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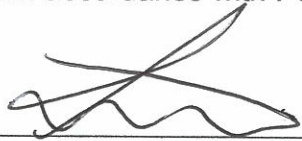
FCC CFR47 PART 24 SUBPART CERTIFICATION TEST DATA

Model Tested: SGH-E715
FCC ID (Requested): A3LSGHE715
Report No: FA-021-R1
Date issued: August 26, 2003

- Abstract -

All measurement reported herein accordance with FCC Rules, 47CFR Part2, Part24.

Prepared By



JH CHOI - Test Engineer

Date

Aug 26, 2003

Checked By



CW PARK - Manager

Date

Aug 27, 2003

Authorized By



JK CHOI - Senior Manager

Date

Aug 29, 2003

Test Equipment

Name of Equipment	Model	Serial No.	Due Date
Spectrum Analyzer	FSIQ26	100009/027	2004-08-19
	E4440A(3Hz~26.5GHz)	MY41000236	2003-11-25
	E4440A(3Hz~26.5GHz)	MY41000233	2003-11-25
Signal Generator	SMIQ03B(300KHz~3.3GHz)	83824/021	2004-01-20
	SMR20(1GHz~20GHz)	835197/030	2004-01-20
Power Meter	E4419B	GB41293846	2003-11-26
Power Sensor	8481B(1mW~25W)	3318A10325	2003-09-26
	8485A(1uW~100mW)	3318A19924	2003-09-26
Amplifier	5S1G4(0.8~4.2GHz, 5W)	304866	2003-11-26
Pre-Amplifier	8449B(1~26.5GHz, 30dB)	3008A00691	2004-01-21
Communication test set	8960	GB42230535	2003-12-02
	8960	GB42360886	2004-01-09
Antenna Master	MA0001	ANT0967	Not Required
Controller	HD100	100/756	Not Required
Environmental Chamber	SH-241	92000548	2003-12-12
	SH-241	92000549	2003-12-12
Horn Antenna	HF906(1GHz~18GHz)	360306/011	2004-02-10
	HF906(1GHz~18GHz)	100134	2004-03-31
Dipole Antenna	3121C-DB4	9007-587	2003-11-08
	3121C-DB4	9007-588	2004-03-21
Receive Antenna	HO040	353255/020	2004-04-08
Attenuator	8494A(0~11dB)	3308A31997	2004-01-20
	8496A(0~110dB)	3308A14426	2004-01-20
Directional Coupler	4278-311-2(0.1~1GHz)	B3679637	2004-01-22
	4278-111-2(1~2GHz)	B103DC8722	2004-01-22
High Pass Filter	WHK1.0/15G-10SS(1~15GHz)	1	Not Required
	WHV1.0/15G-10SS(1~15GHz)	1	Not Required
	WHK/3.5/18G-10SS(3.5~18GHz)	3	Not Required
	WHK/3.5/18G-10SS(3.5~18GHz)	4	Not Required
Shielded Semi-Anechoic Chamber	RF0002	ANT0001	2004-01-21

FCC ID : A3LSGHE715

Equivalent Isotropic Radiated Power (E.I.R.P.)

Supply Voltage: 3.7 VDC

Modulation: PCS GSM

■ Reference level

Frequency (MHz)	Output (dBm)	Polarization	S/A (dBm)	Ant gain (dBi)	Ref level (dBm)
1880.00	27.00	H	-12.56	8.18	-20.74
		V	-12.76	8.18	-20.94

■ Result

Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Azimuth (angle)	EIRP (dBm)	EIRP (W)	Battery
1850.20	-15.22	V	310	32.52	1.786	Standard
1880.00	-15.10	V	311	32.64	1.837	Standard
1909.80	-15.57	V	309	32.17	1.648	Standard

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

□

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The □ receive antenna height and turntable rotation was adjusted for the highest reading on □ the receive spectrum analyzer. A Horn antenna was substituted in place of the EUT. □ This Horn antenna was driven by a signal generator and the level of the signal □ generator was adjusted to obtain the same receive spectrum analyzer reading. The □ conducted power at the terminals of the Horn antenna is measured. The difference □ between the gain of the horn and an isotropic antenna is taken into consideration and □ the EIRP is recorded.

FCC ID : A3LSGHE715

Field Stength of SPURIOUS Radiation

Operating Frequency : 1850.2 MHz

Measured Output Power : 32.64 dBm = 1.837 W

Modulation Signal : PCS GSM

Limit : $43+10\log_{10}(W)$ = 45.64 dBc

■ Result

Channel	Harmonic	Frequency (MHz)	From EUT Tested level (dBm)	POL (H/V)	Result (dBc)
512	2	3700.40	-45.84	H2	55.52
	3	5550.60	-58.00	H2	62.59
	4	7400.80	-52.42	H2	52.79
	5	9251.00	-58.10	H2	54.17
	6	11101.20	-58.56	H1	50.82
	7	12951.40	-60.04	H2	49.74
	8	14801.60	-69.22	V	52.87
661	2	3760.00	-43.84	H2	53.14
	3	5640.00	-57.58	H2	62.38
	4	7520.00	-53.08	H2	53.85
	5	9400.00	-56.86	H2	53.04
	6	11280.00	-55.78	H2	48.22
	7	13160.00	-59.10	H2	47.76
	8	15040.00	-71.05	V	57.18
810	2	3819.60	-44.44	H2	54.08
	3	5729.40	-55.82	H2	61.09
	4	7639.20	-51.02	H2	51.82
	5	9549.00	-55.44	H2	51.13
	6	11458.80	-57.53	H2	48.10
	7	13368.60	-59.84	H2	47.98
	8	15278.40	-	-	-

Radiated Spurious & Harmonic Conversion Table

FCC ID : A3LSGHE715 Mode : GSM1900 EIRP : 32.64

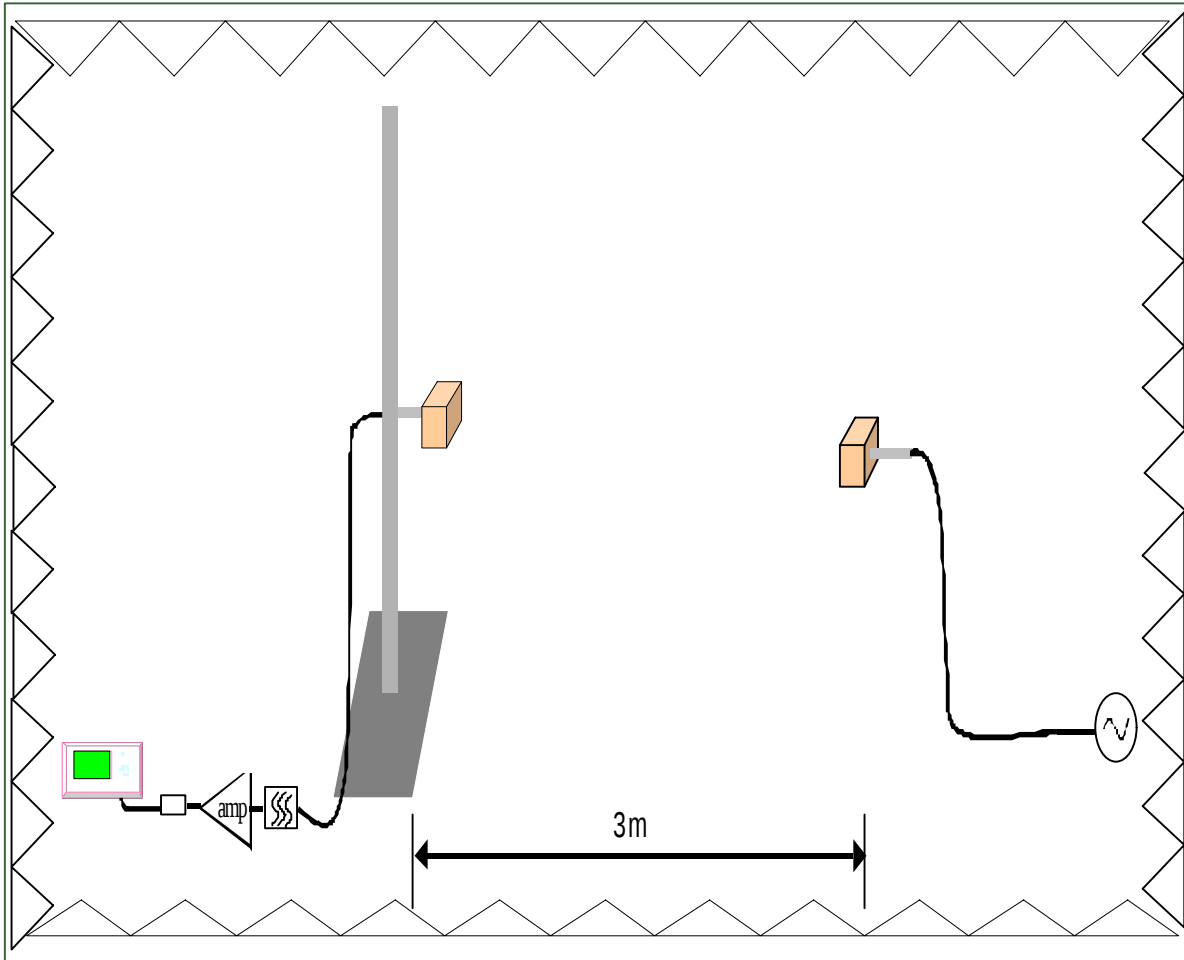
Date ; 2003 . 08 . 20 .

