

ETS Dr.GenZ Taiwan PS Co., LTD

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679

Accredited Testing Laboratory



A2LA Cert.No.: 2300.01

PTCRB Accredited Type Certification Test House

FCC

TEST - REPORT

FCC RULES PART 15 / SUBPART C

FCC ID:Q3N-3666BASE

Test report no.:

W6M20508-6144-P-15

ETS DR. GENZ TAIWAN PS CO., LTD.
6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU, TAIPEI 114, TAIWAN, R.O.C.
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TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	NOTES	3
1.2	TESTING LABORATORY	4
1.2.1	Location	4
1.2.2	Details of accreditation status	4
1.3	DETAILS OF APPROVAL HOLDER	4
1.4	APPLICATION DETAILS	5
1.5	GENERAL INFORMATION OF TEST ITEM	5
1.6	TEST STANDARDS	6
2	TECHNICAL TEST	7
2.1	SUMMARY OF TEST RESULTS	7
2.2	TEST ENVIRONMENT	7
2.3	TEST EQUIPMENT LIST	8
3	TEST RESULTS (ENCLOSURE)	13
3.1	PEAK OUTPUT POWER (TRANSMITTER)	14
3.2	EQUIVALENT ISOTROPIC RADIATED POWER	16
3.2.1	Transmitter	16
3.3	RF EXPOSURE COMPLIANCE REQUIREMENTS	16
3.4	OUT OF BAND RADIATED EMISSIONS	16
3.5	TRANSMITTER RADIATED EMISSIONS IN RESTRICTED BANDS	17
3.6	SPURIOUS EMISSIONS (TX)	18
3.7	CARRIER FREQUENCY SEPARATION	20
3.8	NUMBER OF HOPPING FREQUENCIES	21
3.8.1	Pseudorandom Frequency Hopping Sequence	21
3.8.2	Coordination of hopping sequences to other transmitters	21
3.8.3	System Receiver Hopping Capability	21
3.9	TIME OF OCCUPANCY (DWEIL TIME)	22
3.10	20DB BANDWIDTH	23
3.10.1	System Receiver Input Bandwidth	24
3.11	BAND-EDGE COMPLIANCE OF RF EMISSIONS	24
3.12	RADIATED EMISSIONS FROM RECEIVER SECTION OF TRANSCEIVER	25
3.13	POWER LINE CONDUCTED EMISSION	28
	APPENDIX	32
	APPENDIX A	33
	APPENDIX B	34
	APPENDIX C	35
	APPENDIX D	36
	APPENDIX E	37
	APPENDIX F	38
	APPENDIX G	39
	APPENDIX H	40

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

1 General Information**1.1 Notes**

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has Passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

The test report may only be reproduced or published in full.

Reproduction or publication of extracts from the report requires the prior written approval of the ETS DR. GENZ TAIWAN PS CO., LTD.

Tester:

15.09.2005

Orville Chang



Date

ETS-Lab.

Name

Signature

Technical responsibility for area of testing:

15.09.2005

Steven Chuang



Date

ETS

Name

Signature

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

1.2 Testing laboratory

1.2.1 Location

OATS

No.5-1, Shuang Sing Village,
LiShuei Rd., Wanli Township,
Taipei County 207, Taiwan (R.O.C.)

Company

ETS DR. GENZ TAIWAN PS CO., LTD.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA-registration number: 2300.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679

PTCRB Accredited Type Certification Test House

1.3 Details of approval holder

Name	: Syntech Information CO., LTD.
Street	: 12F, 333 Dunhua S. Rd., Sec.2
Town	: Taipei
Country	: Taiwan
Telephone	: +886-2-8647-1166
Fax	: +886-2-8732-2255
Contact	: Mr. Wen Chen
Telephone	: +886-2-8647-1166

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

1.4 Application details

Date of receipt of application : 29.08.2005
Date of receipt of test sample : 29.08.2005
Date of test : from 30.08.2005 to 14.09.2005

1.5 General information of Test item

Type of test item : Cradle
Model Number : 3666
Hardware : V.0.97
Software : V.1.98
Serial number : without
Photos : see Annex

Technical data

Frequency band : 2.4 GHz – 2.4835 GHz
Frequency (ch A) : 2.402 GHz
Frequency (ch B) : 2.441 GHz
Frequency (ch C) : 2.480 GHz

Transmitter

Unom

Power (ch A or ch 0) : **Conducted: -2.98 dBm**
Power (ch B or ch 39) : **Conducted: -2.34 dBm**
Power (ch C or ch 78) : **Conducted: -3.98 dBm**

Power supply : 5 VDC (AC/DC Adaptor)
Operation modes : duplex
Modulation Type : GFSK
Antenna Type : Chip Antenna
Antenna gain : 3.0 dBi

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Host device : none

Classification :

Fixed Device	☒
Mobile Device (Human Body distance > 20cm)	☐
Portable Device (Human Body distance < 20cm)	☐

Manufacturer:

(if applicable)

Name : ./.

Street : ./.

Town : ./.

Country : ./.

Additional information : The test sample is designed as 3666 device. Its pseudorandom hopping scheme, authentication, receiver parameters, synchronization procedure and other parameters are determined by 3666 Specification.

1.6 Test standards

Technical standard : FCC RULES PART 15 / SUBPART C § 15.247

Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.



2.2 Test environment

Temperature	: 25 °C
Relative humidity content	: 20 ... 75 %
Air pressure	: 86 ... 103 kPa
Details of power supply	: 5 VDC (AC/DC Adaptor)
Extrem conditions parameters	: test voltage : -- extreme min :-- V max :-- V

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2005/11/8
ETSTW-CE 002	PREREULATOR MODE DC POWER SUPPLY				
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2006/11/8
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2006/11/3
ETSTW-CE 006	IMPULS-BEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2006/11/10
ETSTW-CE 007	SPECTRUM ANALYZER 5GHz	FSB	849670/001	R&S	
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	ABSORPTIONS- MESSWANDLER- ZANGE	2006/11/4
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2005/5/10
ETSTW-CE 010	Comb Generator-conducted			ETS	
ETSTW-CE 011	Power Line Conducted Emission Only			ETS	
ETSTW-CE 012	Dual-Phase-V-Network	NNB-2/16Z	03/10201	Telemeter	2006/4/11
ETSTW-CS 001	SIGNAL GENERATOR	SMX	849254/003	R&S	2005/10/31
ETSTW-CS 002	COUPLING AND DECOUPLING NETWORK	CDN S751	19263	CHAFFNER	2006/11/3
ETSTW-CS 003	COUPLING AND DECOUPLING NETWORK	CDN T400	19820	CHAFFNER	2006/11/3
ETSTW-CS 004	COUPLING AND DECOUPLING NETWORK	CDN M016	20053	CHAFFNER	2006/11/3
ETSTW-CS 005	RF Power Amplifier	100A250A	306547	AR	2005/11/3
ETSTW-CS 006	Terminal 50O Load	50T-116 M		JFW	
ETSTW-CS 007	Terminal 50O Load	50T-116 F		JFW	
ETSTW-CS 008	6 dB Attenuator	HFP-5100-3/06 N M/F	2010876106		
ETSTW-RE 001	Controller	CD 1000	C01000/154/867 /004/L	Heinrich Deisel	
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	2005/11/3
ETSTW-RE 003	EMI TEST RECEIVER	ESI	831438/001	R&S	2005/11/16
ETSTW-RE 004	EMI TEST RECEIVER	ESI	831459/012	R&S	2005/11/9
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2005/11/1
ETSTW-RE 008	Controller	HD100	C0100-L/047/ 6670703/L	Heinrich Deisel	
ETSTW-RE 009	Controller	HD100	100/341	Heinrich Deisel	
ETSTW-RE 010	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070181	MOTECH	
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0036	397	K&L	
ETSTW-RE 014	DUAL TRACKING WITH 5V FIXED	GPC-3030D		GW	
ETSTW-RE 015	ANTENNA	HK116	841489/003	R&S	
ETSTW-RE 016	ANTENNA	HL223	848953/006	R&S	

