

Conducted emission (AC Mains)

During Preliminary Tests, the following operating mode were investigated

Channel / Frequency	Mode State	The worst operating condition
-	Charging	
1 (2.4048GHz)	Transmitting	
20 (2.439GHz)	Transmitting	X
40 (2.475GHz)	Transmitting	

Power Line Conducted Emissions				FCC Class B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Result	Limit (dBuV)	Margin (dB)
0.380	31.20	HOT	Quasi-Peak	58	-27.1
0.380	27.90	HOT	Average	48	-20.4
0.370	29.60	NEUTRAL	Quasi-Peak	59	-28.9
0.380	27.90	NEUTRAL	Average	48	-20.3

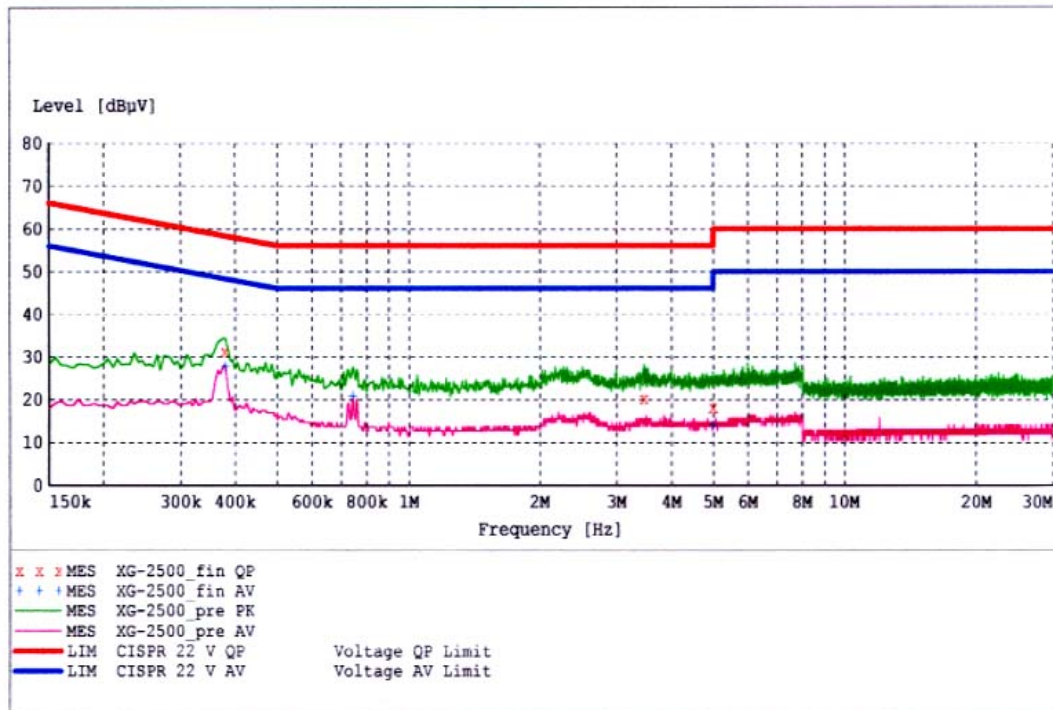
Line Conducted Emissions Data

HCT EMC TESTING Laboratory

EUT: XG-2500
 Manufacturer: Belco International Co., Ltd.
 Operating Condition: charging mode
 Test Site: SHIELD ROOM
 Operator: Keun- Ho Park
 Test Specification: CISPR 22 CLASS B
 Comment: Hot

SCAN TABLE: "CISPR 22 Voltage"

Short Description:			CISPR 22 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "XG-2500_fin QP"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.380000	31.20	10.1	58	27.1	1	---
3.470000	20.30	10.2	56	35.7	1	---
5.000000	18.20	10.3	56	37.8	1	---

MEASUREMENT RESULT: "XG-2500_fin AV"

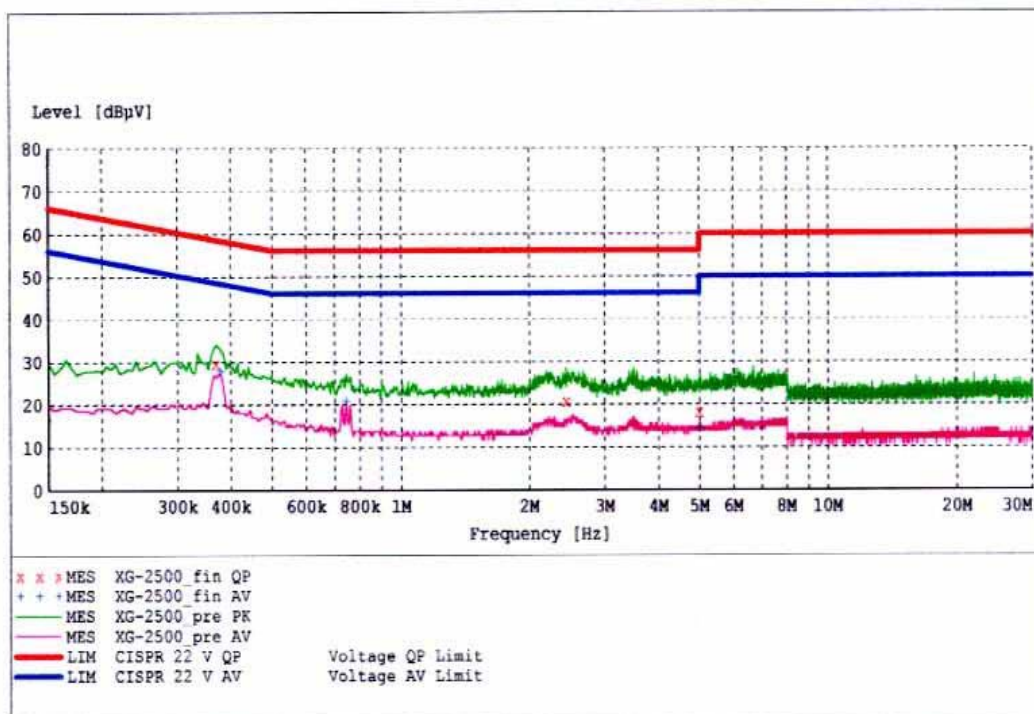
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.380000	27.90	10.1	48	20.4	1	---
0.745000	20.90	10.2	46	25.1	1	---
5.000000	14.20	10.3	46	31.8	1	---

HCT EMC TESTING Laboratory

EUT: XG-2500
 Manufacturer: Belco International Co., Ltd.
 Operating Condition: charging mode
 Test Site: SHIELD ROOM
 Operator: Keun- Ho Park
 Test Specification: CISPR 22 CLASS B
 Comment: Neutral

SCAN TABLE: "CISPR 22 Voltage"

Short Description:				CISPR 22 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
Frequency	Frequency	Width					
150.0 kHz	500.0 kHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				



MEASUREMENT RESULT: "XG-2500_fin QP"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.370000	29.60	10.1	59	28.9	1	---
2.445000	20.70	10.3	56	35.3	1	---
5.000000	18.20	10.3	56	37.8	1	---

MEASUREMENT RESULT: "XG-2500_fin AV"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.380000	27.90	10.1	48	20.3	1	---
0.745000	20.80	10.2	46	25.2	1	---
5.000000	14.40	10.3	46	31.6	1	---

Radiated emission (30MHz~1000MHz)

During Preliminary Tests, the following operating mode were investigated

Mode (Channel)	State	The worst operating condition
-	Charging	
1 (2.4048GHz)	Transmitting	X
20 (2.439GHz)	Transmitting	
40 (2.475GHz)	Transmitting	

BASE

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
72.5	12.56	6.30	1.8	V	20.7	30	-9.3
124.8	6.66	13.18	2.6	V	22.4	30	-7.6
146.2	3.08	14.76	2.7	V	20.5	30	-9.5
193.4	1.14	16.13	3.1	V	20.4	30	-9.6
210.4	-1.33	16.55	3.3	V	18.5	30	-11.5
351.2	5.34	16.45	4.3	V	26.1	37	-10.9
236.5	1.44	17.17	3.5	H	22.1	37	-14.9
346.8	1.40	16.42	4.3	H	22.1	37	-14.9
389.6	5.13	16.84	4.5	H	26.5	37	-10.5
425.1	2.99	17.69	4.7	H	25.4	37	-11.6

HANDY

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
78.6	10.94	6.90	2.0	V	19.8	30	-10.2
116.5	7.36	12.36	2.4	V	22.1	30	-7.9
146.2	2.18	14.76	2.7	V	19.6	30	-10.4
210.4	-0.03	16.55	3.3	V	19.8	30	-10.2
295.6	3.34	19.40	4.0	V	26.7	37	-10.3
348.6	5.78	16.43	4.3	V	26.5	37	-10.5
226.7	-1.01	17.01	3.4	H	19.4	30	-10.6
330.4	2.56	16.36	4.2	H	23.1	37	-13.9
356.2	4.26	16.50	4.3	H	25.1	37	-11.9
410.8	4.61	17.24	4.7	H	26.5	37	-10.5

6dB Bandwidth (Conducted)

Frequency (GHz)	Base / Handset	6dB Band width (MHz)	Limit (kHz)	Result
Ch1 2.4048	Base	1.410	>500	Pass
	Handset	1.415	>500	Pass
Ch20 2.4390	Base	1.410	>500	Pass
	Handset	1.415	>500	Pass
Ch40 2.4750	Base	1.415	>500	Pass
	Handset	1.405	>500	Pass

Base Ch. 1: 2.4048GHz



Base Ch. 20: 2.439GHz



Base Ch. 40: 2.475GHz



Handy Ch. 1: 2.4048GHz



Handy Ch. 20: 2.439GHz



Handy Ch. 40: 2.475GHz



Maximum peak output power (Conducted)**BASE**

CH.	FREQ [MHz]	ATTEN. [dB]	RESULT [dBm]	Convert [mW]	Limit [dBm]	Margin [dB]
1	2.4048	10	11.78	15.1	30.0	-18.22
20	2.4390	10	12.55	18.0	30.0	-17.45
40	2.4750	10	13.01	20.0	30.0	-16.99

HANDY

CH.	FREQ [MHz]	ATTEN. [dB]	RESULT [dBm]	Convert [mW]	Limit [dBm]	Margin [dB]
1	2.4048	10	11.34	13.6	30.0	-18.66
20	2.4390	10	10.98	12.5	30.0	-19.02
40	2.4750	10	10.56	11.4	30.0	-19.44

DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)**Cordless Telephone Equipment (Base)**

1) Mode: Transmitting (ch1: 2408.8MHz)

PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.8176	18.2	31.5	4.3	54.0	74	-20.0	Peak
2	7.2264	13.5	36.1	5.2	54.8	74	-19.2	Peak
3	4.8176	12.4	31.5	4.3	48.2	54	-5.8	Average
4	7.2264	7.6	36.1	5.2	48.9	54	-5.1	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss

2) Mode: Transmitting (ch20: 2439.0MHz)

PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.876	18.7	31.7	4.5	54.9	74	-19.1	Peak
2	7.315	12.4	36.5	5.4	54.3	74	-19.7	Peak
3	4.876	13.1	31.7	4.5	49.3	54	-4.7	Average
4	7.315	7.8	36.5	5.4	49.7	54	-4.3	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss

3) Mode: Transmitting (ch40: 2475MHz)

PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.950	17.6	31.8	4.6	54.0	74	-20.0	Peak
2	7.425	14.5	36.6	5.6	56.7	74	-17.3	Peak
3	4.950	12.8	31.8	4.6	49.2	54	-4.8	Average
4	7.425	7.9	36.6	5.6	50.1	54	-3.9	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss

Cordless Telephone Equipment (Handset)1) Mode: Transmitting (ch1: 2408.8MHz)PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.8176	17.6	31.5	4.3	53.4	74	-20.6	Peak
2	7.2264	13.4	36.1	5.2	54.7	74	-19.3	Peak
3	4.8176	11.4	31.5	4.3	47.2	54	-6.8	Average
4	7.2264	7.5	36.1	5.2	48.8	54	-5.2	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss2) Mode: Transmitting (ch20: 2439.0MHz)PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.876	18.3	31.7	4.5	54.5	74	-19.5	Peak
2	7.315	12.1	36.5	5.4	54.0	74	-20.0	Peak
3	4.876	11.6	31.7	4.5	47.8	54	-6.2	Average
4	7.315	7.2	36.5	5.4	49.1	54	-4.9	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss3) Mode: Transmitting (ch40: 2475MHz)PEAK / AVERAGE DETECT: (S/A: RBW: 1MHz and VBW: 1MHz)

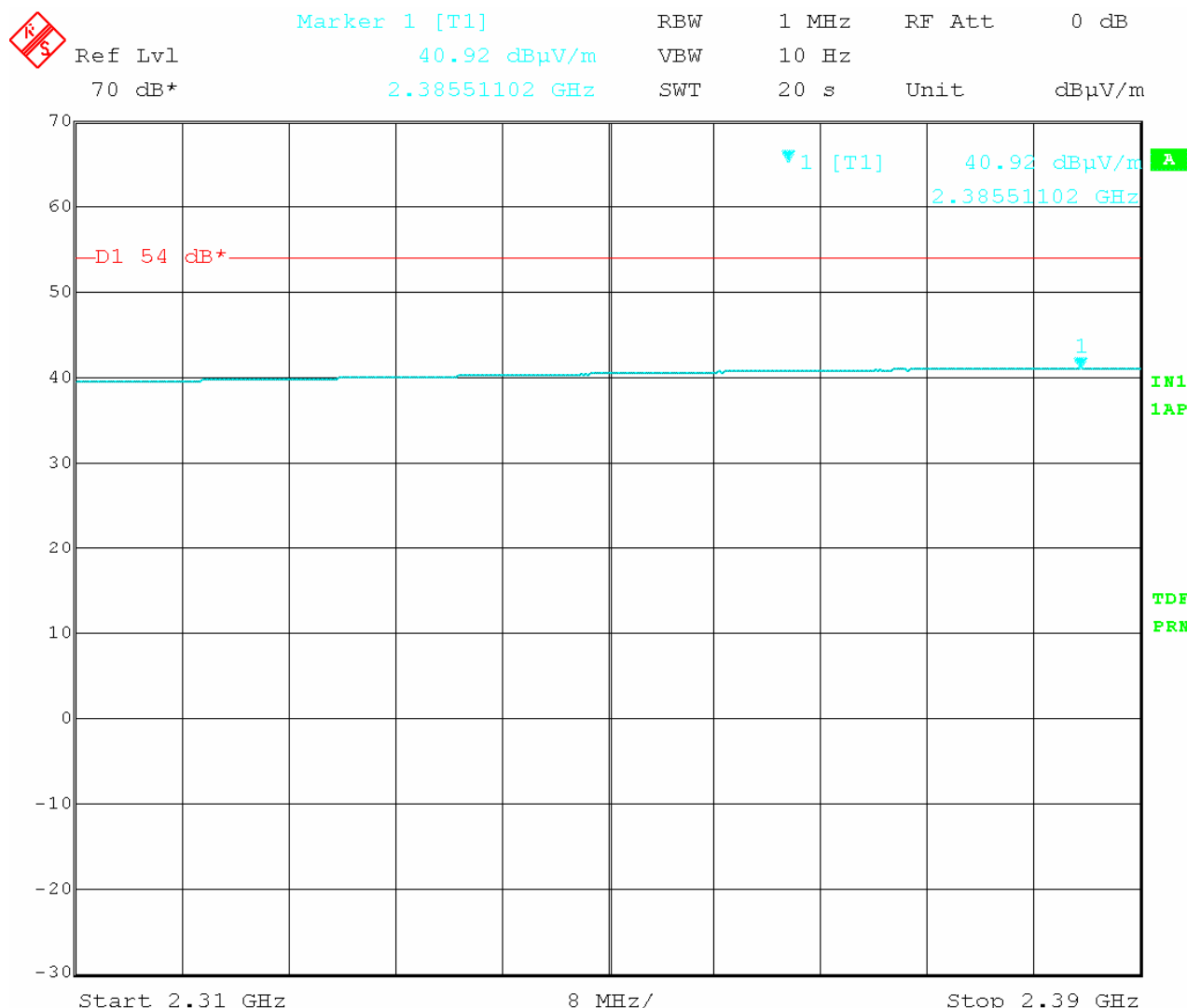
No	FREQ [GHz]	S/A Reading [dBuV]	ANT. Factor [dB]	Cable Loss	Result dBuV/m	Limit dBuV/m	Margin [dB]	Detect
1	4.950	17.6	31.8	4.6	54.0	74	-20.0	Peak
2	7.425	12.3	36.6	5.6	54.5	74	-19.5	Peak
3	4.950	11.1	31.8	4.6	47.5	54	-6.5	Average
4	7.425	7.5	36.6	5.6	49.7	54	-4.3	Average

Test Distance 3meters Result= Reading+ ANT. Factor+ Cable Loss

Out of band emissions (Radiated)

Item	CH.	FREQ [MHz]	Ant. Pol. (V / H)	RESULT [dBuV/m]	Limit [dBuV/m]	Margin [dB]
Base	1	2.4048	V	40.92	54	-13.80
			H	40.92	54	-13.08
	40	2.4750	V	41.36	54	-12.64
			H	41.37	54	-12.63
Handset	1	2.4048	V	40.81	54	-13.19
			H	40.91	54	-13.19
	40	2.4750	V	41.30	54	-12.70
			H	41.34	54	-12.66

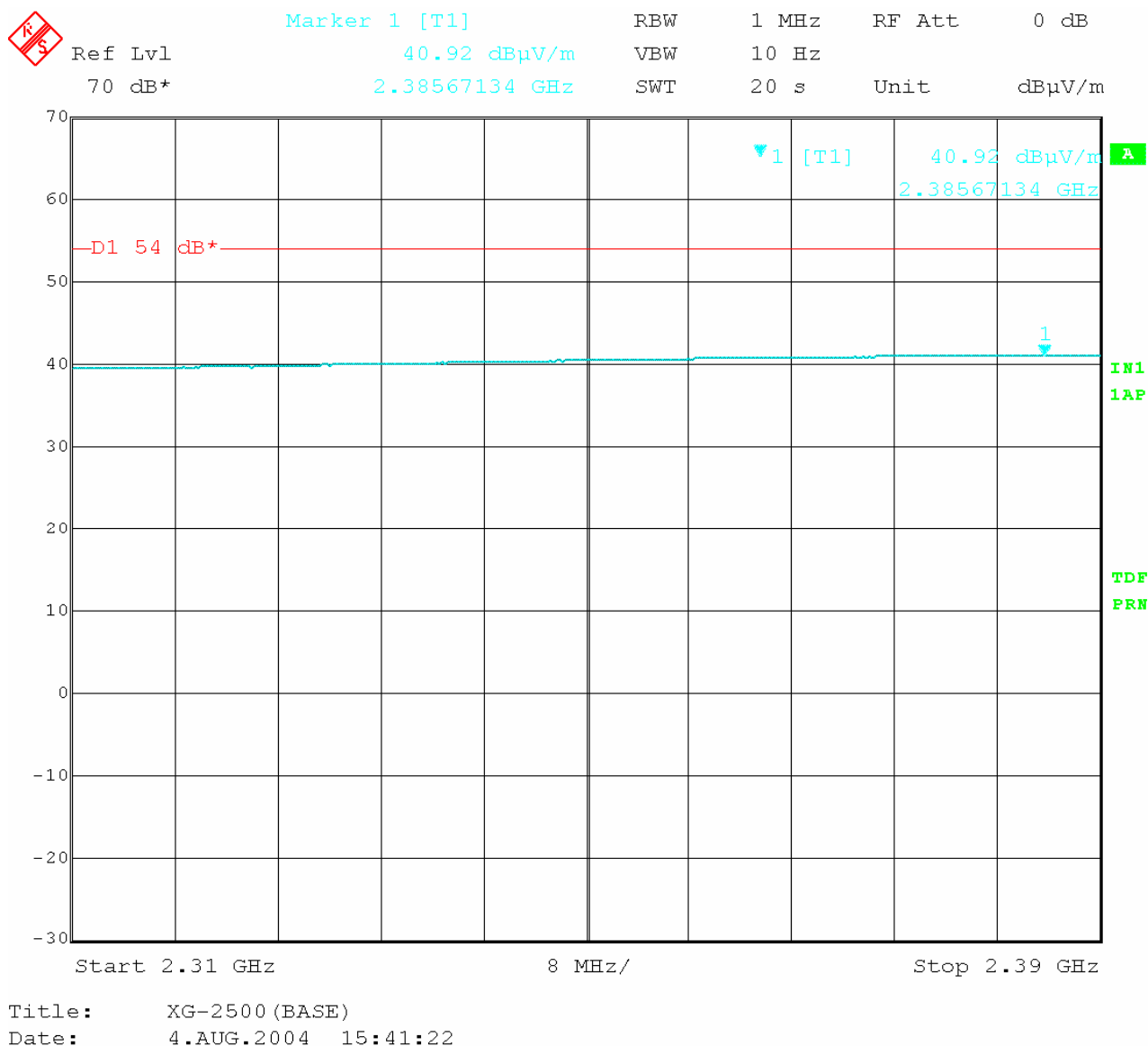
Base Ch. 1: 2.4048GHz [Antenna : V]



