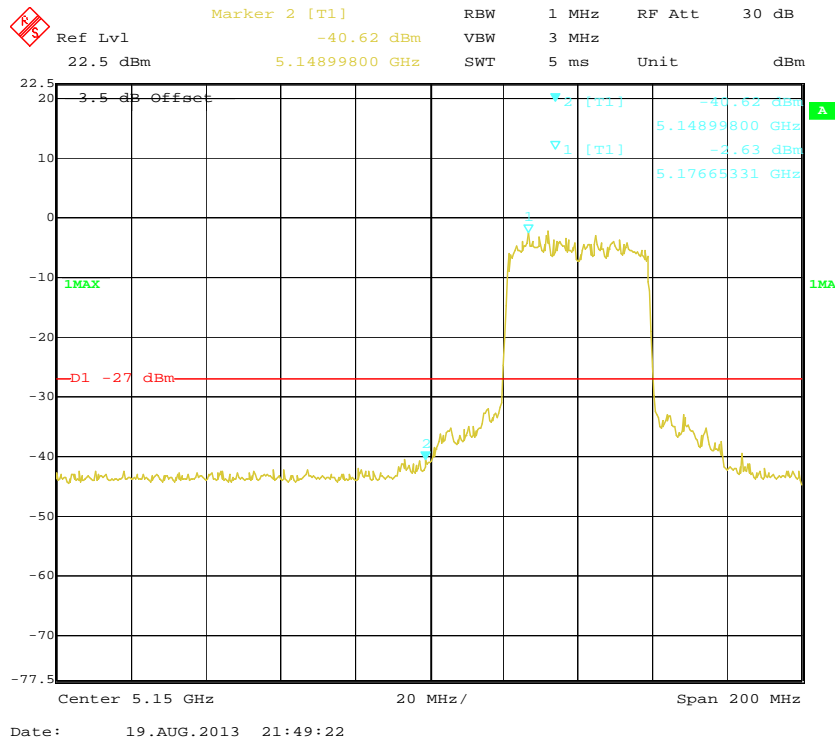
The testing was performed by Simon Wang on 2013-08-19.

Test mode: Transmitting

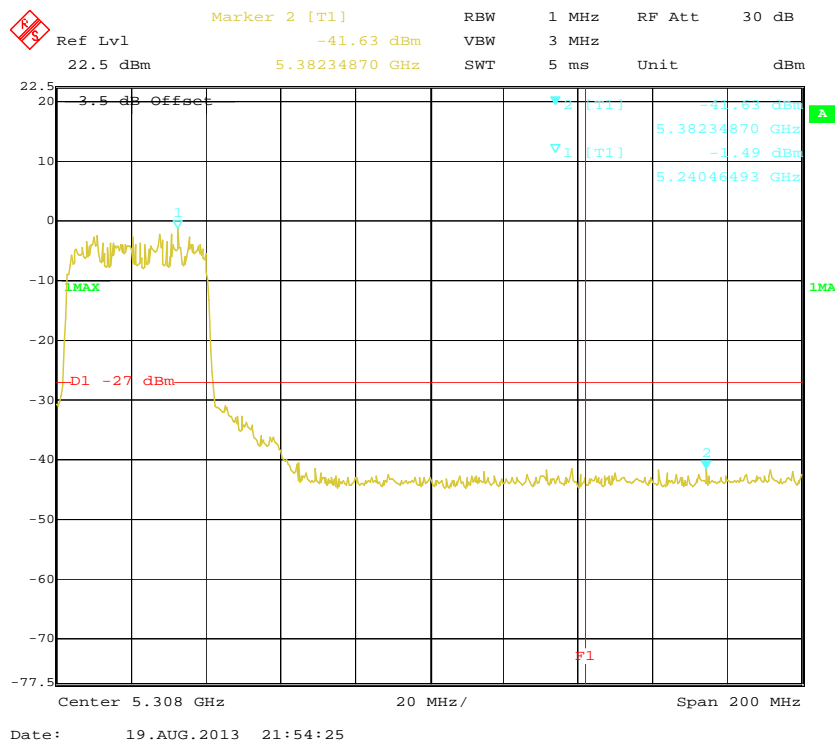
5190 MHz, Chain 1



5190 MHz, Chain 2



5230 MHz, Chain 1



[illegible]

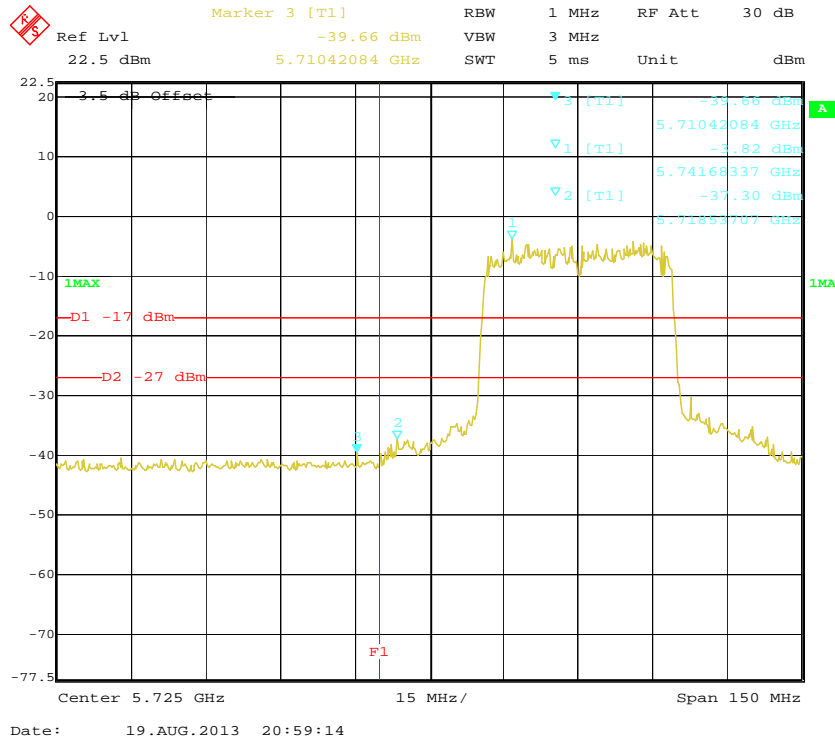
Marker 3 [T1] RBW 1 MHz RF Att 30 dB
 Ref Lvl -38.94 dBm VBW 3 MHz
 22.5 dBm 5.71192385 GHz SWT 5 ms Unit dBm

3.5 dB Offset
 1MAX
 D1 -17 dBm
 D2 -27 dBm
 F1
 1
 2
 3
 1 [T1] -38.94 dBm
 1 [T1] -40.45 dBm
 2 [T1] -35.81 dBm
 5.71192385 GHz
 5.74258517 GHz
 5.72034008 GHz