Test Engineer : E.H. Jung & J.H. Choi

Tx Cable loss
 Tx Horn Ant Gain
 Rx Cable loss + HPF Insertion loss + Attenuator
 Pre-Amp gain
 Air loss
 Tested Level from EUT
 = + + -
 = EIRP -

CH	Har	Frequency (MHz)	Tx CL (dB)	Horn Gain (dB)	Tx Level @ (S/G 10dBm)	Tested Level EUT : H (dBm)	Tested Level EUT : V (dBm)	Amplitude of Emission EUT : H (dBm)	Amplitude of Emission EUT : V (dBm)	Result EUT : H (dBc)	Result EUT : V (dBc)
512	2	3700.40	11.14	8.87	7.73	-45.84	-50.33	-22.88	-27.19	55.52	59.83
	3	5550.60	13.91	10.60	6.69	-58.00	-63.41	-29.95	-35.55	62.59	68.19
	4	7400.80	16.68	10.83	4.15	-52.42	-51.69	-20.15	-20.58	52.79	53.22
	5	9251.00	19.37	11.56	2.19	-58.10	-59.94	-21.53	-24.12	54.17	56.76
	6	11101.20	22.51	12.79	0.28	-58.56	-61.22	-18.18	-21.19	50.82	53.83
	7	12951.40	22.99	12.66	-0.33	-60.04	-61.04	-17.10	-17.93	49.74	50.57
	8	14801.60	24.52	12.69	-1.83	-	-69.22	-	-20.23	-	52.87
661	2	3760.00	11.13	8.98	7.85	-43.84	-49.28	-20.50	-25.85	53.14	58.49
	3	5640.00	14.10	10.60	6.50	-57.58	-58.54	-29.74	-30.95	62.38	63.59
	4	7520.00	17.05	10.83	3.78	-53.08	-53.82	-21.21	-22.90	53.85	55.54
	5	9400.00	19.61	11.60	1.99	-56.86	-57.58	-20.40	-21.96	53.04	54.60
	6	11280.00	22.92	12.93	0.01	-55.78	-57.99	-15.58	-18.02	48.22	50.66
	7	13160.00	23.62	12.64	-0.98	-59.10	-60.56	-15.12	-15.91	47.76	48.55
	8	15040.00	25.04	12.70	-2.34	-	-71.05	-	-24.54	-	57.18
810	2	3819.60	11.28	8.98	7.70	-44.44	-51.07	-21.44	-27.48	54.08	60.12
	3	5729.40	14.12	10.73	6.61	-55.82	-59.03	-28.45	-31.13	61.09	63.77
	4	7639.20	17.47	10.87	3.40	-51.02	-51.01	-19.18	-19.90	51.82	52.54
	5	9549.00	19.92	11.67	1.75	-55.44	-57.19	-18.49	-20.61	51.13	53.25
	6	11458.80	21.77	12.90	1.13	-57.53	-58.22	-15.46	-16.52	48.10	49.16
	7	13368.60	23.26	12.65	-0.61	-59.84	-59.77	-15.34	-15.35	47.98	47.99
	8	15278.40	25.17	12.73	-2.44	-	-	-	-	-	-

Radiated Spurious & Harmonic Configuration for Calibration



Tx Cable loss
Horn Ant Gain
Rx Cable loss + HPF Insertion loss + Attenuator
Pre-Amp gain
Air loss

FCC ID : A3LSGHE715

Frequency Stability (PCS GSM)

Operating Frequency : 1,880,000,000 Hz

Channel : 661

Reference voltage : 3.7VDC

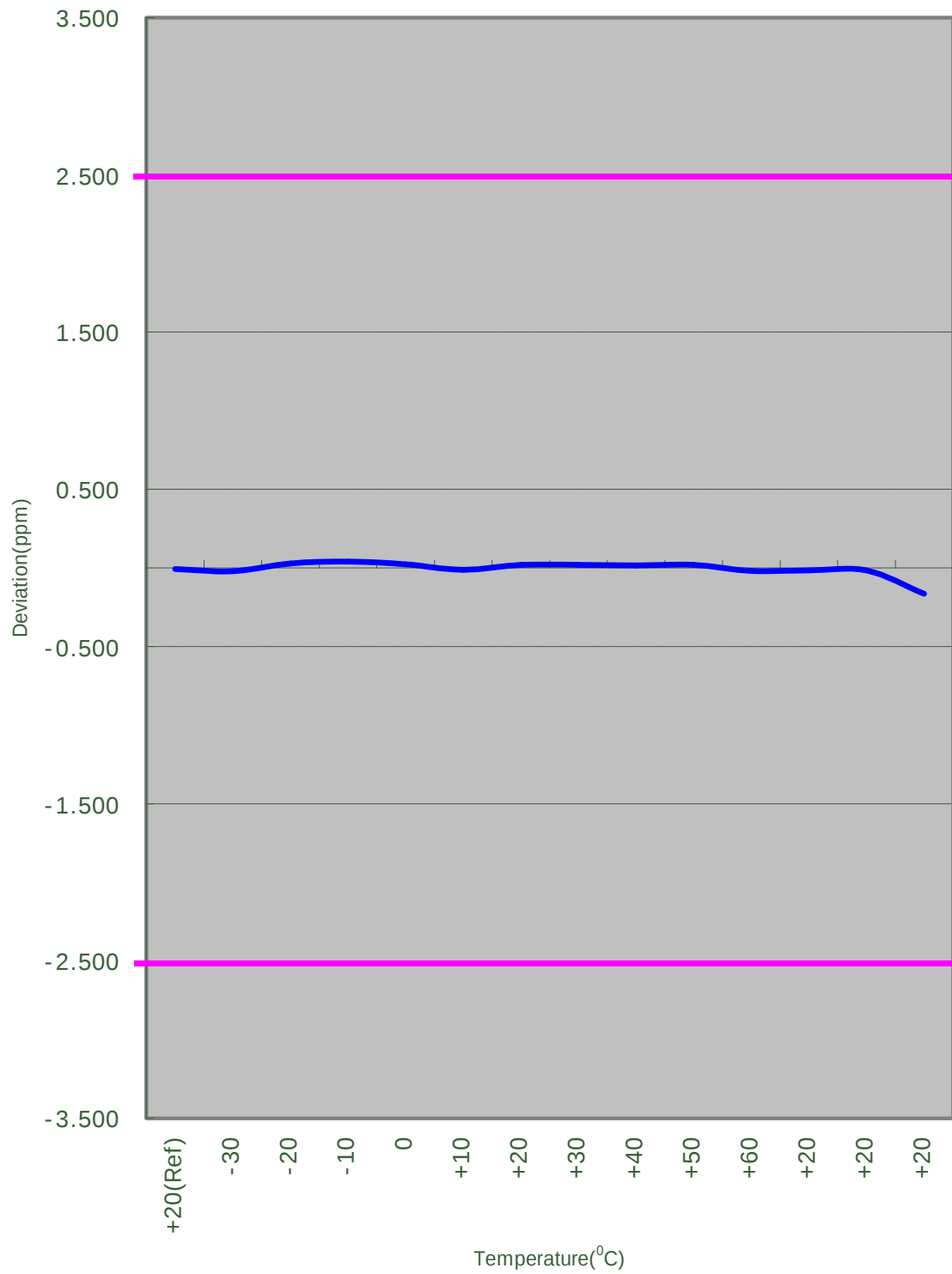
Deviation Limit : $\pm 0.00025\%$ or 2.5ppm