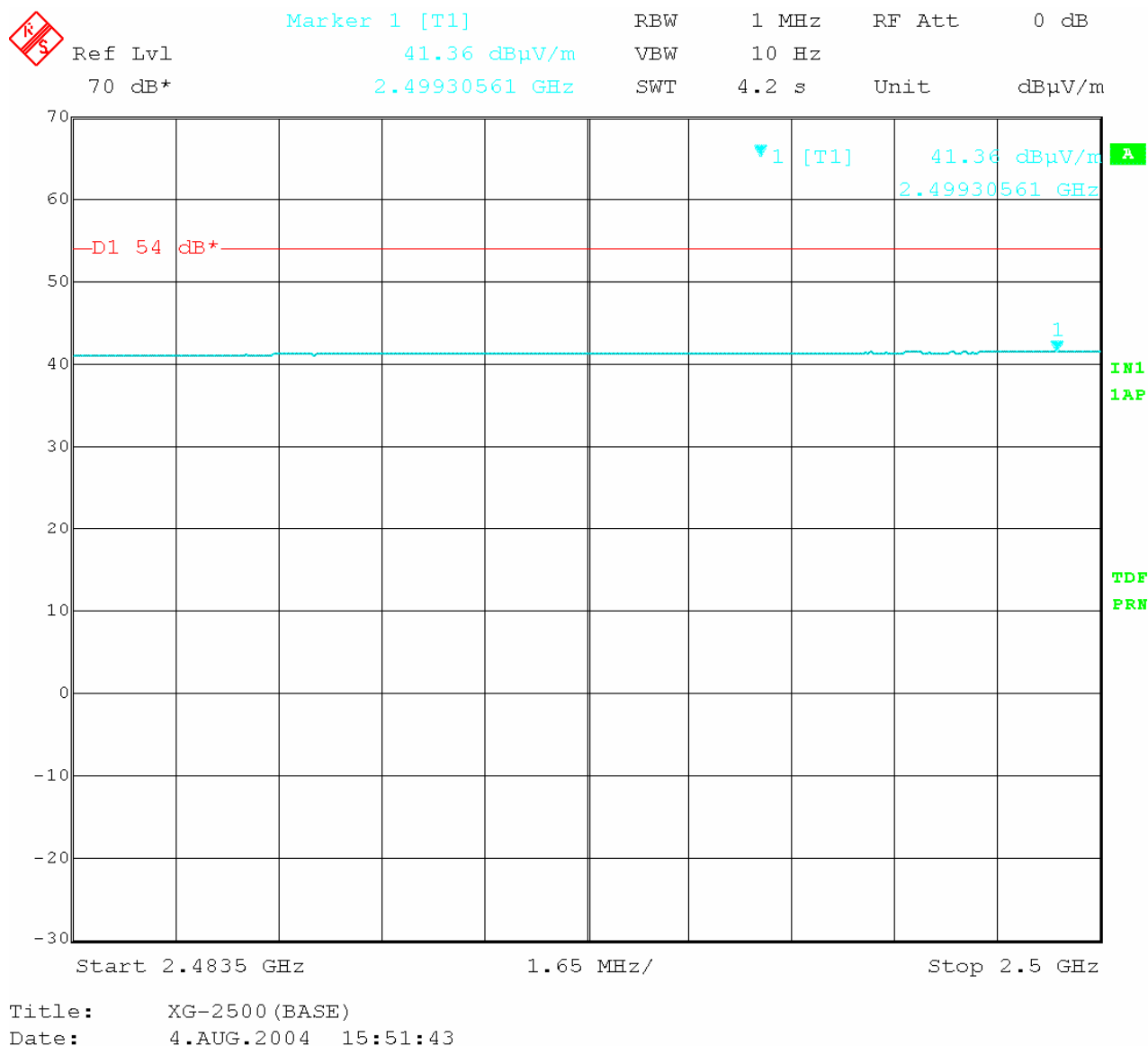
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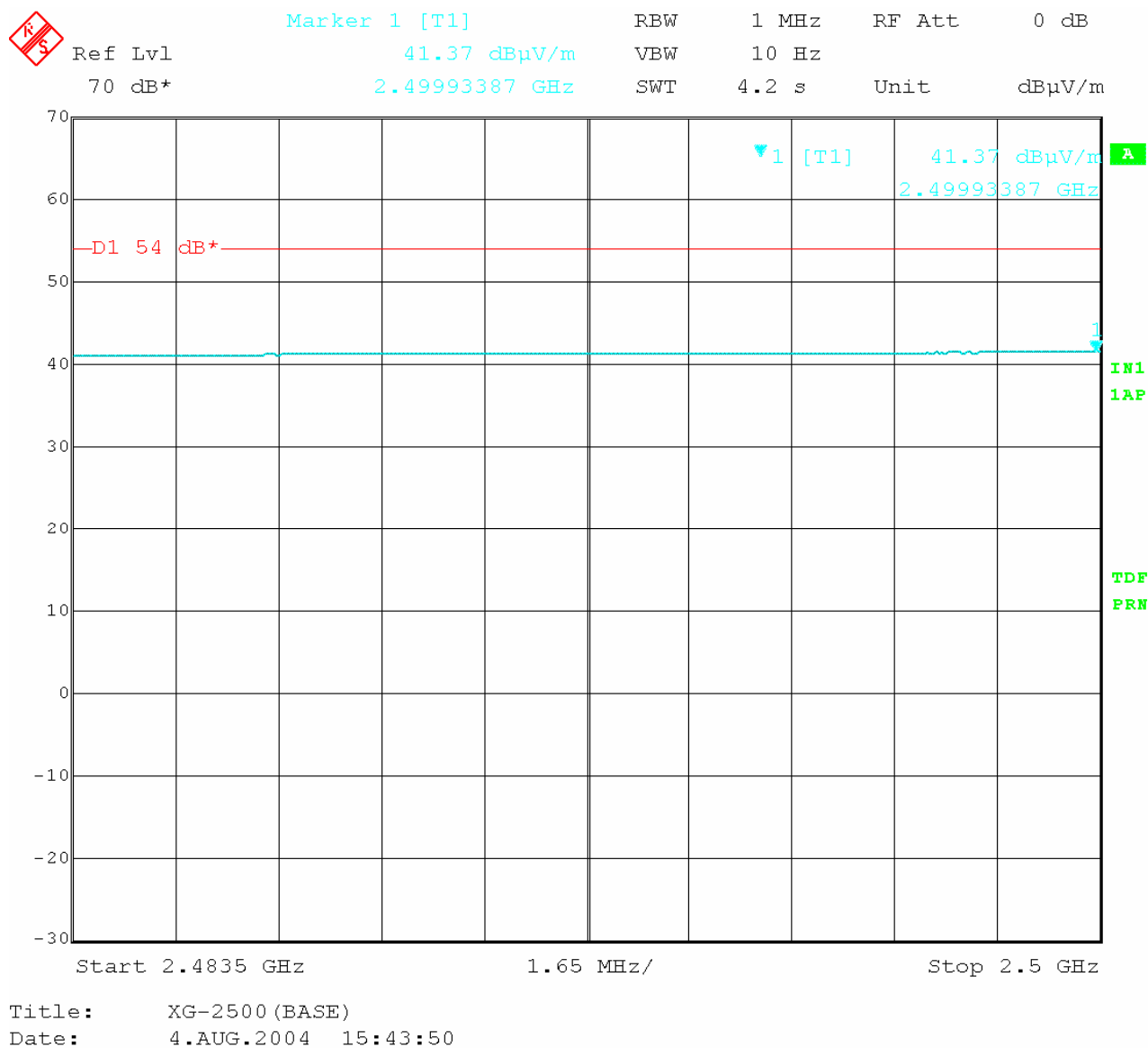
Base Ch. 1: 2.4048GHz [Antenna : H]



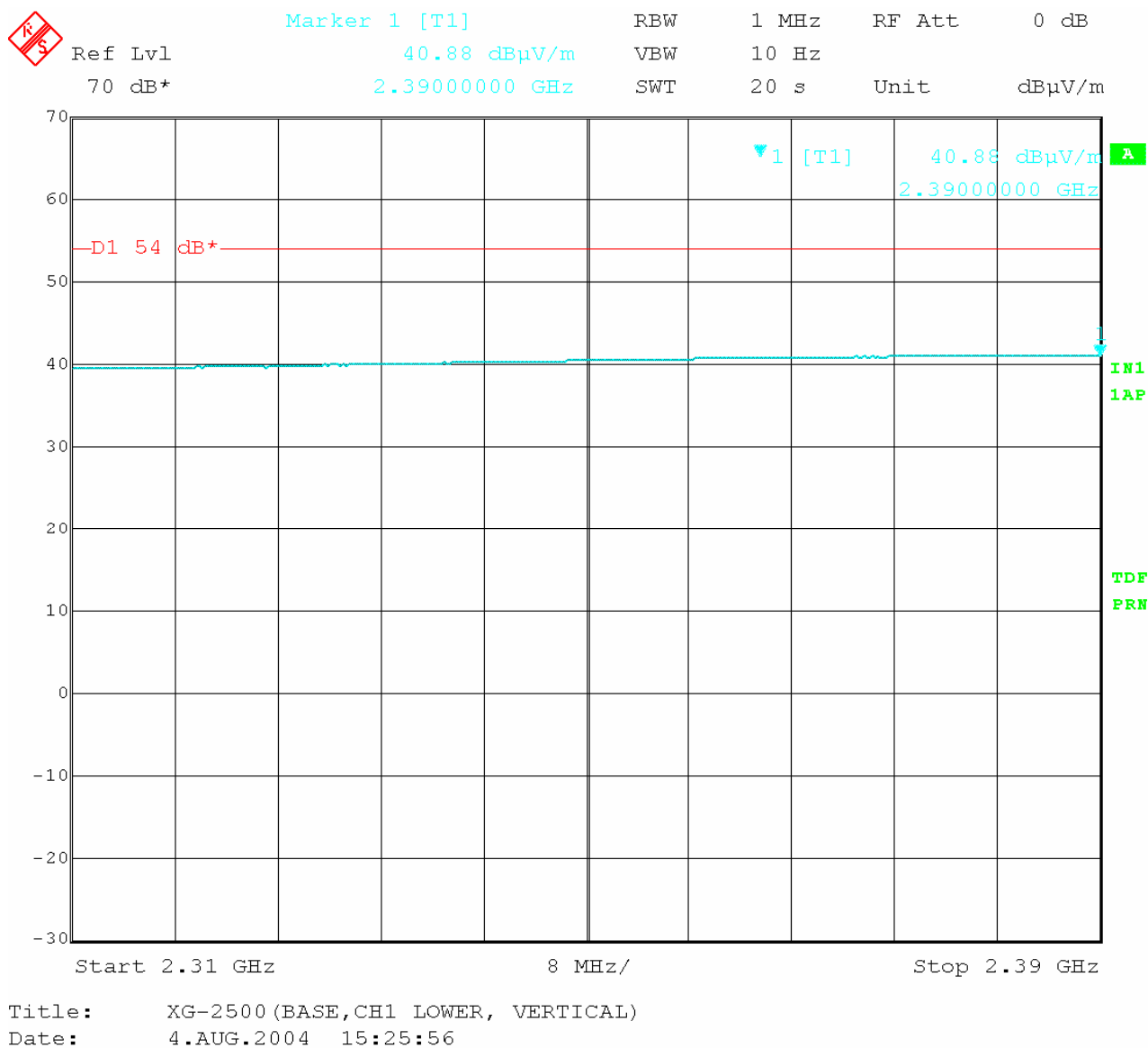
Base Ch. 40: 2.475GHz [Antenna : V]