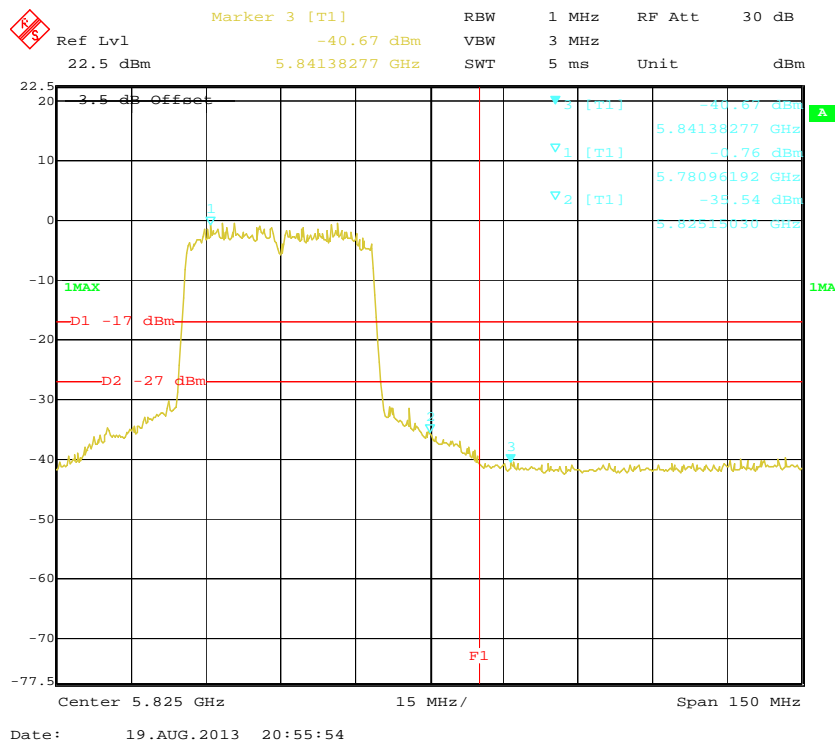
Center 5.725 GHz 15 MHz/ Span 150 MHz

Date: 19.AUG.2013 20:52:42

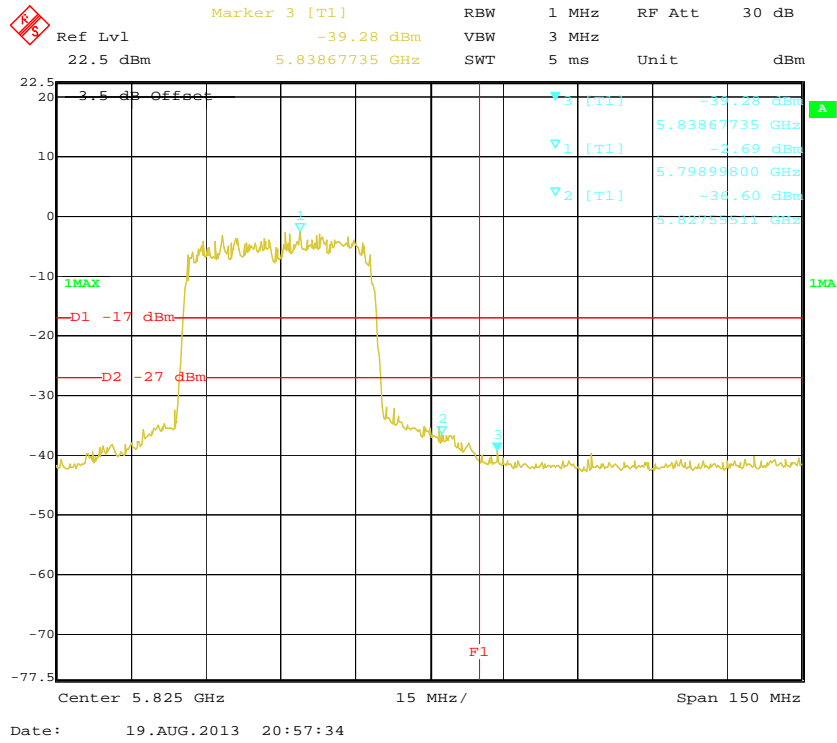
5755 MHz, Chain 2



5795 MHz, Chain 1



5795 MHz, Chain 2



FCC §15.407(a) (1) – 26 dB EMISSION BANDWIDTH**Applicable Standard**

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

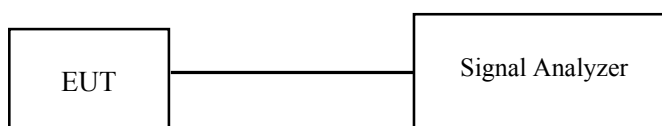
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Use a RBW = approximately 1% of the emission bandwidth. Set the VBW > RBW. Use a peak detector. Do not use the Max Hold function. Rather, use the view button to capture the emission. Measure maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat, measurement as needed until the RBW/EBW ratio is approximately 1%.
4. Repeat above procedures until all frequencies measured were complete.



Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

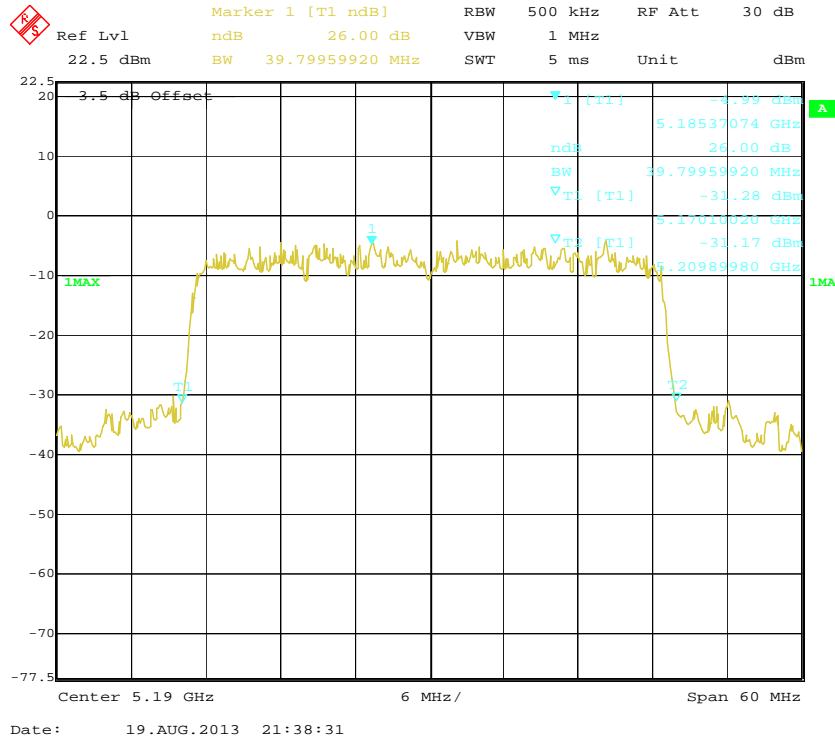
The testing was performed by Simon Wang on 2013-08-19.

Test Result: Pass.

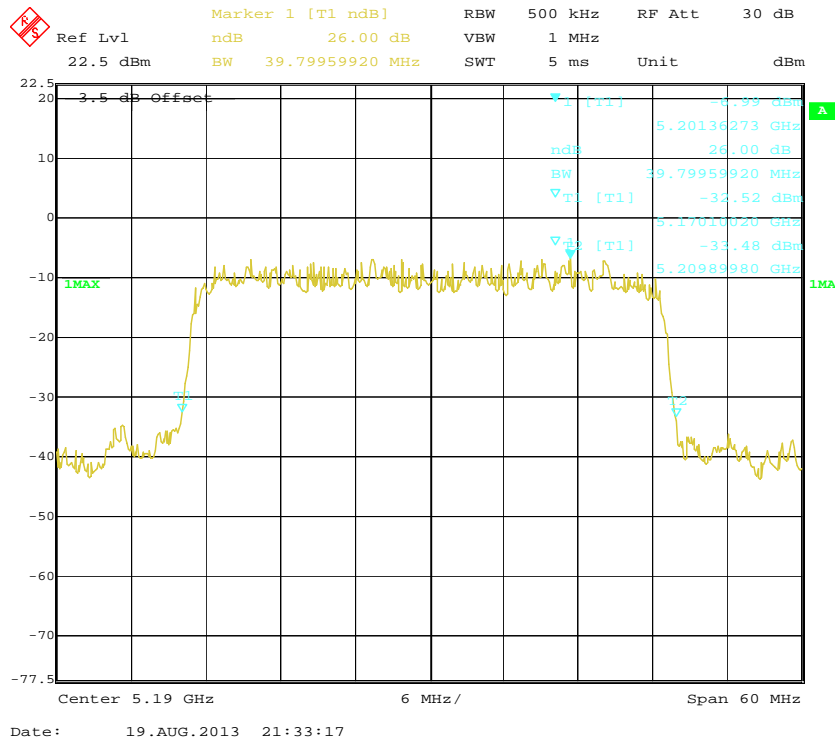
Please refer to the following tables and plots.

Frequency (MHz)	Antenna Port	26 dB Emission Bandwidth (MHz)
5190	Chain 1	39.8
	Chain 2	39.8
5230	Chain 1	39.8
	Chain 2	39.8
5755	Chain 1	39.8
	Chain 2	39.9
5795	Chain 1	39.8
	Chain 2	39.9