Voltage (%)	Power (V dc)	TEMP (OC)	Frequency error (Hz)	Frequency (Hz)	Deviation (%)	ppm
100%	3.70	+20(Ref)	-14.72	1,879,999,985	-0.000001	-0.008
100%		-30	-39.58	1,879,999,960	-0.000002	-0.021
100%		-20	51.67	1,880,000,052	0.000003	0.027
100%		-10	77.24	1,880,000,077	0.000004	0.041
100%		0	42.76	1,880,000,043	0.000002	0.023
100%		+10	-24.58	1,879,999,975	-0.000001	-0.013
100%		+20	36.24	1,880,000,036	0.000002	0.019
100%		+30	35.8	1,880,000,036	0.000002	0.019
100%		+40	28.94	1,880,000,029	0.000002	0.015
100%		+50	35.6	1,880,000,036	0.000002	0.019
100%		+60	-36.85	1,879,999,963	-0.000002	-0.020
85%	3.15	+20	-30.18	1,879,999,970	-0.000002	-0.016
115%	4.26	+20	-29.76	1,879,999,970	-0.000002	-0.016
Batt. Endpoint	3.05	+20	-308.24	1,879,999,692	-0.000016	-0.164

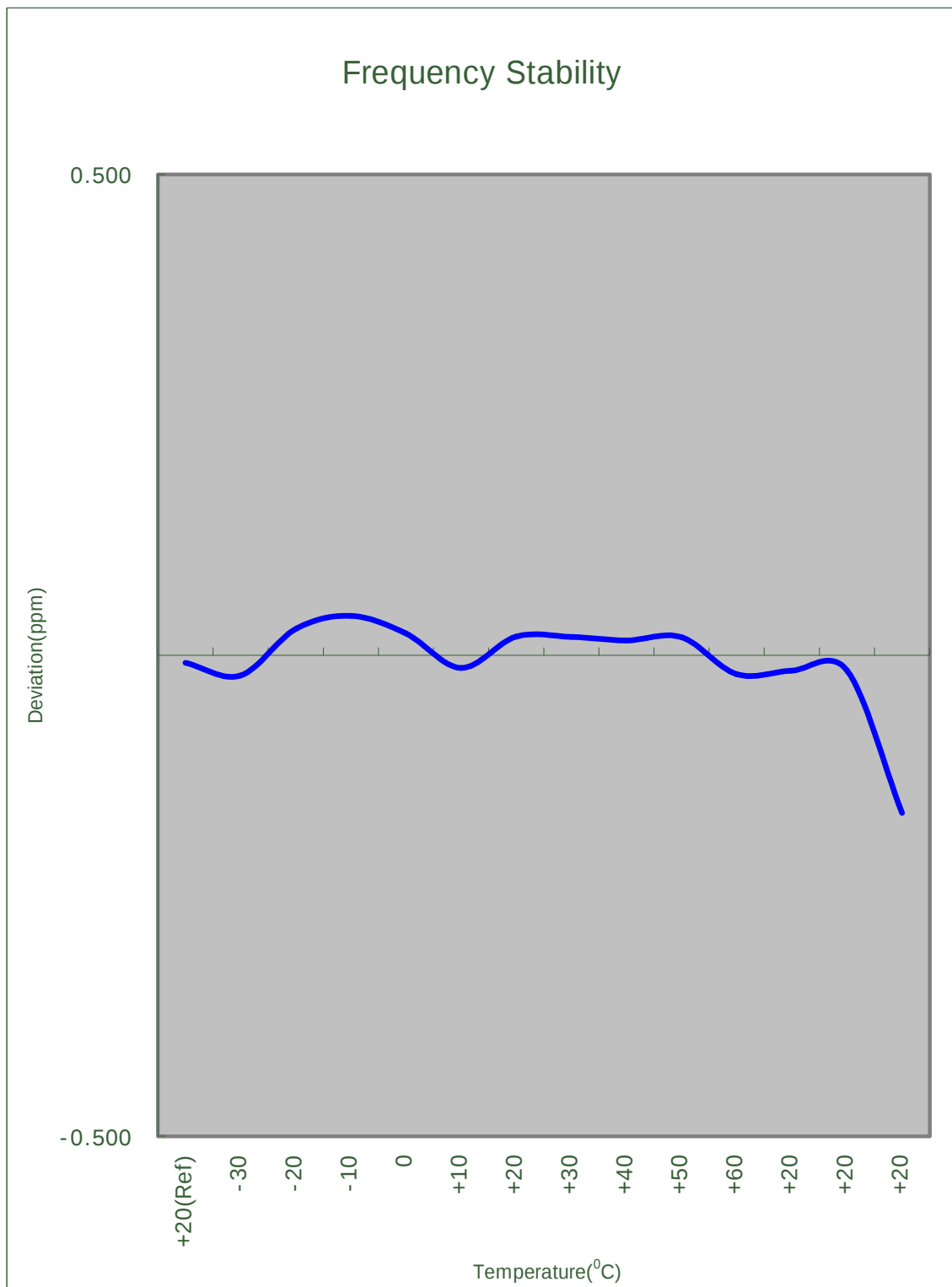
Note : The temperature is varied from -30°C to +60°C using an environmental chamber

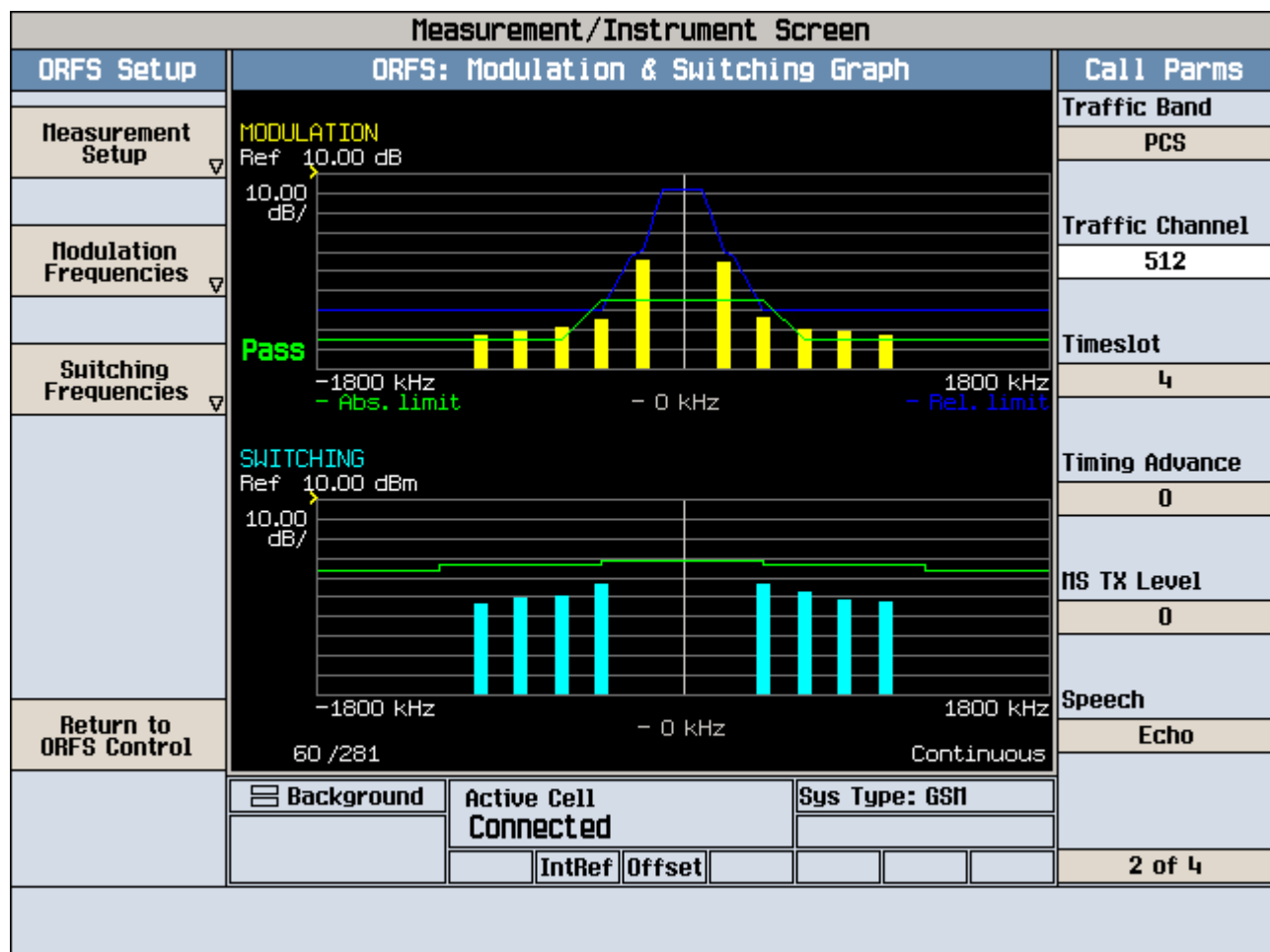
The EUT is tested down to the battery end point.