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

ETSTW-RE 017	ANTENNA	HL025	352886/001	R&S	
ETSTW-RE 018	ANTENNA	AT4560	27212	AR	2006/11/7
ETSTW-RE 019	ANTENNA , HORN	22240-25	121074	FM	
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	
ETSTW-RE 021	SWEEP GENERATOR	SWM05	835130/010	R&S	2005/11/10
ETSTW-RE 022	AMPLIFIER	8447D	2944A09837	Agilent	2005/11/1
ETSTW-RE 023	Shielded room	SR 1		Frankonia	
ETSTW-RE 024	Anechoic Chamber	CHC 1		Frankonia	
ETSTW-RE 025	Anechoic Chamber	CHC 2		Frankonia	
ETSTW-RE 026	Open Area Test Site	10m		ETS	
ETSTW-RE 027	Passive Loop Antenna	6512	34563	EMCO	2006/6/29
ETSTW-RE 028	Log-Periodic DipoleArray Antenna	3148	34429	EMCO	2006/6/14
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2006/6/16
ETSTW-RE 030	Double-Ridged Waveguide Horn Antenna	3117	35224	EMCO	2006/5/4
ETSTW-RE 031	Comb Generator-radiated			ETS	
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2005/11/17
ETSTW-RE 033	4CH 1GHz 5GS/s DSO	WAVERUNNER 6100A	LCRY0604P14508	LeCory	
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2005/11/17
ETSTW-RE 035	1.5GHz Active Voltage Probe	HFP1500	2332	LeCory	
ETSTW-RE 036	100MHz High Voltage Diff Probe	ADP305	3305	LeCory	
ETSTW-RE 037	Log-Periodic DipoleArray Antenna	3148	00034546	EMCO	2006/11/17
ETSTW-RE 038	Log-Periodic DipoleArray Antenna	3148	00034547	EMCO	2006/11/17
ETSTW-RE 039	Biconical Antenna	3110B	41760	EMCO	2006/11/17
ETSTW-RE 040	Biconical Antenna	3110B	41761	EMCO	2006/11/17
ETSTW-RE 041	Anechoic Chamber	CHC 3		Frankonia	
ETSTW-RE 042	ANTENNA	HK116	100172	R&S	2007/1/13
ETSTW-RE 043	ANTENNA	HL223	100166	R&S	2006/4/15
ETSTW-RE 044	ANTENNA	HL050	100094	R&S	
ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2006/3/21
ETSTW-EMI 001	HARMONICS 1000	HAR1000-1P	93	EMC-PARTNER	2005/11/17
ETSTW-EMS 001	Clamp BASELSTRASSE 160 CH-4242 LAUFEN	CN-EFT1000	354	EMC-PARTNER	2005/11/1
ETSTW-EMS 002	Frequency Converter	YF-6020	0308014		
ETSTW-EMS 003	EMC Immunity Test System	TRA2000IN6	579	EMC-PARTNER	2005/11/1
ETSTW-EMS 004	ESD generator minizap	ESD2000	016	EMC-PARTNER	2005/11/1
ETSTW-EMS 005	Attenautor (500)	VERI50	051	EMC-PARTNER	2006/8/30
ETSTW-EMS 006	Attenautor (1 KO)	VERI1K	019	EMC-PARTNER	2006/10/20
ETSTW-EMS 007	20GO Divider	ESD-VERI-V	021	EMC-PARTNER	2006/3/16
ETSTW-RS 001	14" COLOR VIDEO MONITOR	TP-1480HR	P009799	TOPICA	
ETSTW-RS 002	14" COLOR VIDEO MONITOR	TP-1480HR	P009814	TOPICA	
ETSTW-RS 003	RF Power Amplifier	30S1G3	306933	AR	

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

ETSTW-RS 004	RF Power Amplifier	150W1000	307009	AR	2005/11/18
ETSTW-RS 005	Electric Field Probe Type 8.3	EMR-20	BN 2244/20	GW	2005/9/3
ETSTW-RS 006	SIGNAL GENERATOR	SML03	101551	R&S	2005/11/15
ETSTW-RS 007	AUDIO ANALYZER	UPA3	843458/029	R&S	2005/11/15
ETSTW-EMS 008	Safety Test Solutions	ELT-400	E-0039	Narda	2006/1/3
ETSTW-EMS 009	Magnetic Field Antenna	MF1000-1	104	EMC-PARTNER	2006/12/2
ETSTW-GSM 01	SIM Simulator	IT3	B2004-50106	ORGA	
ETSTW-GSM 02	Universal Radio Communication Tester	CMU 200	103489	R&S	
ETSTW-GSM 03	Agilent 8960 Test Set 1	E5515C	GB44052675	Agilent	2006/7/13
ETSTW-GSM 04	Agilent 8960 Test Set 2	E5515C	GB44052665	Agilent	2006/7/13
ETSTW-GSM 05	Agilent 8960 Test Set 3	E5515C	GB44052852	Agilent	2006/7/16
ETSTW-GSM 06	Agilent 8960 Test Set 4	E5515C	GB44052984	Agilent	2006/7/15
ETSTW-GSM 07	Agilent 8960 Test Set 5	E5515C	GB44052658	Agilent	2006/7/13
ETSTW-GSM 08	Agilent 8960 Test Set 6	E5515C	GB44052666	Agilent	2006/7/15
ETSTW-GSM 09	Controler PC	Dell GX 270	700F61J	Dell	
ETSTW-GSM 10	Combiner Wessex / Anite	B4605/100	053	Wessex / Anite	2006/7/13
ETSTW-GSM 11	GSM 850,900,1800,1900 Test system	TS8950G		R&S	2005/10/31
ETSTW-GSM 12	Acoustical Calibrator	4231	2463874	Brüel&Kjær	2005/11/17
ETSTW-GSM 13	Conditioning Amplifier	2690--0S2	2437856	Brüel&Kjær	
ETSTW-GSM 14	Telephone Test Head	4602B	2465324	Brüel&Kjær	
ETSTW-GSM 15	Mouth Simulator	4227	2462516	Brüel&Kjær	
ETSTW-GSM 16	TEMP.&HUMIDITY CHAMBER	GTH-120-40-1P-U	MAA0501002	GIANT FORCE	2005/12/29
ETSTW-GSM 17	ANTENNT COPLER	CMU-Z10	100988	R&S	
ETSTW-GSM 18	AUDIO ANALYZER	UPL16	100173	R&S	2005/9/23
ETSTW-GSM 19	Band Reject Filter	WRCTF824/849-822/851-40/12+9SS	3	WI	
ETSTW-GSM 20	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	
ETSTW-GSM 21	Band Reject Filter	WRCD1879.5/ 1880.5-1875.5/ 1884.5-32/5SS	3	WI	
ETSTW-GSM 22	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50μH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient. temperature of the UUT was 23°C with a humidity of 40 %.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBμV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dBμV + 10.36 dB + 6 dB = 36.36 dBμV/m @3m

The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2003 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by ETS Dr. Genz Taiwan PS Co., Ltd. at the registered open field test site located No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.). The Registration Number: 930600.