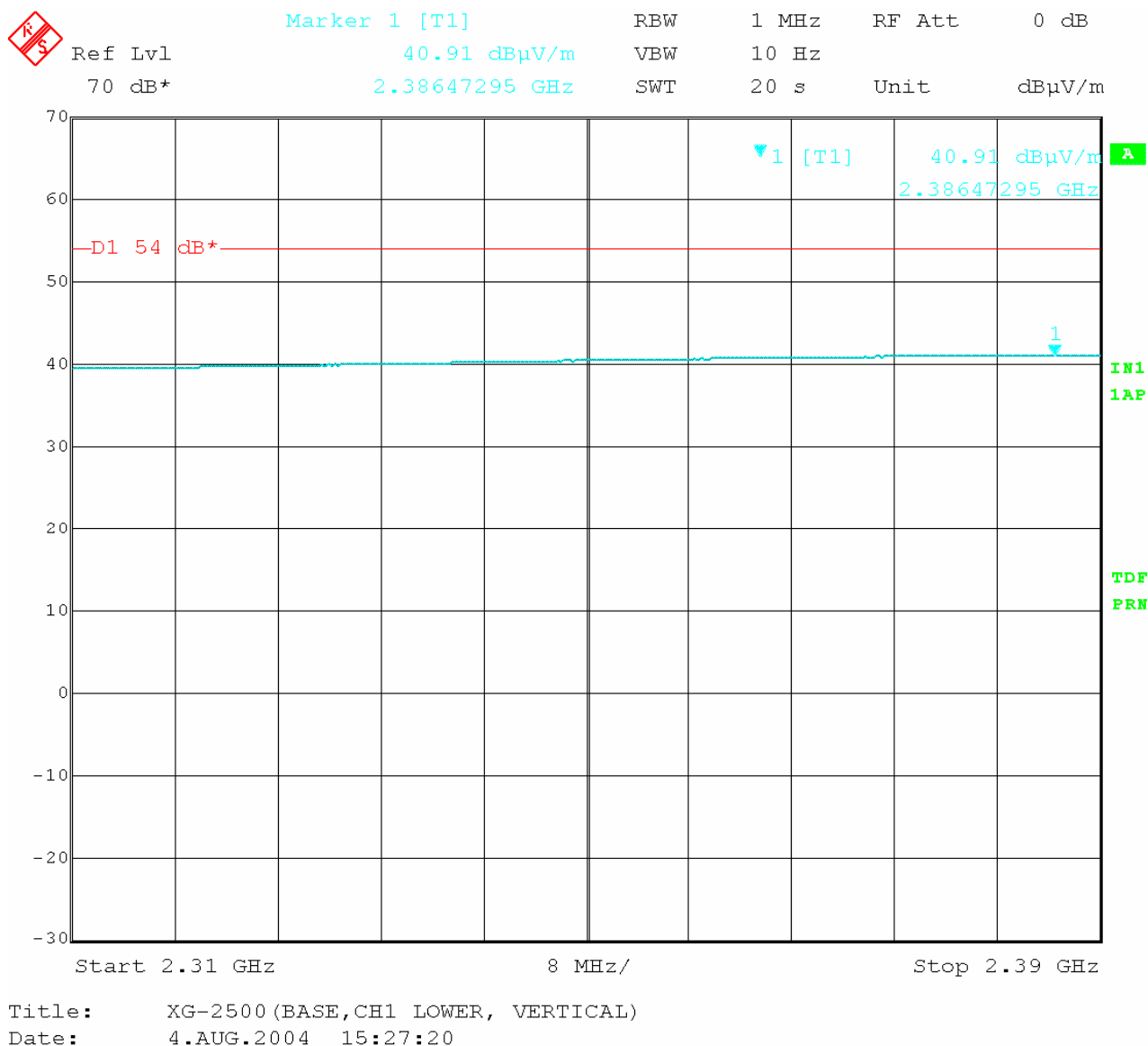
Base Ch. 40: 2.475GHz [Antenna : H]



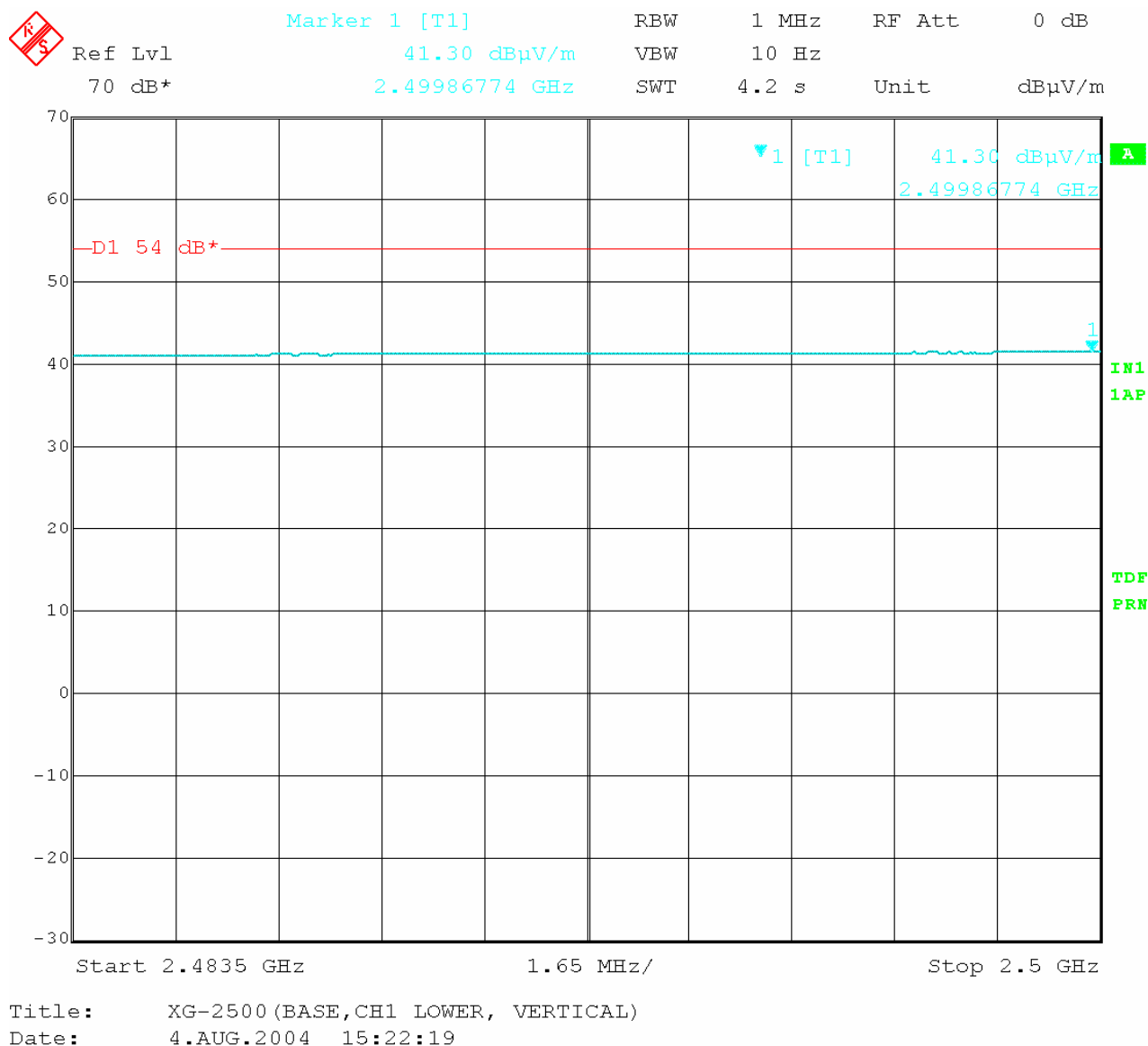
Handy Ch. 1: 2.4048GHz [Antenna : V]



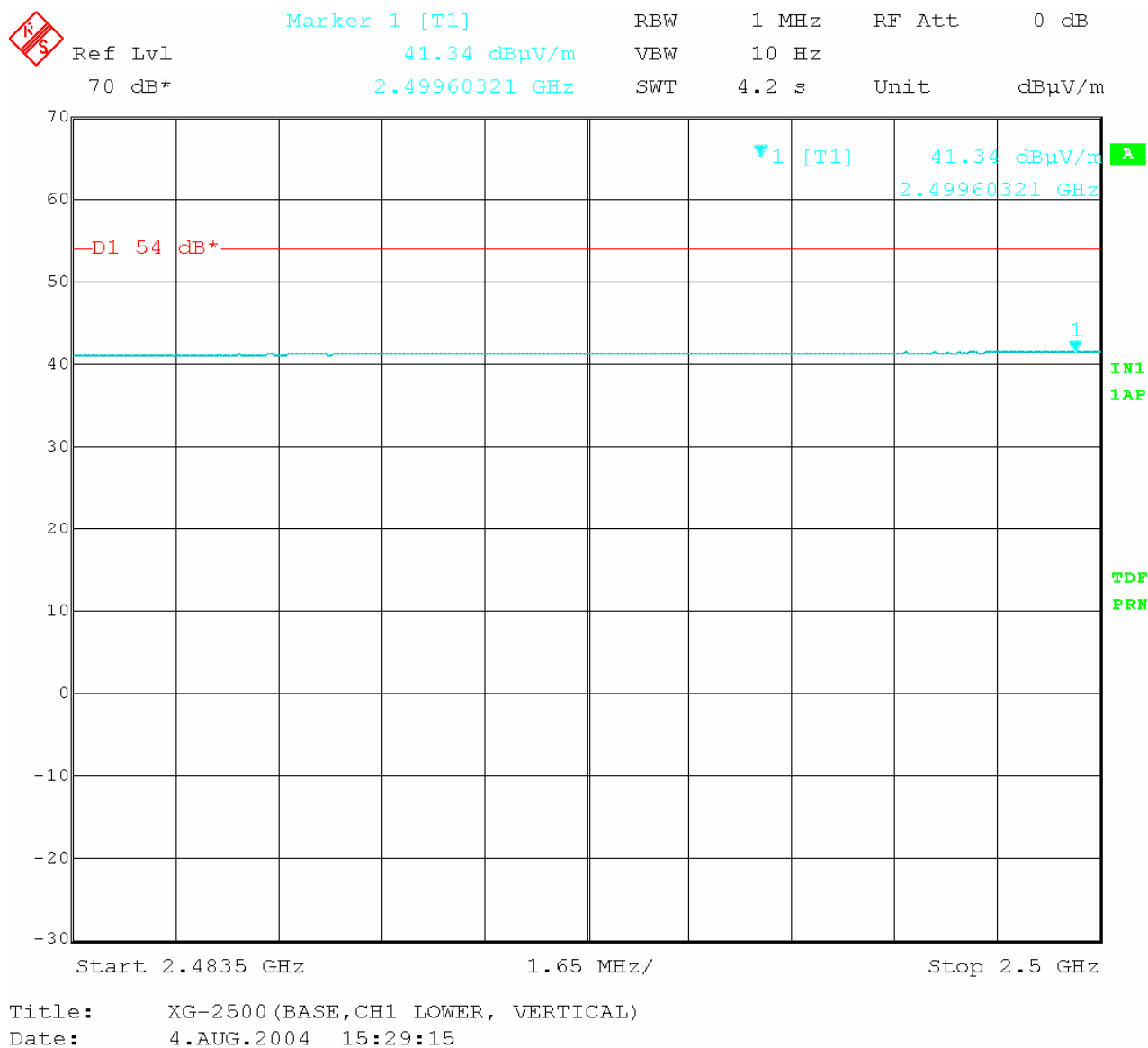
Handy Ch. 1: 2.4048GHz [Antenna : H]



Handy Ch. 40: 2.475GHz [Antenna : V]