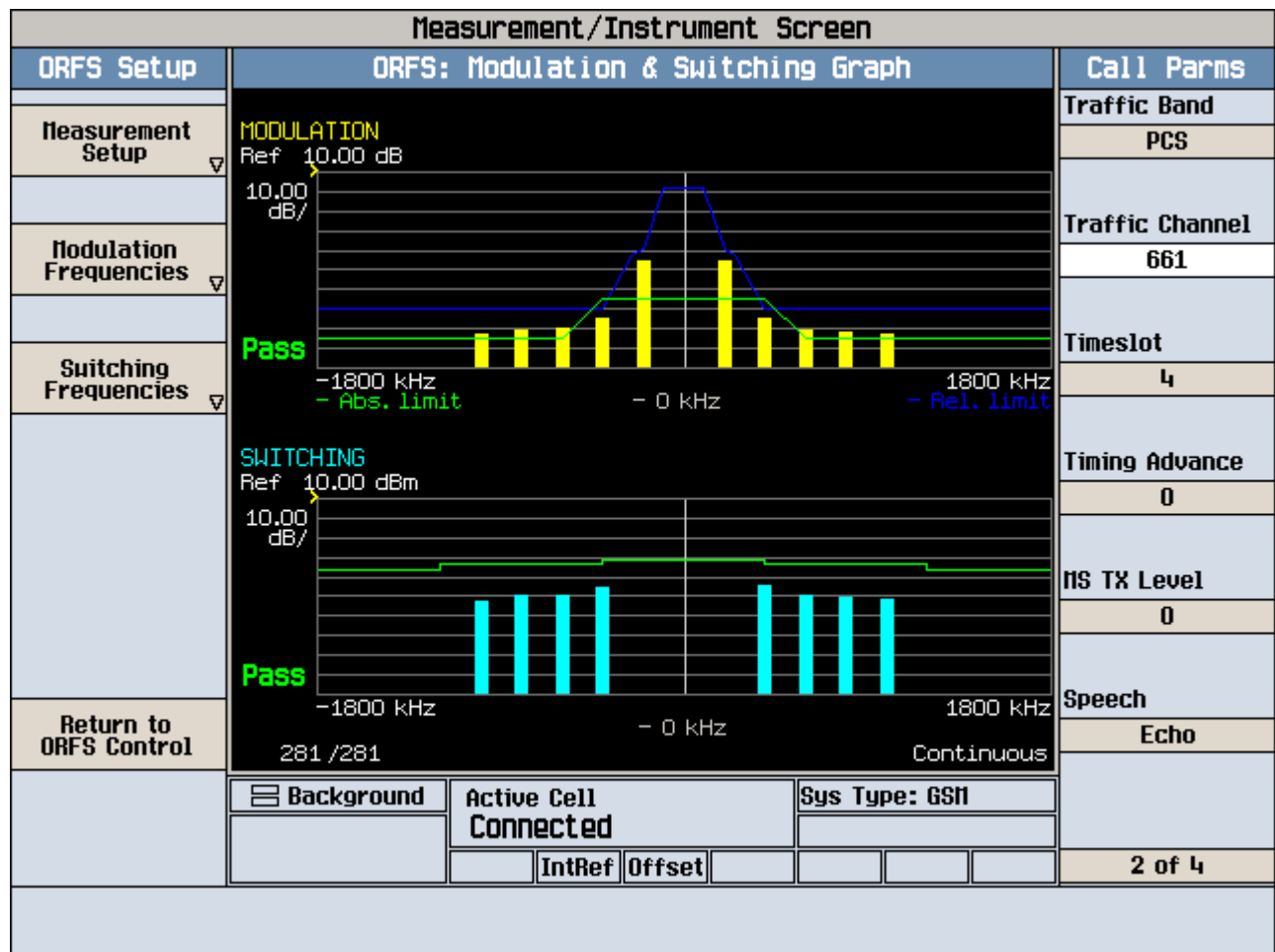
Frequency Stability

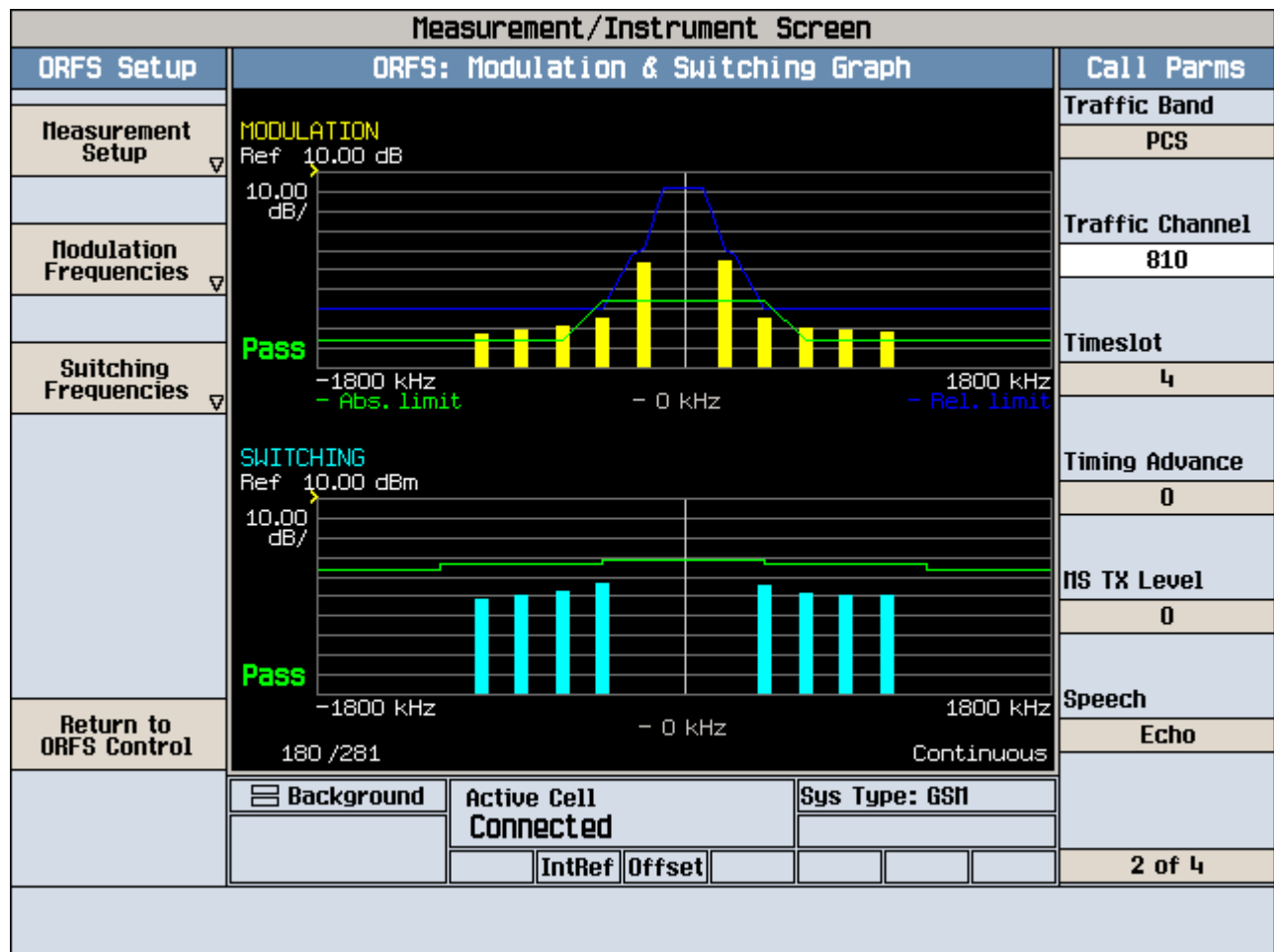


Zoom In









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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.512

Mkr1 873 MHz

Ref 30 dBm

Atten 40 dB

-32.53 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled

Center Freq

1.25500000 GHz

Start Freq

10.0000000 MHz

Stop Freq

2.50000000 GHz

CF Step

249.000000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.512

Mkr1 13.88 GHz

Ref 30 dBm

Atten 40 dB

-28.14 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

Center Freq

11.2500000 GHz

Start Freq

2.50000000 GHz

Stop Freq

20.0000000 GHz

CF Step

1.75000000 GHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 11.25 GHz

Span 17.5 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 43.76 ms (601 pts)