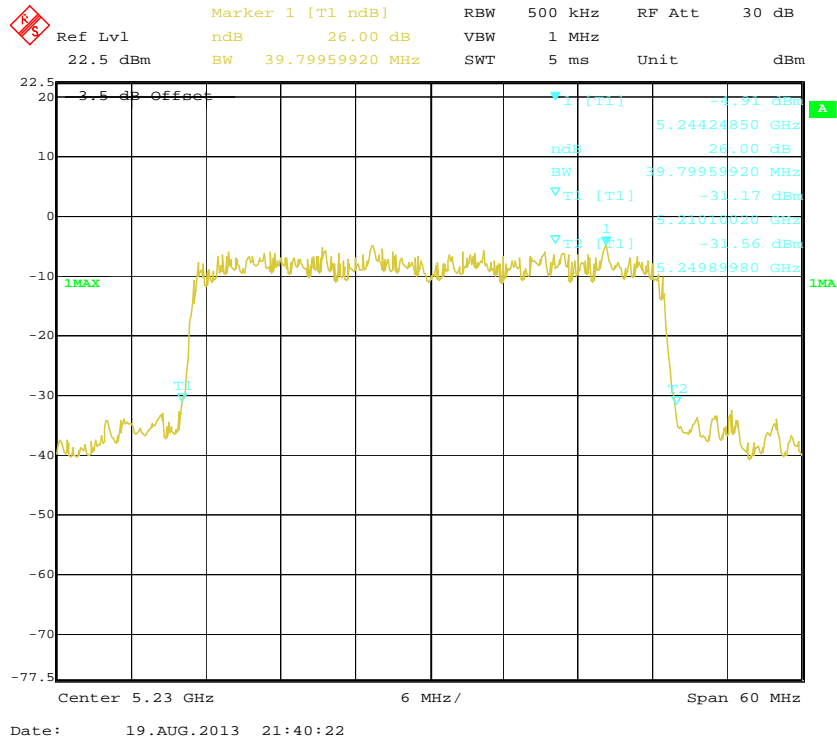
5190 MHz, Chain 1



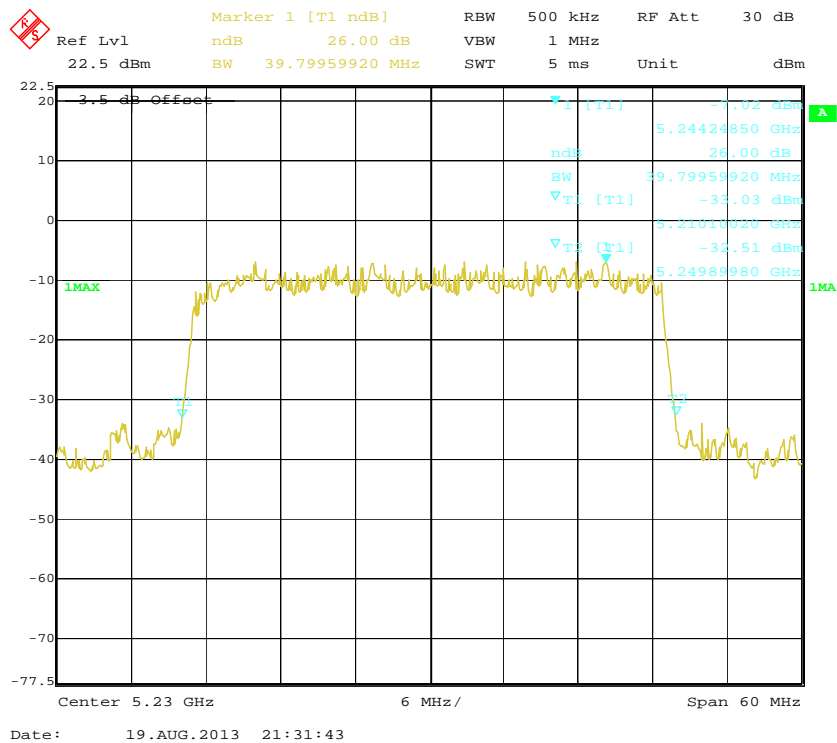
5190 MHz, Chain 2



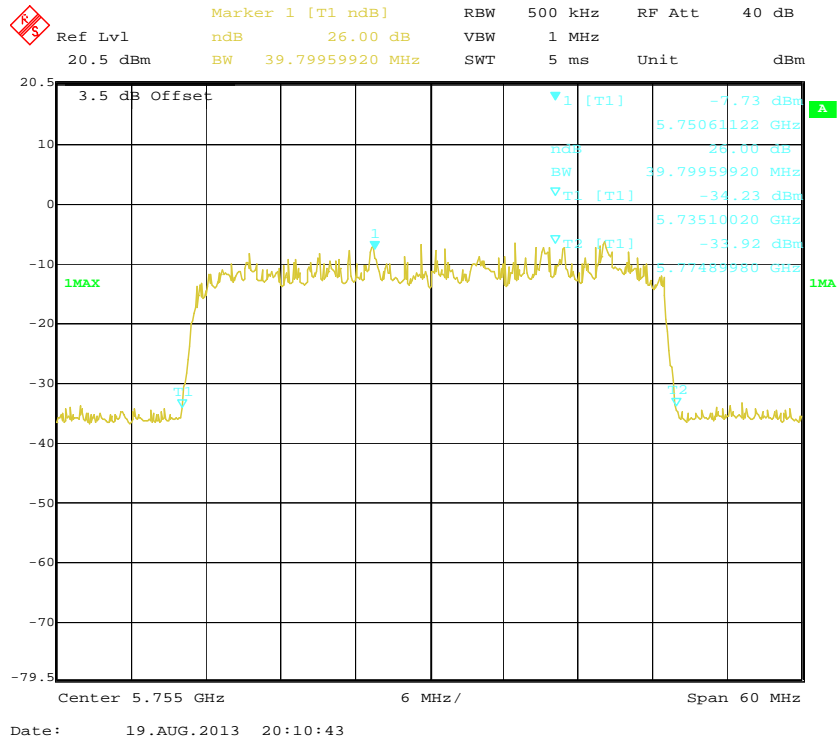
5230 MHz, Chain 1



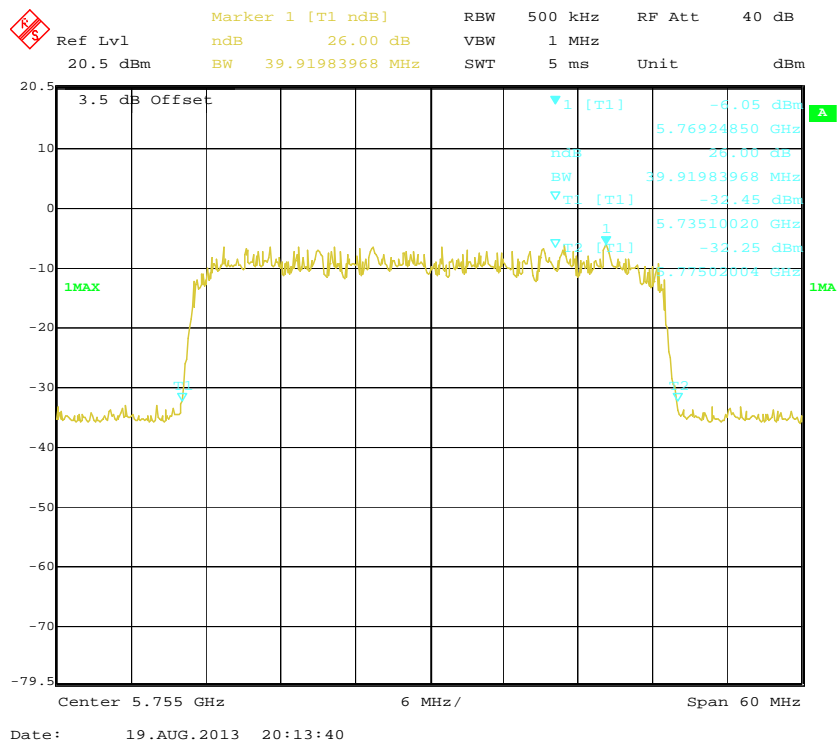
5230 MHz, Chain 2



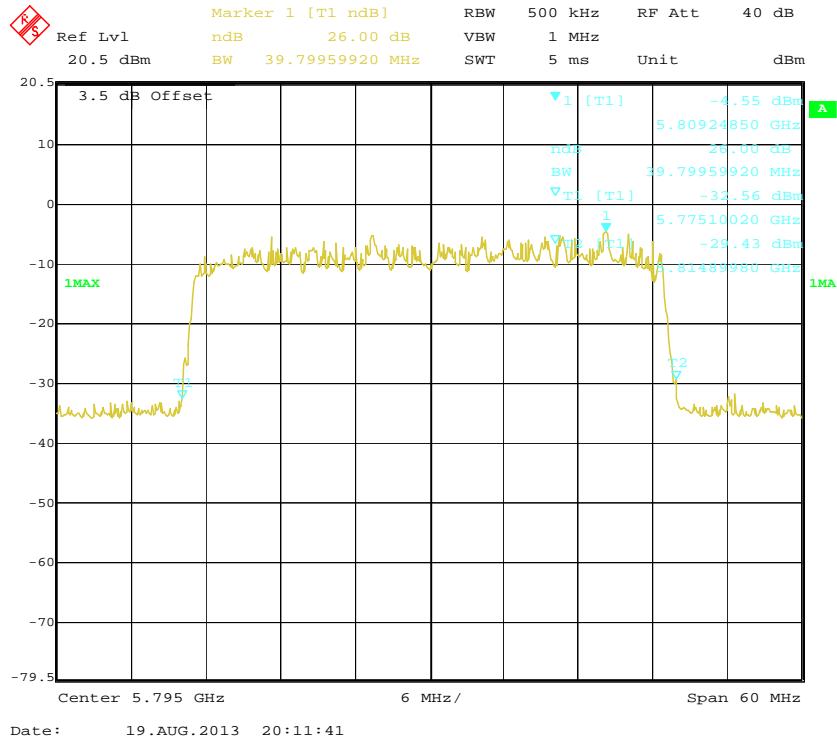
5755 MHz, Chain 1



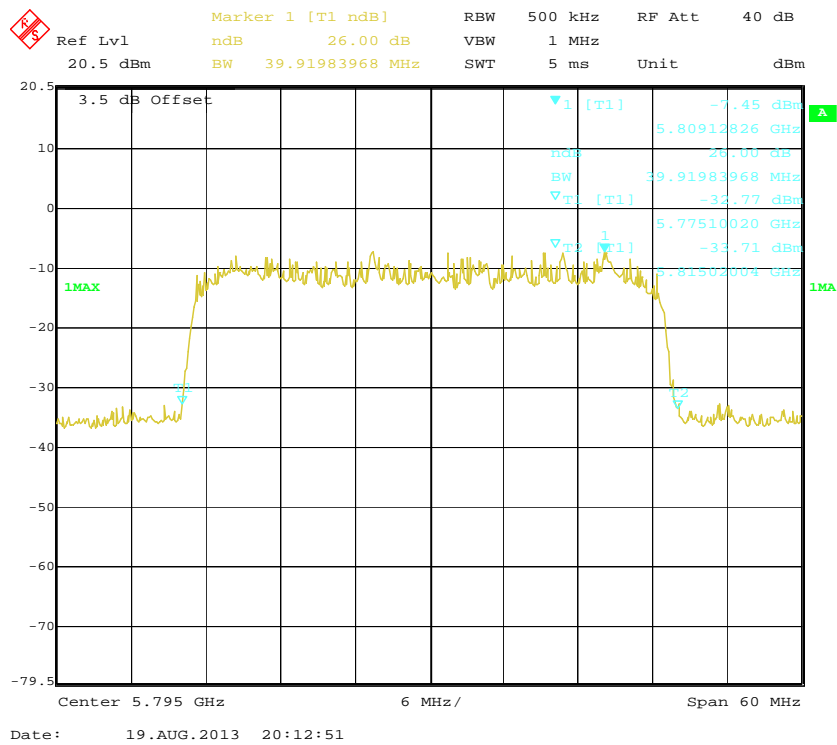
5755 MHz, Chain 2



5795 MHz, Chain 1



5795 MHz, Chain 2



FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER**Applicable Standard**

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set span to encompass the entire emission bandwidth (EBW) of the signal. Set RBW = 1 MHz. Set VBW ≥ 3 MHz. Use sample detector mode Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”. Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms.

4. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.
5. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

The testing was performed by Simon Wang on 2013-08-19.