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:

Average = Peak + Duty Factor

Duty Factor = $20 \log (\text{dwell time}/T)$

T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

ANTENNA & GROUND:

This unit uses Chip antenna.

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3 Test results (enclosure)

TEST CASE	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.247(b)	☒	☒	☐
Equivalent radiated Power	15.247(b)	☒	☒	☐
Spurious Emissions radiated – Transmitter operating	15.247(c)	☒	☒	☐
Spurious Emissions conducted – Transmitter operating	15.247	☐	☐	☐
Carrier Frequency Separation	15.247(a) (1)	☒	☒	☐
Number of Hopping Frequencies	15.247(a) (1)(i)	☒	☒	☐
Time of Occupancy (Dwell Time)	15.247(a) (1)(i)	☒	☒	☐
20 dB Bandwidth	15.247(a) (1)(i)	☒	☒	☐
Band-edge Compliance of RF Emission	15.247(c)	☒	☒	☐
Radiated Emission from Digital Part And Receiver L.O.	15.109	☒	☒	☐
Power Line Conducted Emission	15.207(a)	☒	☒	☐

The follows is intended to leave blank.

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.1 Peak Output Power (transmitter)

FCC Rule: 15.247

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

Test conditions		Conducted Power		
		Channel A [dBm]	Channel B [dBm]	Channel C [dBm]
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	-2.98	-2.34	-3.98
Measurement uncertainty		< 3 dB		

Test conditions		Radiated Power		
		Channel A [dBm]	Channel B [dBm]	Channel C [dBm]
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	--	--	--
Measurement uncertainty		< 3 dB		

Test conditions		Radiated Power		
		Channel A [dBm]	Channel B [dBm]	Channel C [dBm]
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	--	--	--
Measurement uncertainty		< 3 dB		

Test conditions		Radiated Power		
		Channel A [dBm]	Channel B [dBm]	Channel C [dBm]
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	--	--	--
Measurement uncertainty		< 3 dB		

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Test conditions $T_{nom} = 25^{\circ}\text{C}$, $V_{nom} = 5\text{ VDC}$ Frequency[MHz]	Signal Field strength TX highest power mode dB $\mu\text{V/m}$
2441	95.59
Measurement uncertainty	< 3 dB

The diagrams for the field strength measurements are included in Appendix.

Maximum Peak Output Power

Limits:

Frequency MHz	Number of hopping channels			
	≥ 75	≥ 50	$49 \geq 25$	$74 \geq 15$
902-928		30 dBm	24 dBm	
2400-2483.5 MHz	30 dBm	-		21 dbm
5725-5850 MHz	30 dBm	-		

In case of employing transmitter antennas having antenna gain >dBi and using fixed point-to point operation consider §15.247 (b)(4).

Test equipment used: ETSTW-RE 003, ETSTW-RE 012, ETSTW-RE 017, ETSTW-RE 024

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.2 Equivalent isotropic radiated power

FCC Rule: 15.239(b), 15.35

Because using an internal antenna there are no deviations from the radiated test results according 3.1.

3.2.1 Transmitter

Integral Antenna:

At the transmitter the measurement was transacted with the modulation declared by the manufacturer and the maximum available output power of the EUT.

In this arrangement the EUT fulfils the requirements of the FCC rules §15.247, subpart C, section b. This unit uses an internal antenna. There is no provision for an external antenna (see photo).

3.3 RF Exposure Compliance Requirements

According to Supplement C, Edition 01-01 to OET Bulletin 65, Edition 97-01 this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.

The antenna used for this Bluetooth transceiver module must not be co-located or operating in conjunction with any other antenna or transmitter.

3.4 Out of Band Radiated Emissions

FCC Rule: 15.247(c) , 15.35

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Limits:

For frequencies below 1GHz :

Max. reading – 20 dB

95.59 dBμV/m- 20 dB= 75.59 dBμV/m

Guidance on Measurement of FHSS Systems:

“If the emission is pulsed, modify the unit for continuous operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.” Here the correction was added to the limit instead subtracted from the reading.

Duty Cycle correction = $20 \log (\text{dwell time}/100\text{ms})$

For frequencies above 1GHz (Peak measurements).

Limit = max. aver. reading-20dB +20dB(because Peak detector is used)

75.59 dBμV/m

For frequencies above 1GHz (Average measurements).

Max. reading – 20 dB - duty cycle correction:

No duty cycle correction was added to the reading

95.59 dBμV/m- 20 dB= 75.59 dBμV/m

Remarks: See attached diagrams.

Test equipment used: ETSTW-CE 003 , ETSTW-RE 003

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.5 Transmitter Radiated Emissions in restricted Bands

FCC Rules: 15.247 (c), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 26000 MHz.

For radiated emission tests, the analyzer setting was as followings:

RES BW VID BW

Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)

Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)

1 MHz 1 MHz (Average measurements)

Limits:

For frequencies below 1GHz :

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of FHSS Systems:

“If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.” Here the correction was added to the limit instead subtracted from the reading.

Duty cycle correction = $20 \log (\text{dwell time}/100\text{ms})$

For frequencies above 1GHz (Average measurements).

Limit – duty cycle correction

No duty cycle correction was added to the reading.

54.0dB μ V/m

For frequencies above 1GHz (Peak measurements).

Limit + 20dB

54.0dB μ V/m + 20 dB= 74 dB μ V/m

Remarks: See attached diagrams.

Test equipment used: ETSTW-RE 003, ETSTW-RE 012, ETSTW-RE 015, ETSTW-RE 016,
ETSTW-RE 017, ETSTW-RE 024

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.6 Spurious emissions (tx)

Spurious emission was measured with modulation (declared by manufacturer).

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to point 2.3.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

If in the column's correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the "Marker-Delta-Method" or the „Duty-Cycle Correction Factor“.