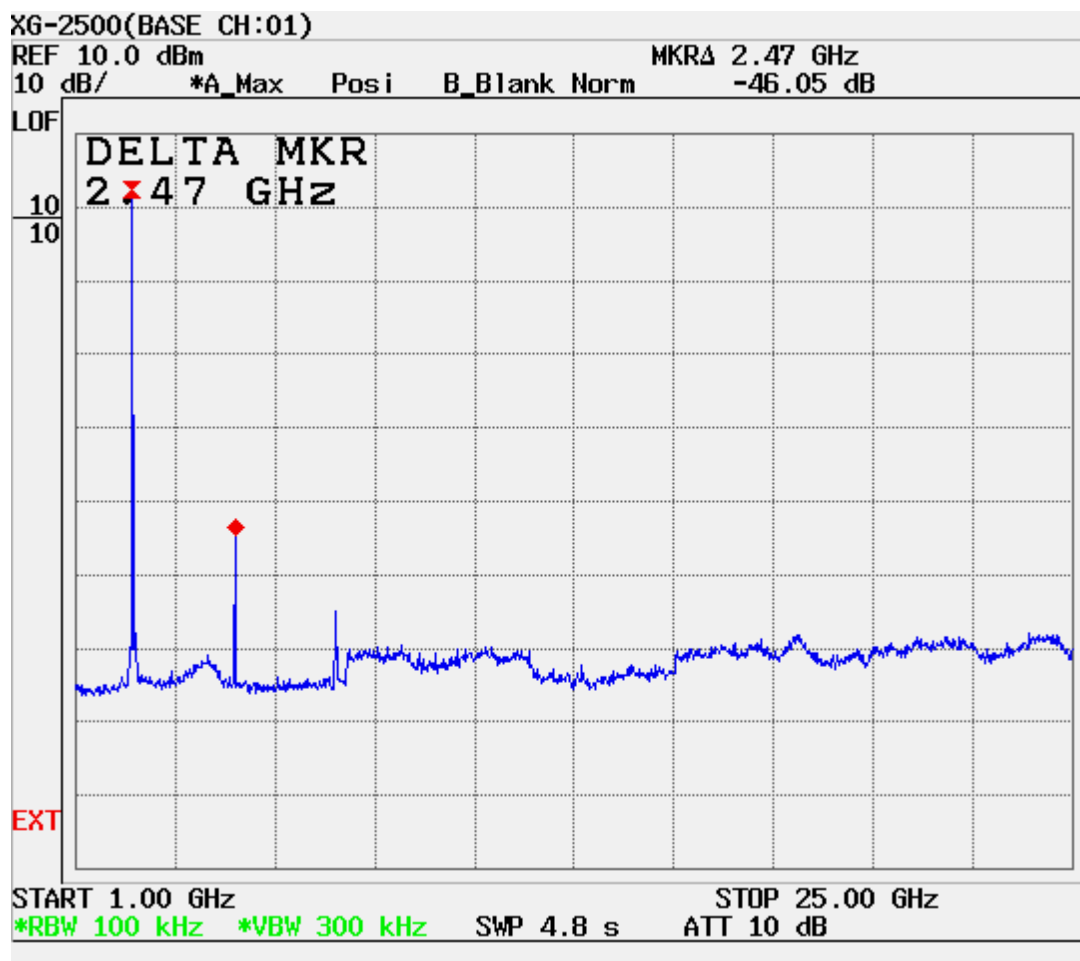
Handy Ch. 40: 2.475GHz [Antenna : H]



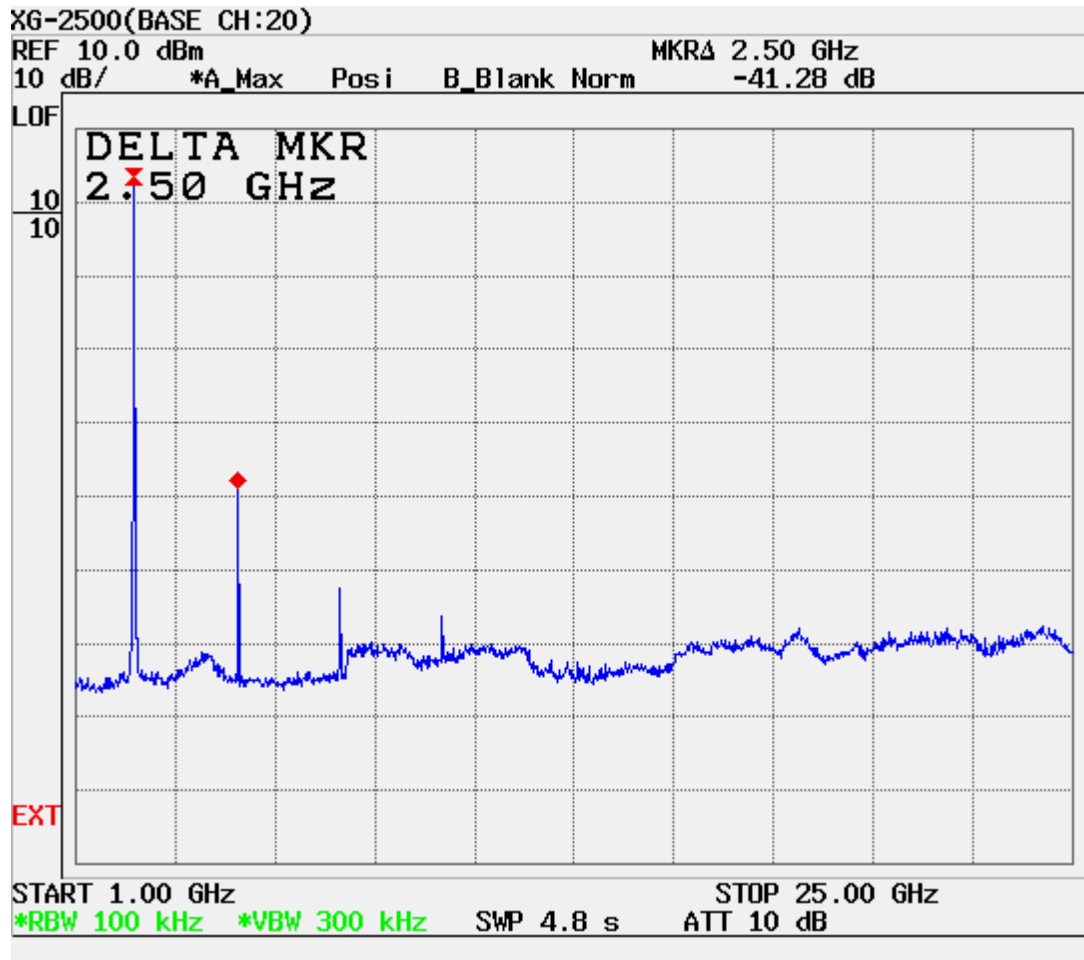
Out of band emissions (Conducted)

Item	CH.	FREQ [MHz]	RESULT [dBc]	Limit [dBc]	Margin [dB]
Base	1	2.4048	46.05	20	-26.05
	20	2.4390	41.28	20	-21.28
	40	2.4750	35.10	20	-15.10
Handset	1	2.4048	45.15	20	-20.15
	20	2.4390	45.38	20	-25.38
	40	2.4750	43.90	20	-23.90