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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.661

Mkr1 616 MHz

Ref 30 dBm

Atten 40 dB

-32.85 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled

Center Freq

1.25500000 GHz

Start Freq

10.0000000 MHz

Stop Freq

2.50000000 GHz

CF Step

249.000000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.661

Mkr1 14.69 GHz

Ref 30 dBm

Atten 40 dB

-27.88 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

Center Freq

11.2500000 GHz

Start Freq

2.50000000 GHz

Stop Freq

20.0000000 GHz

CF Step

1.75000000 GHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 11.25 GHz

Span 17.5 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 43.76 ms (601 pts)

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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.810

Mkr1 765 MHz

Ref 30 dBm

Atten 40 dB

-33.31 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

AC Coupled

Center Freq

1.25500000 GHz

Start Freq

10.0000000 MHz

Stop Freq

2.50000000 GHz

CF Step

249.000000 MHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 1.255 GHz

Span 2.49 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 4.16 ms (601 pts)

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Freq/Channel

FCC ID:A3LSGHE715 Cond Spurs Ch.810

Mkr1 19.42 GHz

Ref 30 dBm

Atten 40 dB

-27.91 dBm

#Peak

Log

10

dB/

Offst

8.9

dB

DI

-13.0

dBm

LgAv

M1 S2

S3 FC

AA

$\mathcal{E}(f)$:

FTun

Swp

Center Freq

11.2500000 GHz

Start Freq

2.50000000 GHz

Stop Freq

20.0000000 GHz

CF Step

1.75000000 GHz

Auto

Man

Freq Offset

0.00000000 Hz

Signal Track

On

Off

Center 11.25 GHz

Span 17.5 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 43.76 ms (601 pts)

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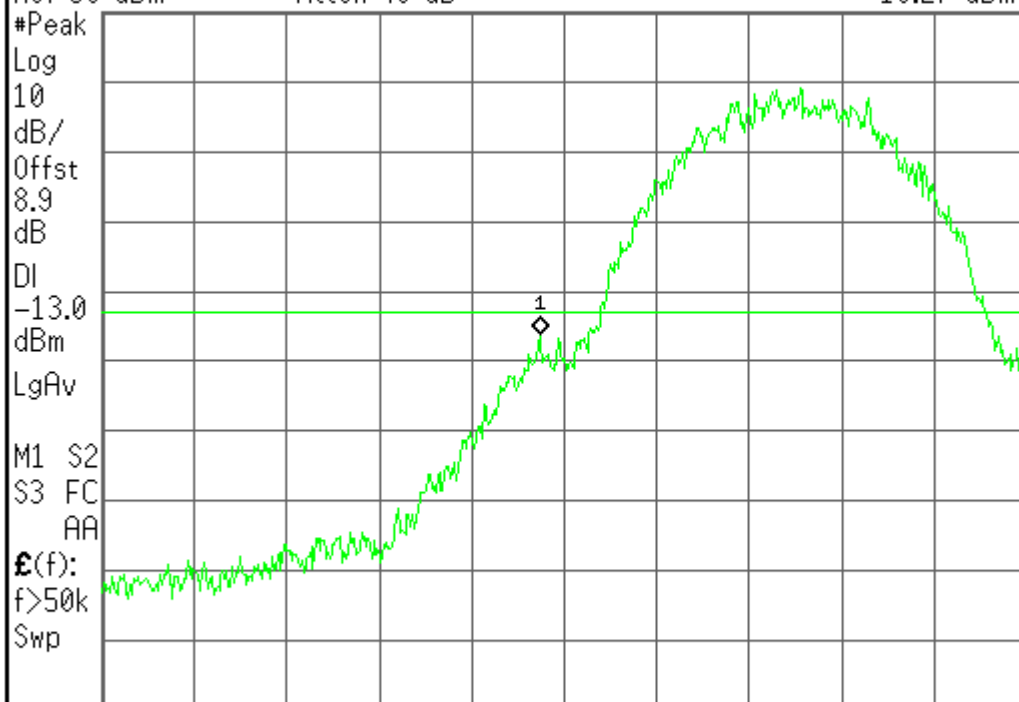
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block A Ch.512 Mkr1 1.849 978 2 GHz

Ref 30 dBm Atten 40 dB -16.27 dBm



Center 1.850 000 0 GHz Span 810 kHz

#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

Center Freq
1.85000000 GHz

Start Freq
1.84959500 GHz

Stop Freq
1.85040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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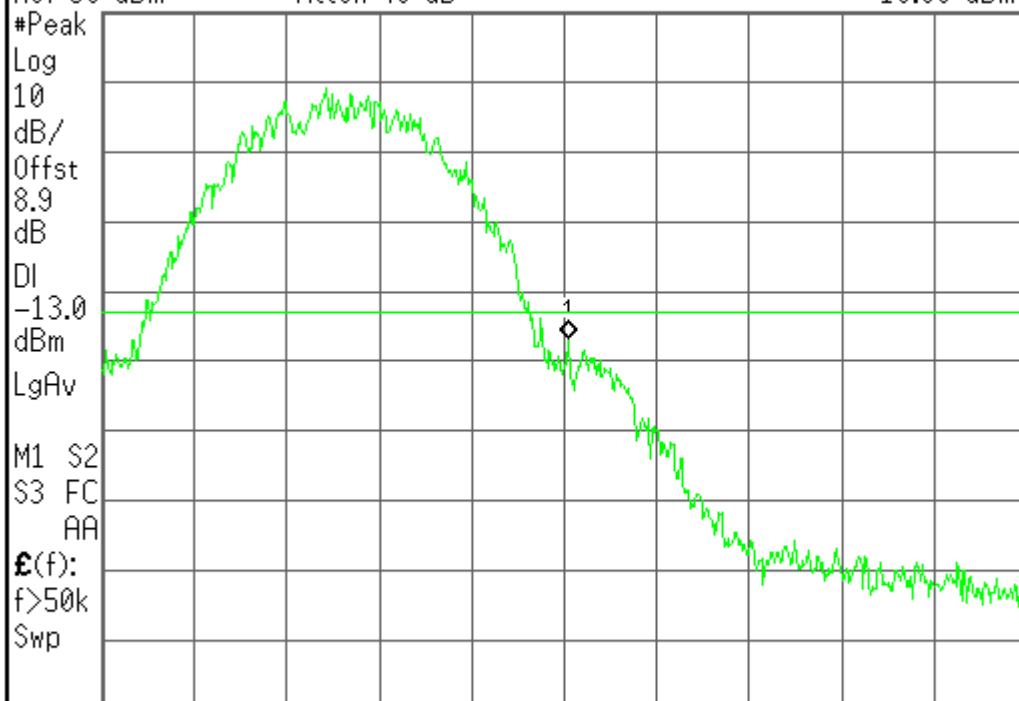
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block A Ch.585 Mkr1 1.865 004 1 GHz

Ref 30 dBm Atten 40 dB -16.60 dBm



Center 1.865 000 0 GHz Span 810 kHz

#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

Center Freq
1.86500000 GHz

Start Freq
1.86459500 GHz

Stop Freq
1.86540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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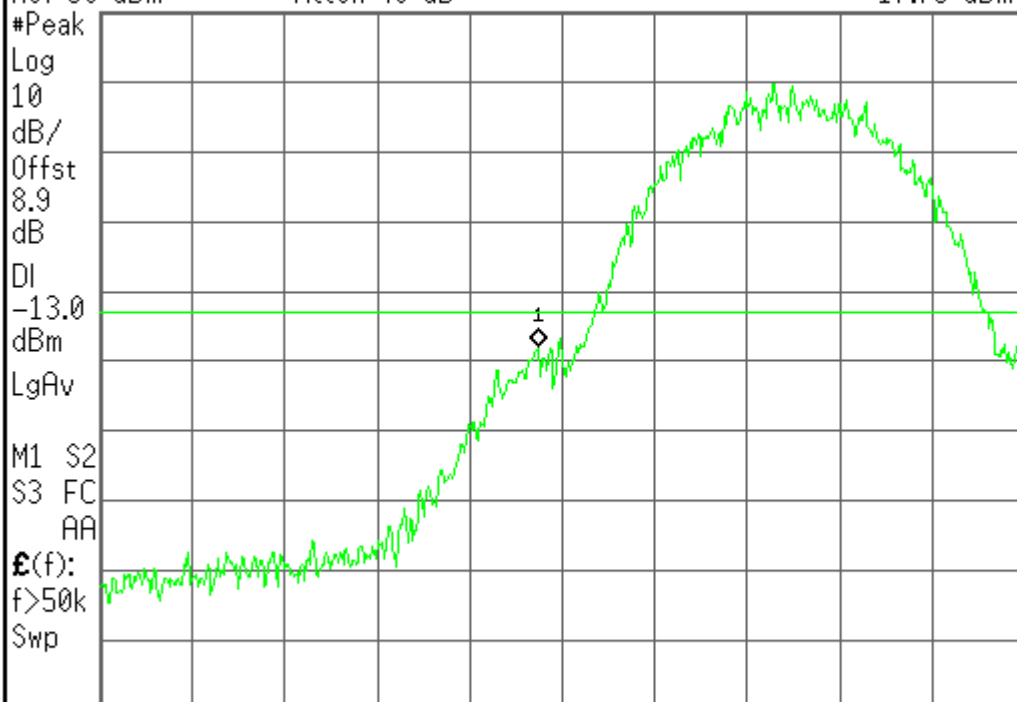
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block B Ch.612 Mkr1 1.869 979 5 GHz

