FCC PART 15.407

TEST REPORT

For

Airpul LLC

6 Daye Road, Jinjiang, Chengdu, Sichuan 610016, China

FCC ID: 2ACCYAC6151

Report Type:	**Product Name:**
Original Report	Wireless HD

Test Engineer:	Toby Ren
Report Number:	RSC140613002
Report Date:	2014-07-22
Reviewed By:	Henry Ding EMC Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Airpul LLC*'s product, model number: *AC6151 (FCC ID: 2ACCYAC6151) or* ("EUT") in this report is a *Wireless HD,* which was measured approximately: 4.27in (L)*3.11in (W)*1.30in (H).
This equipment will be restricted to indoor operation only.
Rated input voltage: Rated input voltage: DC 5 V from adapter or DC 3.7 V from battery.
The operating frequency is 5150~5250 MHz, 5725~5825 MHz.

AC Adapter:
Manufacturer: Mass Power Electronic Limited
Model: SFF0500300U1BA
Input: AC 100-240V~, 50/60Hz, 0.4A
Output: DC 5.0V ⎓ 3.0A

**All measurement and test data in this report was gathered from final production sample, serial number: 140613001/01 (Assigned by BACL, Chengdu). It may have deviation from any other sample.*
The EUT supplied by the applicant was received on 2014-06-13, and EUT complied with test requirement.

Objective

This type approval report is prepared on behalf of *Airpul LLC* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and E of the Federal Communications Commission 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 C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Chengdu).

Test Facility

The test site used by BACL to collect test data is located in the 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China

Test site at BACL 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 July 31, 2009. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.
The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. 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 testing in an engineering mode which was provided by the manufacturer.

The operating frequency range is 5150~5250 MHz and 5725~5825 MHz, the frequencies are 5190 MHz, 5230 MHz for 5150~5250 MHz band.
5755 MHz, 5795 MHz for 5725~5825 MHz band, which was provided by the manufacturer.

EUT Exercise Software

The test was performed under "***AppCom_3.0.3.16*"** which was provided by the manufacturer.

Equipment under Test (EUT) General Description

Applicant	Description	Model Number	Serial Number
Airpul LLC	Wireless HD	AC6151	140613001/01

Support Equipment List and Details

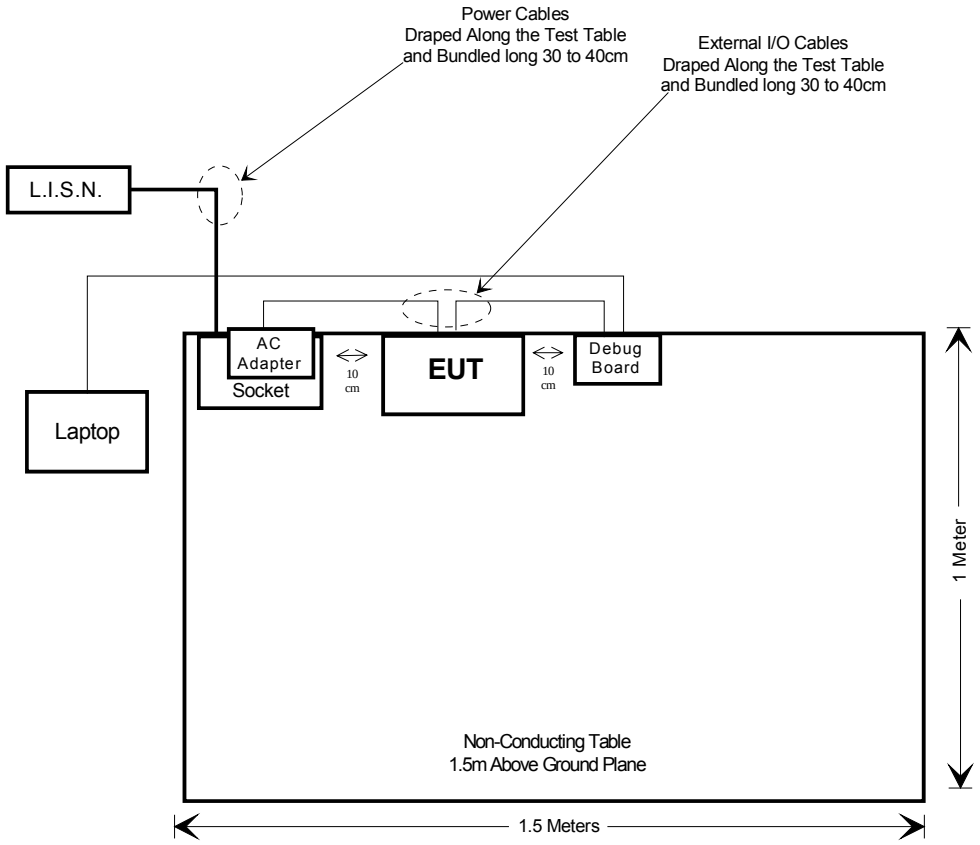
Manufacturer	Description	Model	Serial Number
Dfine	Debug Board	None	None
DELL	Laptop	C6400	59804A00

External I/O Cable

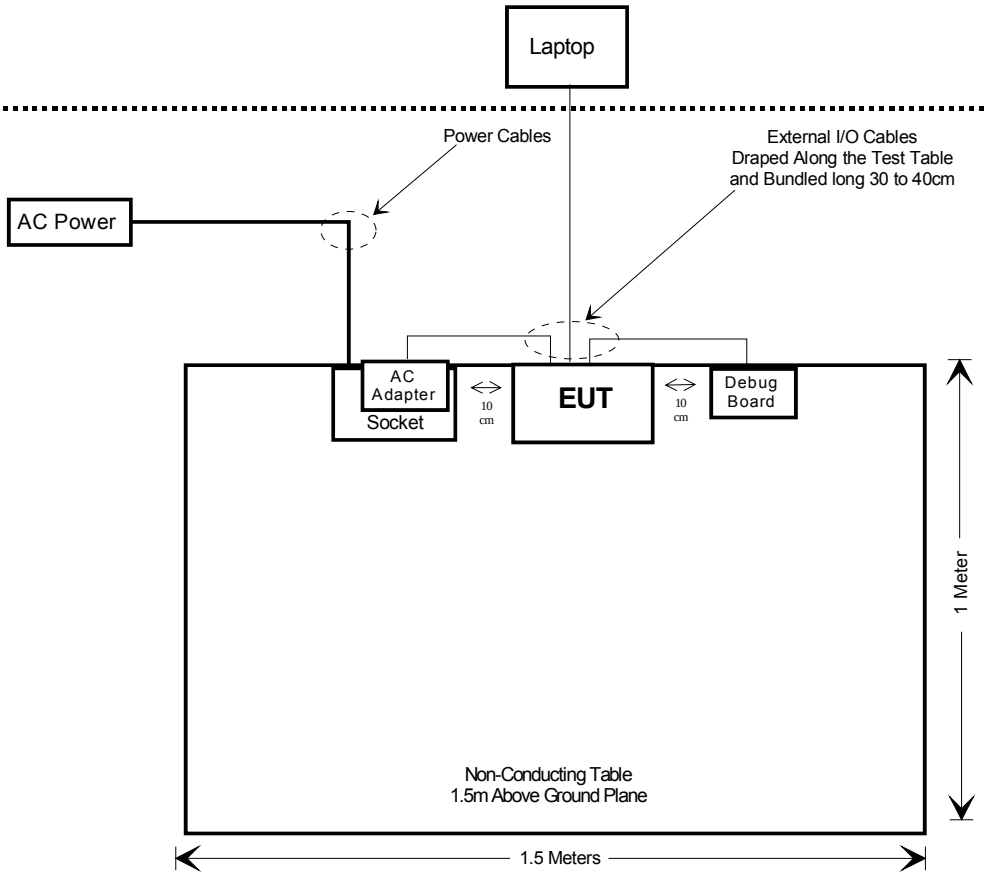
Cable Description	Length (m)	From	To
Shielding RS232 Cable	1.8	Laptop	Debug Board
Unshielded RS232 Cable	0.15	EUT	Debug Board

Block Diagram of Test Setup

For Conducted Emissions:



For Undesirable Emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.407 (f) , §1.1310 & §2.1091	Maximum Permissible Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205, §15.209 & §15.407(b) (1),(4),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1),(2), (3), (4)	Out of Band Emissions	Compliance
§15.407(a) (1),(3),(e)	26dB & 6dB Bandwidth	Compliance
§15.407(a)(1),(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(3),(5)	Power Spectral Density	Compliance

FCC §15.407(f) , §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.407(f), subpart §1.1310 &§2.1091 , 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)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	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;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Conducted Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5190	5	3.16	10.59	11.45	20	0.007	1.0
5230	5	3.16	10.40	10.97	20	0.007	1.0
5755	5	3.16	11.02	12.65	20	0.008	1.0
5795	5	3.16	11.49	14.08	20	0.009	1.0

Result: The device meet FCC MPE at 20 cm distance

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 use of a standard antenna jack or electrical connector is prohibited.
And according to FCC 47 CFR section 15.407 (a)(1),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.

Antenna Connector Construction

The EUT has two dipole antennas, which was used a unique type of connector to attach to the EUT, and complied with 15.203, the maximum gain is 5.0 dBi in 5150-5250 MHz and 5725-5825 MHz band, please refer to the external photos.

Result: Compliance.

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

Applicable Standard

FCC §15.207, §15.407(b) (6)

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

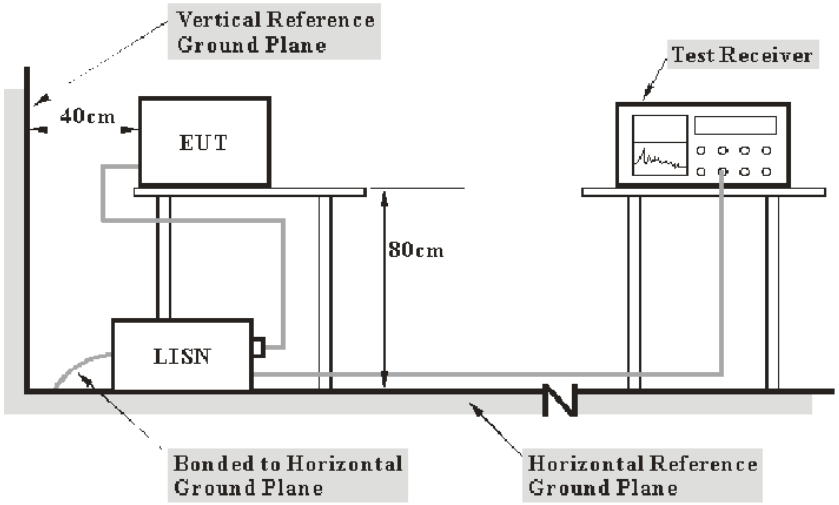
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by (U_{lab} − U_{cispr}), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Chengdu) is ±3.17 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

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 C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

DC 12 V was used by EUT through 120 VAC/60 Hz adapter.

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within 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
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2013-08-22	2014-08-21
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2013-07-31	2014-07-30
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.12	2014-02-08	2015-02-07

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the LISN and the other support equipments were connected to the outlet of the second 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:

7.6 dB at **0.54 MHz** in the **Neutral** conducted mode

Test Data

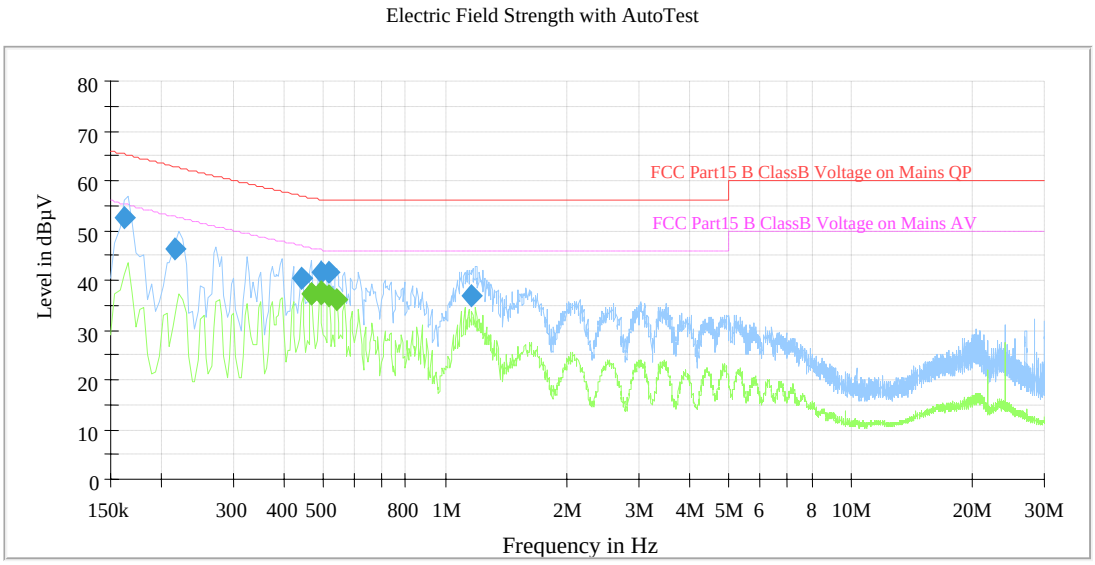
Environmental Conditions

Temperature:	28 °C
Relative Humidity:	42 %
ATM Pressure:	100.7 kPa

The testing was performed by Toby Ren on 2014-07-16.

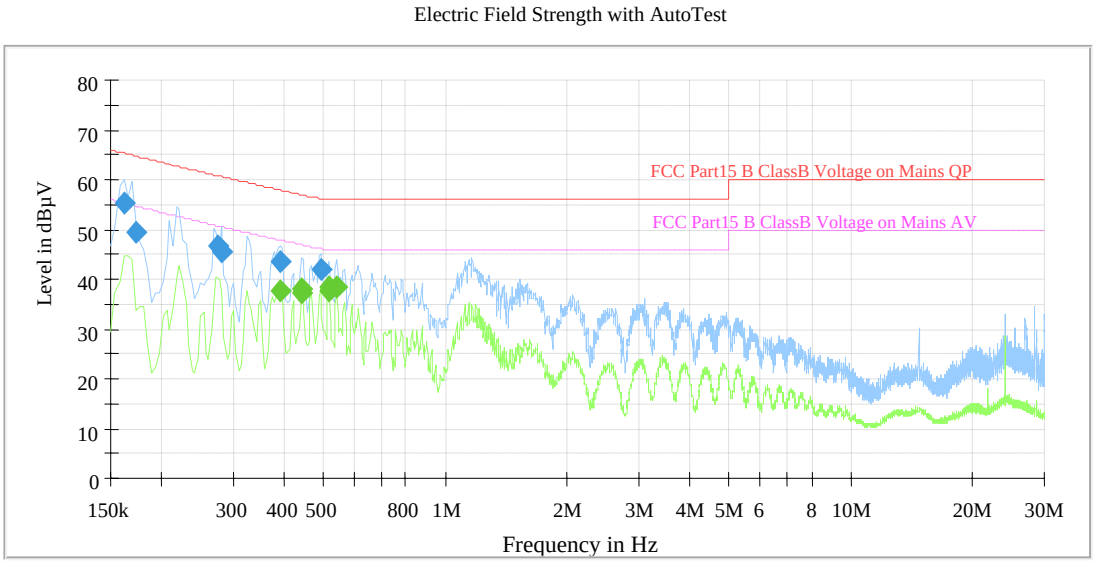
Test Mode: Transmitting

120 V, 60 Hz, Line:



Conducted Emissions					
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Detector (QP/AV)**	**Phase (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
0.16	52.70	QP	Line	65.36	12.66
0.22	46.10	QP	Line	62.93	16.83
0.44	40.50	QP	Line	57.01	16.51
0.49	41.70	QP	Line	56.12	14.42
0.52	41.60	QP	Line	56.00	14.40
1.16	37.00	QP	Line	56.00	19.00
0.47	37.40	AV	Line	46.53	9.13
0.47	37.40	AV	Line	46.53	9.13
0.49	37.20	AV	Line	46.12	8.92
0.49	37.80	AV	Line	46.12	8.32
0.52	36.90	AV	Line	46.00	9.10
0.54	36.10	AV	Line	46.00	9.90

120V, 60 Hz, Neutral:



Conducted Emissions					
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Detector (QP/AV)**	**Phase (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
0.16	55.20	QP	Neutral	65.36	10.16
0.17	49.30	QP	Neutral	64.82	15.52
0.28	46.50	QP	Neutral	60.91	14.41
0.28	45.50	QP	Neutral	60.79	15.29
0.39	43.60	QP	Neutral	58.00	14.40
0.49	41.90	QP	Neutral	56.12	14.22
0.39	37.70	AV	Neutral	48.00	10.30
0.45	37.40	AV	Neutral	46.97	9.57
0.45	38.10	AV	Neutral	46.97	8.87
0.52	38.30	AV	Neutral	46.00	7.70
0.52	37.70	AV	Neutral	46.00	8.30
0.54	38.40	AV	Neutral	46.00	7.60

FCC §15.209, §15.205 & §15.407(b) (1) (4) (6) (7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (4), (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 e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

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

According to KDB 789033 D01 General UNII Test Procedures v01, emission shall be computed as:
E[dBuV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

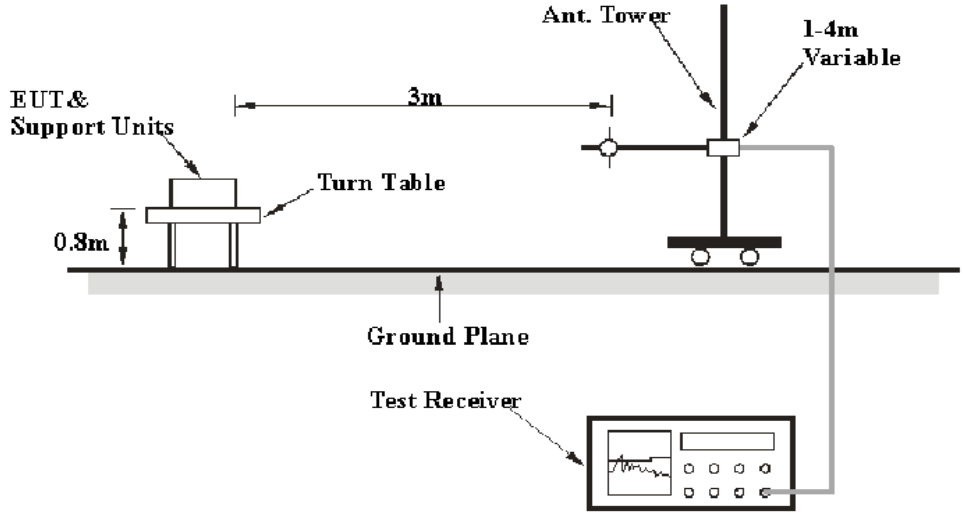
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB ;
200M~1GHz: ±6.0 dB ;
1G-6GHz: ±5.13dB;
6G~40GHz: ±5.47 dB;

Table 1 – V**a**lues of U_{cispr}

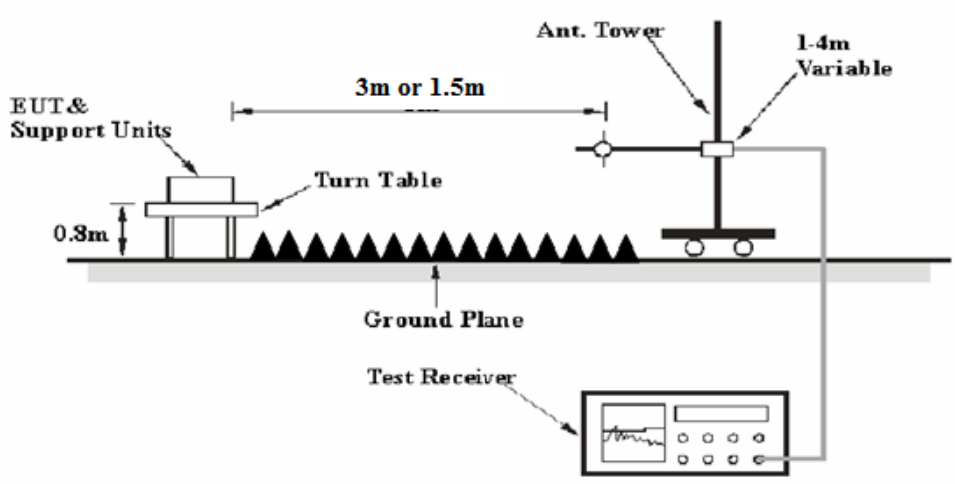
Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber, using the setup accordance with the ANSI C63.4-2003. 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.