Test Mode: Transmitting

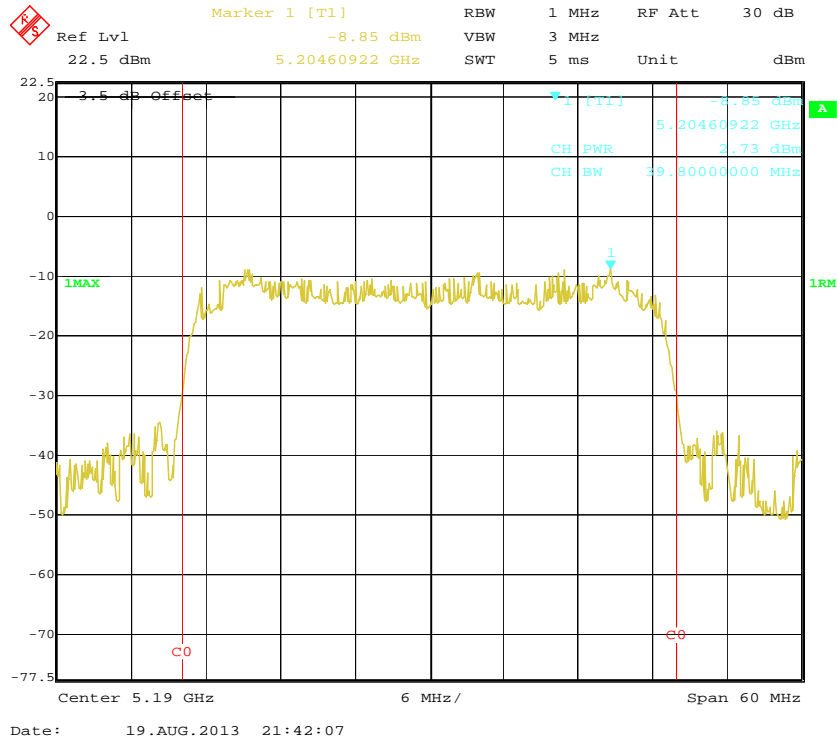
Test Result: Pass

Please refer to the following tables and plots.

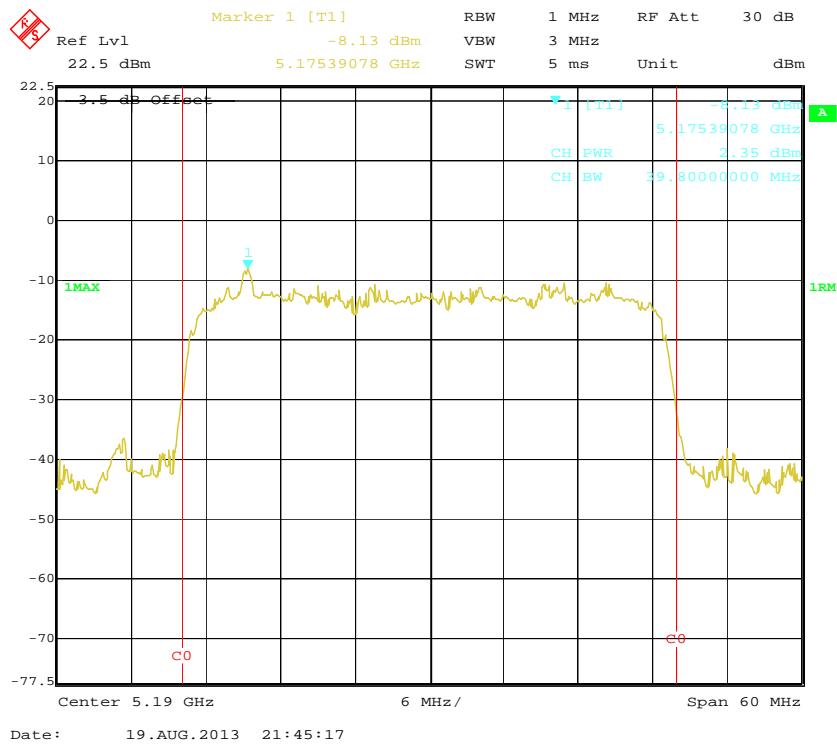
Frequency (MHz)	Antenna Port	Output Power (dBm)	Output Power (dBm) Chain 0 + Chain 1	Limit (dBm)
5190	Chain 1	2.73	5.55	17
	Chain 2	2.35		
5230	Chain 1	2.70	5.52	17
	Chain 2	2.32		
5755	Chain 1	2.76	5.59	30
	Chain 2	2.40		
5795	Chain 1	2.74	5.55	30
	Chain 2	2.32		

*Note: The antenna Gain is 0 dBi.