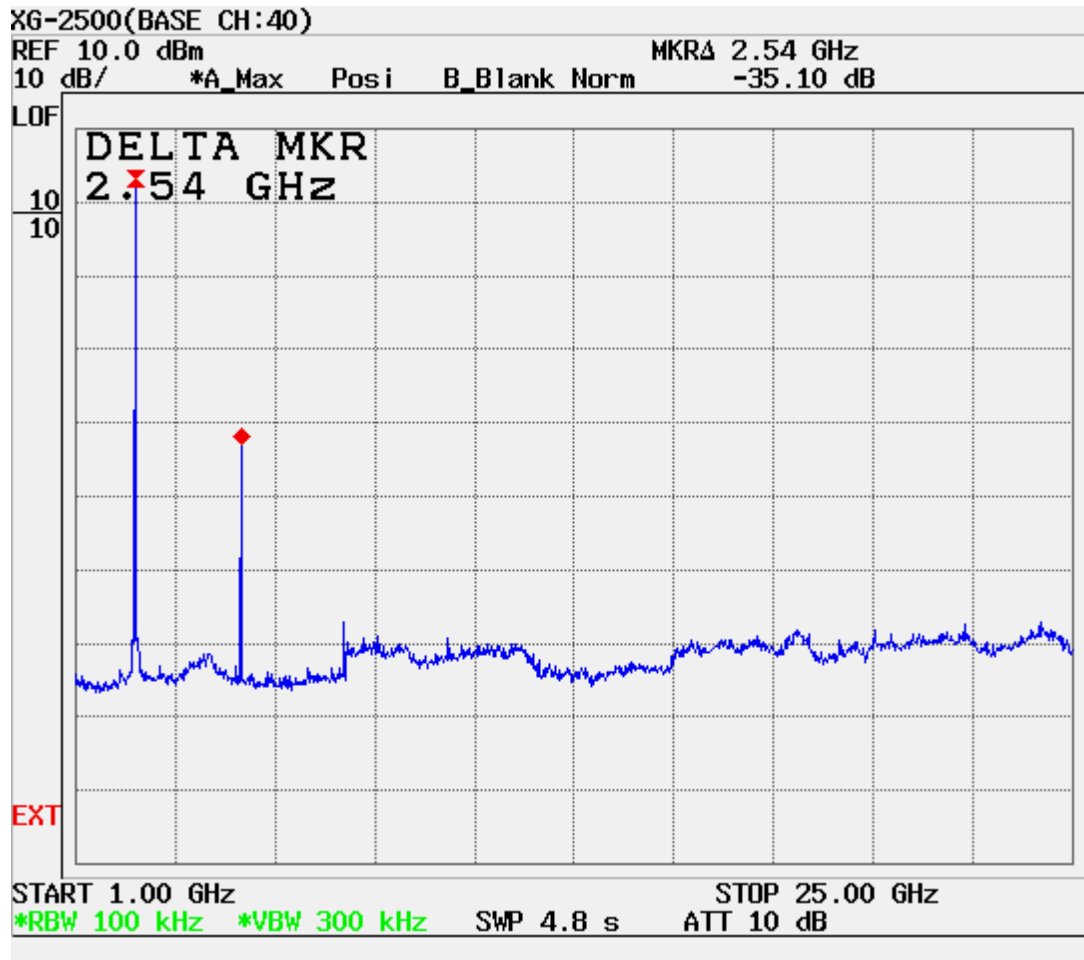
Base Ch. 1: 2.4048GHz



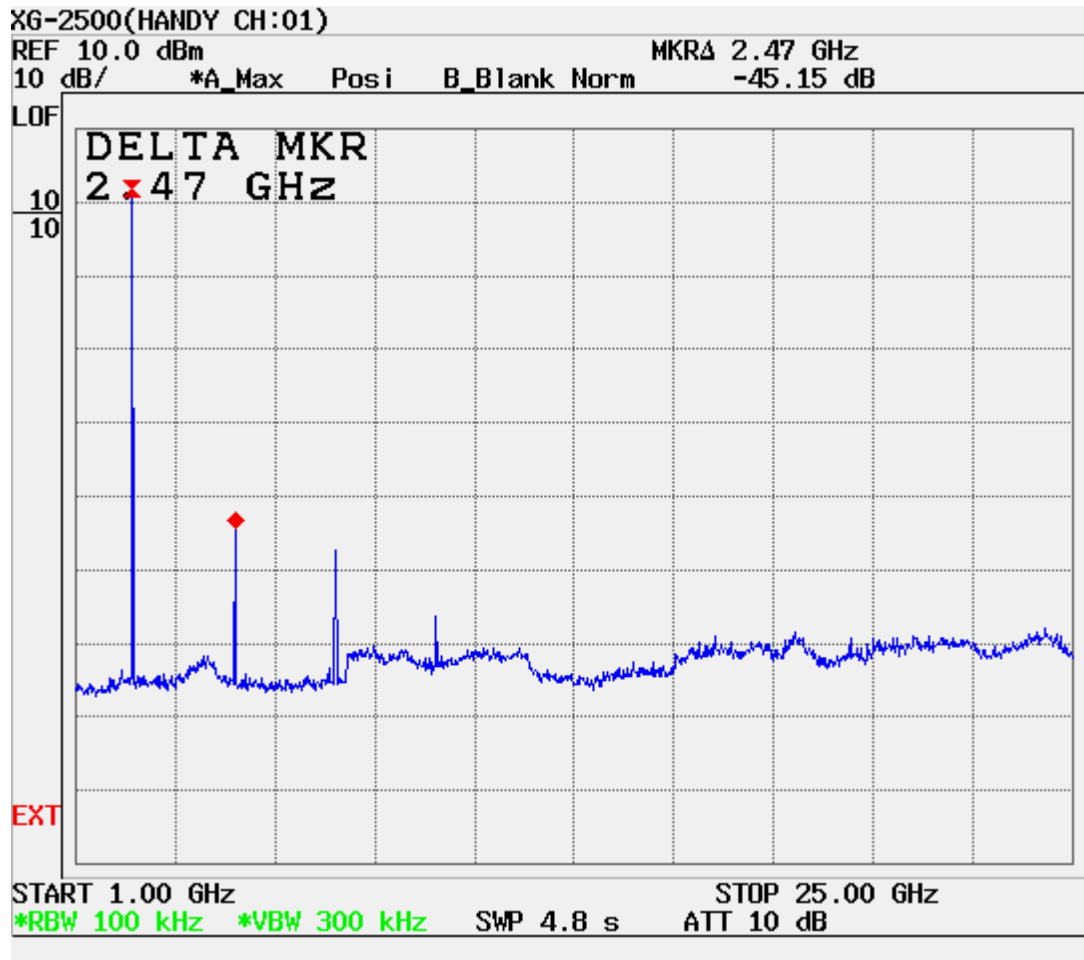
Base Ch. 20: 2.439GHz



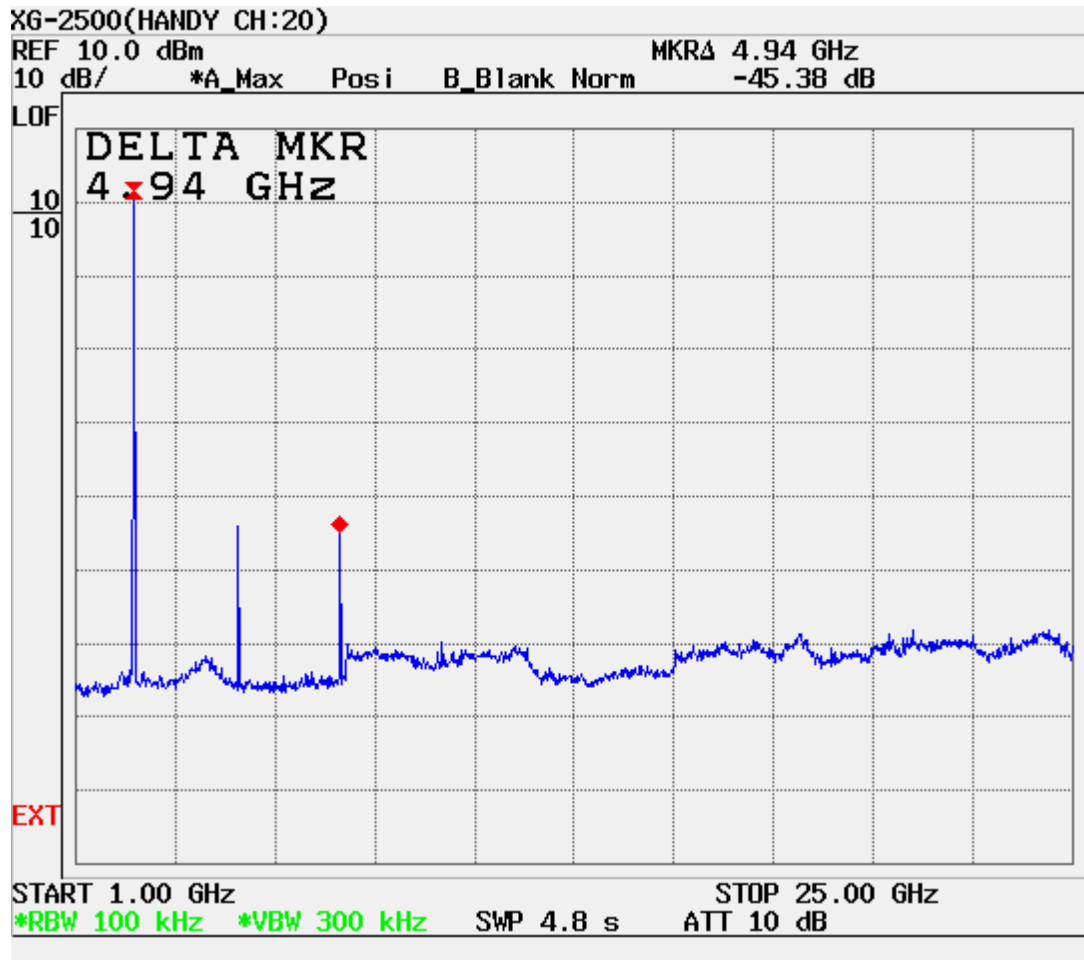
Base Ch. 40: 2.475GHz



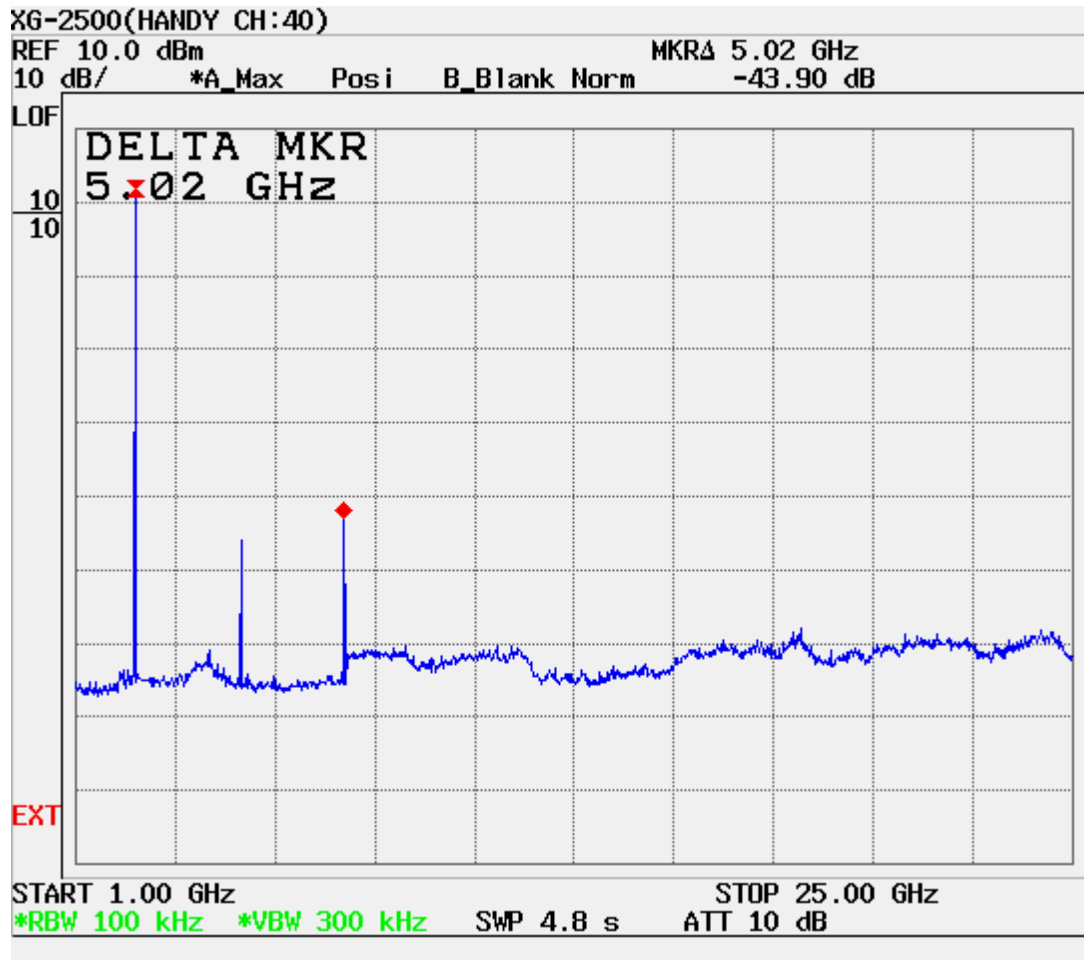
Handy Ch. 1: 2.4048GHz



Handy Ch. 20: 2.439GHz



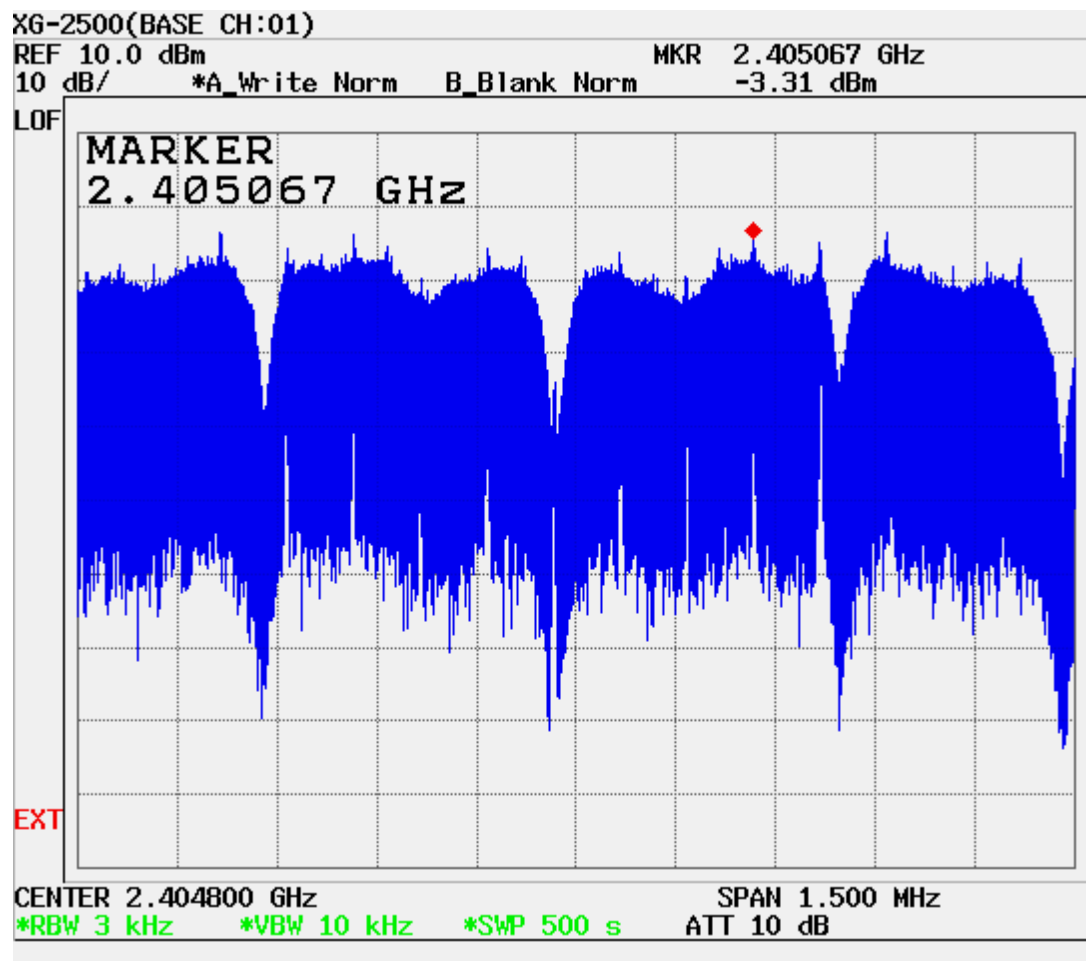