DC 12 V was used by EUT through 120 VAC/60 Hz adapter.

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
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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-1GHz, peak and Average detection modes for frequencies above 1 GHz.

According to ANSI C63.4-2003, the above 1GHz 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 (3m/1.5m) dB
Extrapolation result (dBμV/m) = Corrected Amplitude (dBμV/m) -6dB

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2013-07-23	2014-07-22
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2013-08-22	2014-08-21
Sunol Sciences	Broadband Antenna	JB3	A101808	2014-04-10	2015-04-09
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2013-07-31	2014-07-30
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2013-07-31	2014-07-30
Rohde&Schwarz	Spectrum Analyzer	FSP38	100478	2014-06-16	2015-06-15
EM TEST	Horn Antenna	3115	003-6076	2014-04-09	2015-04-08
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2015-06-15
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2014-06-16	2015-06-15
HP	Amplifier	8449B	3008A00277	2013-07-31	2014-07-30
EMCT	Semi-Anechoic Chamber	966	N/A	2013-03-13	2016-03-12

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Loss + 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 limit. The equation for margin calculation is as follows:

Margin = Limit – Extrapolation result

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:

1.82 dB at **5723 MHz** in the **Vertical** polarization mode for 5755 MHz

Test Data

Environmental Conditions

Temperature:	29 °C
Relative Humidity:	43 %
ATM Pressure:	100.7 kPa

The testing was performed by Toby Ren on 2014-07-16.

Test Mode: Transmitting

5150-5250 MHz:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel: 5190 MHz										
5190	28.24	AV	H	31.74	8.07	0.00	68.05	62.05	N/A	N/A
5190	45.25	PK	H	31.74	8.07	0.00	85.06	79.06	N/A	N/A
5190	34.25	AV	V	31.74	8.07	0.00	74.06	68.06	N/A	N/A
5190	55.25	PK	V	31.74	8.07	0.00	95.06	89.06	N/A	N/A
10380	32.14	PK	V	37.38	14.74	24.12	60.13	54.13	68.20	14.07
10380	20.01	AV	V	37.38	14.74	24.12	48.00	42.00	68.20	26.20
15570	20.06	PK	V	39.41	17.26	22.18	54.56	48.56	68.20	19.64
15570	15.01	AV	V	39.41	17.26	22.18	49.51	43.51	54.00	10.49
5151	30.08	PK	V	31.67	8.11	0.00	69.86	63.86	68.20	*4.34
5151	16.02	AV	V	31.67	8.11	0.00	55.80	49.80	54.00	*4.20
4001.25	40.25	PK	V	29.00	7.34	26.05	50.54	44.54	68.20	23.66
400.158	30.26	AV	V	16.11	1.06	28.26	19.17	13.17	54.00	40.83
365.75	50.06	QP	V	15.69	1.08	28.04	38.78	38.78	46.00	7.22
365.72	42.36	QP	H	15.69	1.08	28.04	31.08	31.08	46.00	14.92
High Channel: 5230 MHz										
5230	27.25	AV	H	31.81	8.04	0.00	67.10	61.10	N/A	N/A
5230	45.02	PK	H	31.81	8.04	0.00	84.87	78.87	N/A	N/A
5230	35.06	AV	V	31.81	8.04	0.00	74.91	68.91	N/A	N/A
5230	56.35	PK	V	31.81	8.04	0.00	96.20	90.20	N/A	N/A
10460	36.25	PK	V	37.39	14.77	24.10	64.31	58.31	68.20	9.89
10460	21.36	AV	V	37.39	14.77	24.10	49.42	43.42	68.20	24.78
15690	26.35	PK	V	39.44	17.26	22.23	60.82	54.82	68.20	13.38
15690	15.25	AV	V	39.44	17.26	22.23	49.72	43.72	54.00	10.28
5255	28.78	PK	V	31.86	8.02	0.00	68.65	62.65	78.20	15.55
5255	15.02	AV	V	31.86	8.02	0.00	54.89	48.89	54.00	*5.11
4001.25	41.52	PK	V	29.00	7.34	26.05	51.81	45.81	68.20	22.39
4001.25	30.06	AV	V	29.00	7.34	26.05	40.35	34.35	54.00	19.65
365.75	49.69	QP	V	15.69	1.08	28.04	38.41	38.41	46.00	7.59
365.75	43.65	QP	H	15.69	1.08	28.04	32.37	32.37	46.00	13.63

*Within measurement uncertainty!

5725-5825 MHz:

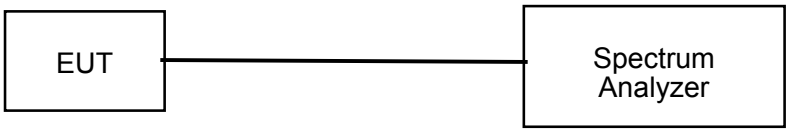
Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel: 5755 MHz										
5755	30.02	AV	H	32.61	8.45	0.00	71.08	65.08	N/A	N/A
5755	46.36	PK	H	32.61	8.45	0.00	87.42	81.42	N/A	N/A
5755	35.25	AV	V	32.61	8.45	0.00	76.31	70.31	N/A	N/A
5755	56.36	PK	V	32.61	8.45	0.00	97.42	91.42	N/A	N/A
10380	32.98	PK	V	37.38	14.74	24.12	60.97	54.97	68.20	13.23
10380	20.32	AV	V	37.38	14.74	24.12	48.31	42.31	68.20	25.89
17265	19.36	PK	V	43.12	17.89	22.42	57.96	51.96	68.20	16.24
17265	14.69	AV	V	43.12	17.89	22.42	53.29	47.29	54.00	6.71
5723	32.25	PK	V	32.57	8.36	0.00	73.18	67.18	78.20	11.02
5723	17.25	AV	V	32.57	8.36	0.00	58.18	52.18	54.00	*1.82
4001.25	42.15	PK	V	29.00	7.34	26.05	52.44	46.44	68.20	21.76
4001.25	31.25	AV	V	29.00	7.34	26.05	41.54	35.54	54.00	18.46
365.75	47.25	QP	V	15.69	1.08	28.04	35.97	35.97	46.00	10.03
365.75	44.02	QP	H	15.69	1.08	28.04	32.74	32.74	46.00	13.26
High Channel: 5795 MHz										
5795	28.65	AV	H	32.65	8.56	0.00	69.86	63.86	N/A	N/A
5795	47.25	PK	H	32.65	8.56	0.00	88.46	82.46	N/A	N/A
5795	36.98	AV	V	32.65	8.56	0.00	78.19	72.19	N/A	N/A
5795	58.02	PK	V	32.65	8.56	0.00	99.23	93.23	N/A	N/A
10460	36.36	PK	V	37.39	14.77	24.10	64.42	58.42	68.20	9.78
10460	20.36	AV	V	37.39	14.77	24.10	48.42	42.42	68.20	25.78
17385	25.96	PK	V	43.67	17.69	22.42	64.90	58.90	68.20	9.30
17385	15.02	AV	V	43.67	17.69	22.42	53.96	47.96	54.00	6.04
5825	28.02	PK	V	32.69	8.64	0.00	69.35	63.35	68.20	*4.86
5825	14.98	AV	V	32.69	8.64	0.00	56.31	50.31	54.00	*3.70
4001.25	42.25	PK	V	29.00	7.34	26.05	52.54	46.54	68.20	21.66
4001.25	31.25	AV	V	29.00	7.34	26.05	41.54	35.54	54.00	18.46
365.75	50.02	QP	V	15.69	1.08	28.04	38.74	38.74	46.00	7.26
365.75	43.6	QP	H	15.69	1.08	28.04	32.32	32.32	46.00	13.68

*Within measurement uncertainty!

Conducted Spurious Emission at Antenna Port

Test Procedure

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 1 MHz, the Video bandwidth is set to ≥ 3MHz, report the peak value out of the oprating band. Offset the antenna gain and cable loss.
3. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	27 °C & 28 °C
Relative Humidity:	57 % & 56 %
ATM Pressure:	100.9 kPa &100.5 kPa

The testing was performed by Toby Ren on 2014-07-17 & 2014-07-21.

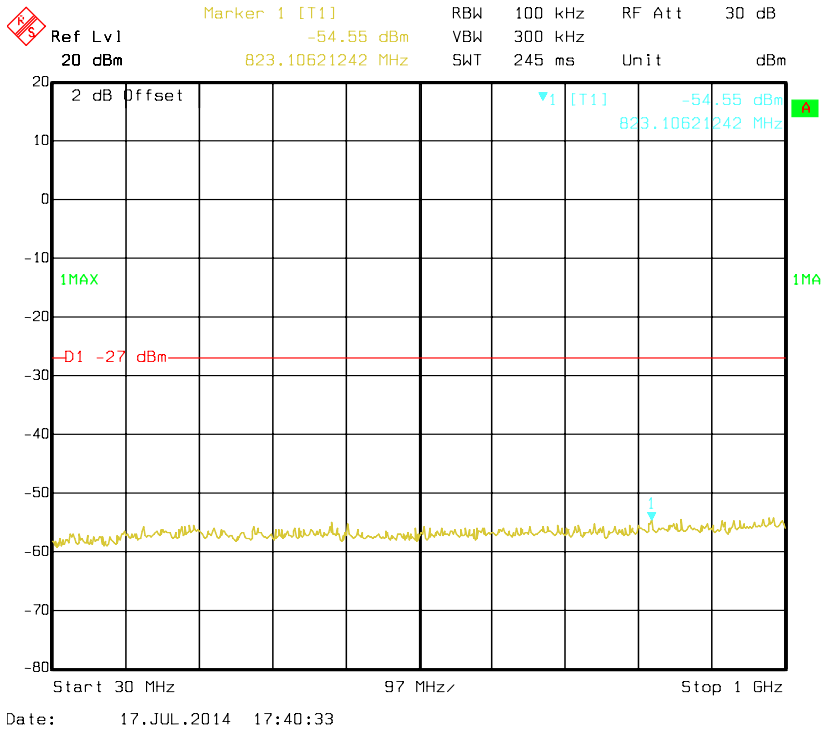
Please refer to the following table and plots.

Frequency (MHz)	Worst Reading Level (dBm)			Limit (dBm)	Result
	Antenna 1	Antenna 2	Antenna 1+Antenna 2		
5190	-38.29	-37.72	-34.99	-27	PASS
5230	-38.55	-38.37	-35.45	-27	PASS
5755	-39.08	-38.83	-35.94	-27	PASS
5795	-38.78	-38.61	-35.68	-27	PASS

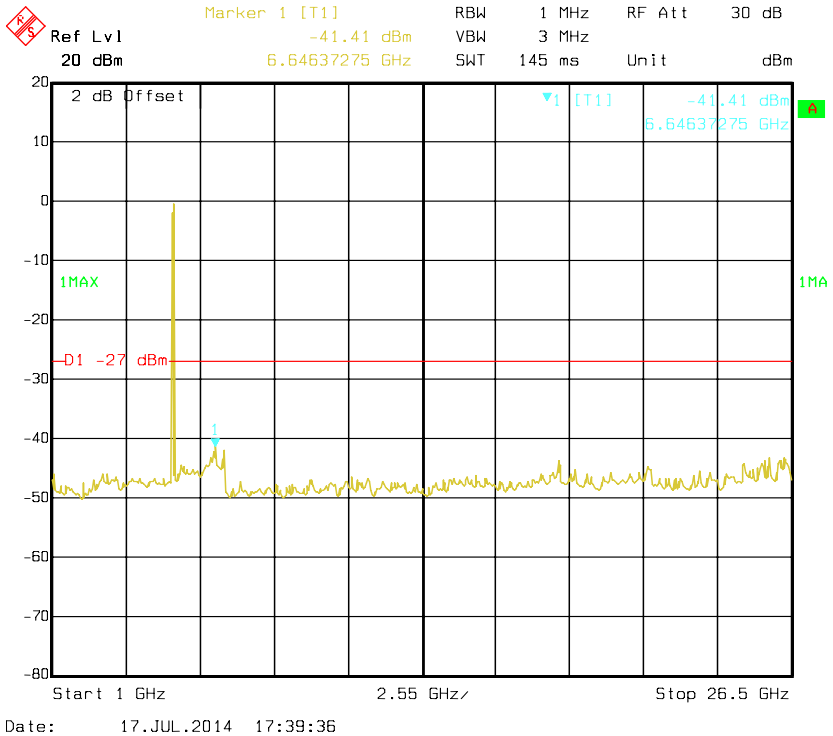
Note: the antenna gain was 5dBi, the cable loss was 1dB.

5150-5250 MHz:

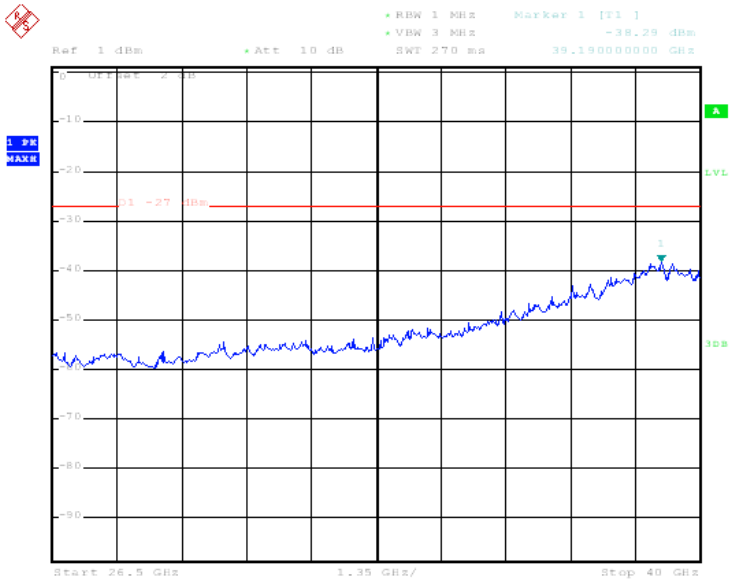
Antenna 1: 5190 MHz（30 MHz-1 GHz）



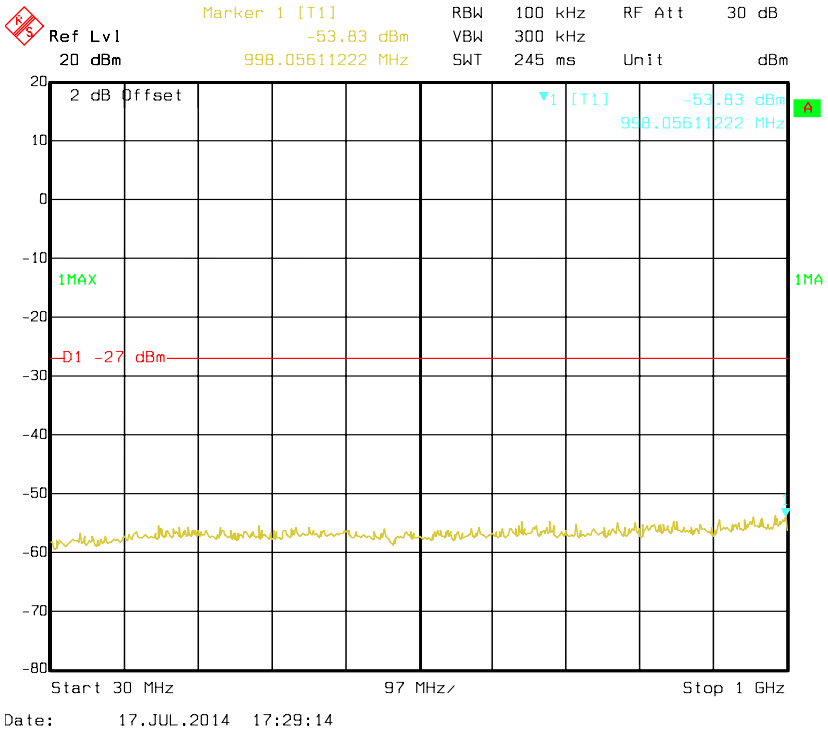
Antenna 1: 5190 MHz（1 GHz-26.5 GHz）



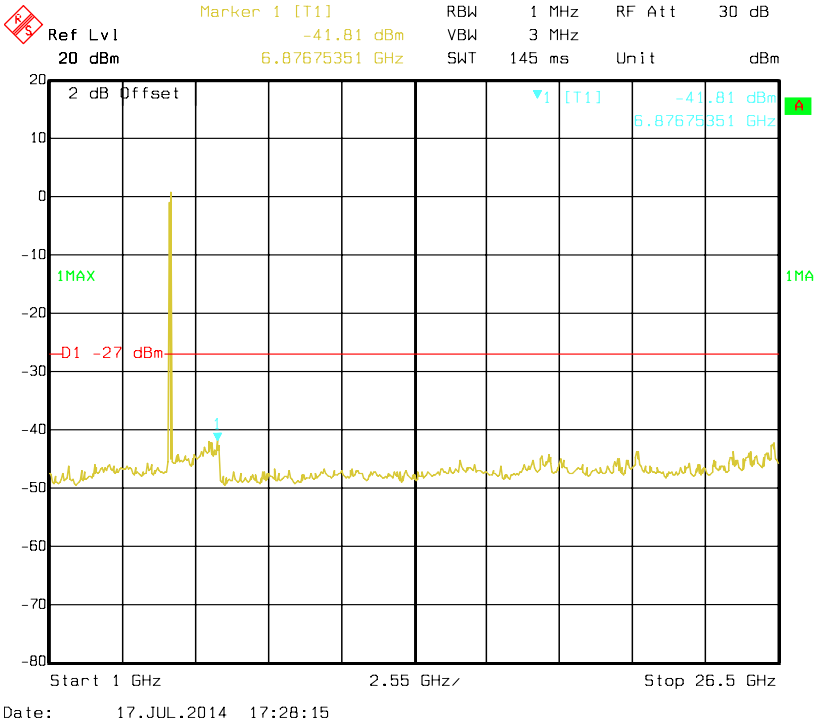
Antenna 1: 5190 MHz（26.5 GHz-40 GHz）



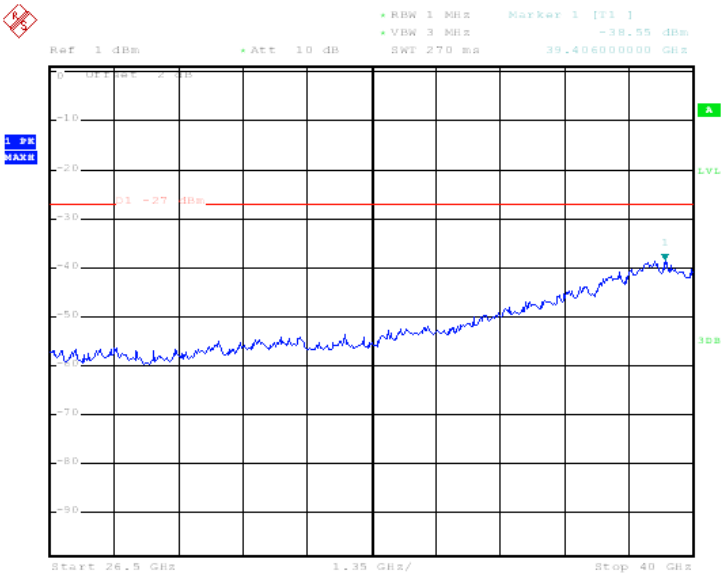
Antenna 1: 5230 MHz（30 MHz-1 GHz）



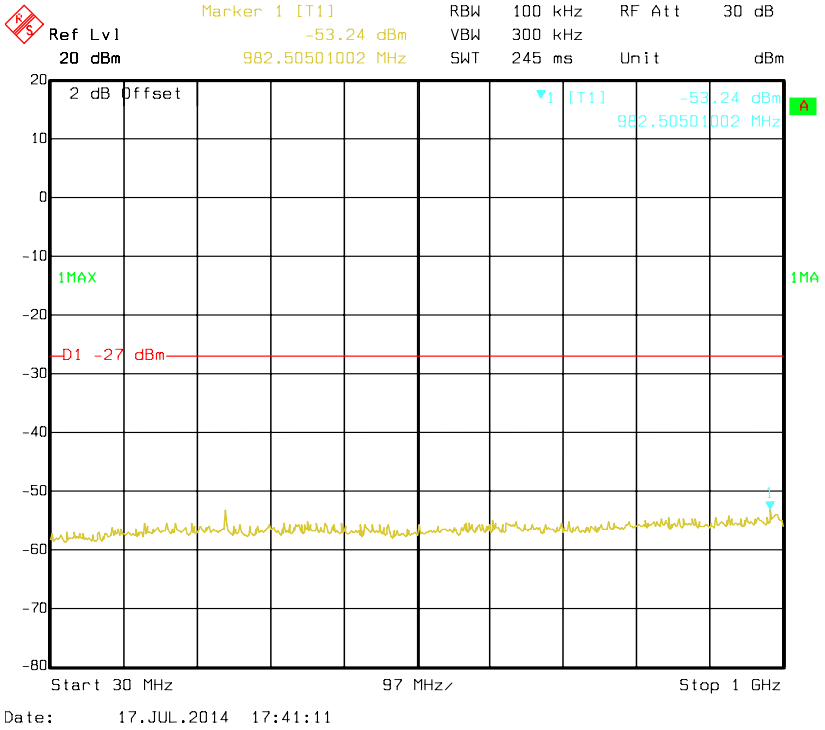
Antenna 1: 5230 MHz（1 GHz-26.5 GHz）



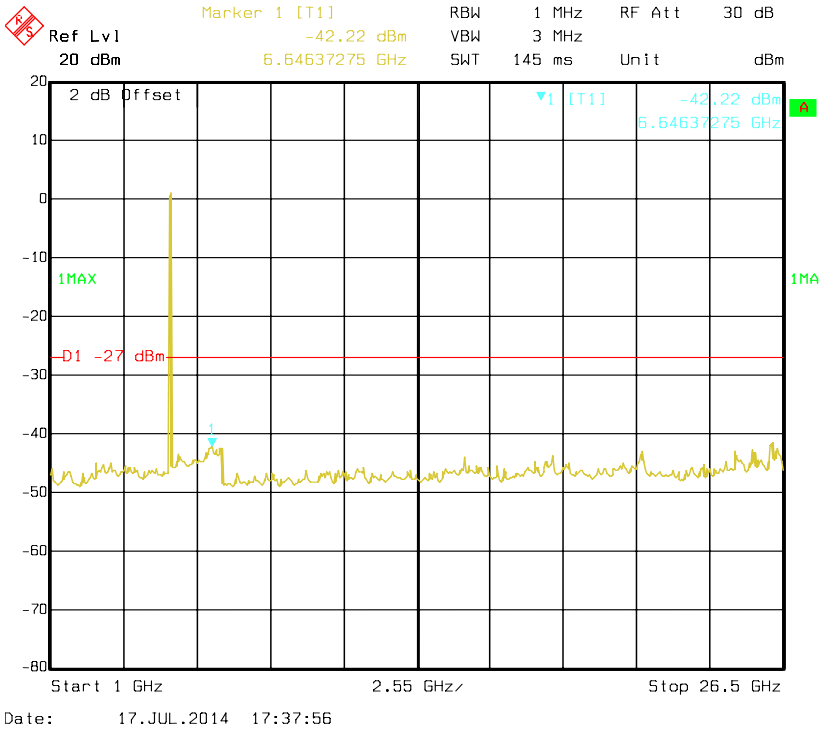
Antenna 1: 5230 MHz（26.5 GHz-40 GHz）



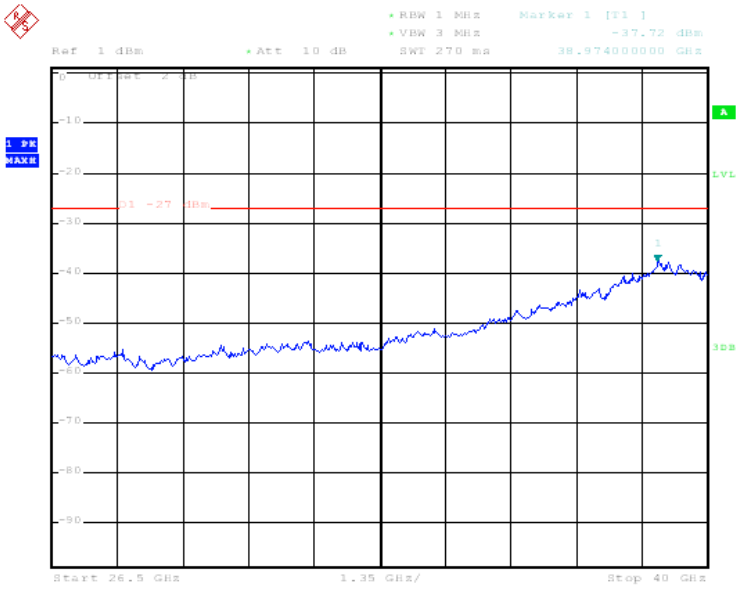
Antenna 2: 5190 MHz（30MHz-1GHz）



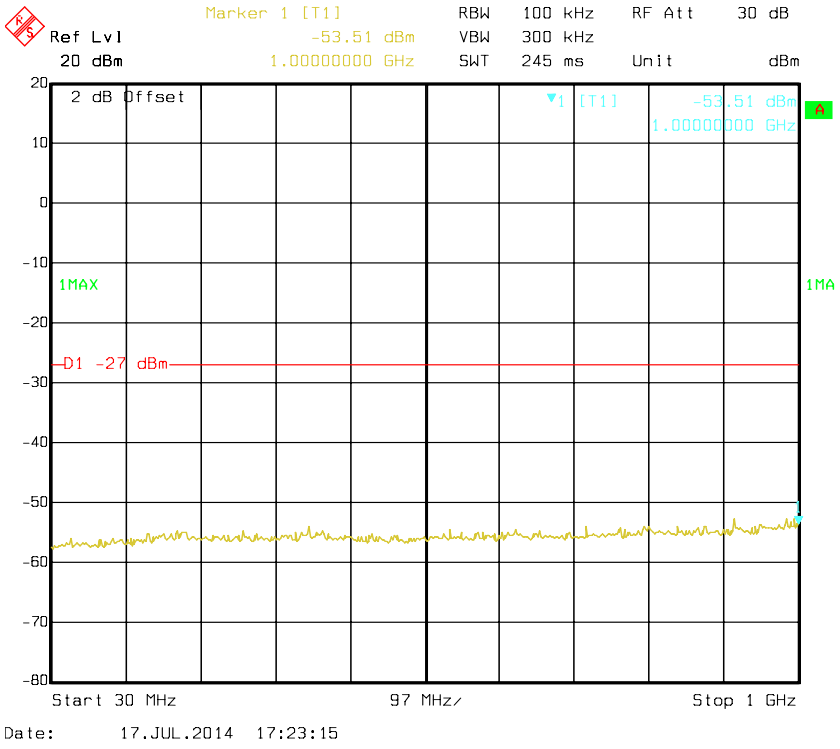
Antenna 2: 5190 MHz（1 GHz-26.5 GHz）



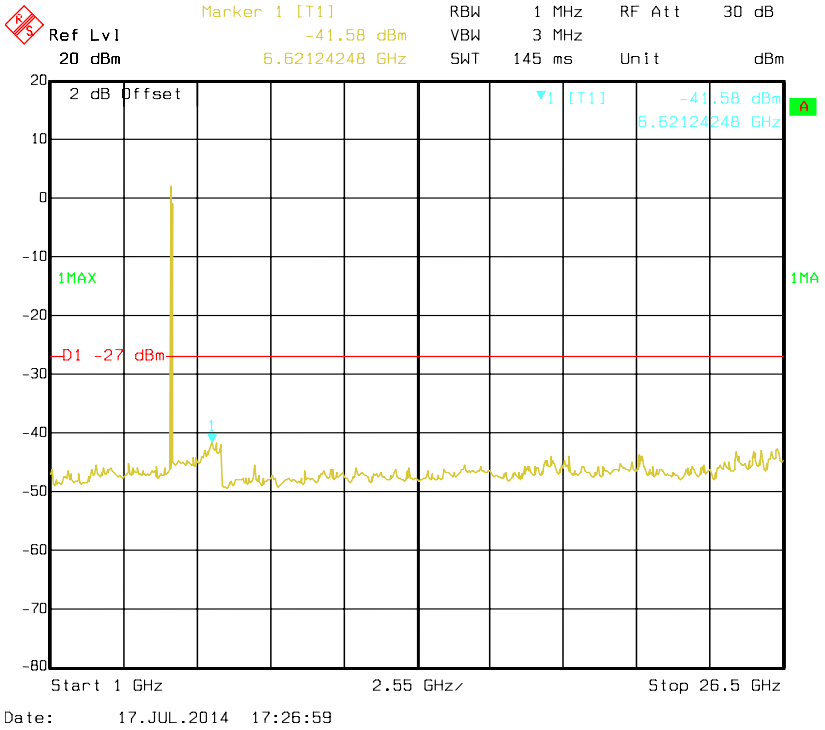
Antenna 2: 5190 MHz（26.5 GHz-40 GHz）



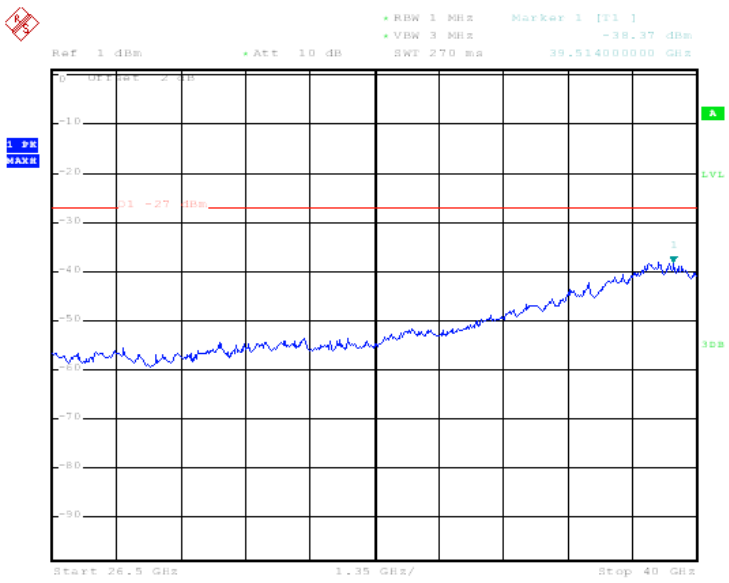
Antenna 2: 5230 MHz（30 MHz-1 GHz）



Antenna 2: 5230 MHz（1 GHz-26.5 GHz）

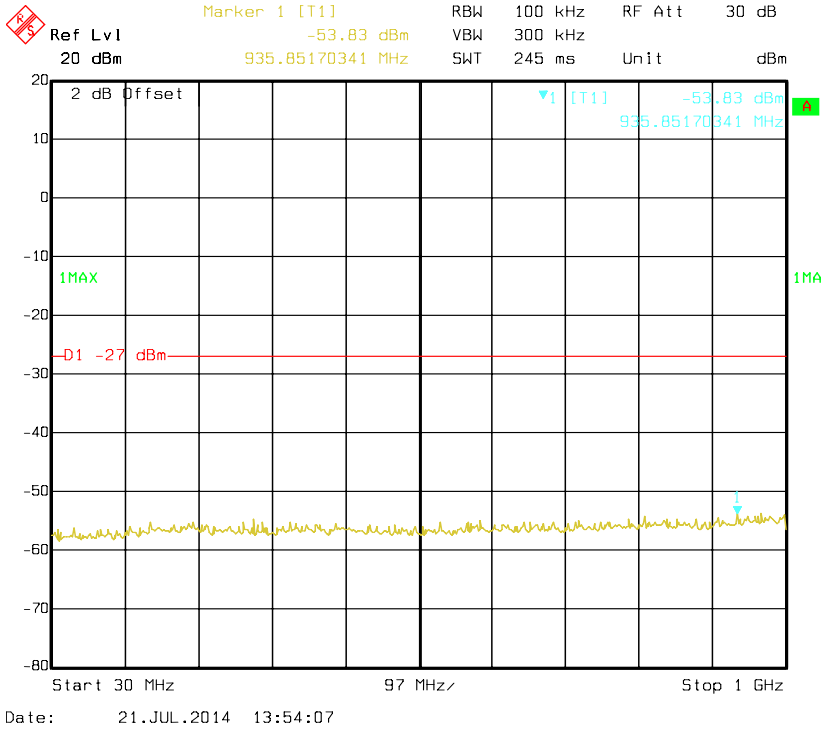


Antenna 2: 5230 MHz（26.5 GHz-40 GHz）

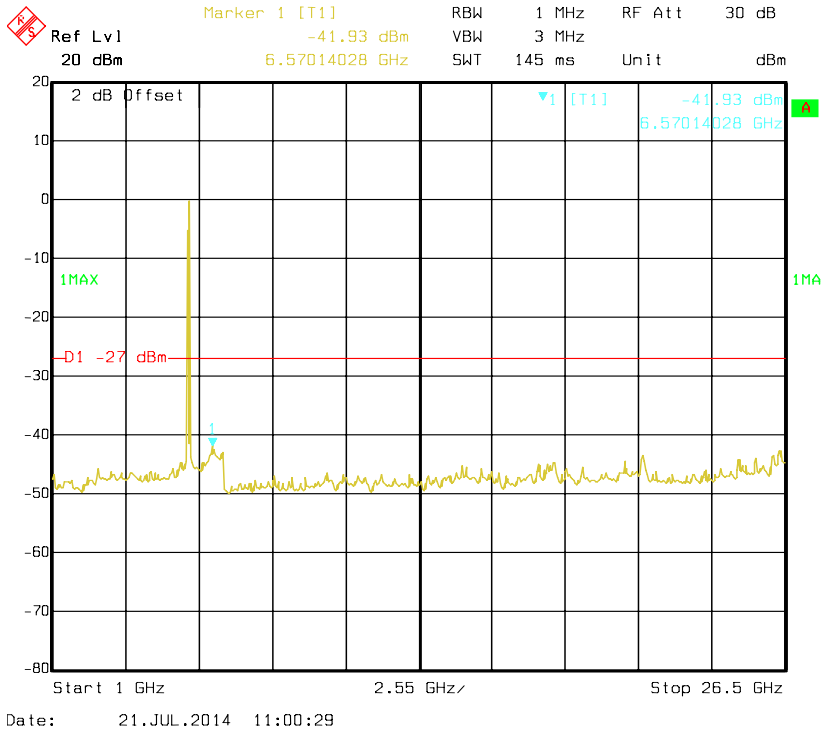


5725-5825 MHz:

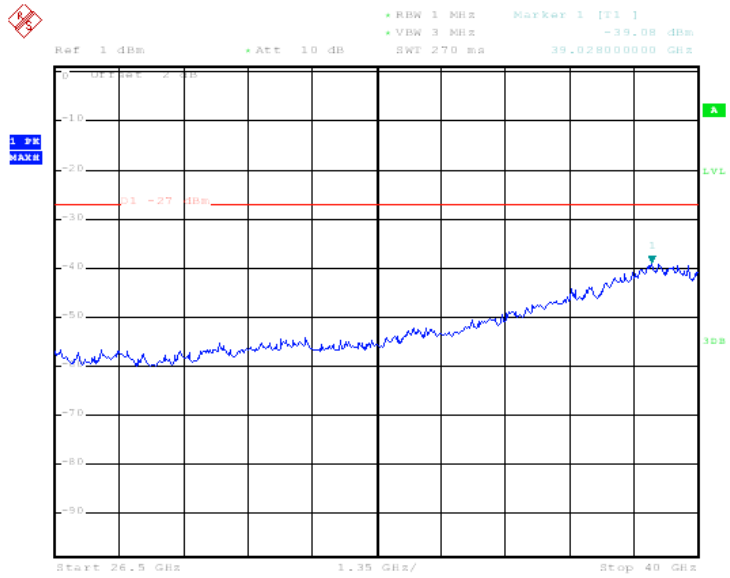
Antenna 1: 5755 MHz（30 MHz-1 GHz）



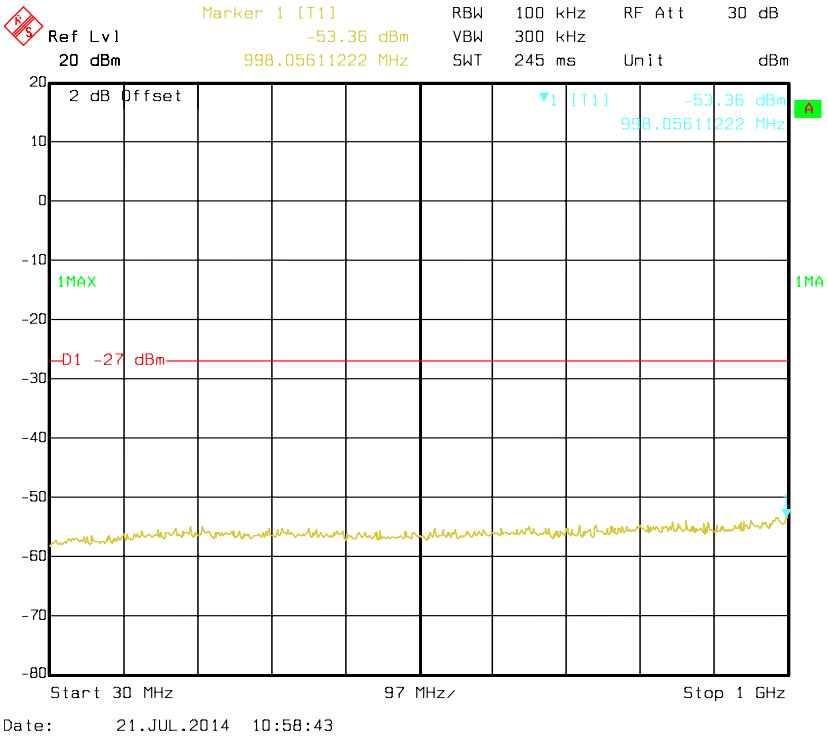
Antenna 1: 5755 MHz（1 GHz-26.5 GHz）



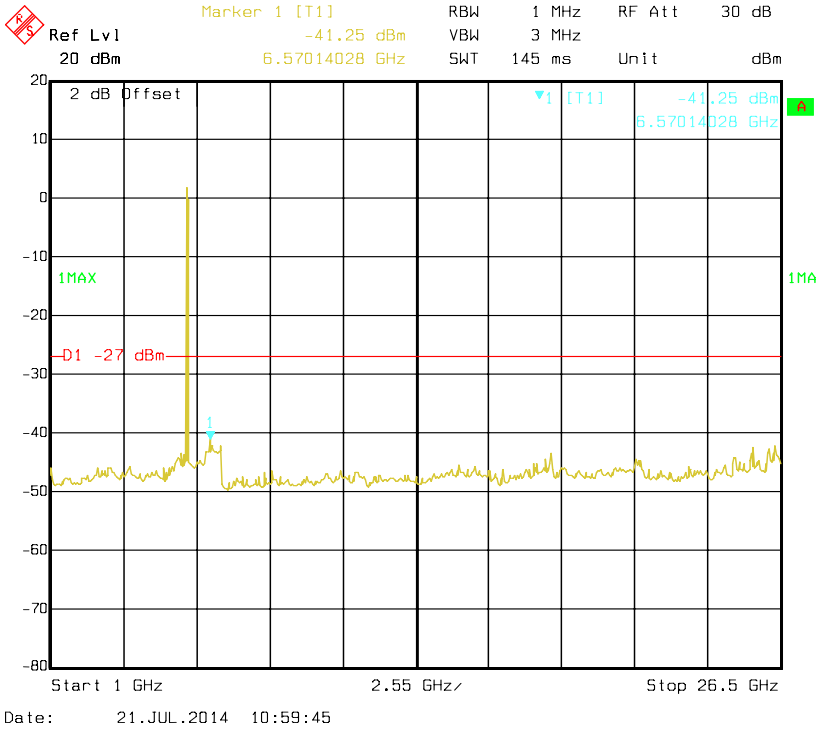
Antenna 1: 5755 MHz（26.5 GHz-40 GHz）



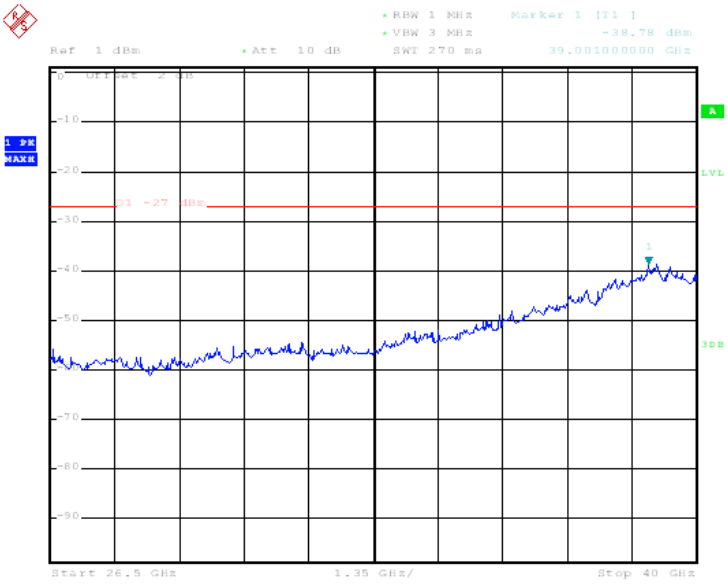
Antenna 1: 5795 MHz（30 MHz-1 GHz）



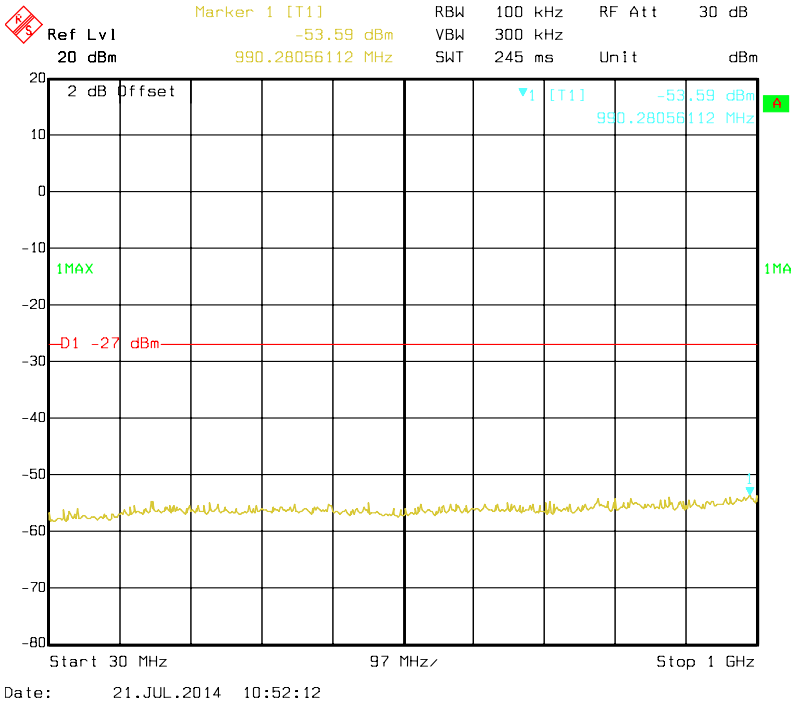
Antenna 1: 5795 MHz（1 GHz-26.5 GHz）



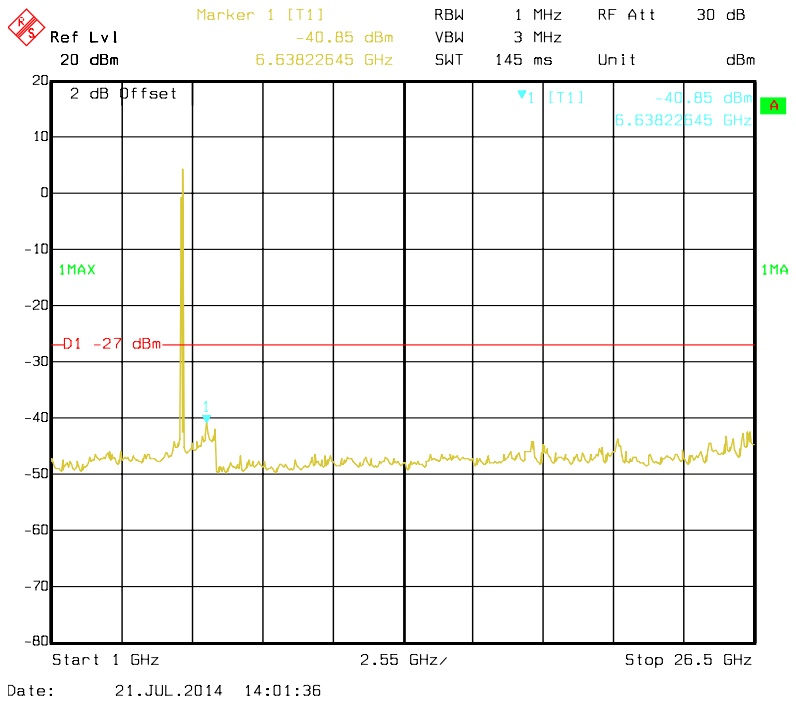
Antenna 1: 5795 MHz（26.5 GHz-40 GHz）



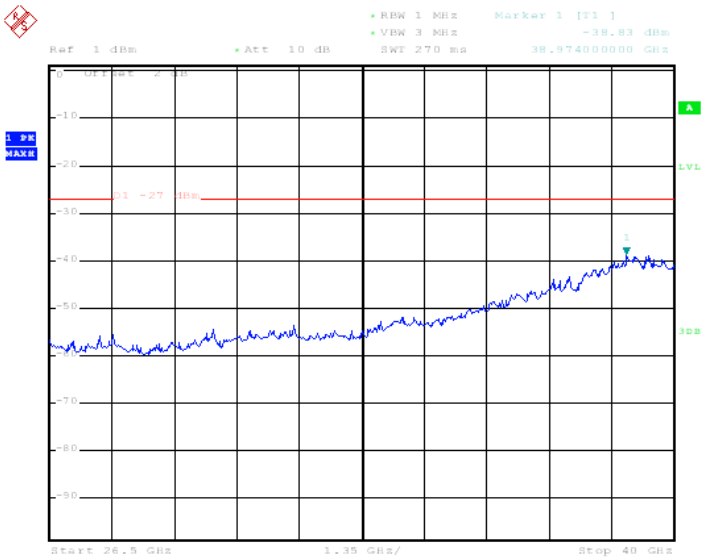
Antenna 2: 5755 MHz（30 MHz-1 GHz）



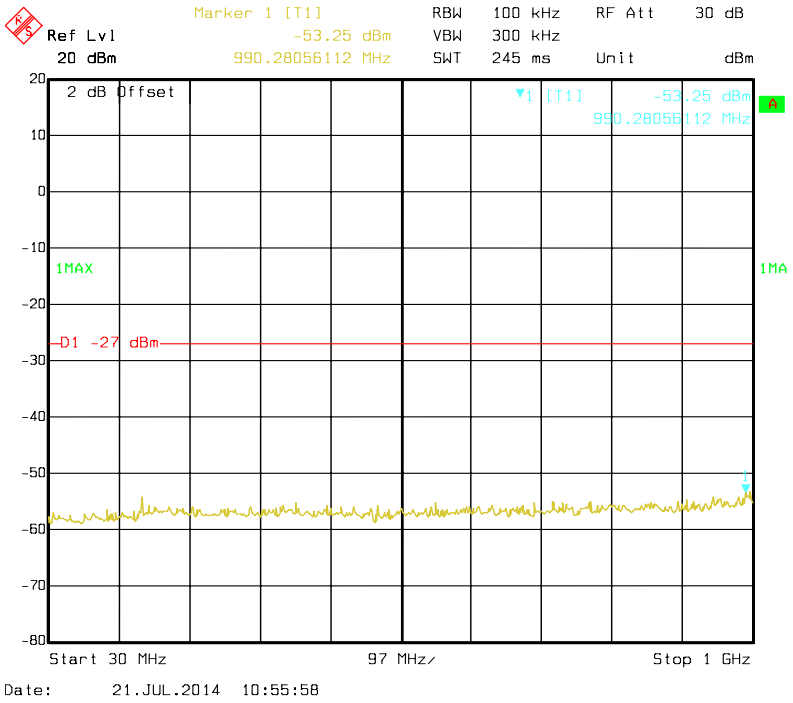
Antenna 2: 5755 MHz（1 GHz-26.5 GHz）



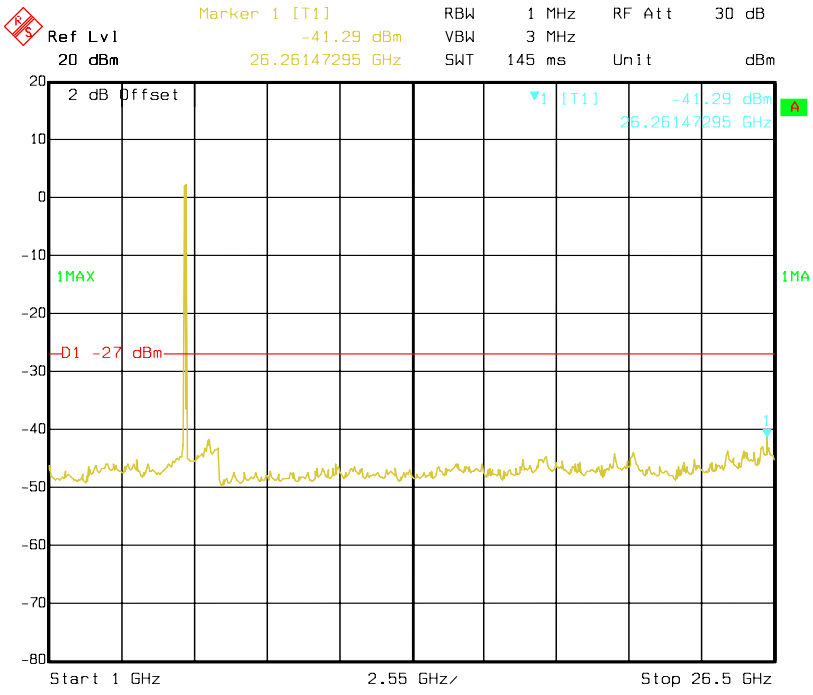
Antenna 2: 5755 MHz（26.5 GHz-40 GHz）



Antenna 2: 5795 MHz（30 MHZ-1 GHz）

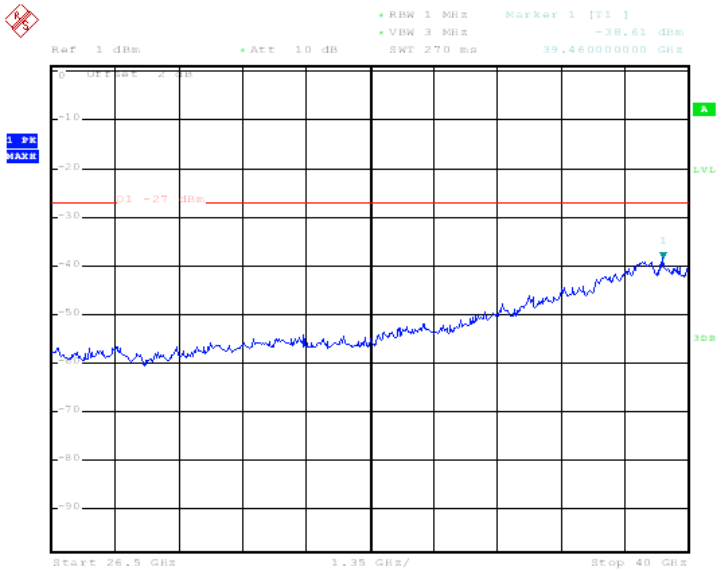


Antenna 2: 5795 MHz（1 GHz-26.5 GHz）



Date: 21.JUL.2014 14:03:06

Antenna 2: 5795 MHz（26.5 GHz-40 GHz）



Date: 10.JUL.2014 16:39:38

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 e.i.r.p. 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 e.i.r.p. of −27 dBm/MHz.

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 e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. 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 measuremen 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 100 kHz and VBW to 300 kHz 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	Spectrum Analyzer	FSEM30	100018	2013-07-31	2014-07-30

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	28 °C & 25 °C
Relative Humidity:	51 % & 51 %
ATM Pressure:	100.4 kPa & 100.6 kPa

The testing was performed by Toby Ren on 2014-07-18 & 2014-07-21.

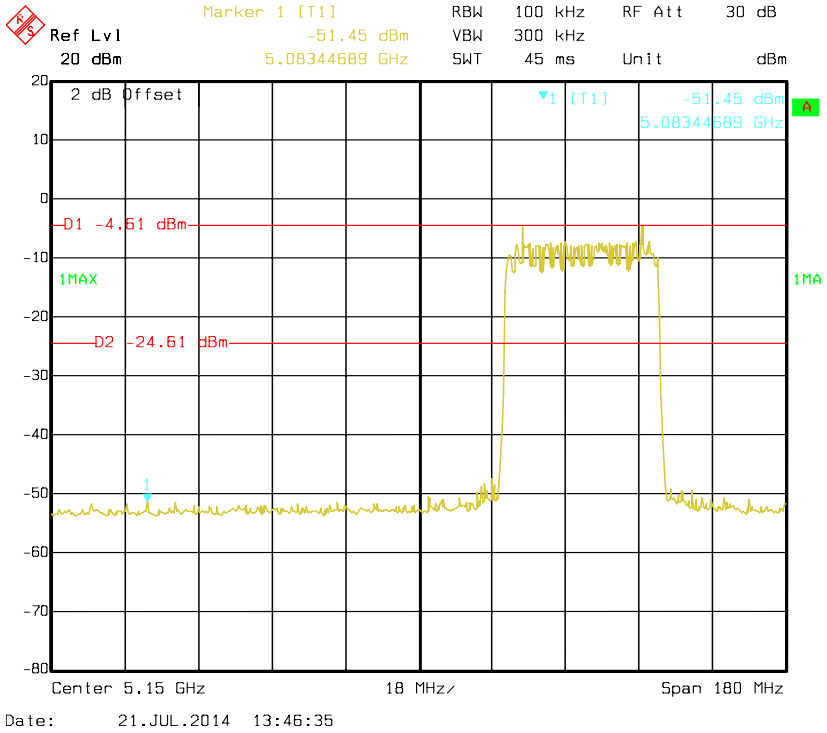
Test mode: transmitting

Frequency band	Bandedge	Worst Reading Level (dBm)			Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 1+Antenna 2		
5150-5250MHz	Left	-51.45	-50.85	-48.13	-27	Pass
	Right	-43.42	-45.28	-41.24	-27	Pass
5725-5825MHz	Left	-44.21	-36.30	-35.65	-27	Pass
	Right	-49.55	-47.84	-45.60	-27	Pass

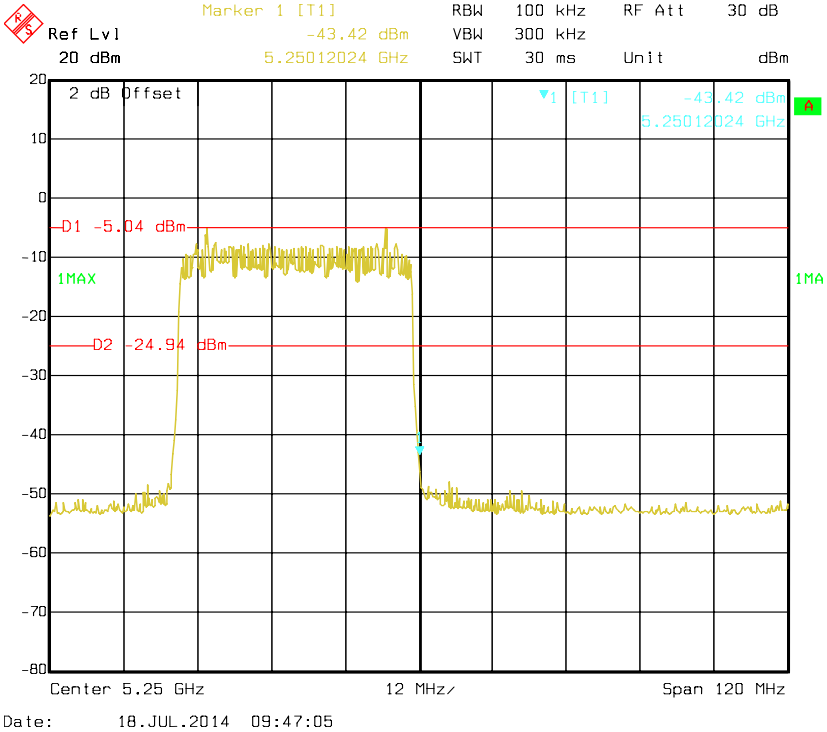
Note: the antenna gain was 5dBi, the cable loss was 1dB.