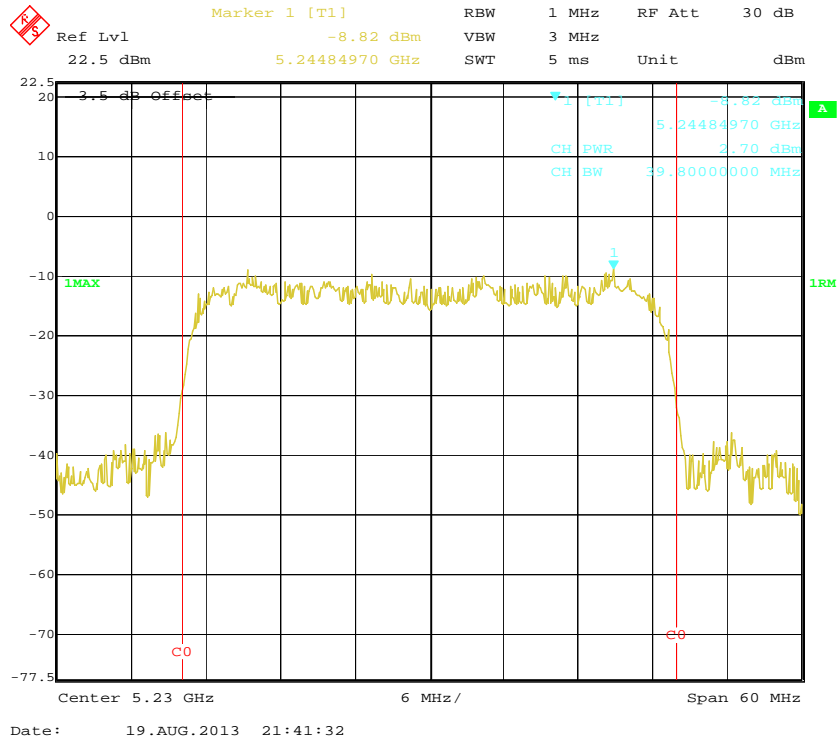
RF Output Power, 5190 MHz, Chain 1



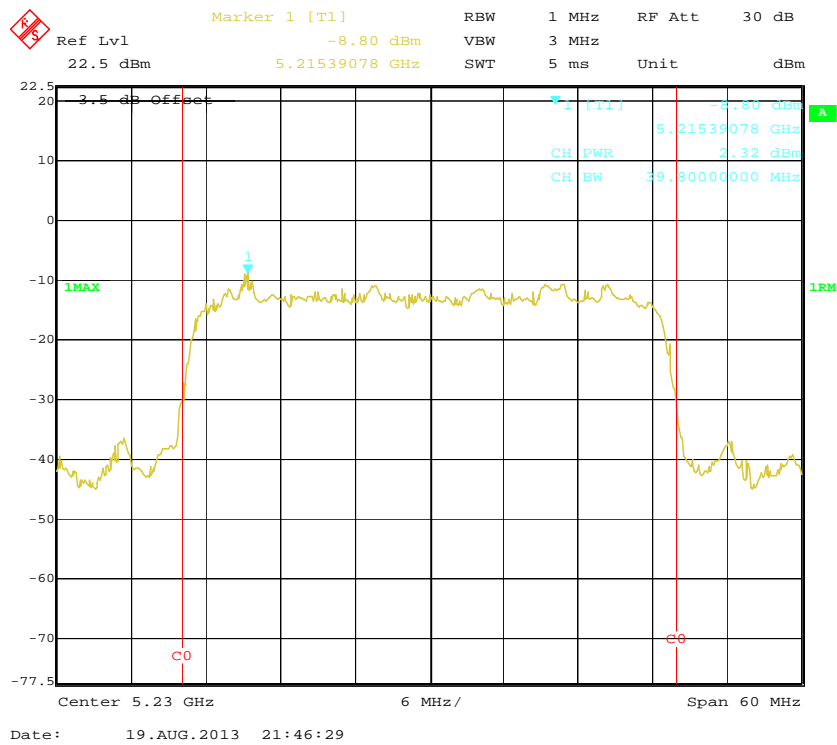
RF Output Power, 5190 MHz, Chain 2



RF Output Power, 5230 MHz, Chain 1



RF Output Power, 5230 MHz, Chain 2



Ref Lvl 22.5 dBm

Marker 1 [T1] 5.74027054 GHz -6.82 dBm

RBW 1 MHz VBW 3 MHz SWF 5 ms Unit dBm

3.5 dB Offset

CH PWR 2.76 dBm

CH BW 39.80000000 MHz

1 (T1) -6.82 dBm

5.74027054 GHz

2.76 dBm

39.80000000 MHz

1MAX

1RM

Center 5.755 GHz

Span 60 MHz

6 MHz/

Date: 19.AUG.2013 20:23:18

Ref Lvl 22.5 dBm

Marker 1 [T1] -9.98 dBm

RBW 1 MHz

VBW 3 MHz

SWT 5 ms

RF Att 30 dB

Unit dBm

3.5 dB Offset

CH PWR 2.40 dBm

CH BW 39.90000000 MHz

1MAX

1RM

CO

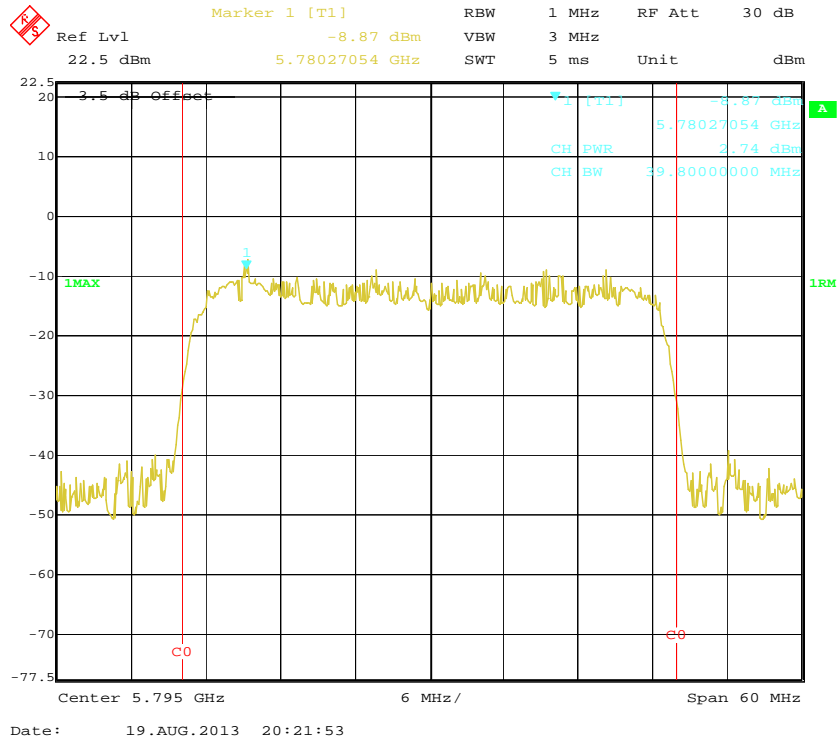
Center 5.755 GHz

6 MHz/

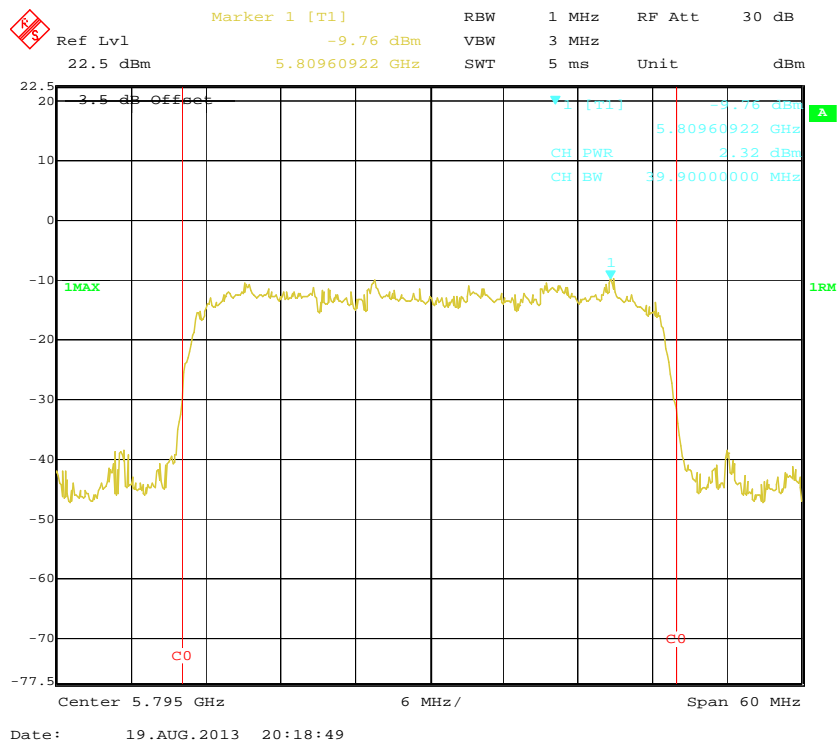
Span 60 MHz

Date: 19.AUG.2013 20:16:19

RF Output Power, 5795 MHz, Chain 1



RF Output Power, 5795 MHz, Chain 2



FCC §15.407(a) (1) (5) - POWER SPECTRAL DENSITY**Applicable Standard**

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Use sample detector and power averaging (not video averaging) mode. Set RBW= 1 MHz*, VBW > 1 MHz. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging. This method is permitted only if the transmission pulse or sequence of pulses remains at maximum transmits power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

The testing was performed by Simon Wang on 2013-08-19.

Test Mode: Transmitting

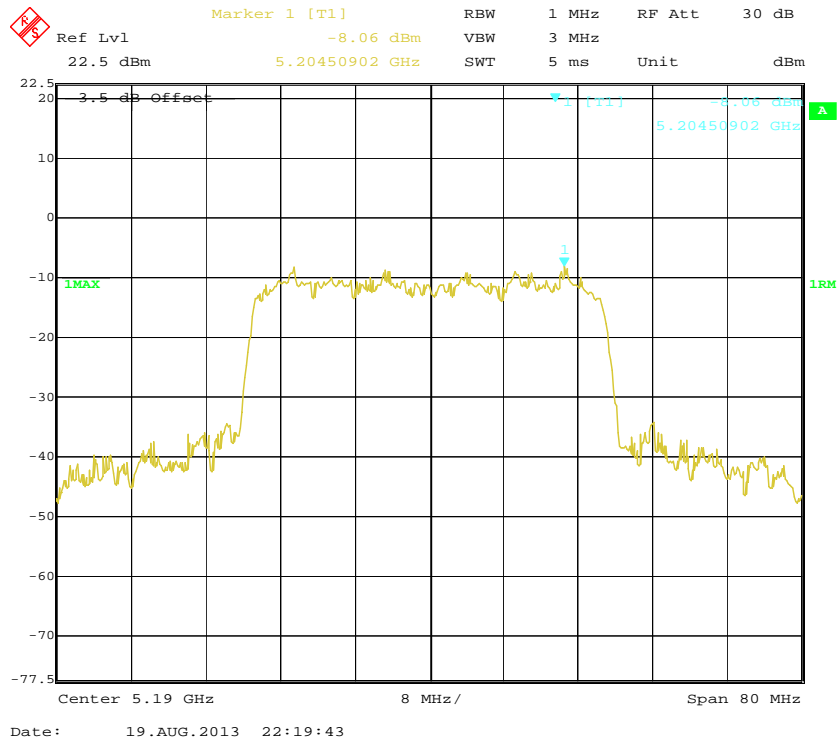
Test Result: Pass

Please refer to the following tables and plots.

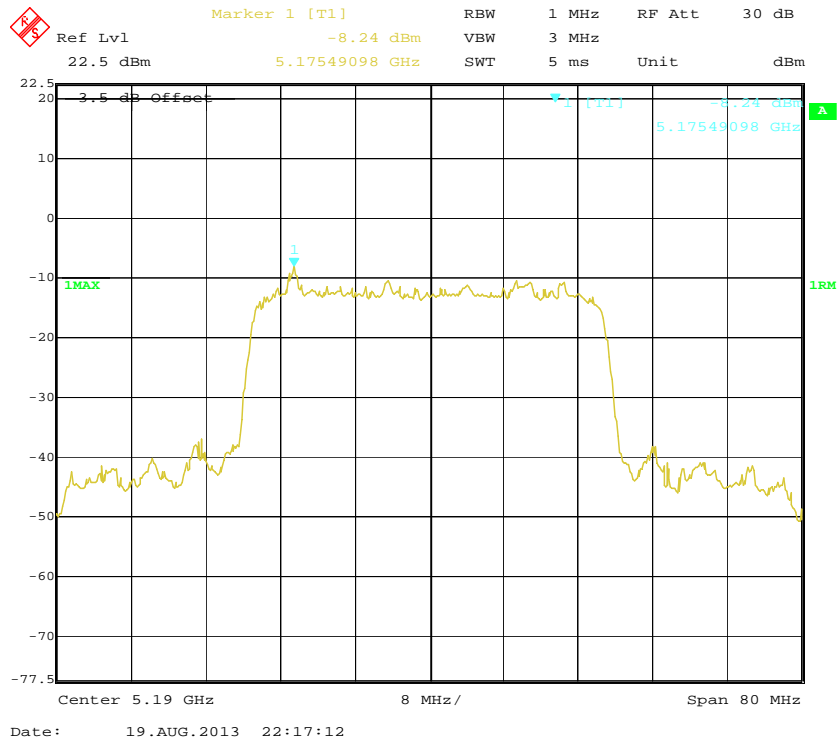
Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/MHz)	Power Spectral Density (dBm/MHz) Chain0+Chain1	Limit (dBm/MHz)
5190	Chain 1	-8.06	-5.14	4
	Chain 2	-8.24		
5230	Chain 1	-8.20	-5.53	4
	Chain 2	-8.92		
5755	Chain 1	-6.79	-4.58	17
	Chain 2	-8.56		
5795	Chain 1	-7.37	-5.28	17
	Chain 2	-9.45		

*Note: The antenna Gain is 0 dBi.