Handy Ch. 40: 2.475GHz



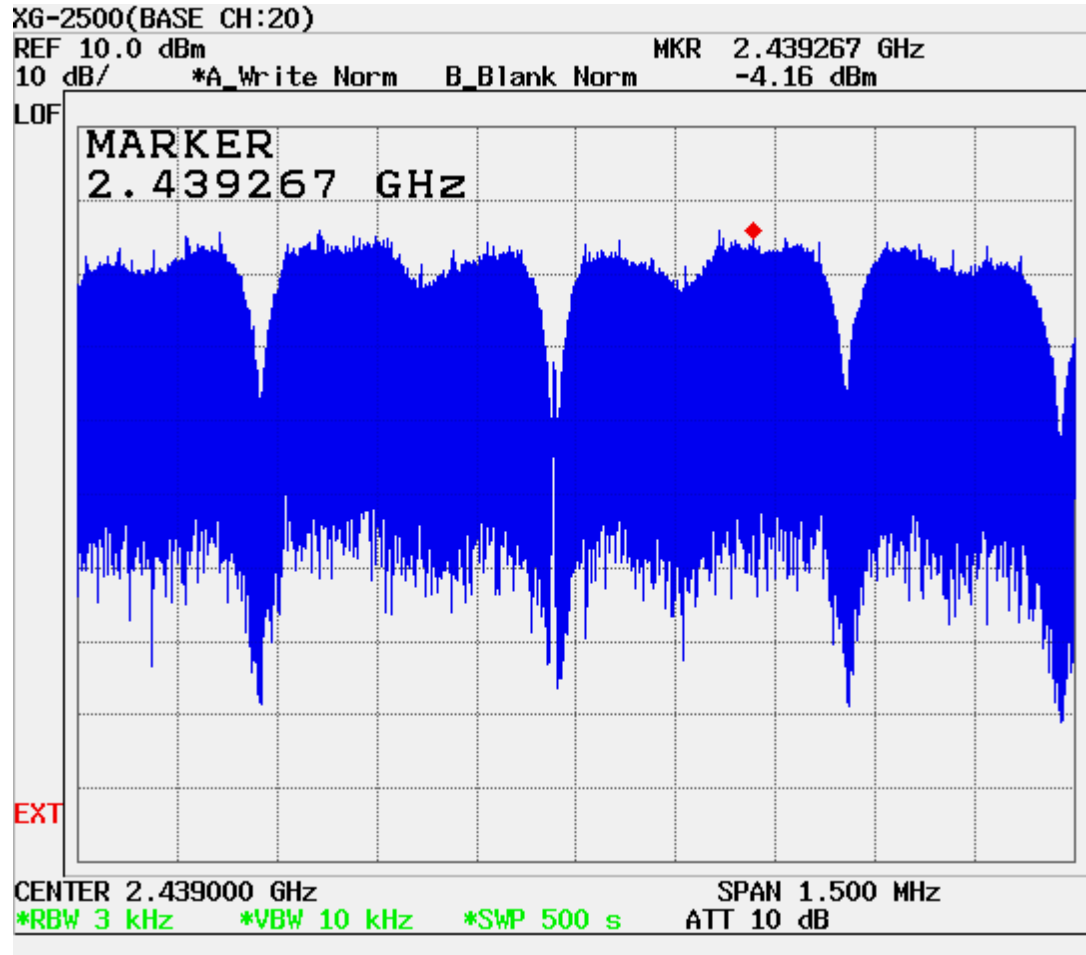
Power density (Conducted)

Item	CH.	FREQ [MHz]	Cable Loss [dB]	RESULT [dBm]	Limit [dBm]	Margin [dB]
Base	1	2.4048	1.3	-3.31	8	-11.31
	20	2.4390	1.3	-4.16	8	-12.16
	40	2.4750	1.3	-1.35	8	-9.35
Handset	1	2.4048	1.3	-2.91	8	-10.91
	20	2.4390	1.3	-4.73	8	-12.73
	40	2.4750	1.3	-2.91	8	-10.91