5150-5250 MHz:

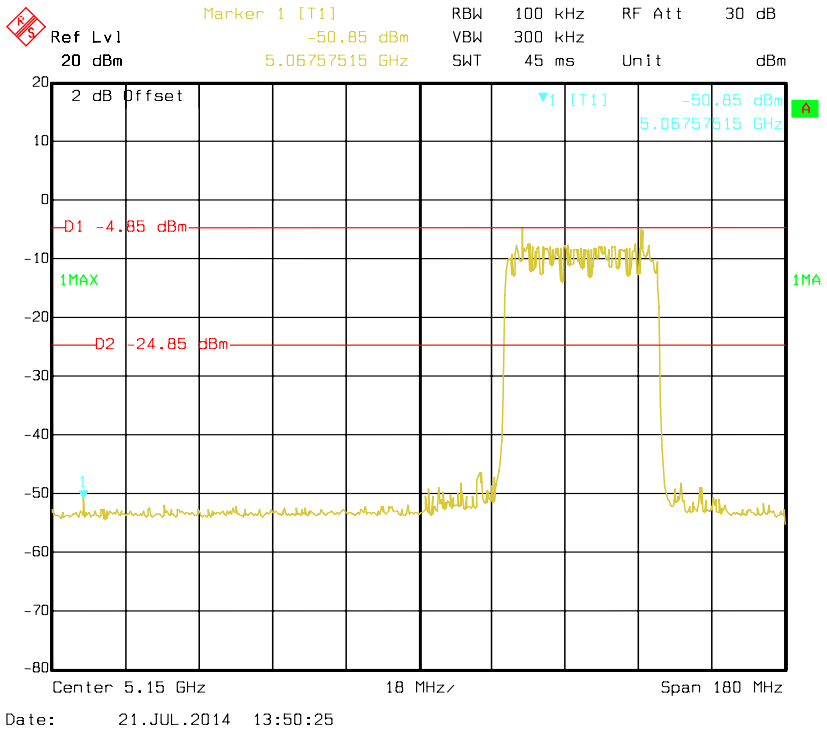
Antenna 1: Bandedge-Left



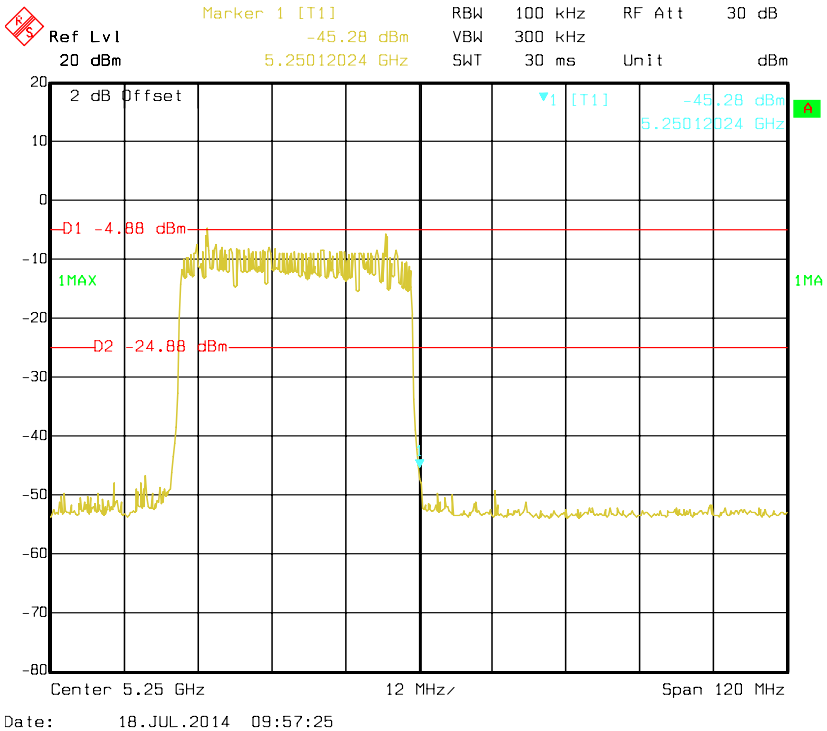
Antenna 1: Bandedge-Right



Antenna 2: Bandedge-Left

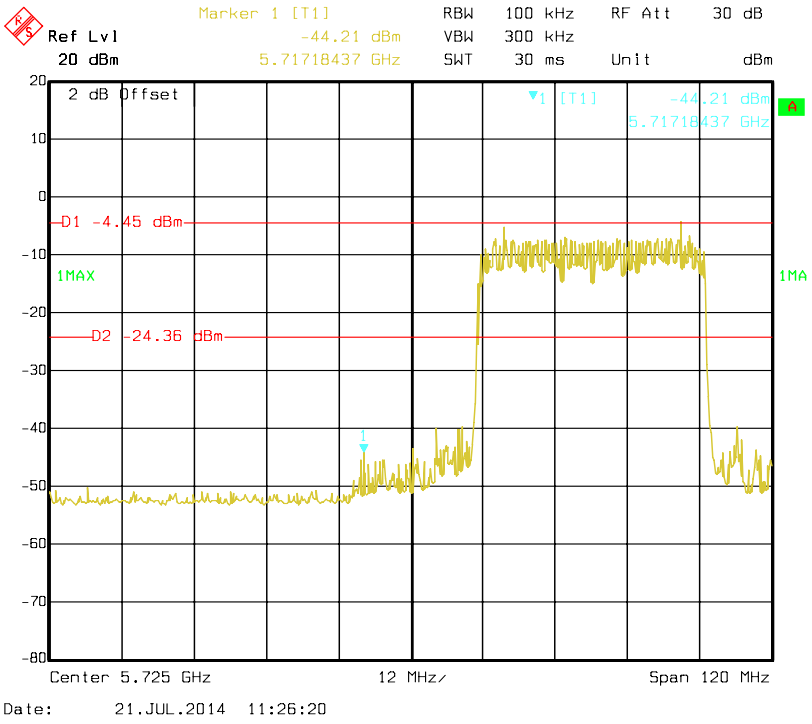


Antenna 2: Bandedge-Right

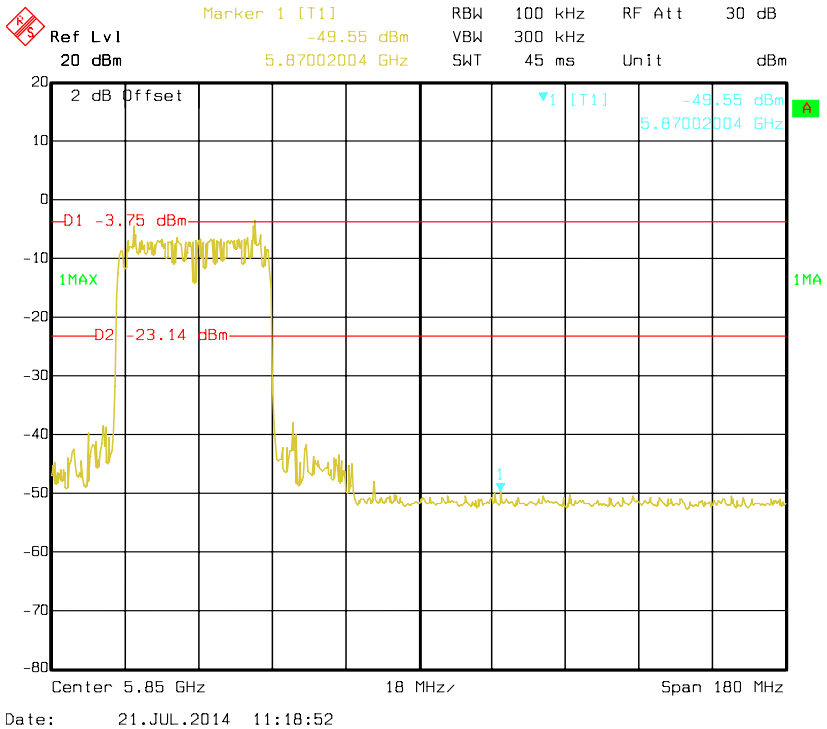


5725-5825 MHZ:

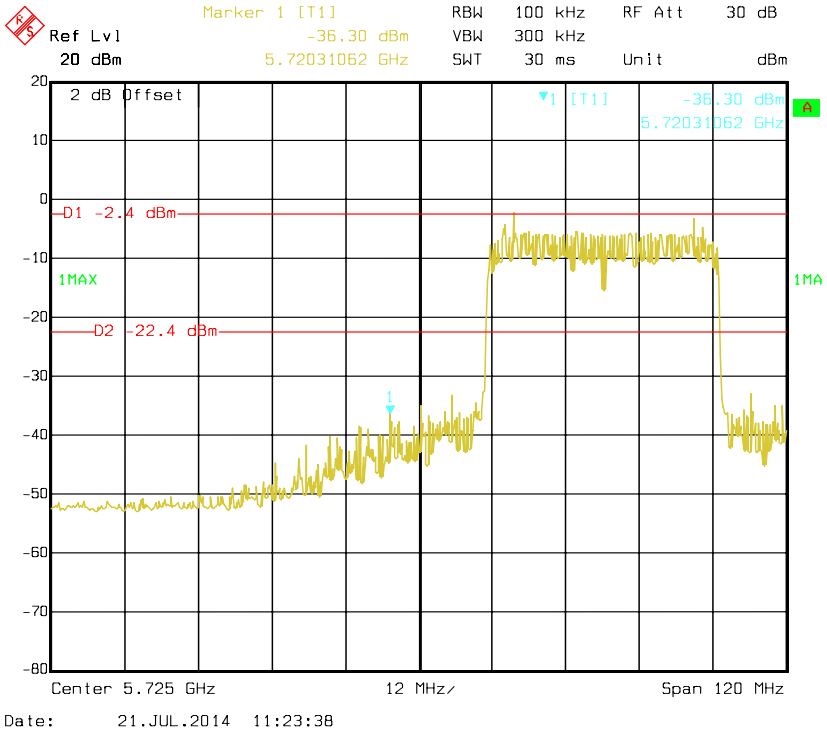
Antenna 1: Bandedge-Left



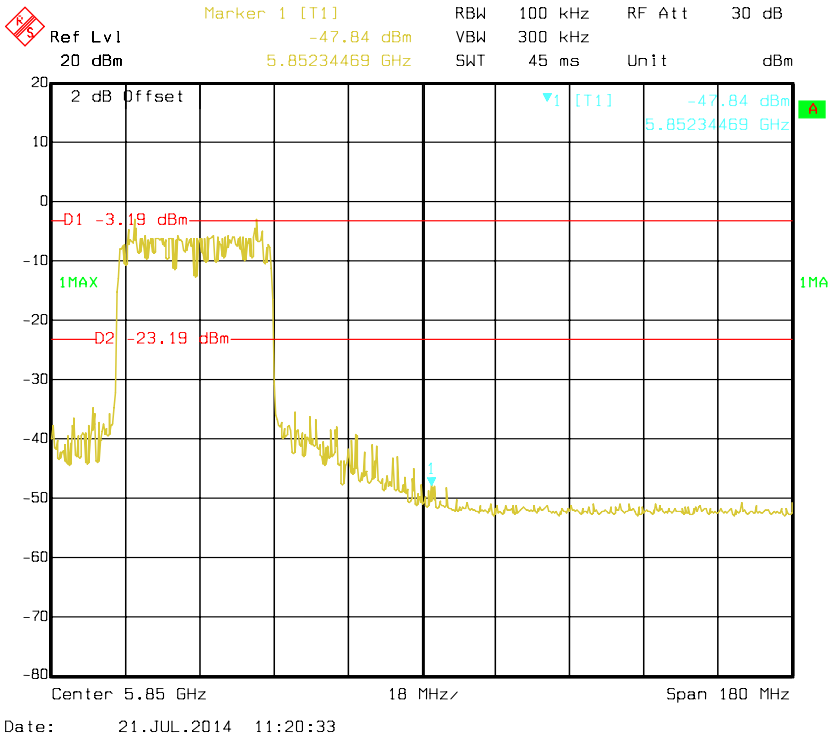
Antenna 1: Bandedge-Right



Antenna 2: Bandedge-5755 MHz



Antenna 2: Bandedge-5795 MHz



FCC §15.407(a) (1) (3), (e) – 26dB & 6dB 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 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2013-07-31	2014-07-30

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

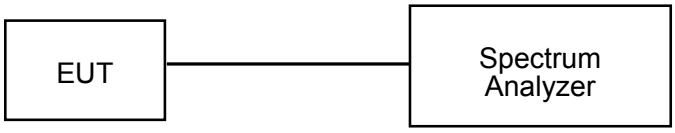
Test Procedure

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.
   (a) 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%.
   (b) Set RBW = 100 kHz and the video bandwidth (VBW) ≥ 3 x RBW. Use a peak detector. Do not use the Max Hold function and auto couple. Rather, use the trace to stabilize the emission. Measure the maximum width of emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	27 °C & 30 °C
Relative Humidity:	57 % & 42 %
ATM Pressure:	100.9 kPa & 100.7 kPa

The testing was performed by Toby Ren on 2014-07-17 & 2014-07-18.

Temperature:	31 °C & 28 °C
Relative Humidity:	56 % & 46 %
ATM Pressure:	100.6 kPa & 100.5 kPa

The testing was performed by Toby Ren on 2014-07-21 & 2014-07-22.

Test Result: Pass.

Please refer to the following tables and plots.

Test mode: Transmitting

5150-5250 MHz:

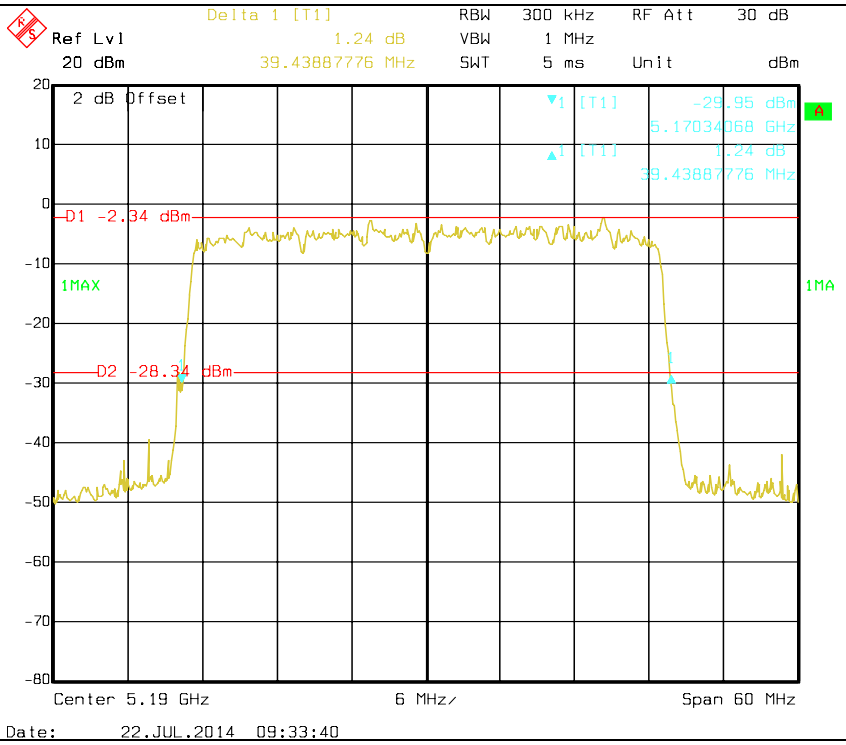
Frequency (MHz)	26dB Bandwidth (MHz)		OBW (MHz)	
	Antenna 1	Antenna 2	Antenna 1	Antenna 2
5190	39.438	39.318	37.274	37.274
5230	39.318	39.559	37.274	37.274

5725-5825 MHz:

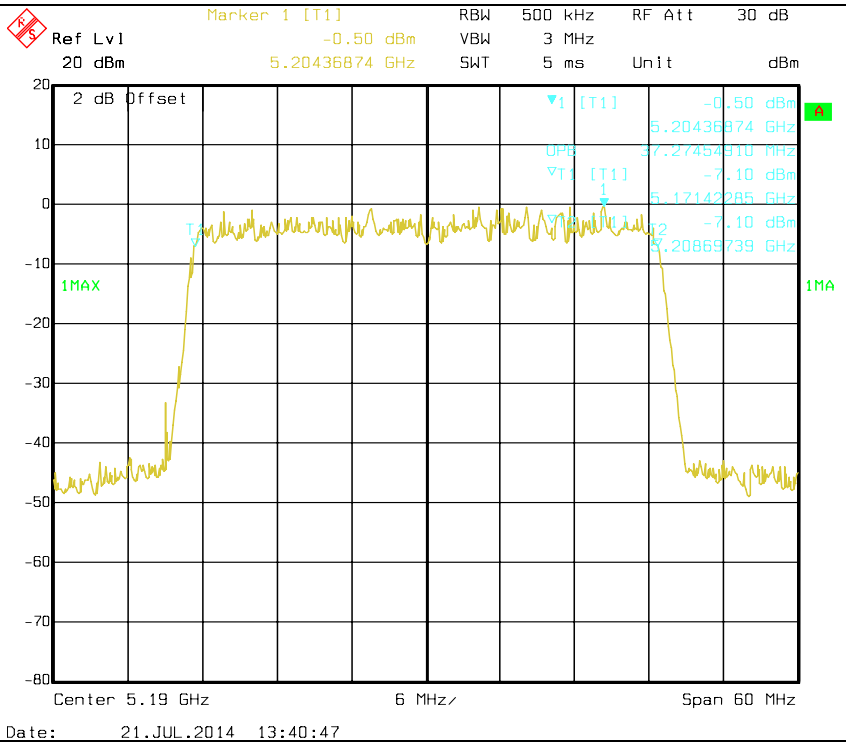
Frequency (MHz)	6dB Bandwidth (MHz)		OBW (MHz)	
	Antenna 1	Antenna 2	Antenna 1	Antenna 2
5755	36.913	37.154	37.394	37.274
5795	37.154	37.154	37.274	37.394

5150-5250 MHZ:

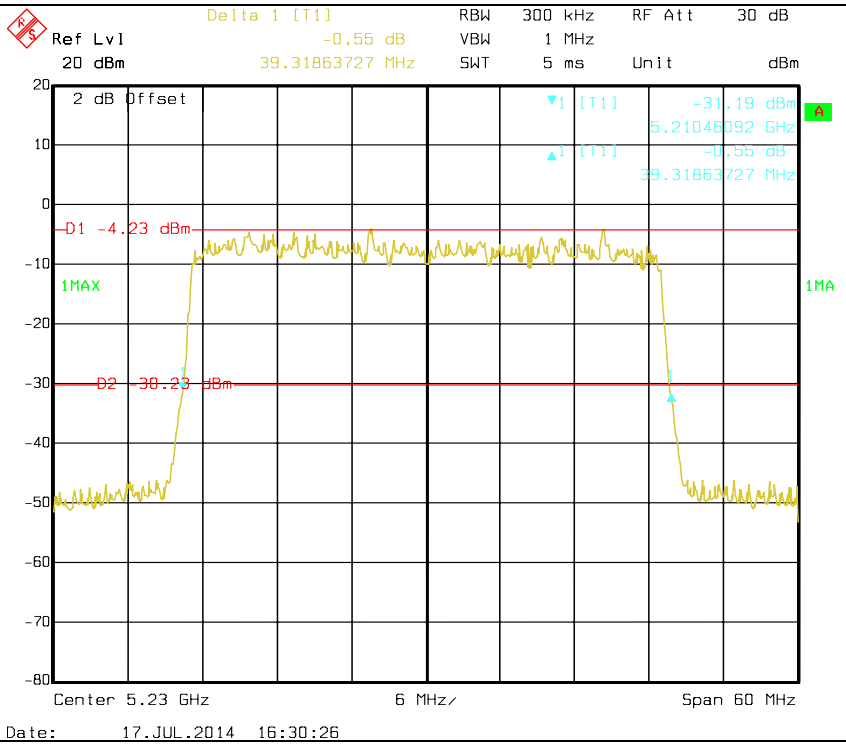
Antenna 1: 26 dB Bandwidth-5190 MHz



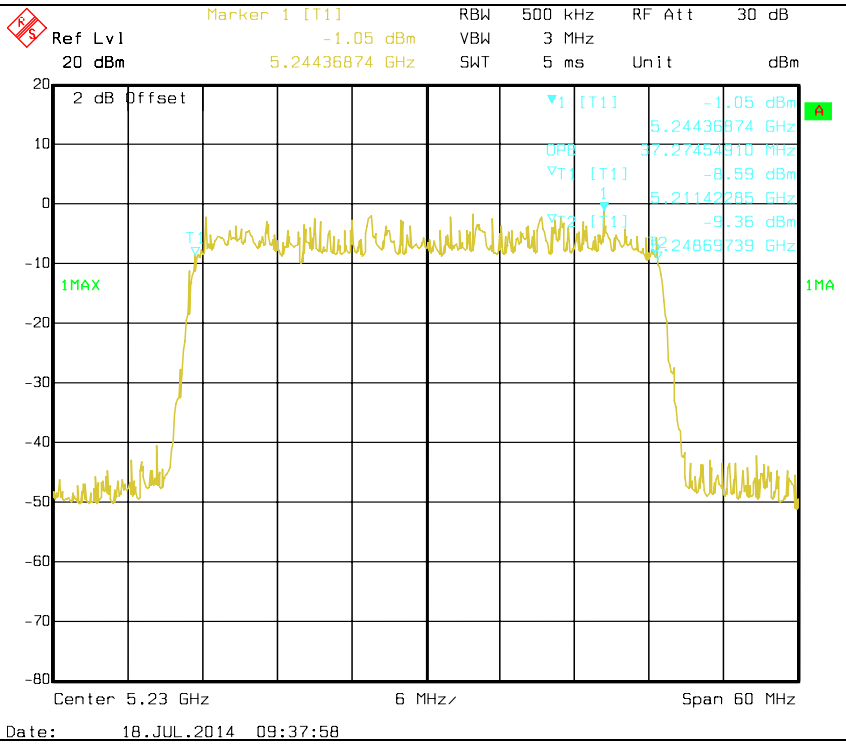
Antenna 1: OBW Bandwidth-5190 MHz



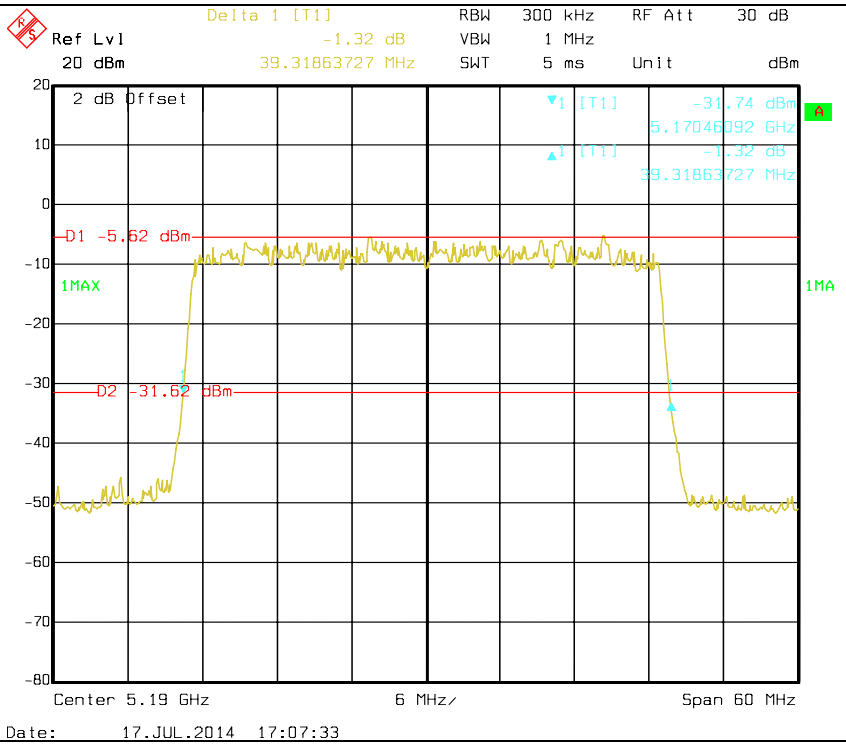
Antenna 1: 26 dB Bandwidth-5230 MHz



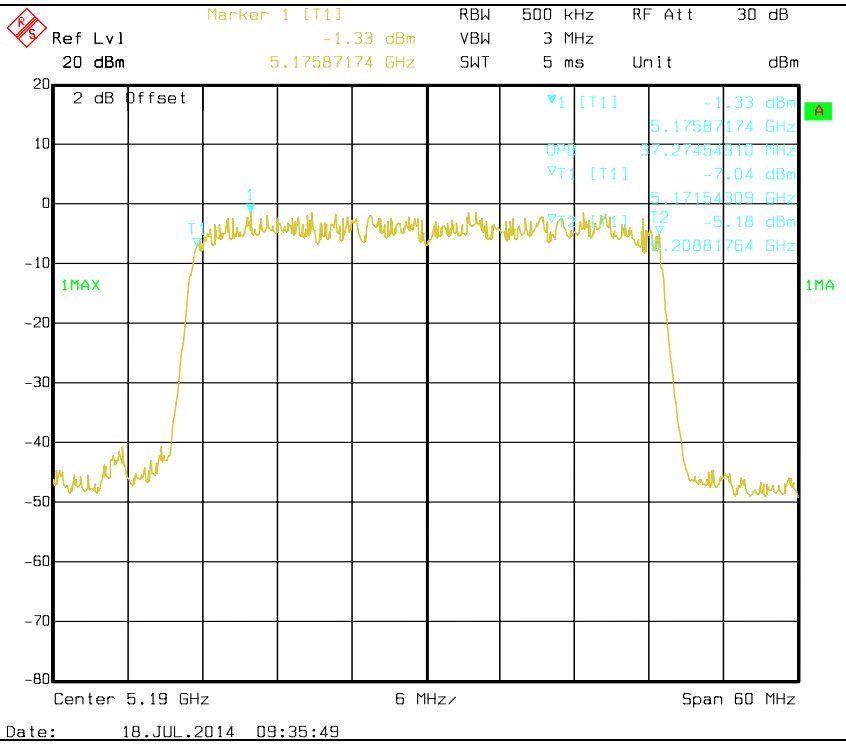
Antenna 1: OBW Bandwidth-5230 MHz



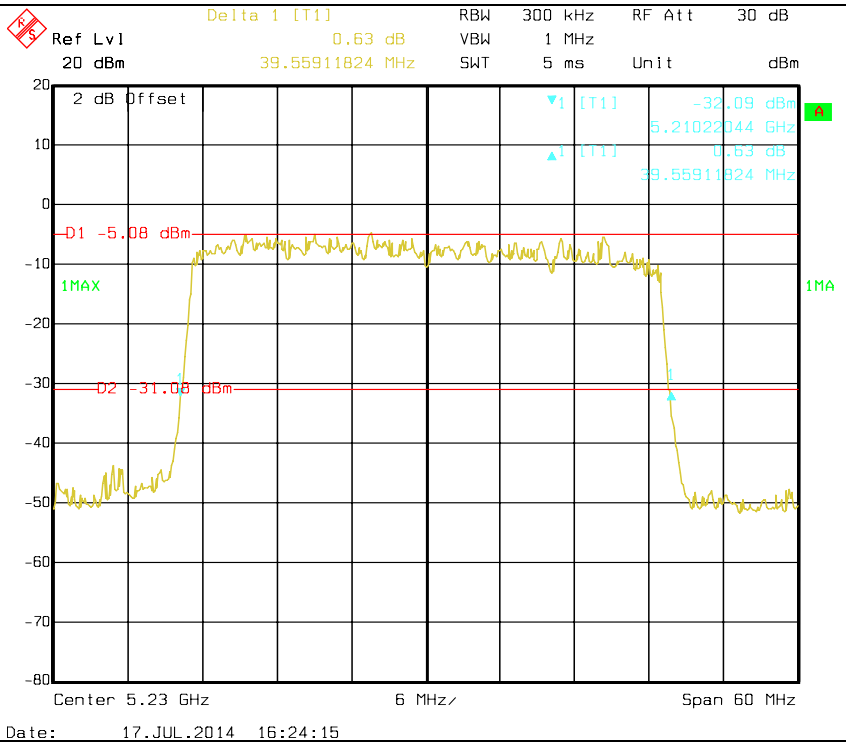
Antenna 2: 26 dB Bandwidth-5190 MHz



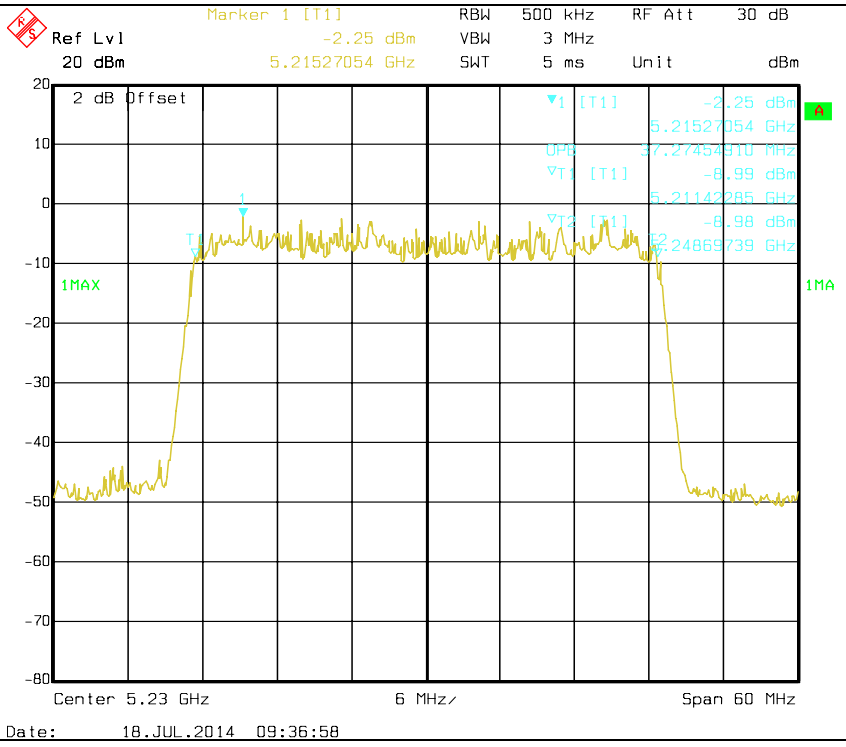
Antenna 2: OBW Bandwidth-5190 MHz



Antenna 2: 26 dB Bandwidth-5230 MHz

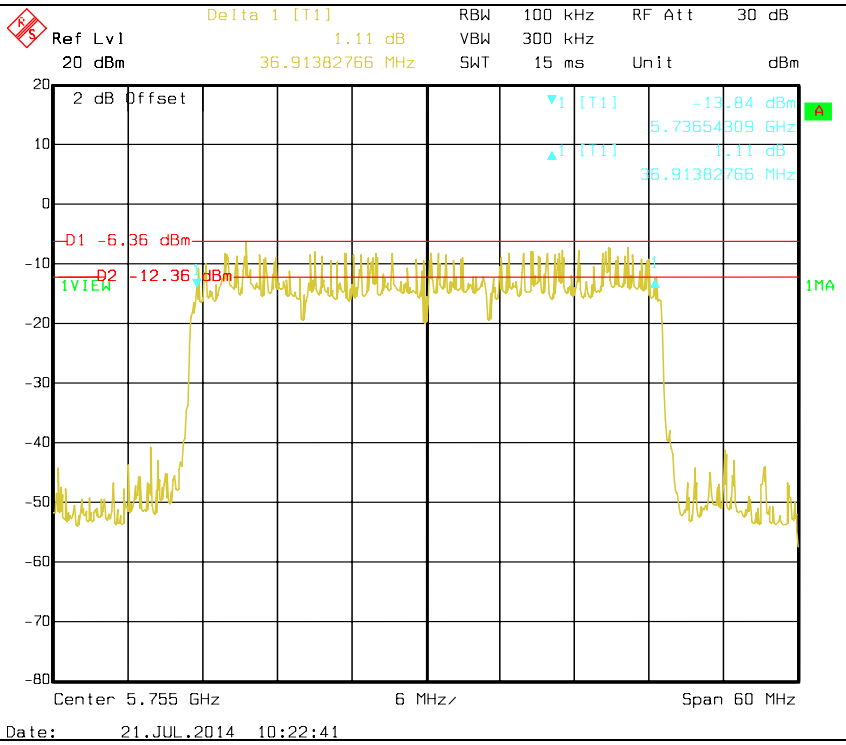


Antenna 2: OBW Bandwidth-5230 MHz

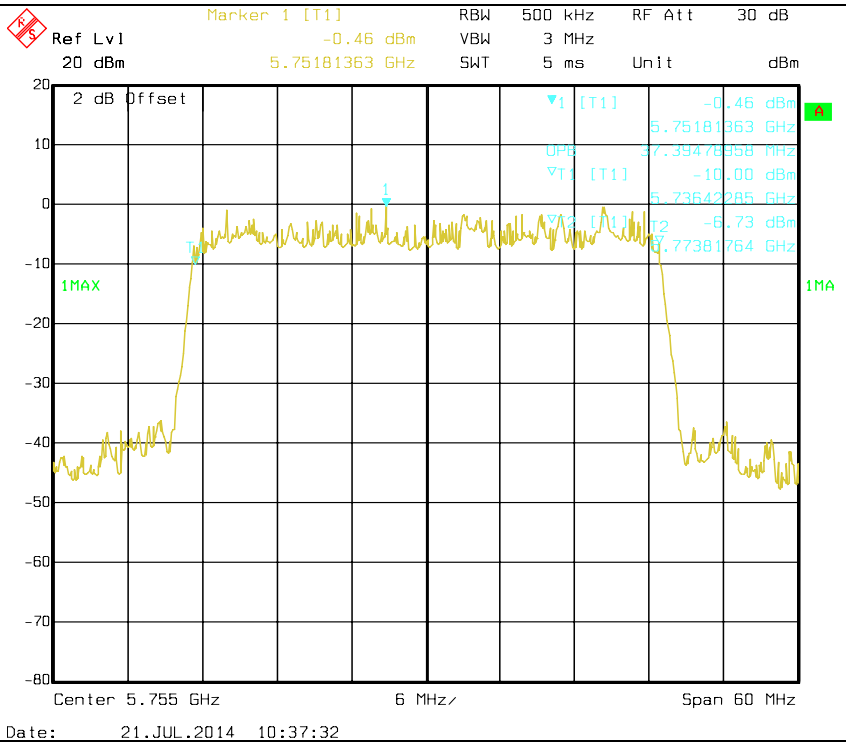


5725-5825 MHZ:

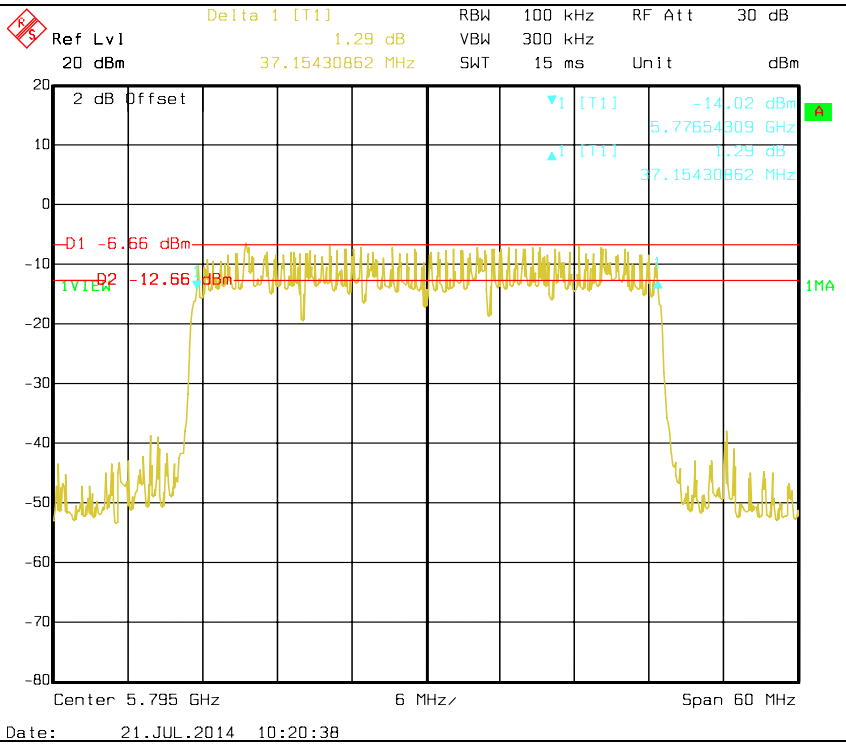
Antenna 1: 6 dB Bandwidth-5755 MHz



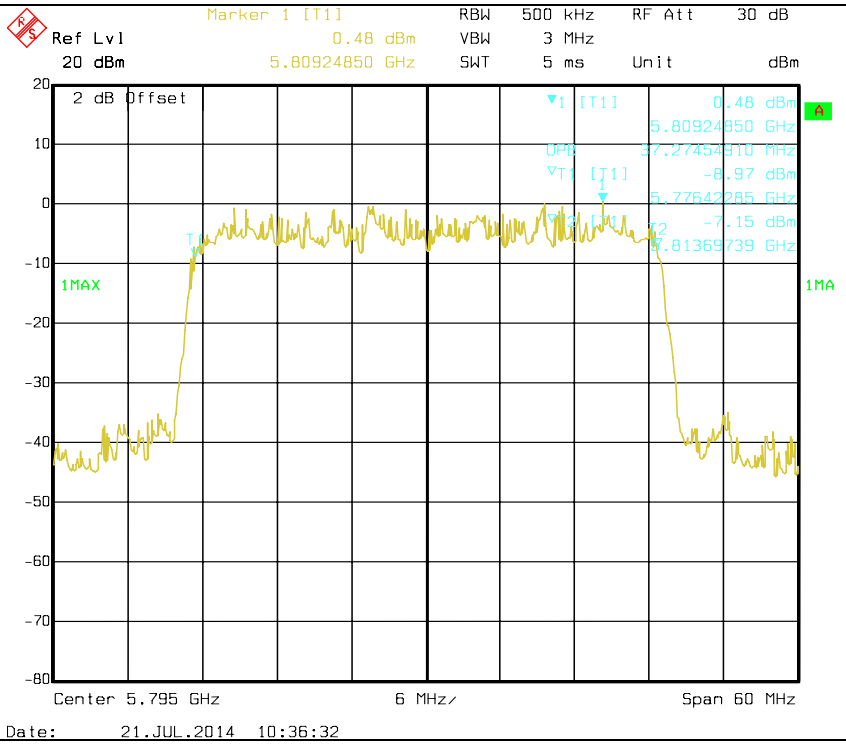
Antenna 1: OBW Bandwidth-5755 MHz



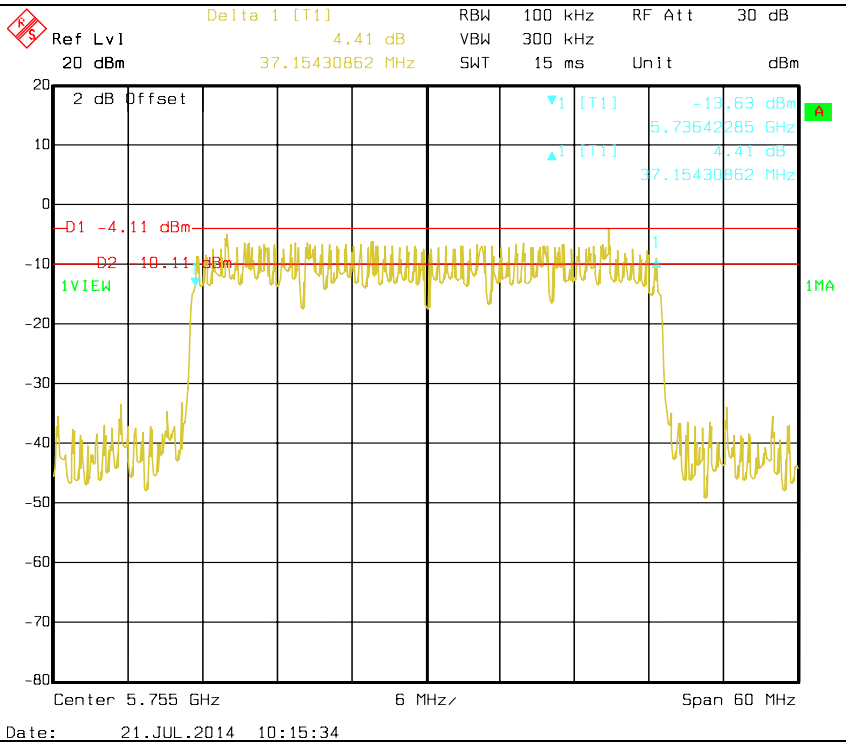
Antenna 1: 6 dB Bandwidth-5795 MHz



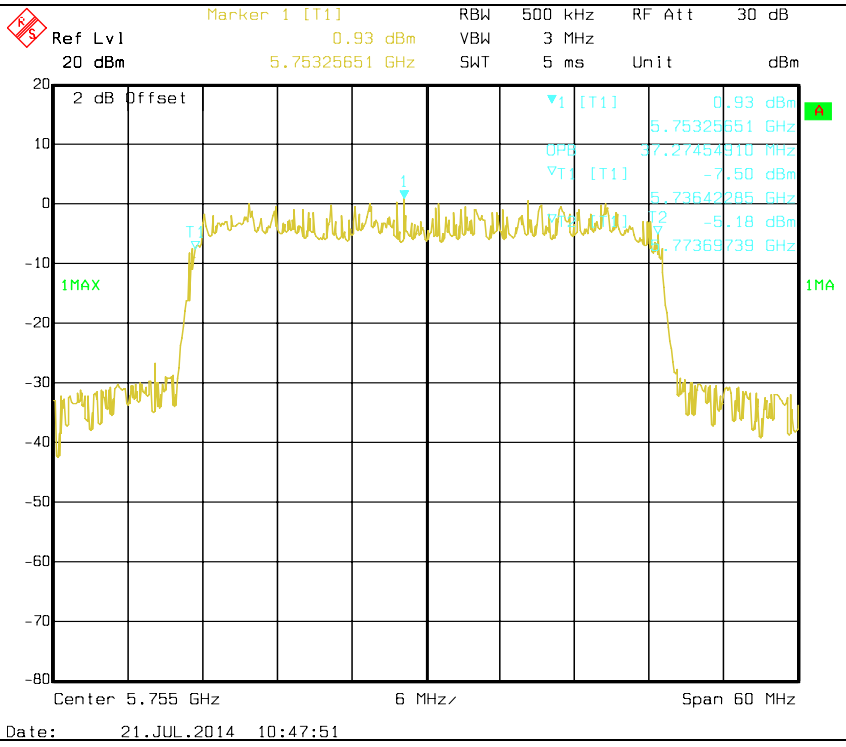
Antenna 1: OBW Bandwidth-5795 MHz



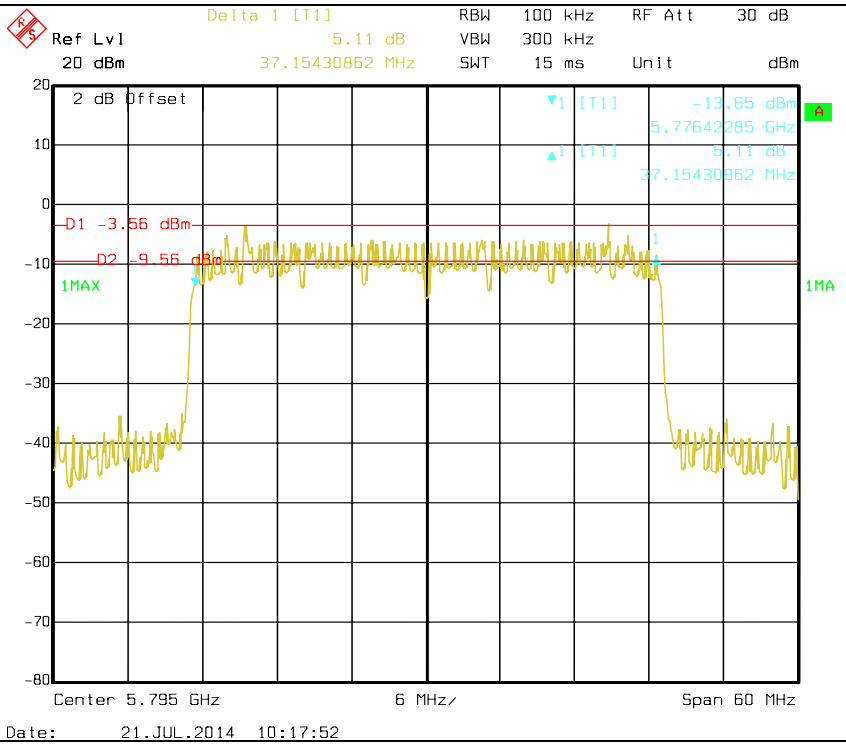
Antenna 1: 6 dB Bandwidth-5755 MHz



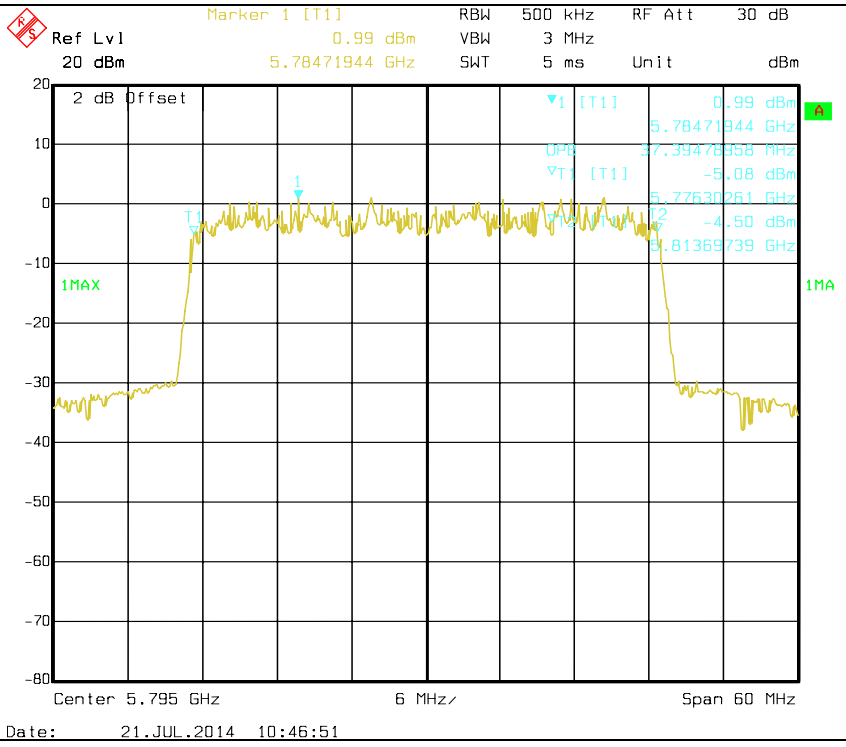
Antenna 1: OBW Bandwidth-5755 MHz



Antenna 1: 6 dB Bandwidth-5795 MHz



Antenna 1: OBW Bandwidth-5795 MHz



FCC §15.407(a) (1) (3)– 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 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSL18	100180	2013-07-31	2014-07-30

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, 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. 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.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	27 °C, 31 °C & 28 °C
Relative Humidity:	57 %, 56 % & 46 %
ATM Pressure:	100.9 kPa, 100.6 kPa & 100.5 kPa

The testing was performed by Toby Ren on 2014-07-17, 2014-07-21 & 2014-07-22.

5150-5250 MHz:

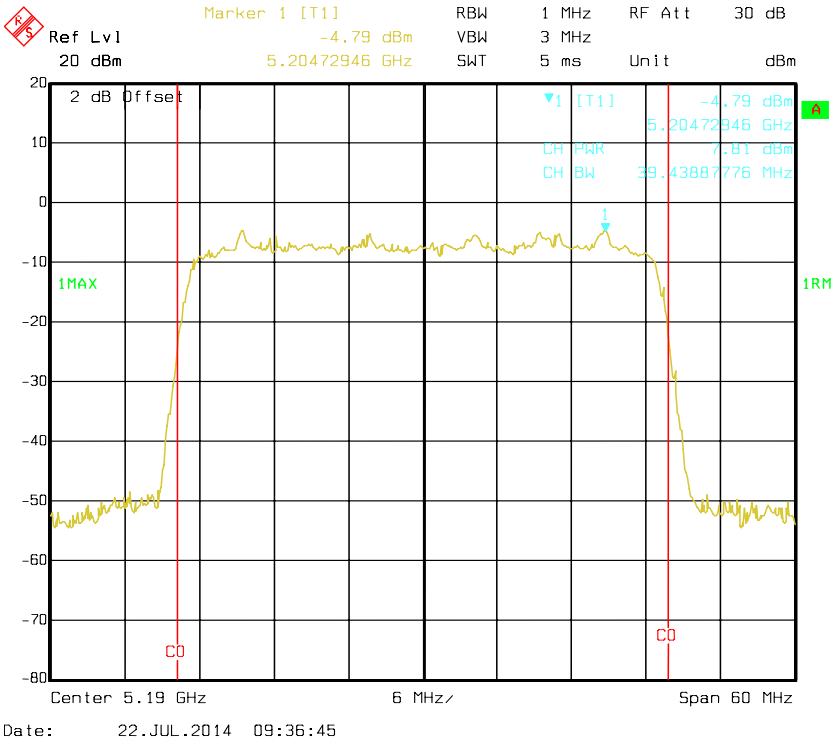
Frequency (MHz)	Output Power (dBm)			Limit (dBm)
	Antenna 1	Antenna 2	Antenna 1 + Antenna 2	
5190	7.81	7.33	10.59	17
5230	7.43	7.35	10.40	17

5725-5825 MHz:

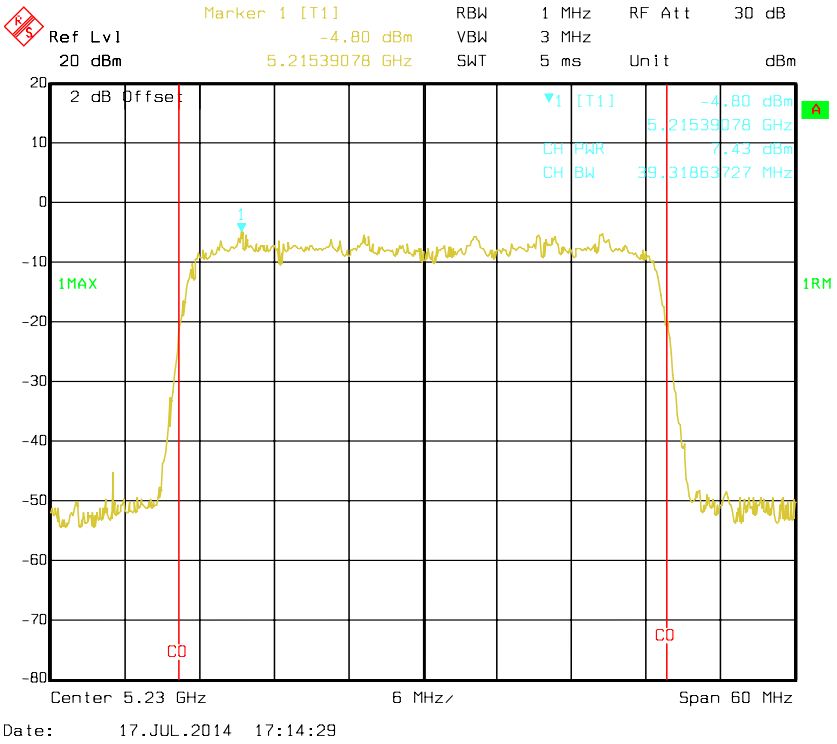
Frequency (MHz)	Output Power (dBm)			Limit (dBm)
	Antenna 1	Antenna 2	Antenna 1 + Antenna 2	
5755	7.72	8.28	11.02	30
5795	8.24	8.70	11.49	30

5150-5250 MHz:

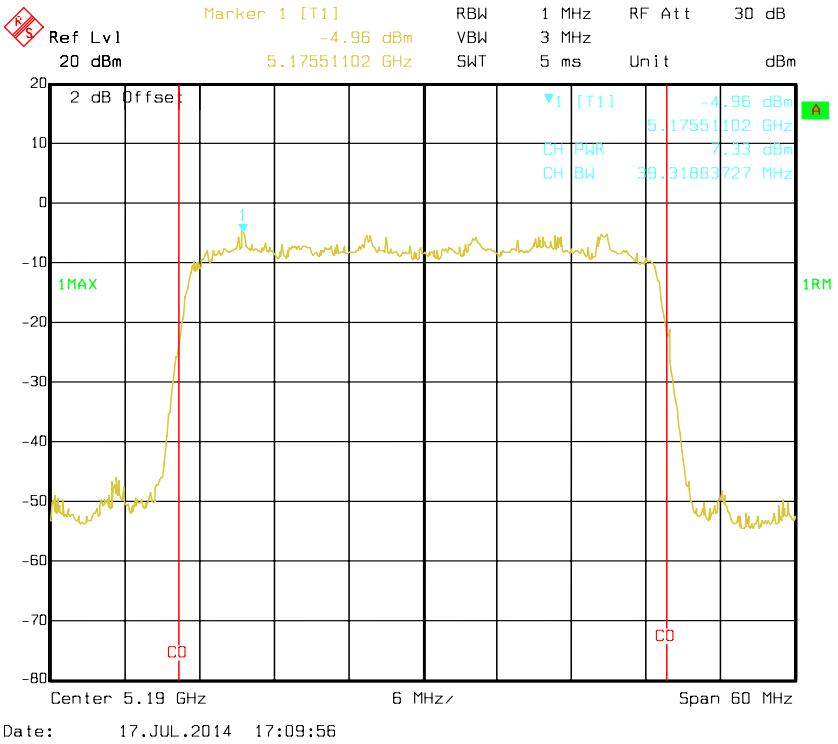
Antenna 1: RF Output Power, 5190 MHz



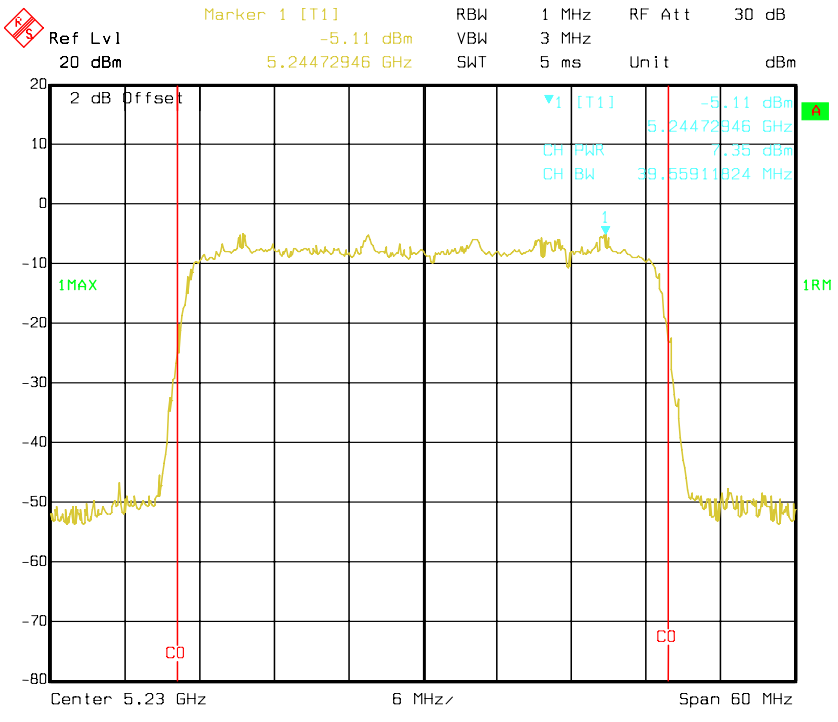
Antenna 1: RF Output Power, 5230 MHz



Antenna 2: RF Output Power, 5190 MHz

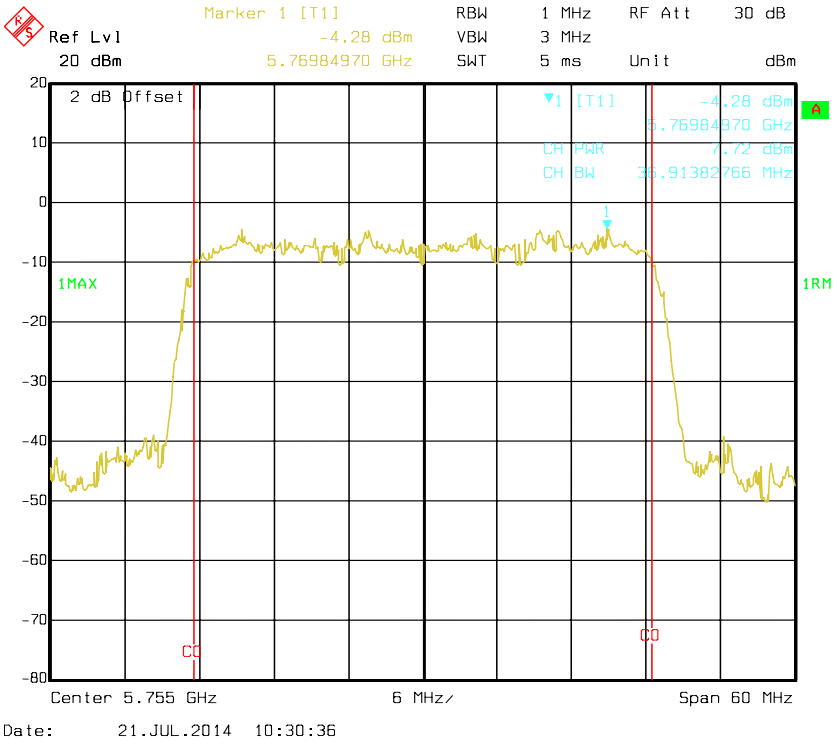


Antenna 2: RF Output Power, 5230 MHz

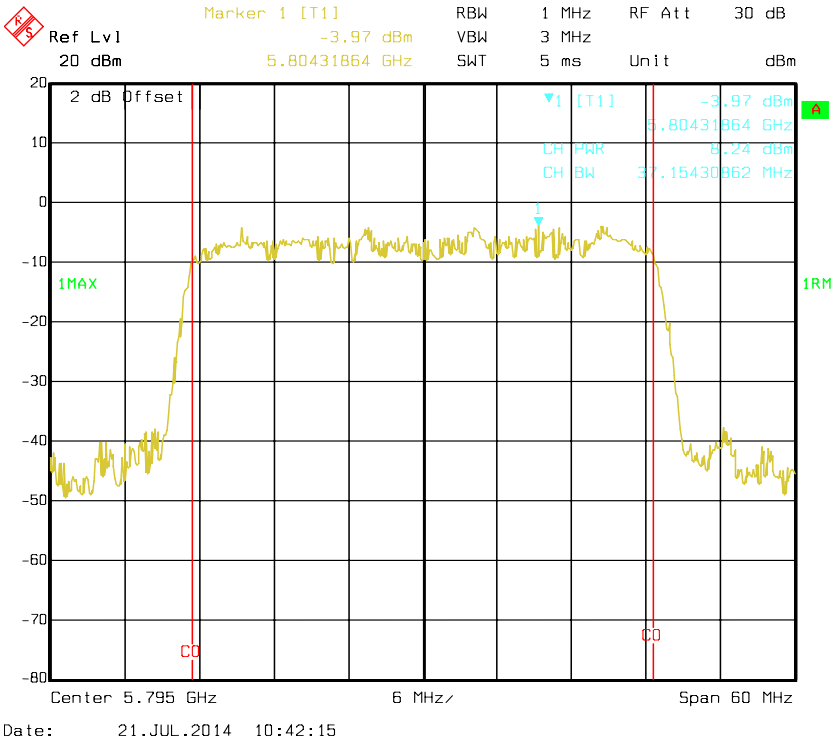


5725-5825 MHz:

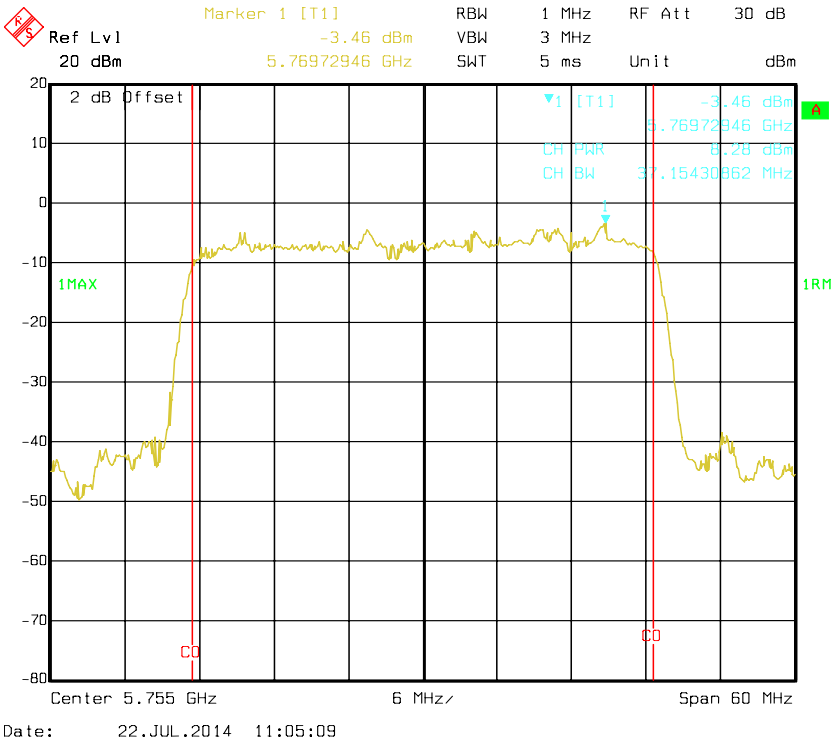
Antenna 1: RF Output Power, 5755 MHz



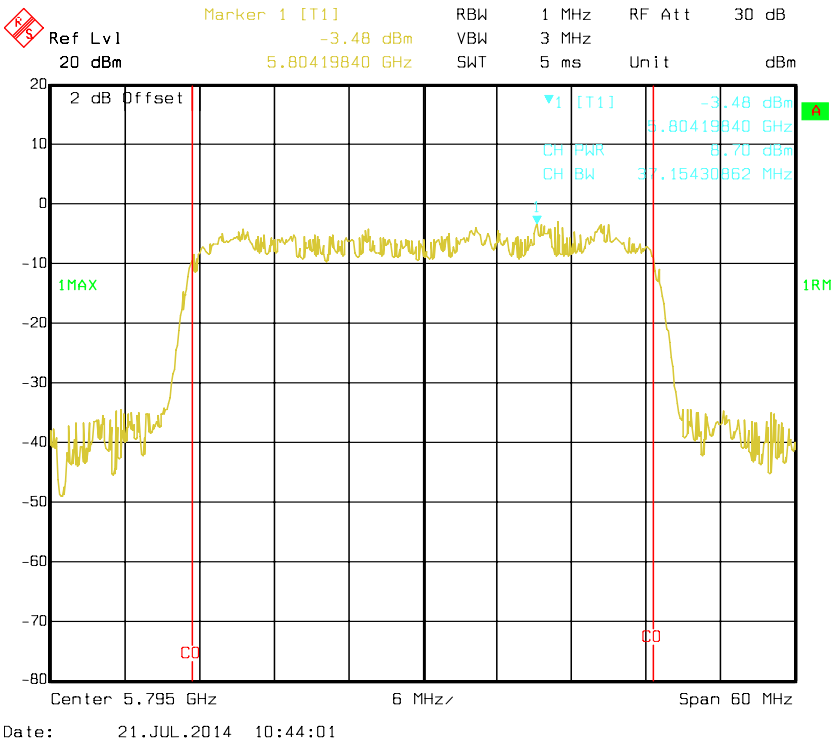
Antenna 1: RF Output Power, 5795 MHz



Antenna 2: RF Output Power, 5755 MHz



Antenna 2: RF Output Power, 5795 MHz



FCC §15.407(a) (1) (3) (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 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

The maximum power spectral density 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. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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	Spectrum Analyzer	FSL18	100180	2013-07-31	2014-07-30

*** Statement of Traceability:** BACL (Chengdu) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27 °C & 28 °C
Relative Humidity:	57 % & 56 %
ATM Pressure:	100.9 kPa & 100.5 kPa

The testing was performed by Toby Ren on 2014-07-17 & 2014-07-21.