Summary table with radiated data of the test plots

Freq	Used Ch	Frequency Marker [MHz]	Polarization	corrections dB	Corrected Reading [dBuV/m]	Compliance Limit [dBuV/m]	Detector	BW [MHz]	Margin
1	0	167.635	H		33.29	43.5	PK	0.1	10.21
2	0	257.715	H		35.88	46	PK	0.1	10.12
3	0	1234.468	H		43.48	54	PK	1	10.52
3	0	1603.468	H		46.11	54	PK	1	7.89
3	0	2394.208	H		48.15	54	PK	1	5.85
3	0	3248.496	H		48.76	54	PK	1	5.24
4	0	4803.938	H		50.02	54	PK	1	3.98
1	0	167.635	V		39.38	43.5	PK	0.1	4.12
2	0	257.715	V		37.27	46	PK	0.1	8.73
3	0	1234.468	V		41.31	54	PK	1	12.69
3	0	1603.468	V		43.21	54	PK	1	10.79
3	0	2394.208	V		46.26	54	PK	1	7.74
3	0	3248.496	V		46.06	54	PK	1	7.94
4	0	4803.938	V		49.68	54	PK	1	4.32

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Freq	Used Ch	Frequency Marker [MHz]	Polarization	corrections dB	Corrected Reading [dBuV/m]	Compliance Limit [dBuV/m]	Detector	BW [MHz]	Margin
1	39	167.975	H		33.51	43.5	PK	0.1	9.99
2	39	240.08	H		38.02	46	PK	0.1	7.98
2	39	265.731	H		34.06	46	PK	0.1	11.94
3	39	1629.254	H		47.76	54	PK	1	6.24
4	39	4881.969	H		49.33	54	PK	1	4.67
1	39	167.975	V		37.35	43.5	PK	0.1	6.15
2	39	240.08	V		33.89	46	PK	0.1	12.11
2	39	265.731	V		31.65	46	PK	0.1	14.35
3	39	1629.254	V		43.24	54	PK	1	10.76
4	39	4881.969	V		50.02	54	PK	1	3.98
1	78	168.3166	H		33.71	43.5	PK	0.1	9.79
2	78	256.1122	H		33.30	46	PK	0.1	12.7
2	78	260.921	H		33.12	46	PK	0.1	12.88
3	78	1655.31	H		46.72	54	PK	1	7.28
4	78	4960.312	H		50.11	54	PK	1	3.89
1	78	168.3166	V		37.88	43.5	PK	0.1	5.62
2	78	256.1122	V		38.24	46	PK	0.1	7.76
2	78	260.921	V		37.59	46	PK	0.1	8.41
3	78	1655.31	V		44.50	54	PK	1	9.5
4	78	4960.312	V		49.31	54	PK	1	4.69

All other not noted test plots do not contain significant test results in relation to the limits.

TEST RESULT (Transmitter): The unit DOES meet the FCC requirements.

Test equipment used: ETSTW-RE 003, ETSTW-RE 012, ETSTW-RE 015, ETSTW-RE 016,
ETSTW-RE 017, ETSTW-RE 024

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.7 Carrier Frequency Separation

Carrier Frequency Separation was measured with modulation (declared by manufacturer).

According to FCC rules part 15 subpart C §15.247 frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.

Test conditions		Channel Separation	
		Channel B	Channel B+1
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5 \text{ VDC}$	997.99599198 kHz	
Measurement uncertainty		< 10 Hz	

Limits:

Frequency Range MHz	Limits	
	20 dB bandwidth < 25 kHz	20 dB bandwidth > 25 kHz
902-928	25 kHz	20 dB bandwidth
2400-2483.5 5725-5850.0	25 kHz	20 dB bandwidth

Test equipment used: ETSTW-CE 003, ETSTW-RE 003

Comment: see attached diagram

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.8 Number of Hopping Frequencies

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies. Frequency hopping systems in 5725-5850 MHz bands shall use least 75 hopping frequencies.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20dB bandwidth of the hopping channel 250 kHz or greater, the system shall use at least 25 hopping frequencies.

Test conditions		Operating Mode	Number of Channels
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	normal transmitting	79
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5\text{ VDC}$	Inquiry mode	32

Limits:

Frequency Range MHz	Limit			
	20dB Bandwidth		20dB Bandwidth < 250 kHz	20dB Bandwidth ≥ 250 kHz
	= 1MHz			
902-928 MHz			≥ 50	≥ 25
2400-2483.5	≥ 15	≥ 15		
5725-5850.0 MHz	≥ 75			

Test equipment used: ETSTW-CE 003 , ETSTW-RE 003

Comment: see attached diagrams

3.8.1 Pseudorandom Frequency Hopping Sequence

The generation of the hopping sequence is determined by the Bluetooth cord specification and complies with the FCC requirements.

3.8.2 Coordination of hopping sequences to other transmitters

According to the Bluetooth core specification V1.1 such a coordination is not possible. During scatternet function only one of the two hopping sequences will be used at a definite moment.

3.8.3 System Receiver Hopping Capability

According to the Bluetooth core specification. The system receivers shift frequencies in synchronization with the transmitted signals.

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.9 Time of Occupancy (Dwell Time)

Frequency hopping systems operating in the 5725-5850 MHz band shall use an average time of occupancy on any frequency not greater than 0.4 seconds within a 30 second period.

In 2400-2483,5 MHz band the average time of occupancy on any channel shall not be greater than 0,4 seconds multiplied by the number of hopping channels employed.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not greater than 0.4 seconds within a 20 second period; if the 20dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test conditions	Operating mode	Measurement periode	Time of Occupancy
$T_{nom} = 25^{\circ}C$ $V_{nom} = 5 \text{ VDC}$ Channel B	normal transmitting		298.594 ms
	inquiry mode		36.86 ms
Measurement uncertainty	< 1 μs		

Limits and measurement periods:

Frequency MHz	Number of channels	Measurement Periode	Limit
902 – 928	≥ 50	20 s	0,4 s
	$49 \geq 25$	10 s	0,4 s
2400 – 2483,5	≥ 15	0,4 s * number of used channels	0,4 s
5725- 5850	≥ 75	30 s	0,4s

Test equipment used: ETSTW-CE 003 , ETSTW-RE 003

Comment: See attached diagram, which show the On-time and the number of counted events during the measurement period

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.10 20dB Bandwidth

Frequency hopping systems operating in the 5725-5850 MHz bands shall use a maximum 20dB bandwidth of 1 MHz.

The 20dB bandwidth is measured on the lowest, middle and highest hopping channel.

For frequency hopping systems operating in the 902-928 MHz band the maximum 20dB bandwidth of the hopping channel is 500 kHz.

Test conditions		20 dB Bandwidth		
		Channel A	Channel B	Channel C
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5 \text{ VDC}$	969.93987976 kHz	961.92384770 kHz	977.95591182 kHz
Measurement uncertainty		< 10 Hz		

Limits:

Frequency Range / MHz	Number of channels	Limit
902-928	< 50	< 250 kHz
	$49 \geq 25$	500 kHz $\geq$ 250 kHz
2400-2483.5	≥ 15	not determined
5725-5850	75	= 1 MHz

Test equipment used: ETSTW-CE 003 , ETSTW-RE 003

Comment: see attached diagram

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.10.1 System Receiver Input Bandwidth

It is determined in the Bluetooth core specification. The value matches to the bandwidth of transmitter signal.

3.11 Band-edge Compliance of RF Emissions

According to FCC rules part 15 subpart C §15.247(c) in any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required.

In addition radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also with the radiated emission limits.