Ref 30 dBm Atten 40 dB -17.73 dBm



Center Freq
1.87000000 GHz

Start Freq
1.86959500 GHz

Stop Freq
1.87040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.870 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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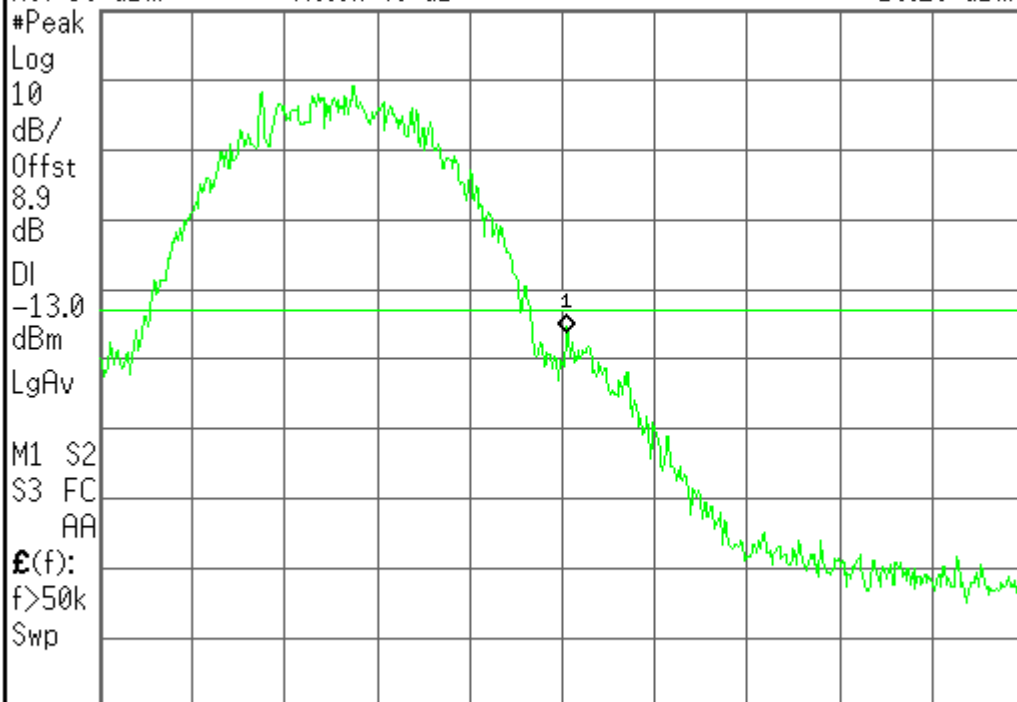
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block B Ch.685 Mkr1 1.885 002 7 GHz

Ref 30 dBm Atten 40 dB -16.28 dBm



Center Freq
1.88500000 GHz

Start Freq
1.88459500 GHz

Stop Freq
1.88540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.885 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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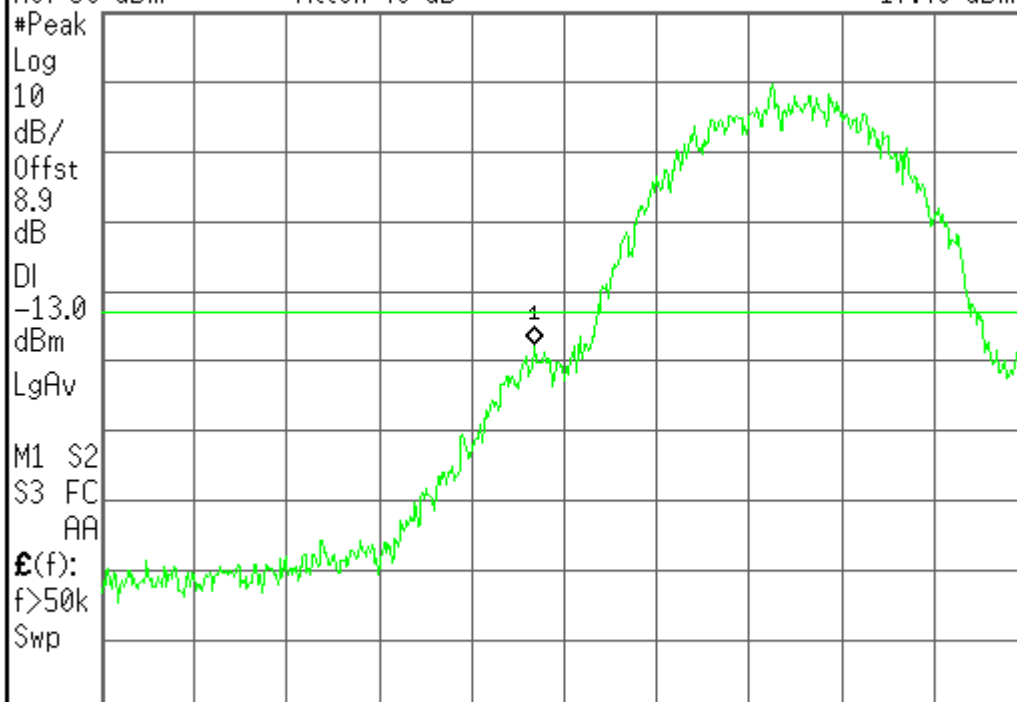
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block C Ch.737 Mkr1 1.894 972 7 GHz

Ref 30 dBm Atten 40 dB -17.49 dBm



Center Freq
1.89500000 GHz

Start Freq
1.89459500 GHz

Stop Freq
1.89540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.895 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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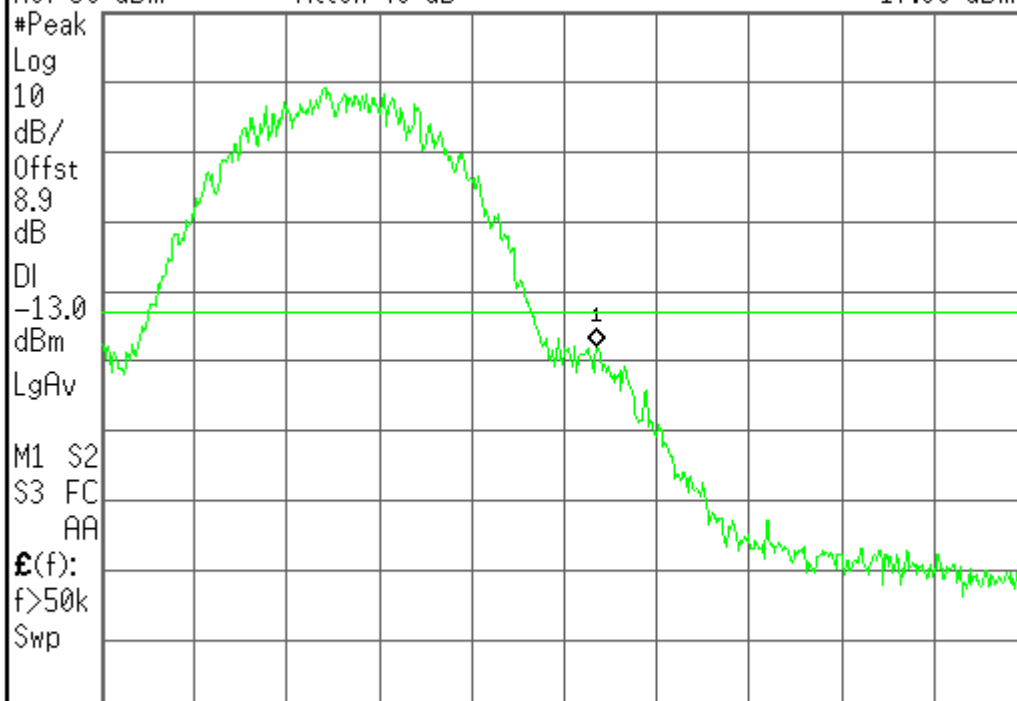
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block C Ch.810 Mkr1 1.910 028 6 GHz