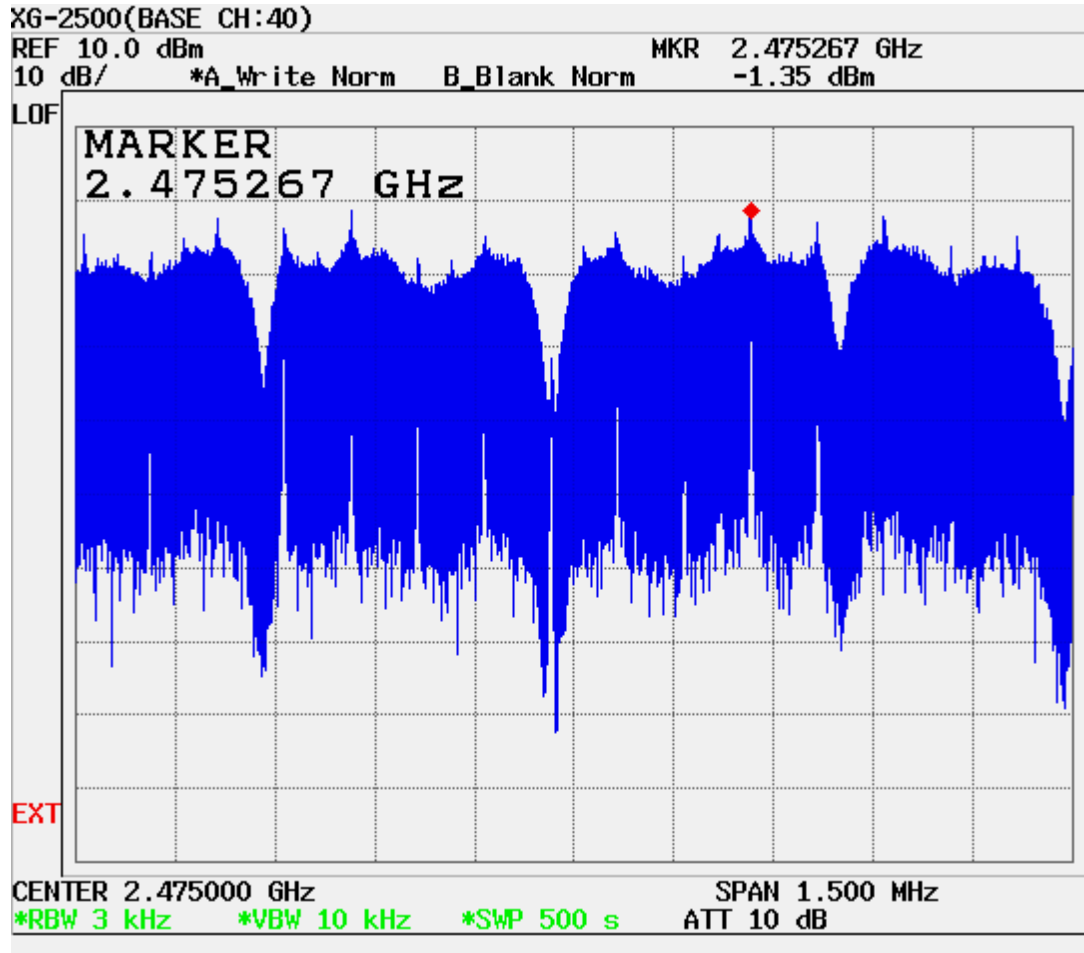
Base Ch. 1: 2.4048GHz



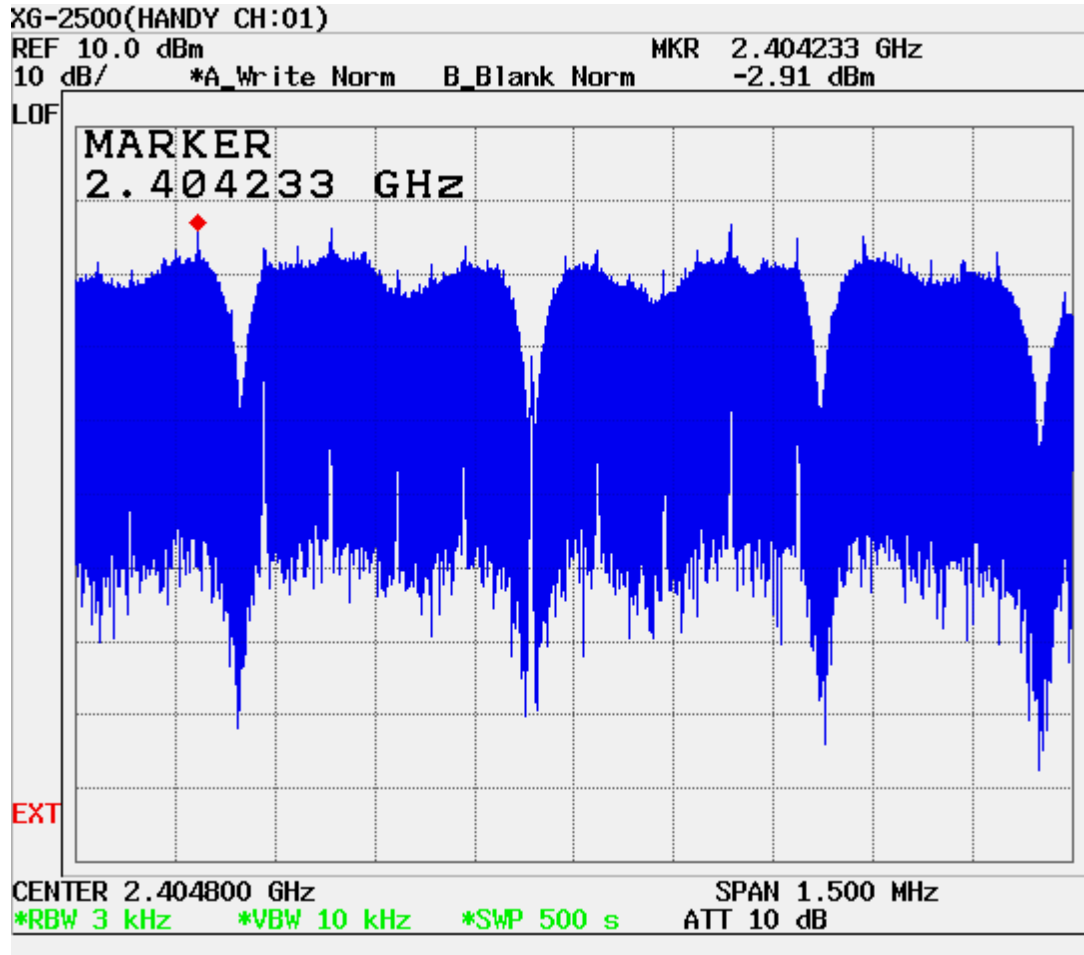
Base Ch. 20: 2.439GHz



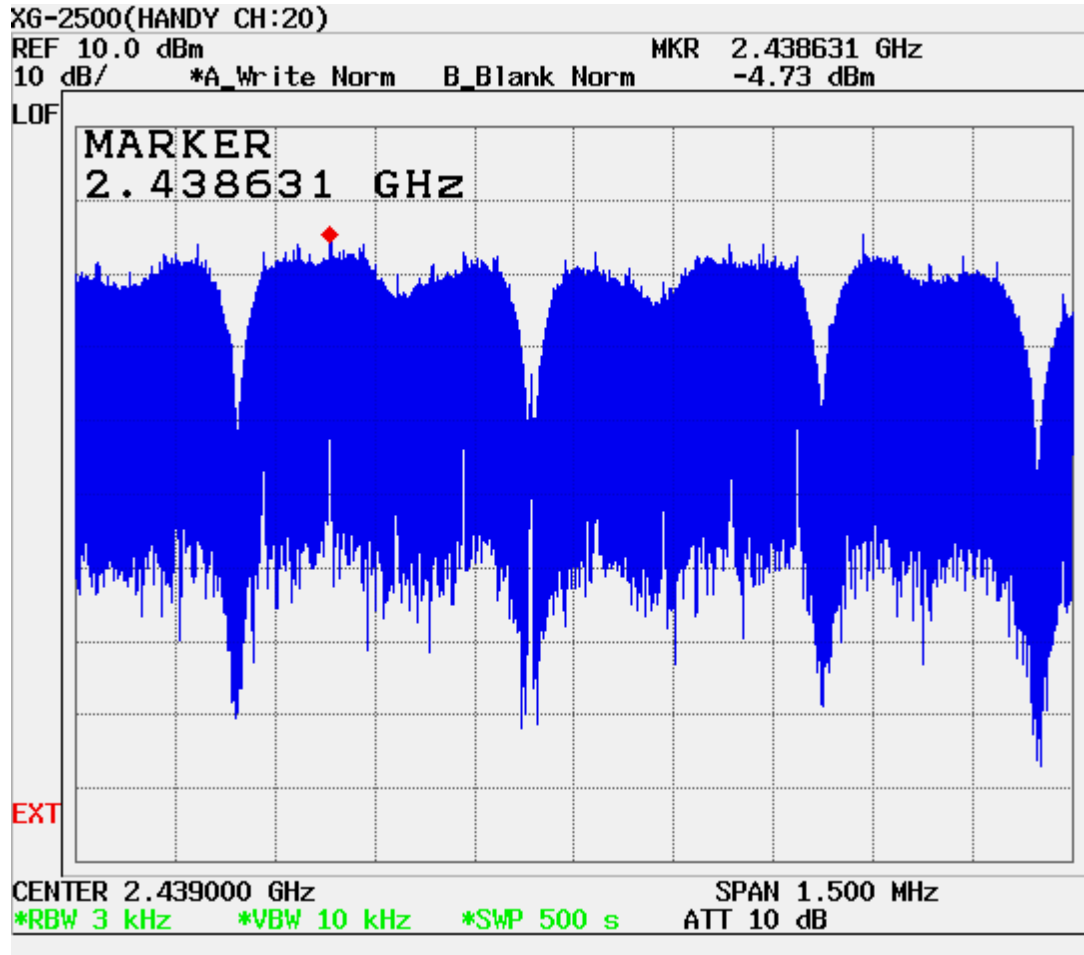
Base Ch. 40: 2.475GHz



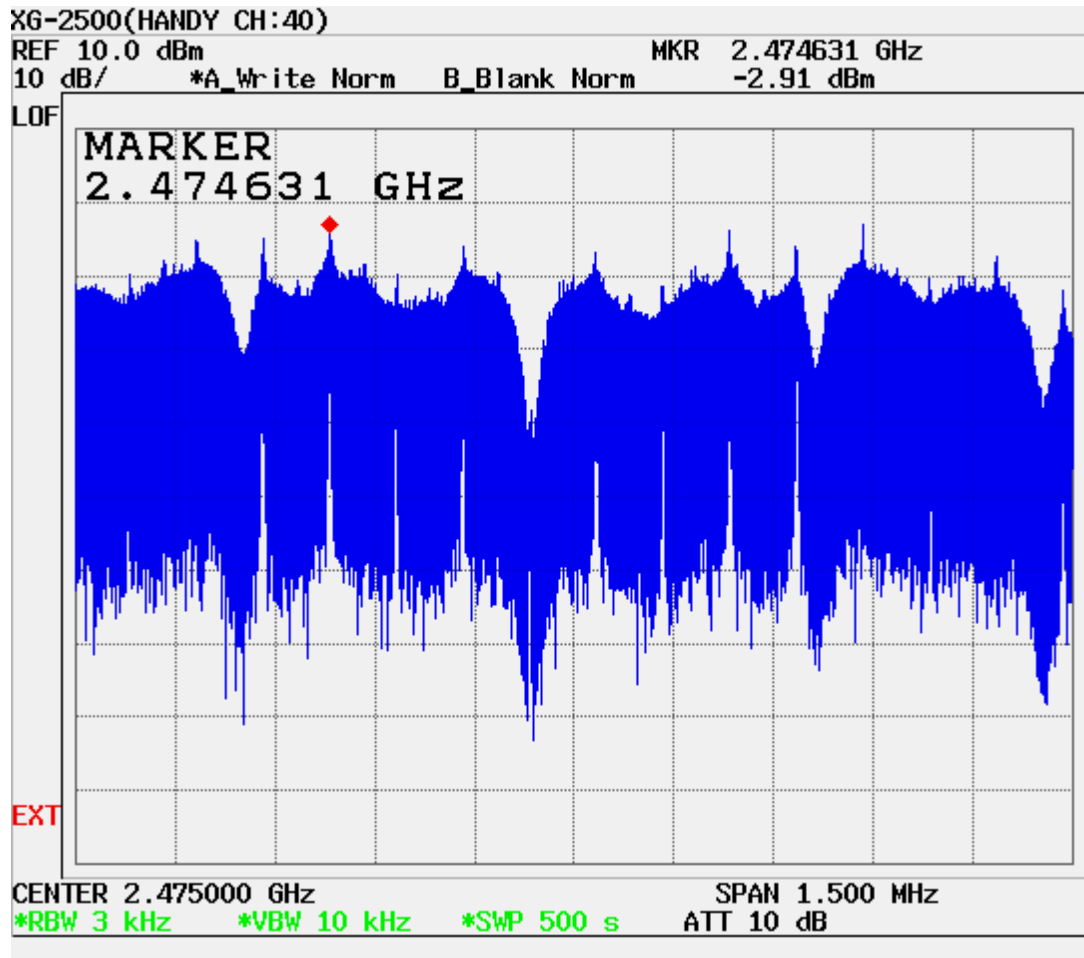
Handy Ch. 1: 2.4048GHz



Handy Ch. 20: 2.439GHz



Handy Ch. 40: 2.475GHz



Processing Gain (Conducted), Section 15.247(e)

Results & Calculation

Table 3: Test Results (1Ch~ 40Ch)

Jammer Frequency (MHz)	BER (BS)	Received jammer power (dBm)	Received signal power (dBm)	Jammer/Signal ra tio (dB)
2404.8	9.4×10^{-4}	-59.55	-63.65	4.1
2406.6	9.6×10^{-4}	-57.95	-63.65	5.7
2408.4	9.6×10^{-4}	-60.15	-63.65	3.5
2410.2	9.6×10^{-4}	-64.25	-63.65	-0.6
2412.0	1.1×10^{-3}	-61.55	-63.65	2.1
2413.8	9.8×10^{-4}	-61.55	-63.65	2.1
2415.6	1.1×10^{-3}	-61.95	-63.65	1.7
2417.4	9.2×10^{-4}	-62.85	-63.65	0.8
2419.2	1.0×10^{-3}	-59.85	-63.65	3.8
2421.0	1.0×10^{-3}	-61.15	-63.65	2.5
2422.8	1.1×10^{-3}	-62.05	-63.65	1.6
2424.6	1.0×10^{-3}	-57.65	-63.65	6.0
2426.4	1.1×10^{-3}	-55.65	-63.65	8.0
2428.2	1.0×10^{-3}	-49.35	-63.65	14.3
2430.0	1.1×10^{-3}	-59.25	-63.65	4.4
2431.8	1.0×10^{-3}	-62.35	-63.65	1.3
2433.6	9.7×10^{-4}	-59.05	-63.65	4.6
2435.4	1.0×10^{-3}	-61.05	-63.65	2.6
2437.2	1.1×10^{-3}	-62.55	-63.65	1.1
2439.0	9.0×10^{-4}	-61.95	-63.65	1.7
2440.8	1.0×10^{-3}	-61.05	-63.65	2.6
2442.6	9.9×10^{-4}	-62.35	-63.65	1.3
2444.4	1.1×10^{-3}	-64.05	-63.65	-0.4
2446.2	9.2×10^{-4}	-56.25	-63.65	7.4
2448.0	1.0×10^{-3}	-59.85	-63.65	3.8
2449.8	1.1×10^{-3}	-57.25	-63.65	6.4
2451.6	9.9×10^{-4}	-58.15	-63.65	5.5
2453.4	9.6×10^{-4}	-57.95	-63.65	5.7
2455.2	9.6×10^{-4}	-64.25	-63.65	-0.6
2457.0	1.1×10^{-3}	-61.55	-63.65	2.1
2458.8	9.2×10^{-4}	-62.85	-63.65	0.8

2460.6	1.0×10^{-3}	-61.15	-63.65	2.5
2462.4	1.0×10^{-3}	-57.65	-63.65	6.0
2464.2	1.0×10^{-3}	-49.35	-63.65	14.3
2466.0	1.0×10^{-3}	-62.35	-63.65	1.3
2467.8	1.0×10^{-3}	-61.05	-63.65	2.6
2469.6	9.0×10^{-4}	-61.95	-63.65	1.7
2471.4	1.0×10^{-3}	-61.05	-63.65	2.6
2473.2	1.1×10^{-3}	-64.05	-63.65	-0.4
2475.0	1.0×10^{-3}	-59.85	-63.65	3.8

For DBPSK at 10^{-3} bit error rate the required SNR is 8.0 dB. Using the results above and the data in the table below the processing gain is calculated to be 11.3 dB.

Table 4: Processing Gain Calculation data

required SNR (dB)	8.0
system losses (dB)	2.0
J/S ratio at 80% point (dB)	1.30
FCC Processing gain (dB)	11.3

Conclusions

The result measured for processing gain of 11.3 dB is close to the actual processing gain due to a 12 chip spreading code of $10 \times \log_{10}(12) = 10.8$ dB