Test conditions		Attenuation at or outside band-edges Single Frequency	
		Lower Band-edge	Upper Band-edge
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5 \text{ VDC}$	54.39 dB	54.34 dB
Measurement uncertainty		< 100 Hz	

Test conditions		Attenuation at or outside band-edges Hopping Frequency	
		Lower Band-edge	Upper Band-edge
$T_{nom} = 25^{\circ}\text{C}$	$V_{nom} = 5 \text{ VDC}$	34.73 dB	49.49 dB
Measurement uncertainty		< 100 Hz	

Limits:

Frequency Range / MHz	Limit
902 – 928	- 20 dB
2400 – 2483.5	
5725 - 5850	

Test equipment used: ETSTW-CE 003 , ETSTW-RE 003

Comment: see attached diagrams

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.12 Radiated Emissions from Receiver Section of Transceiver

FCC Rule: 15.109

Summary table with radiated data of the test plots

Freq	Used Ch	Frequency Marker [MHz]	Polarization	corrections dB	Corrected Reading [dBuV/m]	Compliance Limit [dBuV/m]	Detector	BW [MHz]	Margin
1	0	104.949	H		25.51	43.5	PK	0.1	17.99
1	0	165.931	H		31.44	43.5	PK	0.1	12.06
2	0	257.715	H		27.79	46	PK	0.1	18.21
2	0	432.464	H		31.99	46	PK	0.1	14.01
3	0	1603.202	H		42.17	54	PK	1	11.83
3	0	2402.08	H		39.11	54	PK	1	14.89
1	0	104.949	V		24.49	43.5	PK	0.1	19.01
1	0	165.931	V		34.11	43.5	PK	0.1	9.39
2	0	257.715	V		31.70	46	PK	0.1	14.3
2	0	432.464	V		34.46	46	PK	0.1	11.54
3	0	1603.202	V		39.12	54	PK	1	14.88
3	0	2402.08	V		38.75	54	PK	1	15.25
1	39	144.468	H		26.85	43.5	PK	0.1	16.65
1	39	167.975	H		31.95	43.5	PK	0.1	11.55
2	39	257.715	H		29.02	46	PK	0.1	16.98
2	39	432.464	H		31.53	46	PK	0.1	14.47
3	39	1629.25	H		43.33	54	PK	1	10.67
3	39	2441.002	H		38.71	54	PK	1	15.29
1	39	144.468	V		30.55	43.5	PK	0.1	12.95
1	39	167.975	V		31.61	43.5	PK	0.1	11.89
2	39	257.715	V		31.59	46	PK	0.1	14.41
2	39	432.464	V		34.39	46	PK	0.1	11.61
3	39	1629.25	V		40.59	54	PK	1	13.41
3	39	2441.002	V		38.99	54	PK	1	15.01
1	78	144.468	H		28.87	43.5	PK	0.1	14.63
1	78	165.931	H		30.35	43.5	PK	0.1	13.15
2	78	256.112	H		27.87	46	PK	0.1	18.13
2	78	432.464	H		32.04	46	PK	0.1	13.96
3	78	1655.298	H		44.05	54	PK	1	9.95
3	78	2480.802	H		38.12	54	PK	1	15.88
1	78	144.468	V		31.01	43.5	PK	0.1	12.49
1	78	165.931	V		31.74	43.5	PK	0.1	11.76
2	78	256.112	V		32.07	46	PK	0.1	13.93

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

2	78	432.464	V		34.90	46	PK	0.1	11.1
3	78	1655.298	V		40.72	54	PK	1	13.28
3	78	2480.802	V		37.99	54	PK	1	16.01

Charging mode

Freq	Used Ch	Frequency Marker [MHz]	Polarization	corrections dB	Corrected Reading [dBuV/m]	Compliance Limit [dBuV/m]	Detector	BW [MHz]	Margin
1		34.428	V		38.68	40	PK	0.1	1.32
1		55.21	V		39.61	40	PK	0.1	0.39
1		69.178	V		35.96	40	PK	0.1	4.04
1		126.753	V		40.85	43.5	PK	0.1	2.65
1		167.294	V		31.62	43.5	PK	0.1	11.88
1		55.21	H		34.37	40	PK	0.1	5.63
1		69.178	H		33.49	40	PK	0.1	6.51
1		119.599	H		38.49	43.5	PK	0.1	5.01
1		167.975	H		30.63	43.5	PK	0.1	12.87
2		256.112	V		29.79	46	PK	0.1	16.21
2		672.945	V		37.68	46	PK	0.1	8.32
2		820.440	V		41.46	46	PK	0.1	4.54
2		259.318	H		28.51	46	PK	0.1	17.49
2		661.723	H		34.36	46	PK	0.1	11.64

Active mode

Freq	Used Ch	Frequency Marker [MHz]	Polarization	corrections dB	Corrected Reading [dBuV/m]	Compliance Limit [dBuV/m]	Detector	BW [MHz]	Margin
1		55.21	V		36.36	40	PK	0.1	3.64
1		135.27	V		36	43.5	PK	0.1	7.5
1		134.929	H		35.27	43.5	PK	0.1	8.23
1		166.953	H		33.26	43.5	PK	0.1	10.24
2		727.454	V		36.02	46	PK	0.1	9.98
2		432.464	V		32.37	46	PK	0.1	13.63
2		496.593	H		39	46	PK	0.1	7
2		828.456	H		38.31	46	PK	0.1	7.69

Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

Test equipment used: ETSTW-RE 015, ETSTW-RE 016, ETSTW-RE 017, ETSTW-CS 001,
ETSTW-RE 026, ETSTW-RE 003, ETSTW-RE 025

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

3.13 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Frequency	Level (dB μ V)	
	quasi-peak	average
150 kHz	lower limit line	Lower limit line

Measurement Result: “_ Fin AV”

Charging mode

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance AVLlimit [dBuV]	BW [MHz]	Margin(AV)
1	0.2	N	40.7	54.571429	0.01	13.87
1	0.295	N	43.6	51.857143	0.01	8.26
1	0.37	N	15.9	49.714286	0.01	33.81
1	0.495	N	30.6	46.142857	0.01	15.54
1	4.345	N	5.4	46	0.01	40.60

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance AVLlimit [dBuV]	BW [MHz]	Margin(AV)
1	0.2	L1	40.8	54.571429	0.01	13.77
1	0.195	L1	45.1	54.714286	0.01	9.61
1	0.39	L1	30	49.142857	0.01	19.14
1	0.49	L1	36.4	46.285714	0.01	9.89
1	2.94	L1	20.5	46	0.01	25.50
1	3.725	L1	15.1	46	0.01	30.90
1	4.015	L1	24.7	46	0.01	21.30
1	4.31	L1	15.2	46	0.01	30.80

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Active mode

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance AVLlimit [dBuV]	BW [MHz]	Margin(AV)
1	0.2	N	41.8	54.571429	0.01	12.77
1	0.3	N	41.2	51.714286	0.01	10.51
1	0.495	N	40	46.142857	0.01	6.14
1	1.19	N	28.9	46	0.01	17.10
1	3.96	N	30.9	46	0.01	15.10
1	8.915	N	34.6	50	0.01	15.40

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance AVLlimit [dBuV]	BW [MHz]	Margin(AV)
1	0.2	L1	43.6	54.571429	0.01	10.97
1	0.3	L1	43.6	51.714286	0.01	8.11
1	0.495	L1	39.6	46.142857	0.01	6.54
1	0.695	L1	28.7	46	0.01	17.30
1	3.075	L1	27.6	46	0.01	18.40
1	11.59	L1	34.6	50	0.01	15.40
1	20.605	L1	30.6	50	0.01	19.40