Ref 30 dBm Atten 40 dB -17.98 dBm



Center Freq
1.91000000 GHz

Start Freq
1.90959500 GHz

Stop Freq
1.91040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.910 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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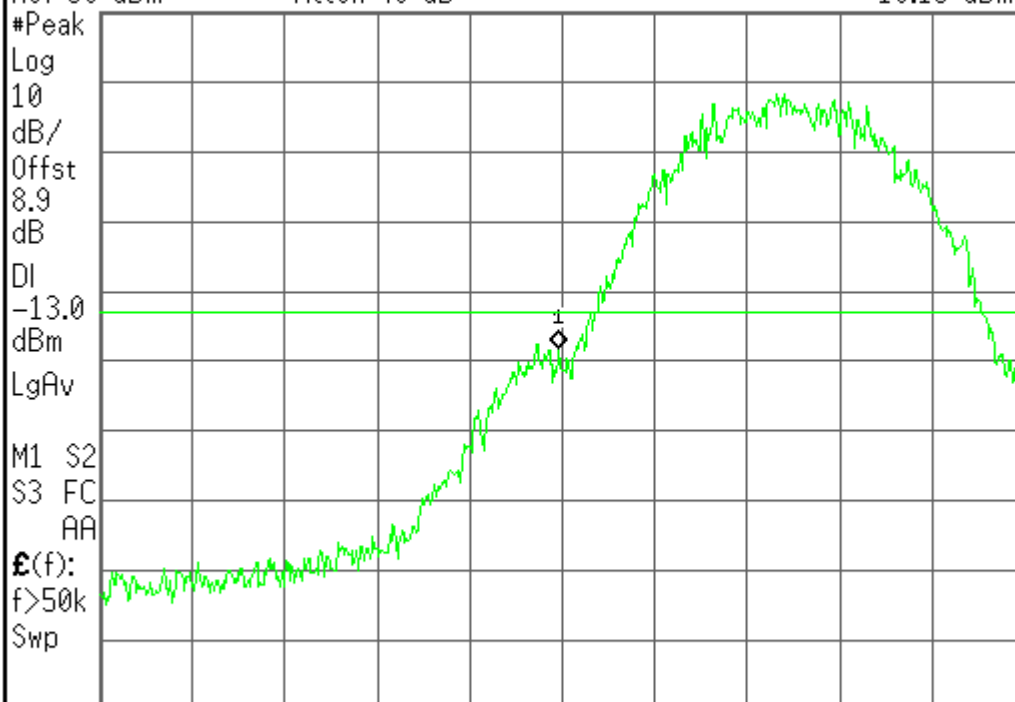
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block D Ch.587 Mkr1 1.864 997 3 GHz

Ref 30 dBm Atten 40 dB -18.13 dBm



Center Freq
1.86500000 GHz

Start Freq
1.86459500 GHz

Stop Freq
1.86540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.865 000 0 GHz Span 810 kHz
#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

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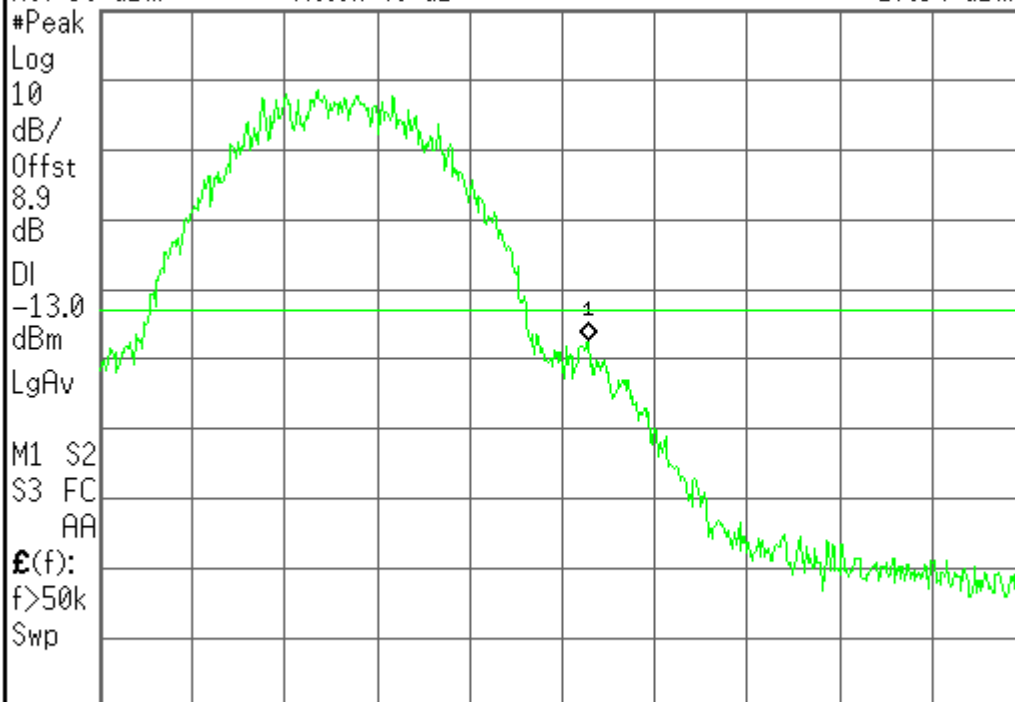
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Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block D Ch.610 Mkr1 1.870 023 2 GHz

Ref 30 dBm Atten 40 dB -17.34 dBm



Center Freq
1.87000000 GHz

Start Freq
1.86959500 GHz

Stop Freq
1.87040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.870 000 0 GHz Span 810 kHz
#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

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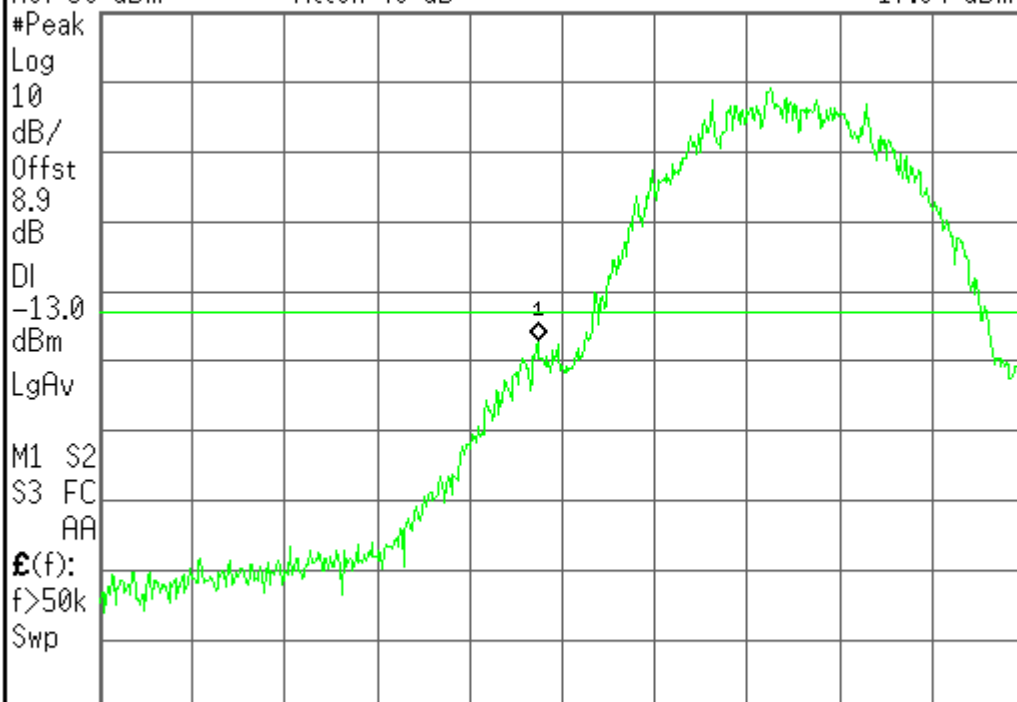
Agilent

L

Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block E Ch.687 Mkr1 1.884 978 2 GHz