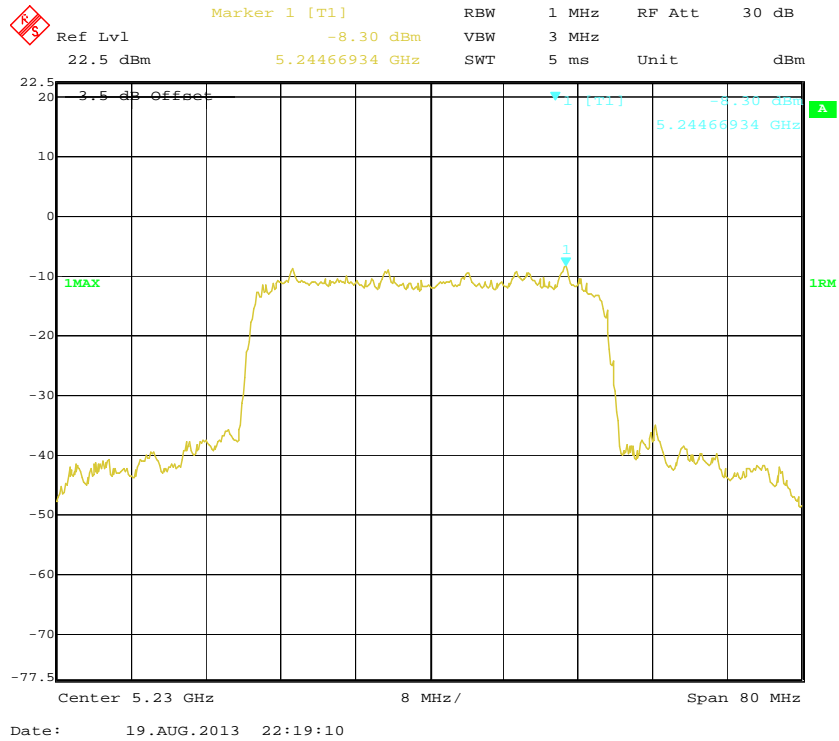
5190 MHz, Chain 1



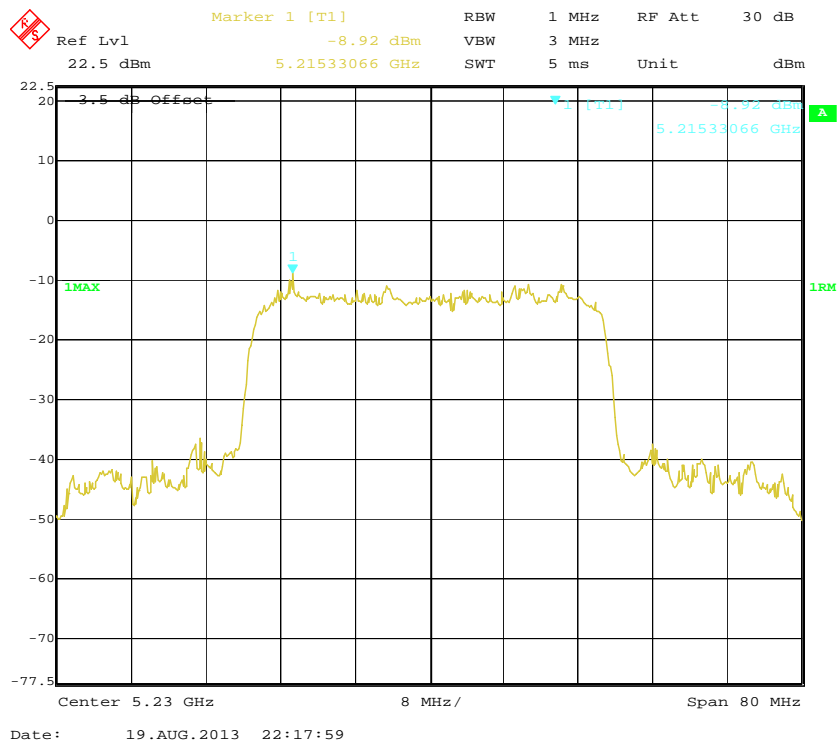
5190 MHz, Chain 2



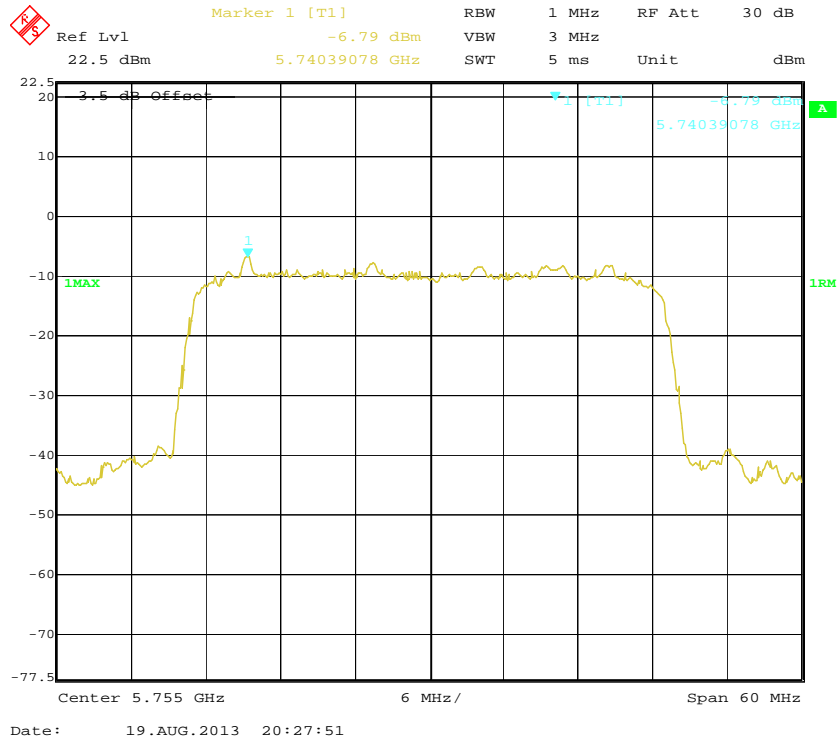
5230 MHz, Chain 1



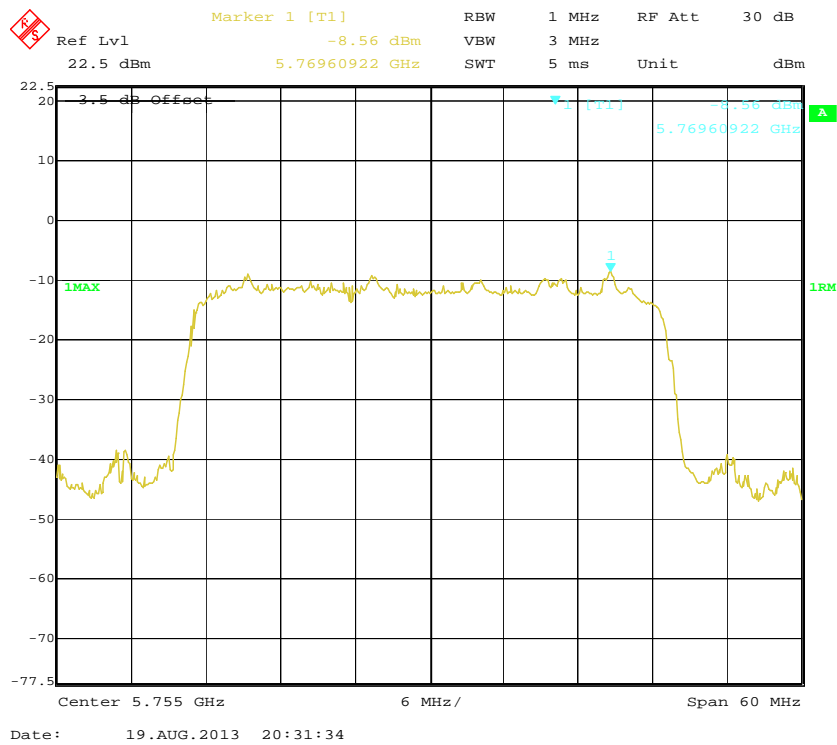
5230 MHz, Chain 2



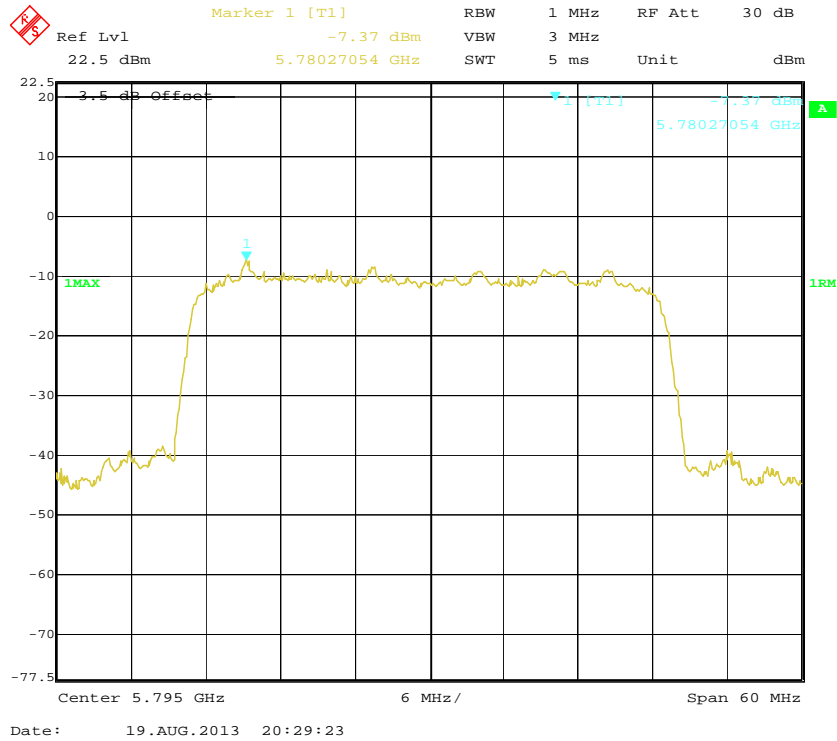
5755 MHz, Chain 1



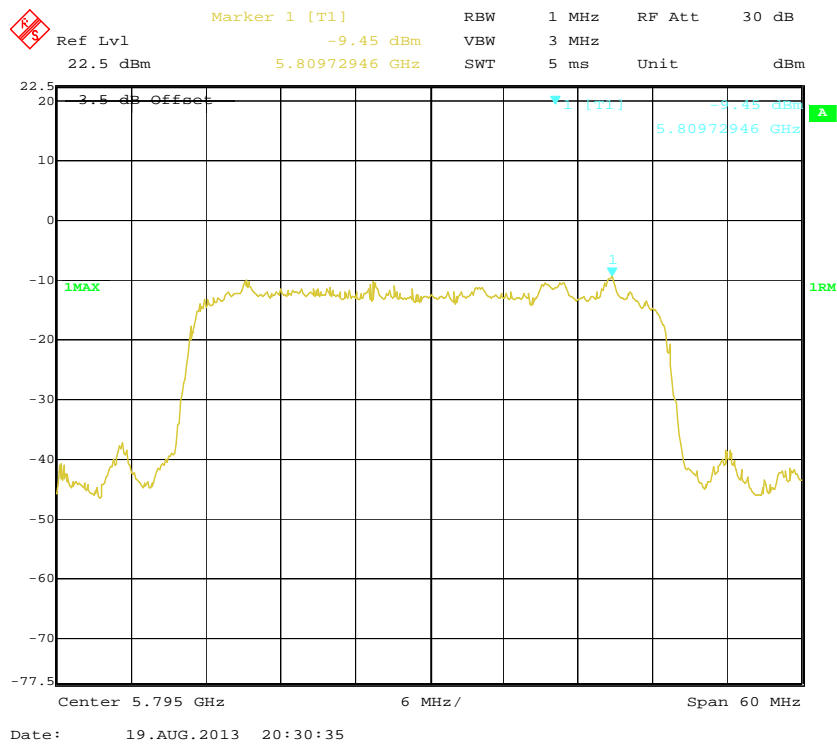
5755 MHz, Chain 2



5795 MHz, Chain 1



5795 MHz, Chain 2



FCC §15.407(a) (6) – PEAK EXCURSION RATIO

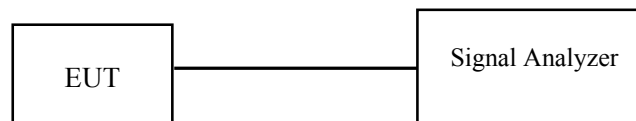
Applicable Standard

According to §15.407(a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Test Procedure

According to KDB789033 D01 General UNII Test procedures v01r03-subclause F , G

- 1) Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.
- 2) Find the maximum of the peak-max-hold spectrum.
 - a) Set RBW = 1 MHz.
 - b) VBW \geq 3 MHz.
 - c) Detector = peak.
 - d) Trace mode = max-hold.