Measurement Result: “_ Fin QP”

Charging mode

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance QPLimit [dBuV]	BW [MHz]	Margin(QP)
1	0.2	N	55.3	64.571429	0.01	9.27
1	0.295	N	50.7	61.857143	0.01	11.16
1	0.37	N	43.3	59.714286	0.01	16.41
1	0.495	N	39.1	56.142857	0.01	17.04
1	4.345	N	15.1	56	0.01	40.90

Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance QPLimit [dBuV]	BW [MHz]	Margin(QP)
1	0.2	L1	55.4	64.571429	0.01	9.17
1	0.195	L1	56.2	64.714286	0.01	8.51
1	0.39	L1	48.5	59.142857	0.01	10.64
1	0.49	L1	44.4	56.285714	0.01	11.89
1	2.94	L1	33.2	56	0.01	22.80
1	3.725	L1	27.8	56	0.01	28.20
1	4.015	L1	35.8	56	0.01	20.20
1	4.31	L1	29.3	56	0.01	26.70

Active mode

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance QPLimit [dBuV]	BW [MHz]	Margin(QP)
1	0.2	N	50.5	64.571429	0.01	14.07
1	0.3	N	42.7	61.714286	0.01	19.01
1	0.495	N	41.6	56.142857	0.01	14.54
1	1.19	N	32.7	56	0.01	23.30
1	3.96	N	34.4	56	0.01	21.60
1	8.915	N	39.1	60	0.01	20.90

Freq	Frequency Marker [MHz]	Type	Corrected Reading [dBuV]	Compliance QPLimit [dBuV]	BW [MHz]	Margin(QP)
1	0.2	L1	52.9	64.571429	0.01	11.67
1	0.3	L1	41.8	61.714286	0.01	19.91
1	0.495	L1	42.14	56.142857	0.01	14.00
1	0.695	L1	33.2	56	0.01	22.80
1	3.075	L1	36.1	56	0.01	19.90
1	11.59	L1	38.6	60	0.01	21.40
1	20.605	L1	35.0	60	0.01	25.00

Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Limits:

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test is not required if the sample is using a battery.

Test equipment used: ETSTW-CE 004, ETSTW-CE 001, ETSTW-RE 023

Comment: see attached diagram

Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix

- A Peak Output Power
- B Carrier Frequency Separation
- C Number of Hopping Frequencies
- D Time of Occupancy (Dwell Time)
- E 20dB Bandwidth
- F Band-edge Compliance of RF Conducted Emissions
- G Power Line Conducted Emission
- H Pictures



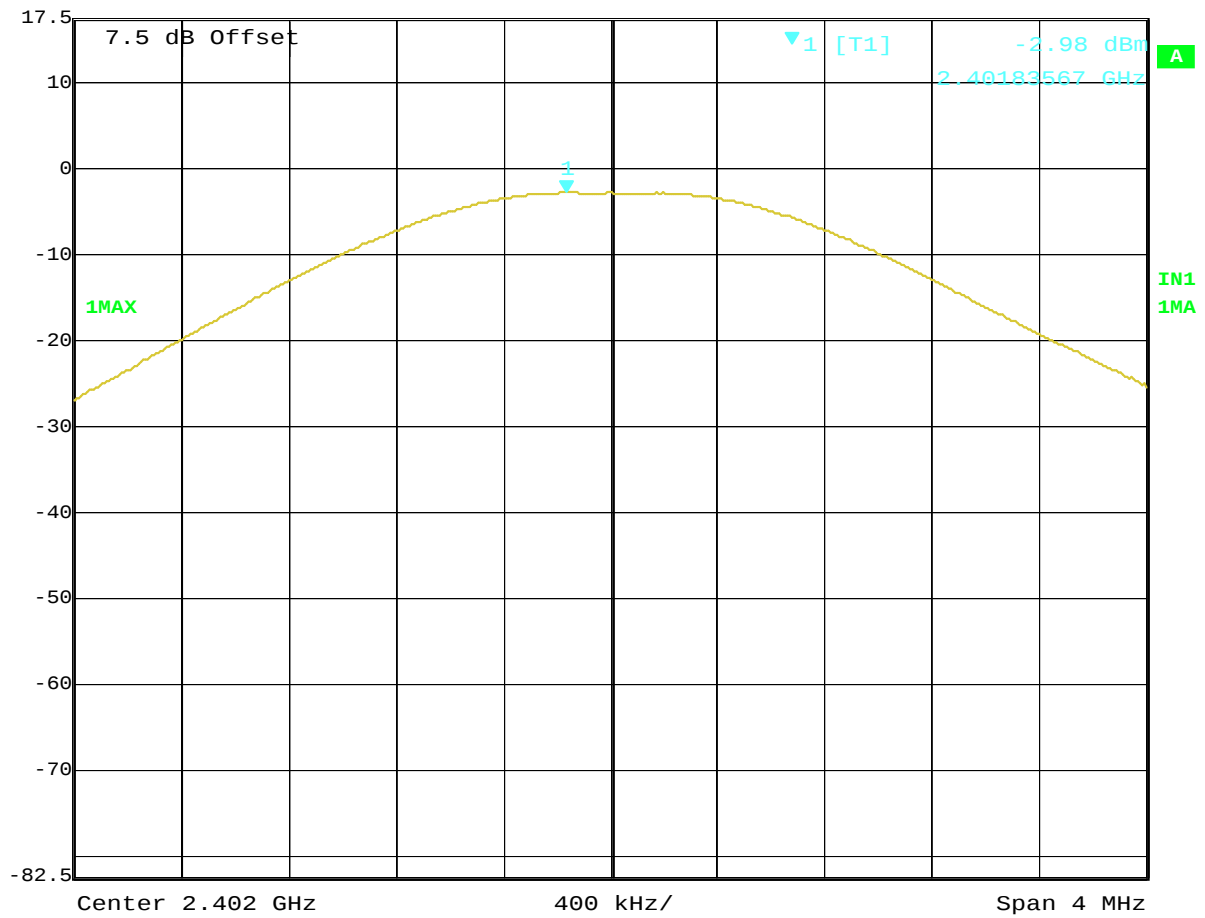
Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix A