Ref 30 dBm Atten 40 dB -17.04 dBm



Center Freq
1.88500000 GHz

Start Freq
1.88459500 GHz

Stop Freq
1.88540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.885 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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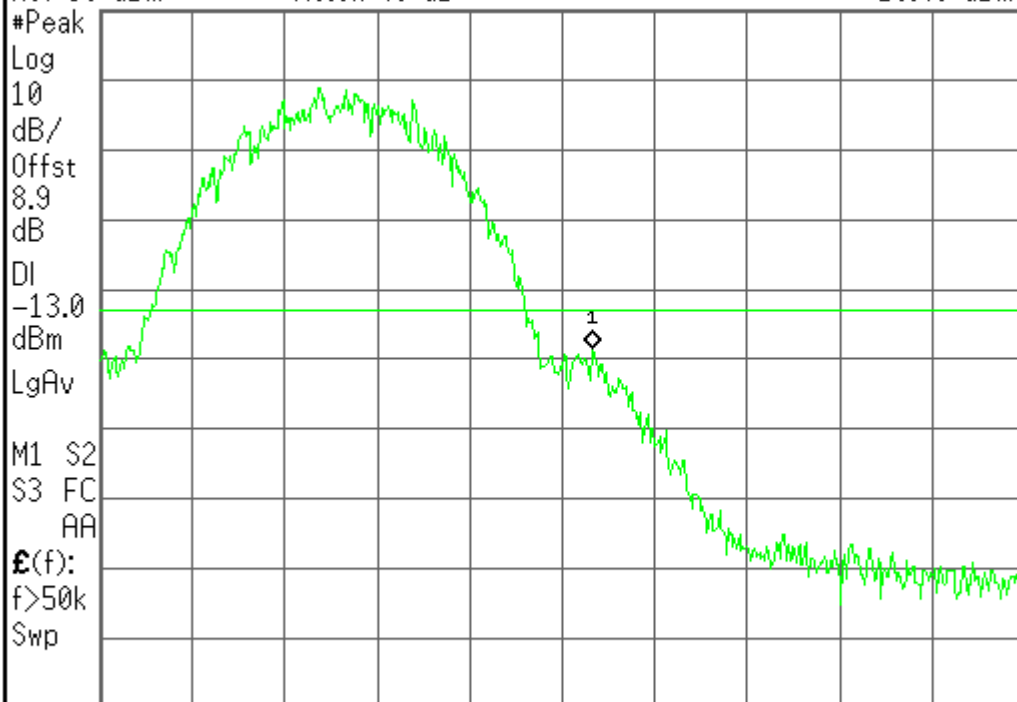
Agilent

L

Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block E Ch.710 Mkr1 1.890 027 3 GHz

Ref 30 dBm Atten 40 dB -18.40 dBm



Center Freq
1.89000000 GHz

Start Freq
1.88959500 GHz

Stop Freq
1.89040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Center 1.890 000 0 GHz Span 810 kHz

*Res BW 3 kHz *VBW 3 kHz Sweep 108.5 ms (601 pts)

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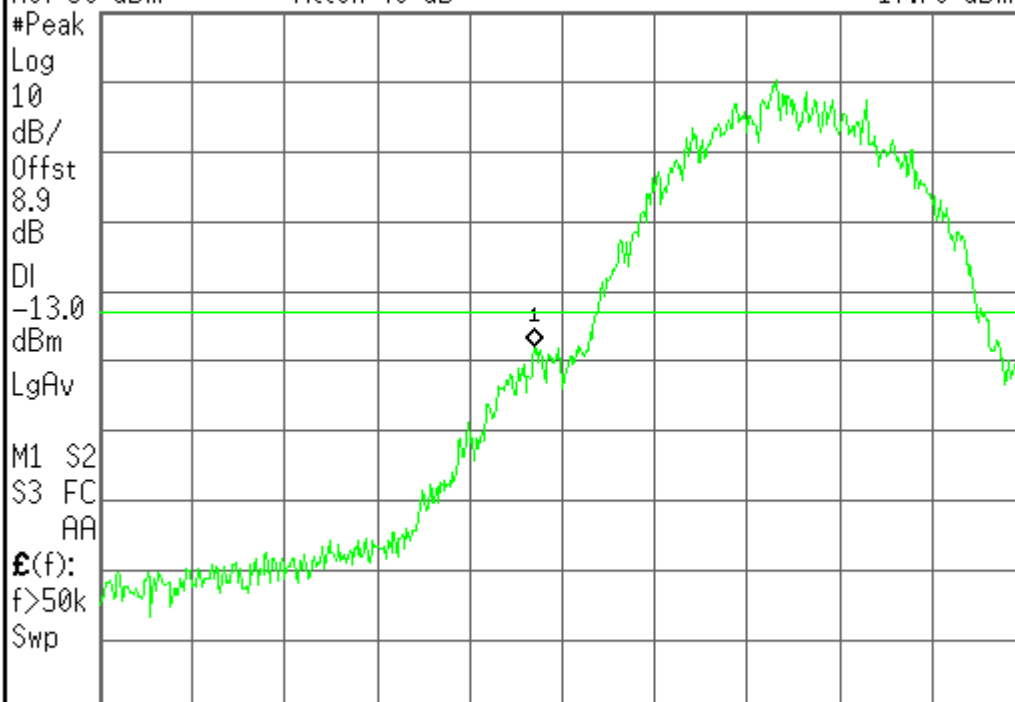
Agilent

L

Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block F Ch.712 Mkr1 1.889 975 4 GHz

Ref 30 dBm Atten 40 dB -17.76 dBm



Center 1.890 000 0 GHz Span 810 kHz

#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

Center Freq
1.89000000 GHz

Start Freq
1.88959500 GHz

Stop Freq
1.89040500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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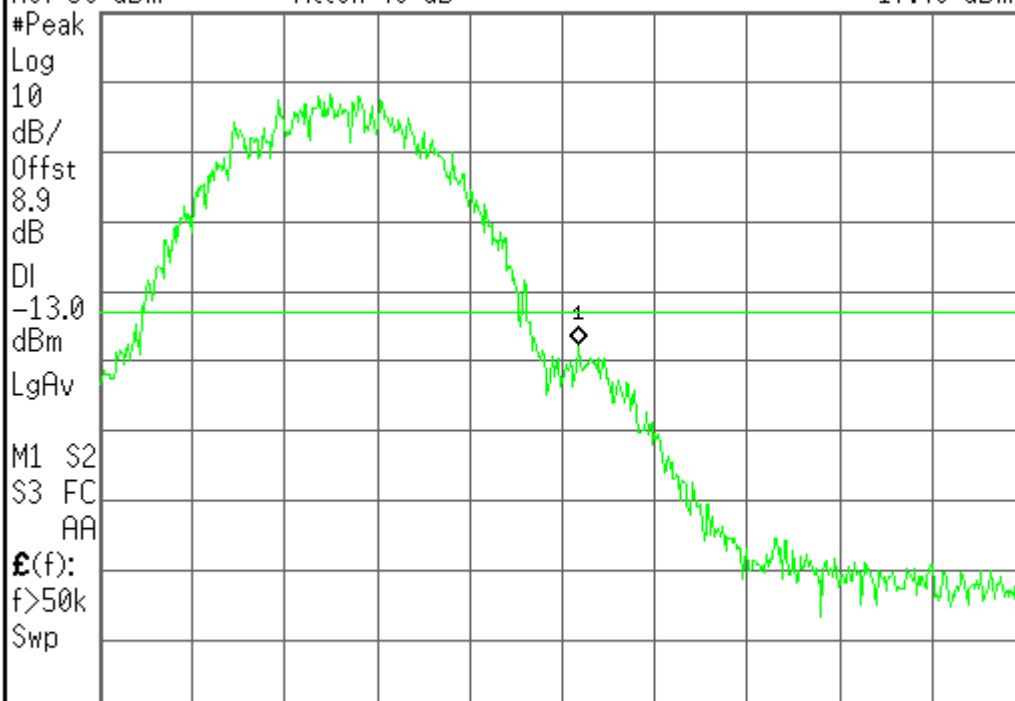
Agilent

L

Freq/Channel

FCC ID:A3LSGHE715 Band Edge Block F Ch.735 Mkr1 1.895 013 6 GHz

Ref 30 dBm Atten 40 dB -17.46 dBm



Center 1.895 000 0 GHz Span 810 kHz

#Res BW 3 kHz #VBW 3 kHz Sweep 108.5 ms (601 pts)

Center Freq
1.89500000 GHz

Start Freq
1.89459500 GHz

Stop Freq
1.89540500 GHz

CF Step
81.00000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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