Test Mode: Transmitting

Test Result: Pass

5150-5250 MHz:

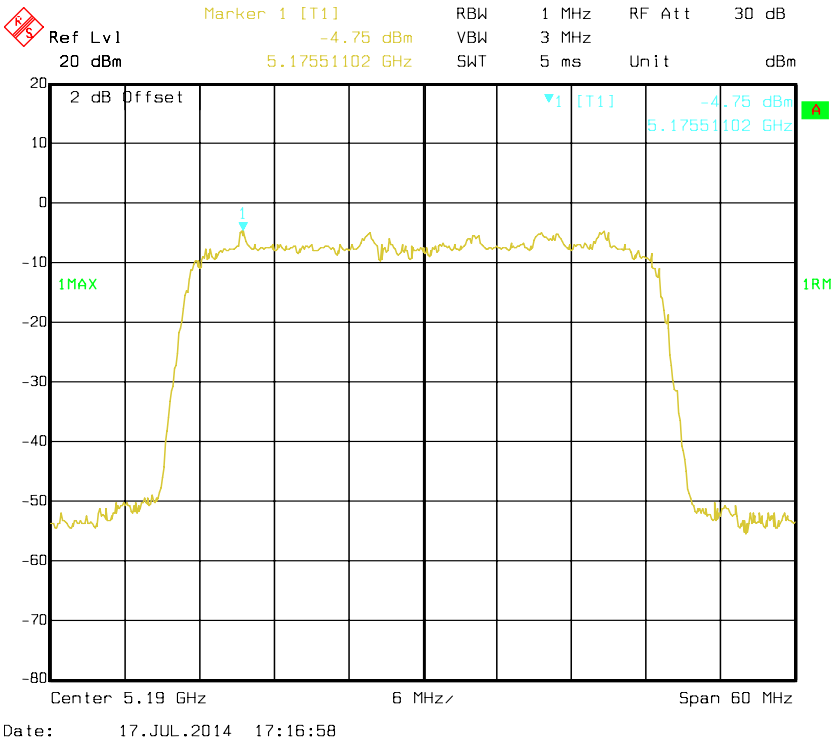
Frequency (MHz)	Power Spectral Density (dBm)			Limit (dBm)	Result
	Antenna 1	Antenna 2	Antenna 1 + Antenna 2		
5190	-4.75	-5.30	-2.01	17	Pass
5230	-4.84	-4.72	-1.77	17	Pass

5725-5825 MHz:

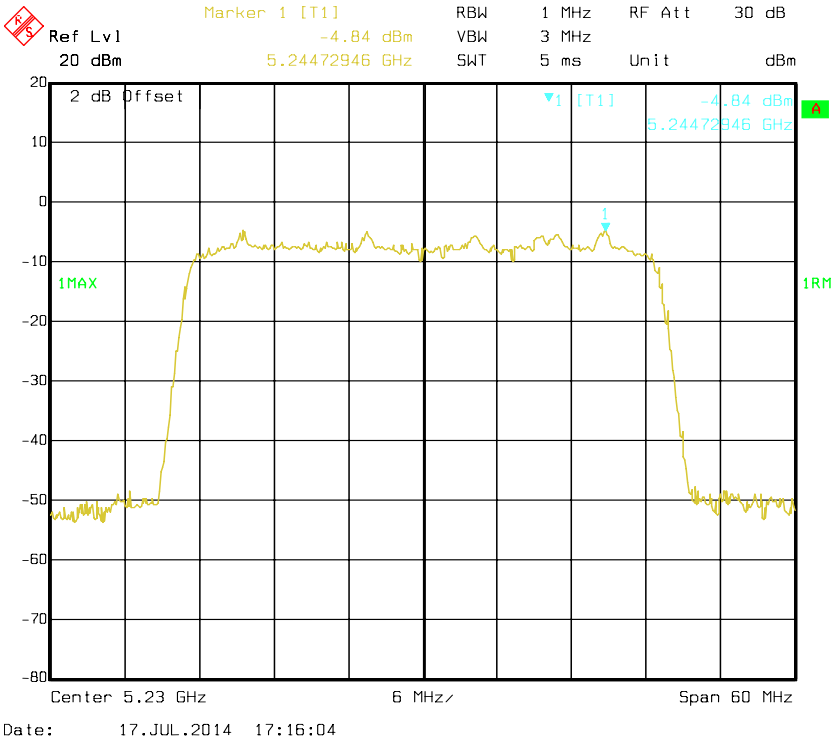
Frequency (MHz)	Power Spectral Density (dBm)			Limit (dBm)	Result
	Antenna 1	Antenna 2	Antenna 1 + Antenna 2		
5755	-5.95	-2.48	-0.87	30	Pass
5795	-4.36	-3.09	-0.67	30	Pass

5150-5250 MHz:

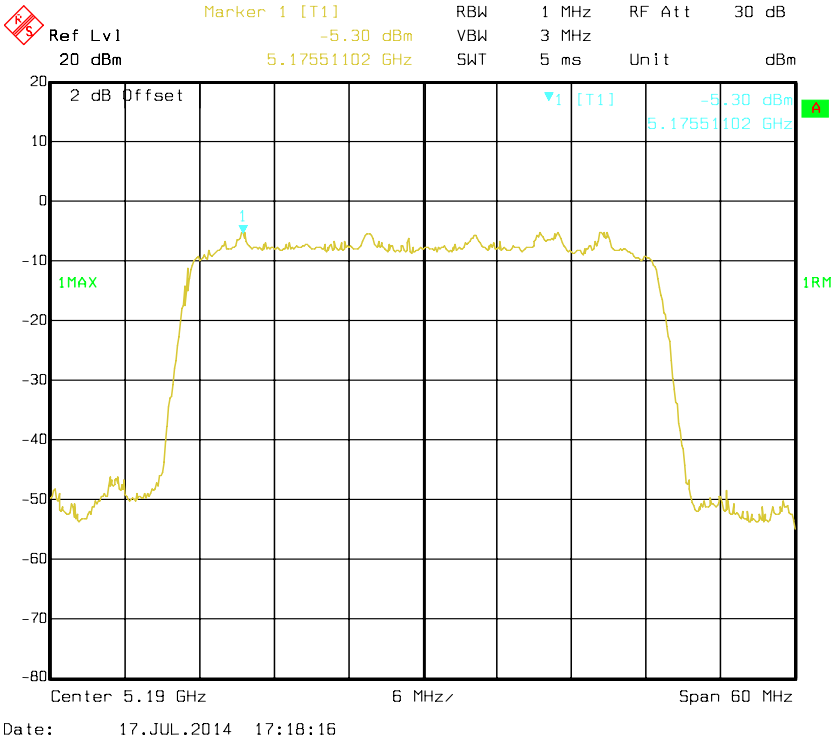
Antenna 1: Power Spectral Density, 5190 MHz



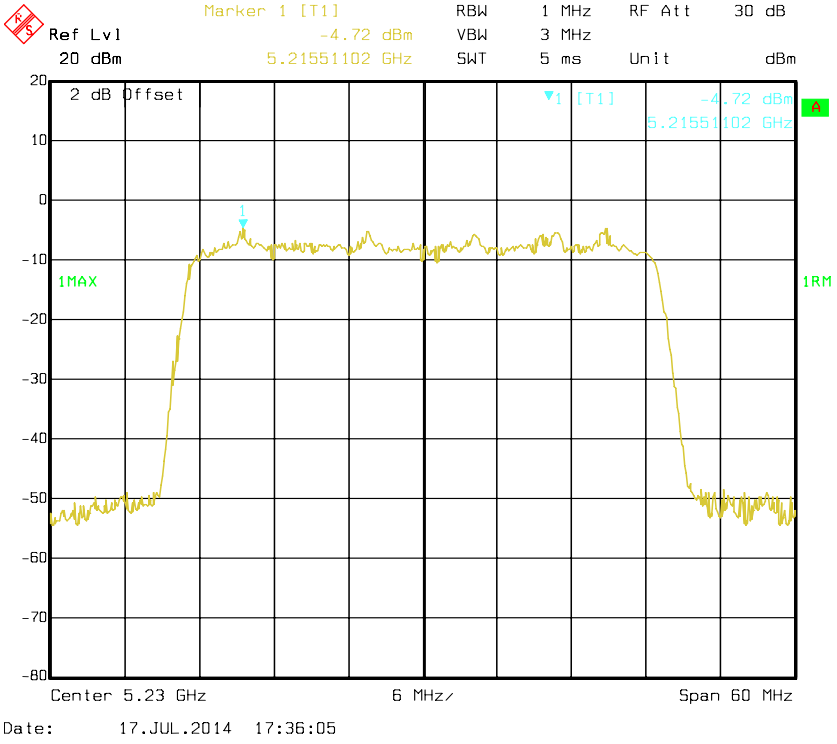
Antenna 1: Power Spectral Density, 5230 MHz



Antenna 2: Power Spectral Density, 5190 MHz

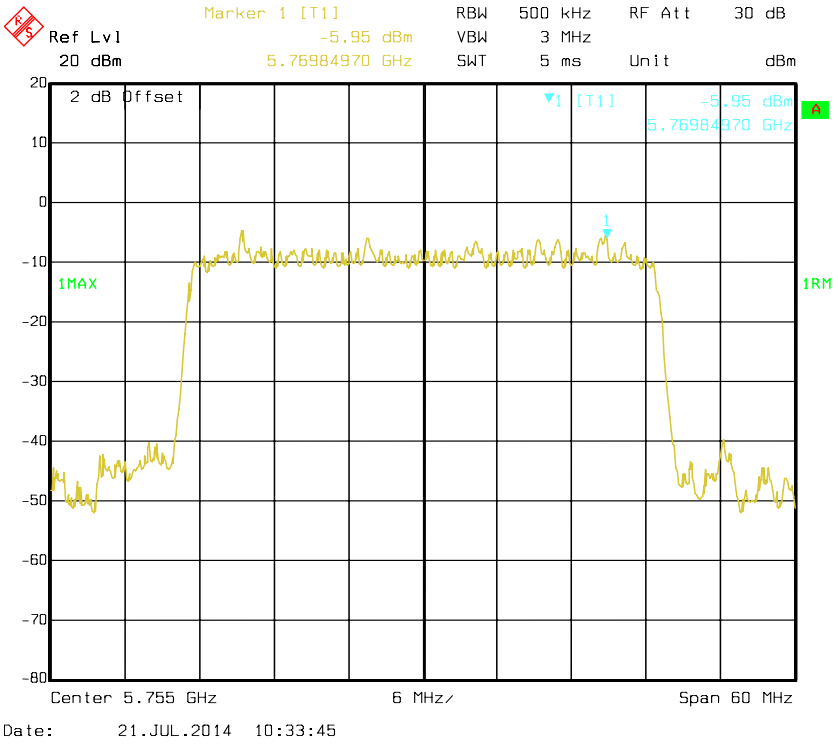


Antenna 2: Power Spectral Density, 5230 MHz



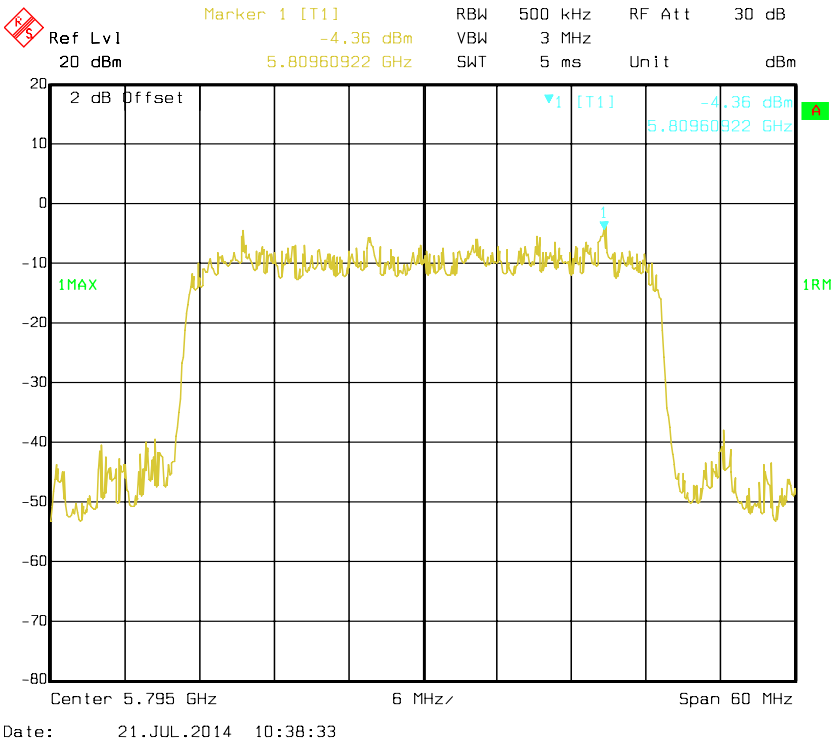
5725-5825 MHz:

Antenna 1: Power Spectral Density, 5755 MHz



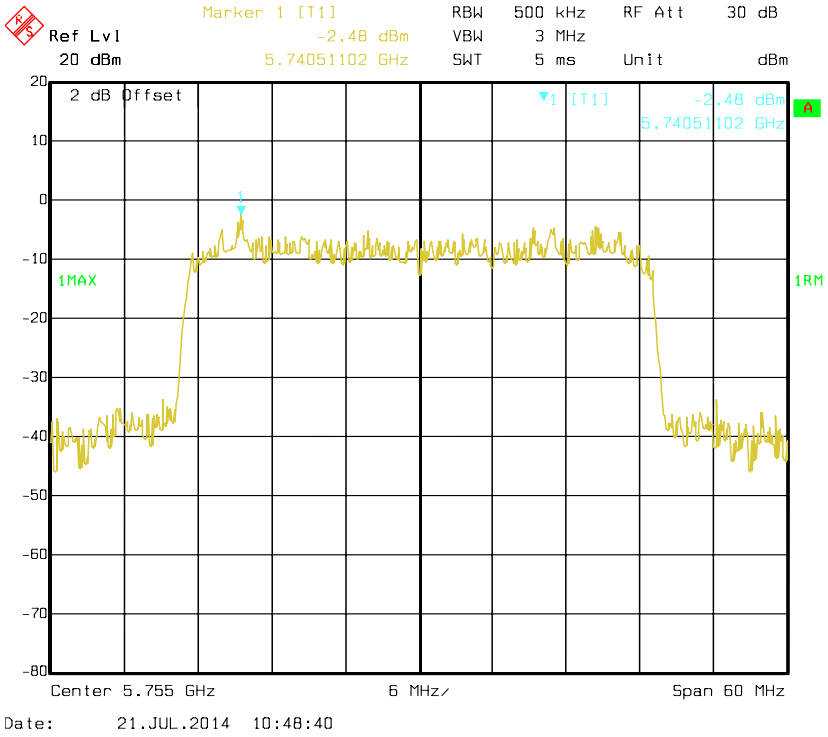
Date: 21.JUL.2014 10:33:45

Antenna 1: Power Spectral Density, 5795 MHz

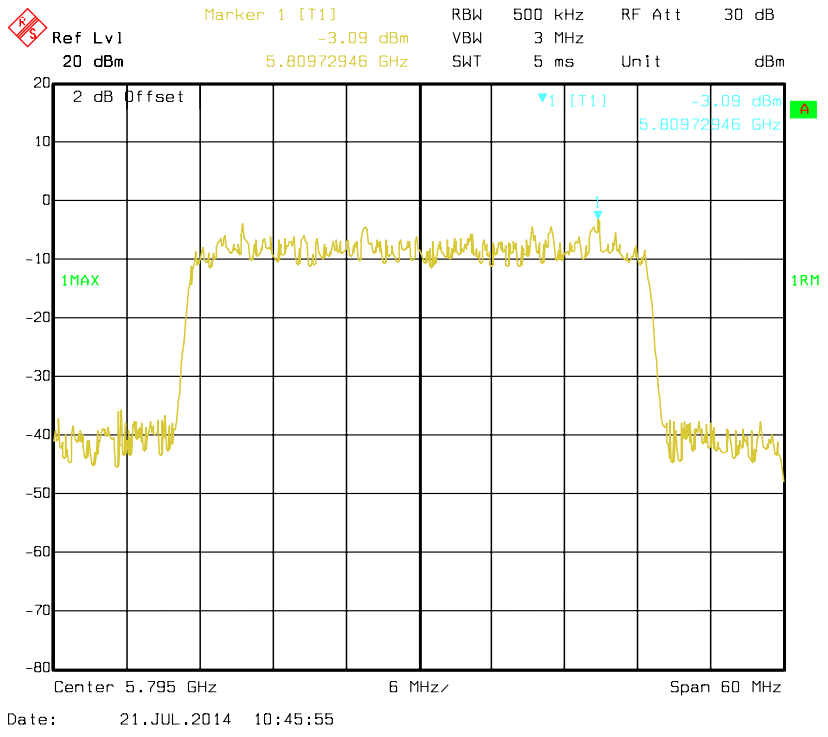


Date: 21.JUL.2014 10:38:33

Antenna 2: Power Spectral Density, 5755 MHz



Antenna 2: Power Spectral Density, 5795 MHz



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