Peak Output Power



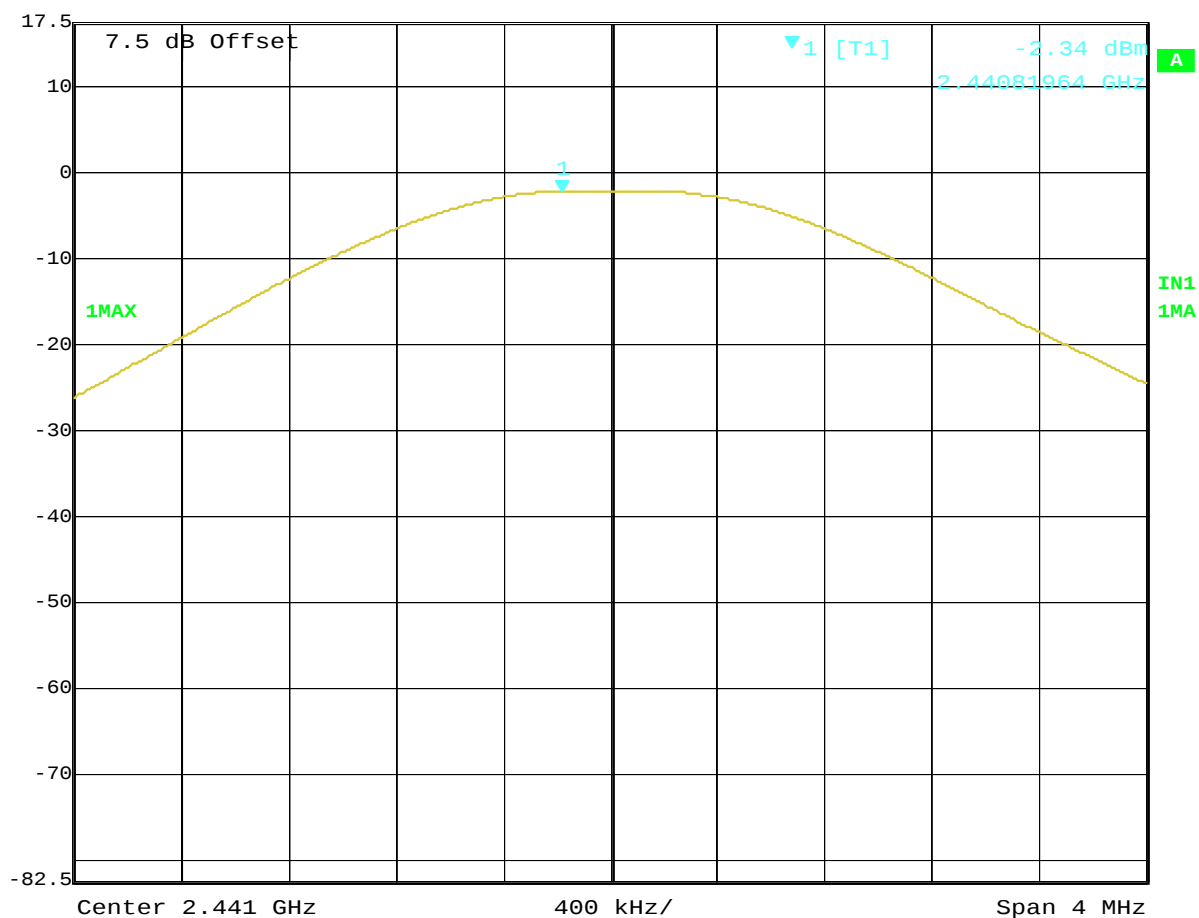
Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -2.98 dBm VBW 1 MHz
17.5 dBm 2.40183567 GHz SWT 200 ms Unit dBm



Title: MAX OUTPUT POWER CHO
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:20:36



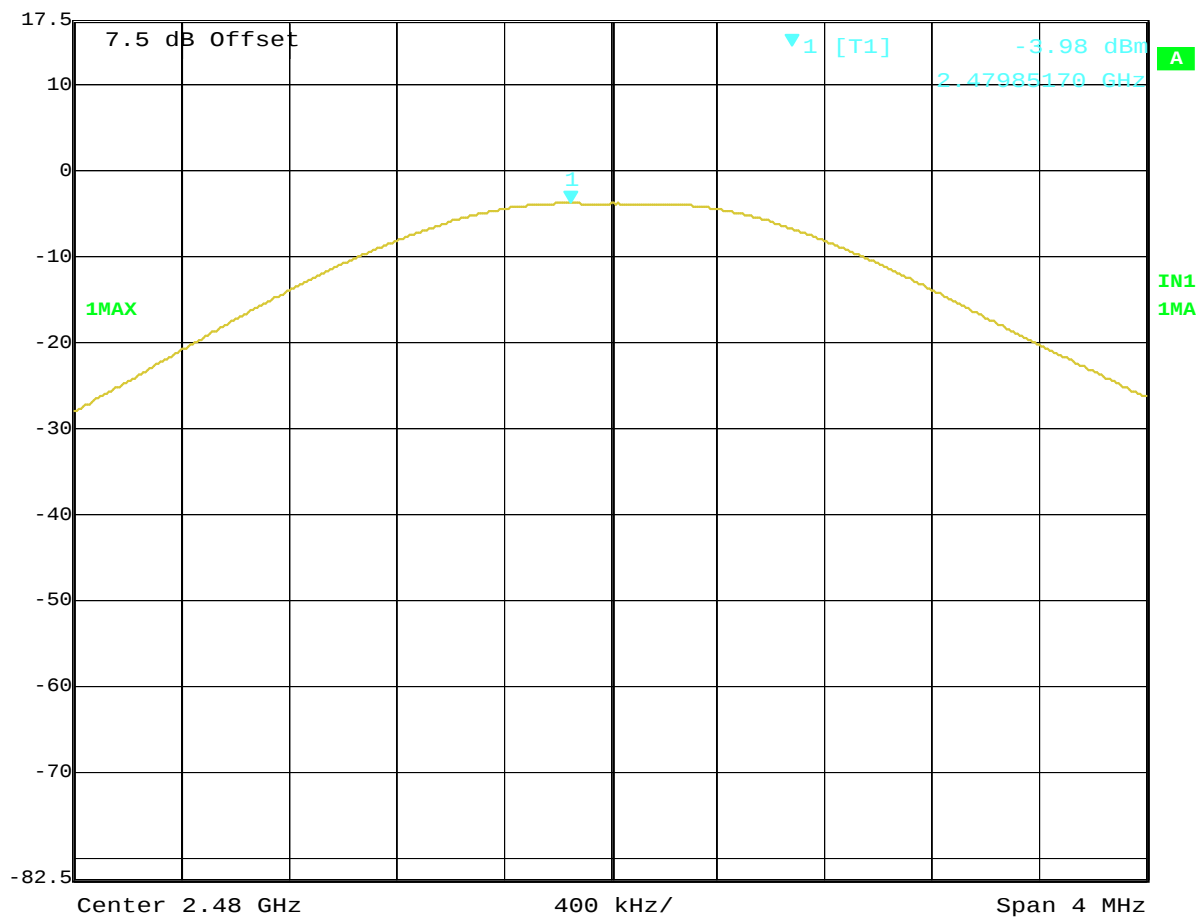
Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -2.34 dBm VBW 1 MHz
17.5 dBm 2.44081964 GHz SWT 200 ms Unit dBm



Title: MAX OUTPUT POWER CH39
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:24:58



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -3.98 dBm VBW 1 MHz
17.5 dBm 2.47985170 GHz SWT 200 ms Unit dBm



Title: MAX OUTPUT POWER CH80
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:24:08