 - e) Allow the sweeps to continue until the trace stabilizes.
 - f) Use the peak search function to find the peak of the spectrum.
- 3) Use the procedure found under F) to measure the PPSD.
- 4) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

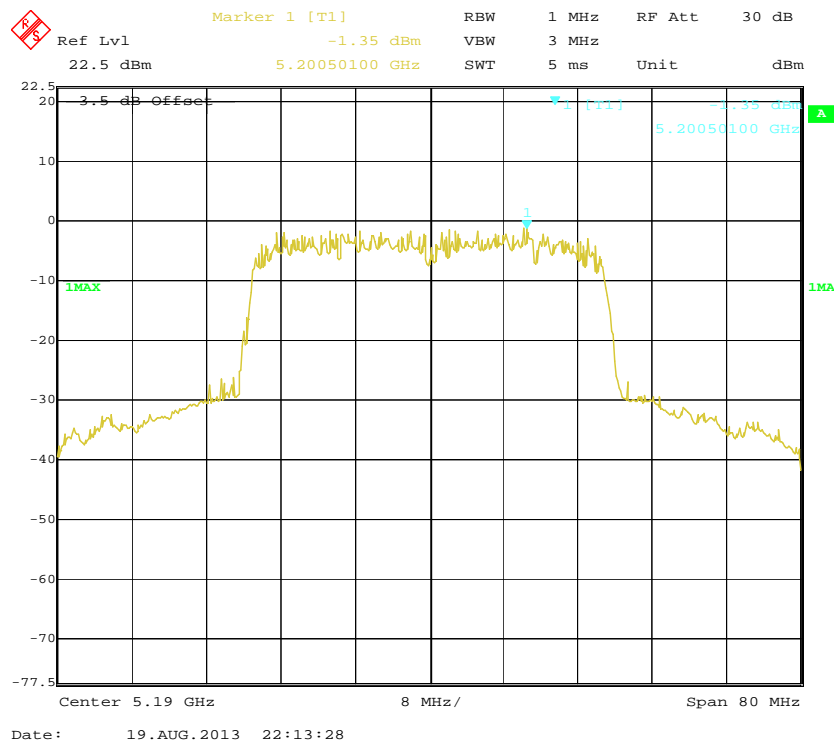
The testing was performed by Simon Wang on 2013-08-19.

Test Mode: Transmitting

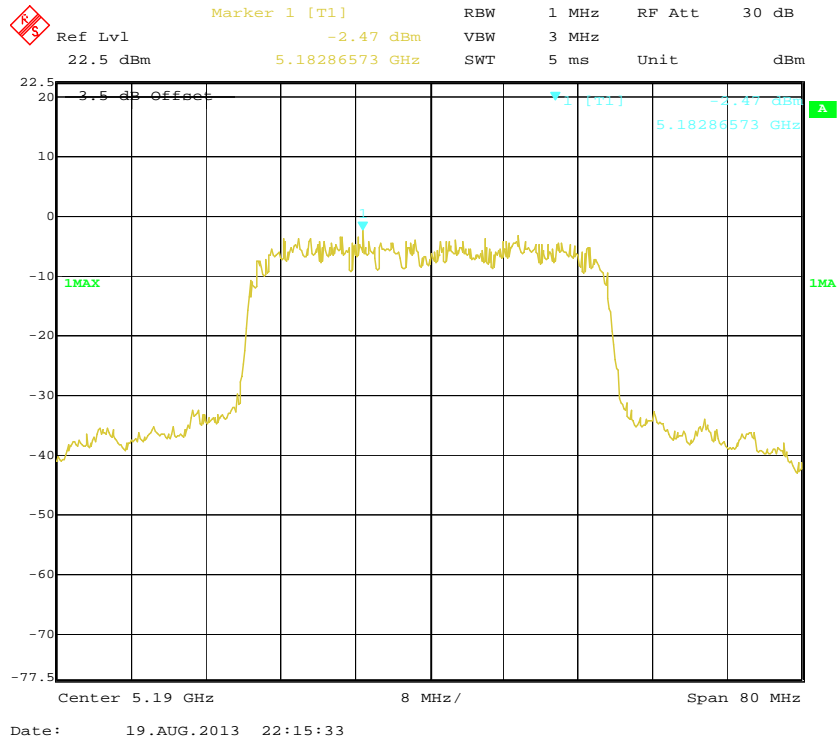
Please refer to the following tables and plots

Channel Frequency (MHz)	Antenna Port	PPSD (dBm/MHz)	Peak of the Spectrum (dBm)	Peak Excursion Ratio (dB)	Limit (dB)
5190	Chain 1	-8.06	-1.35	6.71	13
	Chain 2	-8.24	-2.47	5.77	13
5230	Chain 1	-8.20	-1.67	6.53	13
	Chain 2	-8.92	-2.98	5.94	13
5755	Chain 1	-6.79	0.57	7.36	13
	Chain 2	-8.56	-2.17	6.39	13
5795	Chain 1	-7.37	-0.10	7.27	13
	Chain 2	-9.45	-2.45	7.00	13

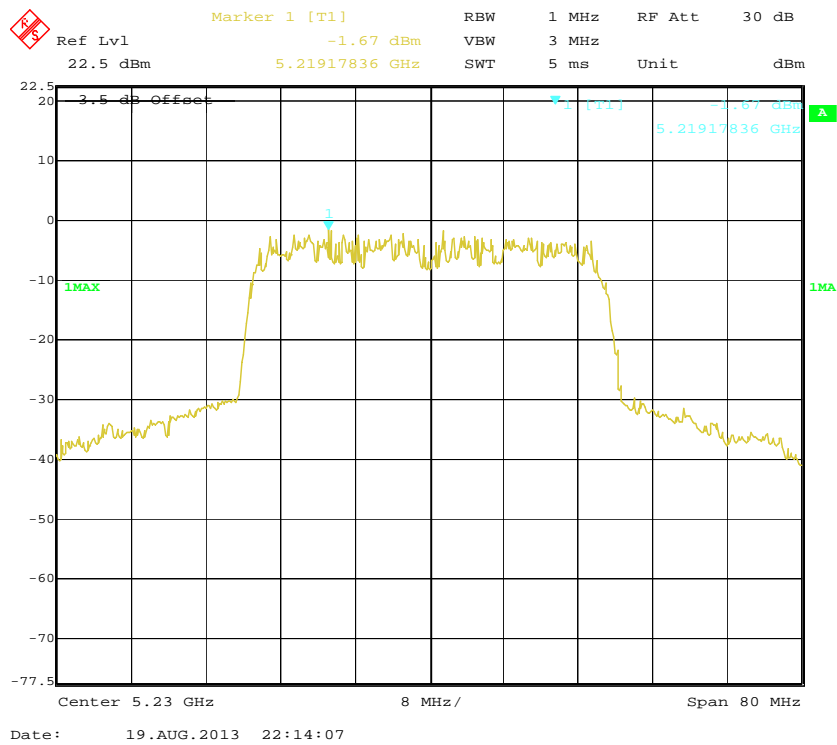
5190 MHz, Chain 1 (Peak of the spectrum)



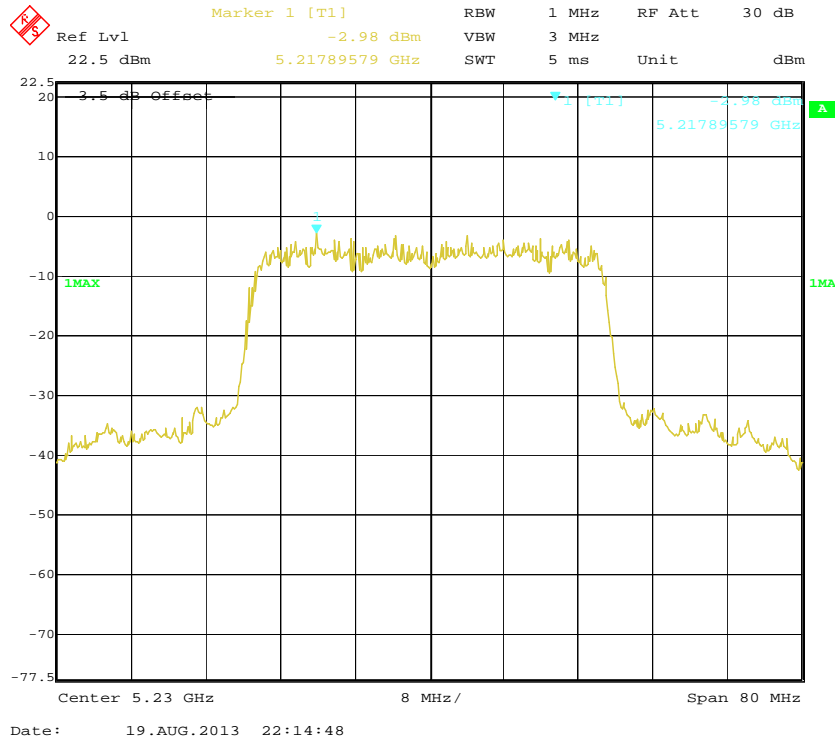
5190 MHz, Chain 2 (Peak of the spectrum)



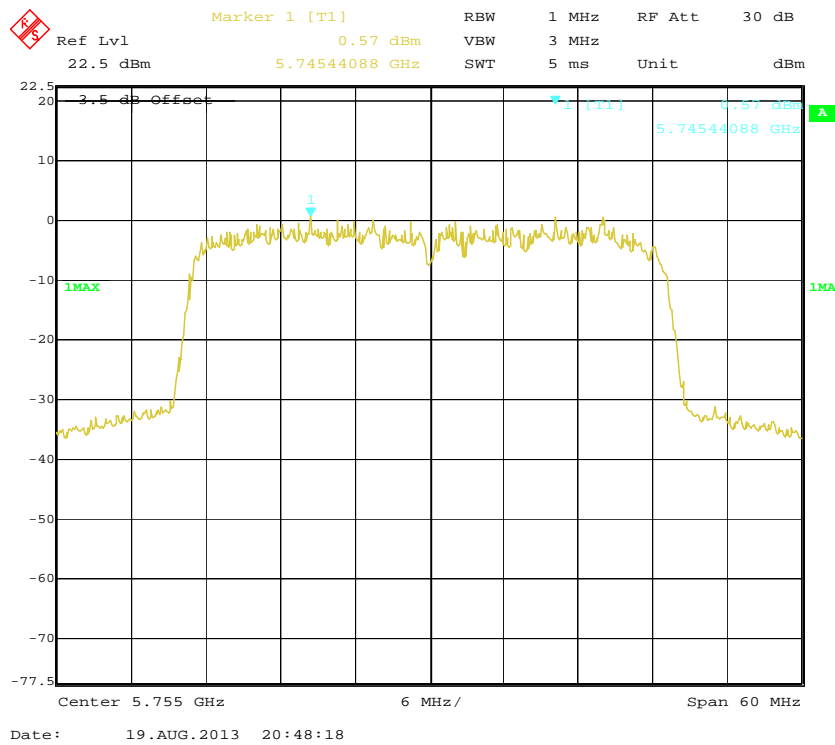
5230 MHz, Chain 1 (Peak of the spectrum)



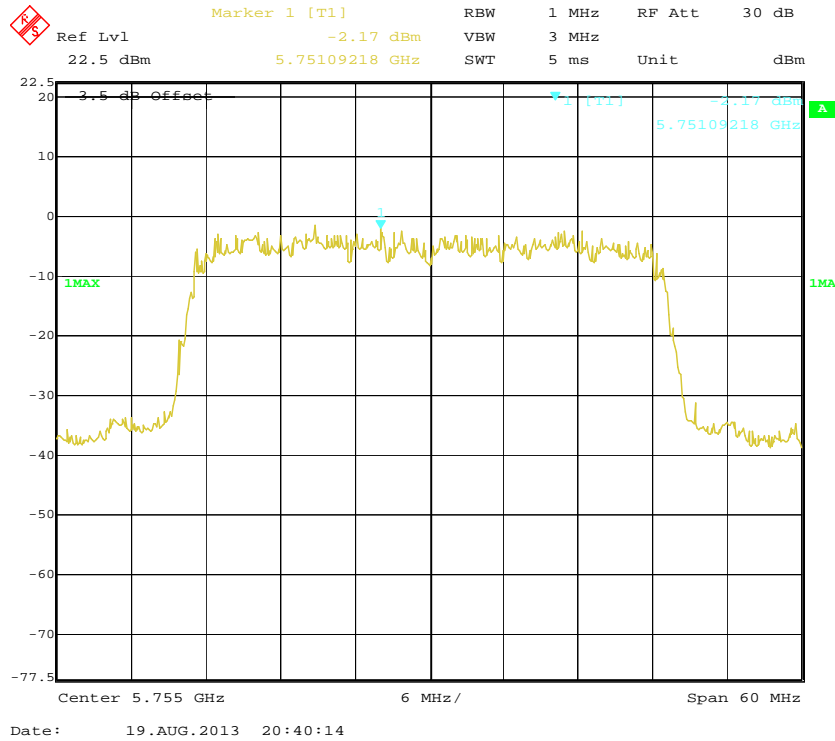
5230 MHz, Chain 2 (Peak of the spectrum)



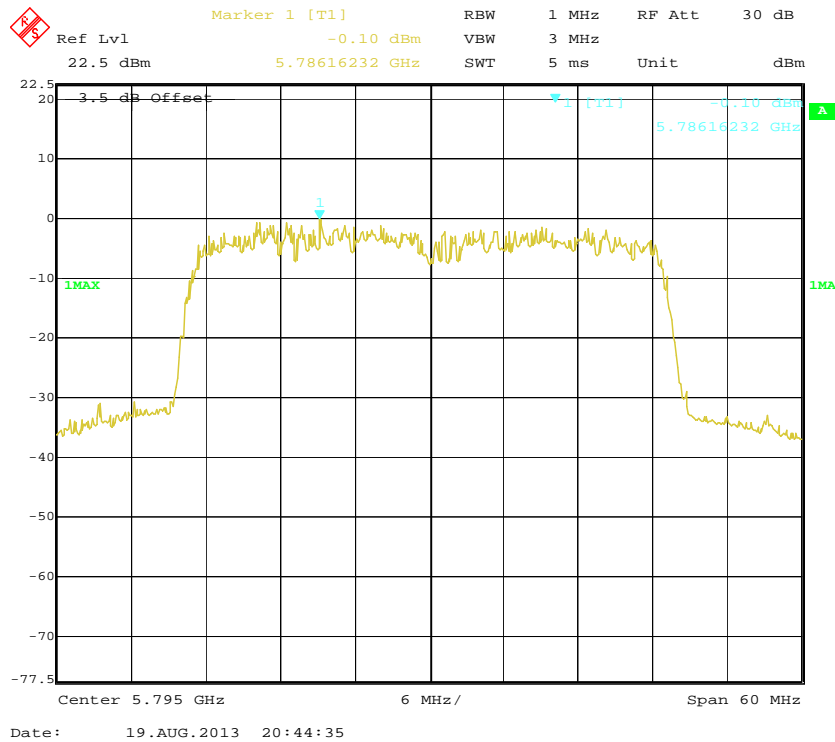
5755 MHz, Chain 1 (Peak of the spectrum)



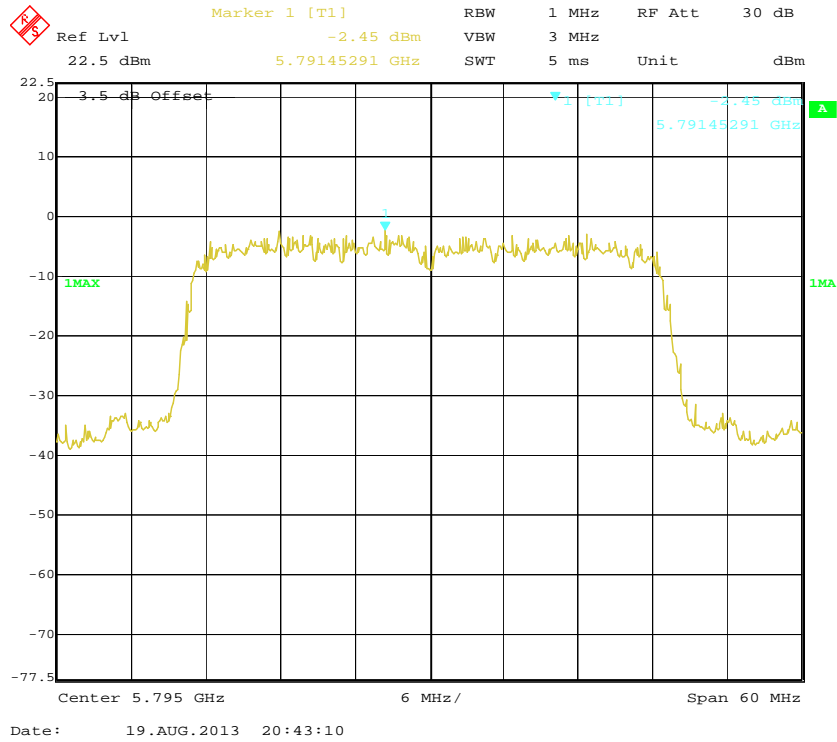
5755 MHz, Chain 2 (Peak of the spectrum)



5795 MHz, Chain 1 (Peak of the spectrum)



5795 MHz, Chain 2 (Peak of the spectrum)



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