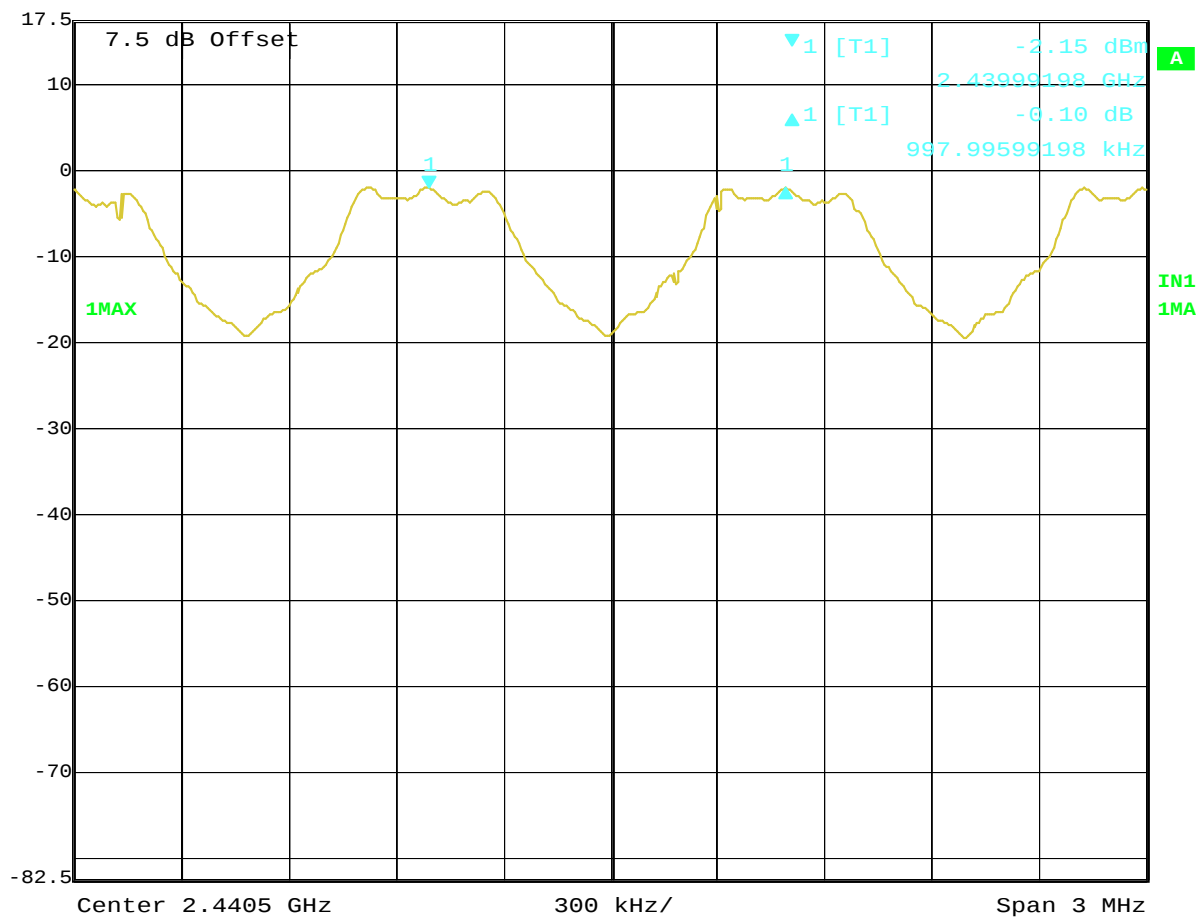
Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix B

Carrier Frequency Separation



Ref Lvl 17.5 dBm Delta 1 [T1] -0.10 dB RBW 100 kHz RF Att 20 dB
997.99599198 kHz VBW 100 kHz Unit dBm
SWT 200 ms



Title: FREQUENCY SEPARATION CH38 AND CH39
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:45:41

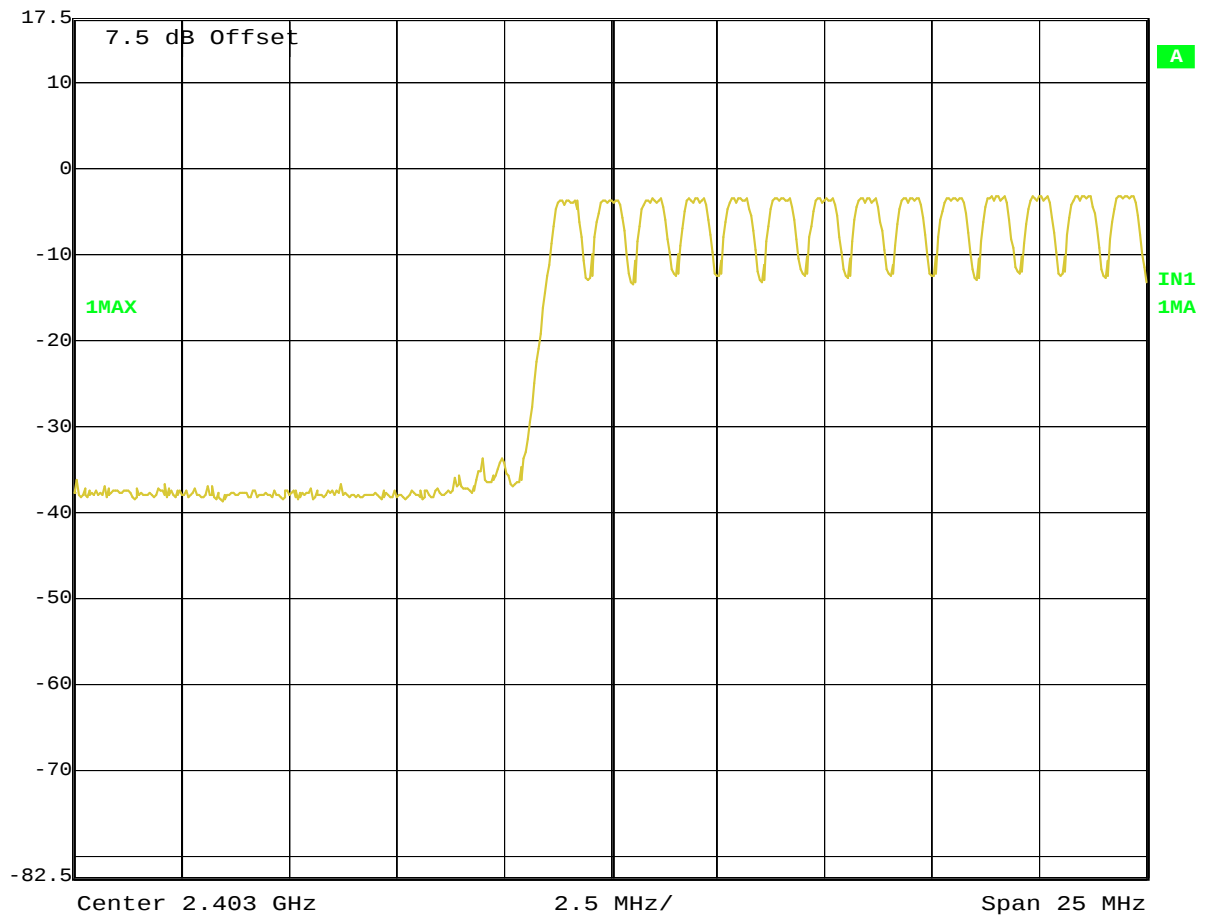
Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix C

Number of Hopping Frequencies



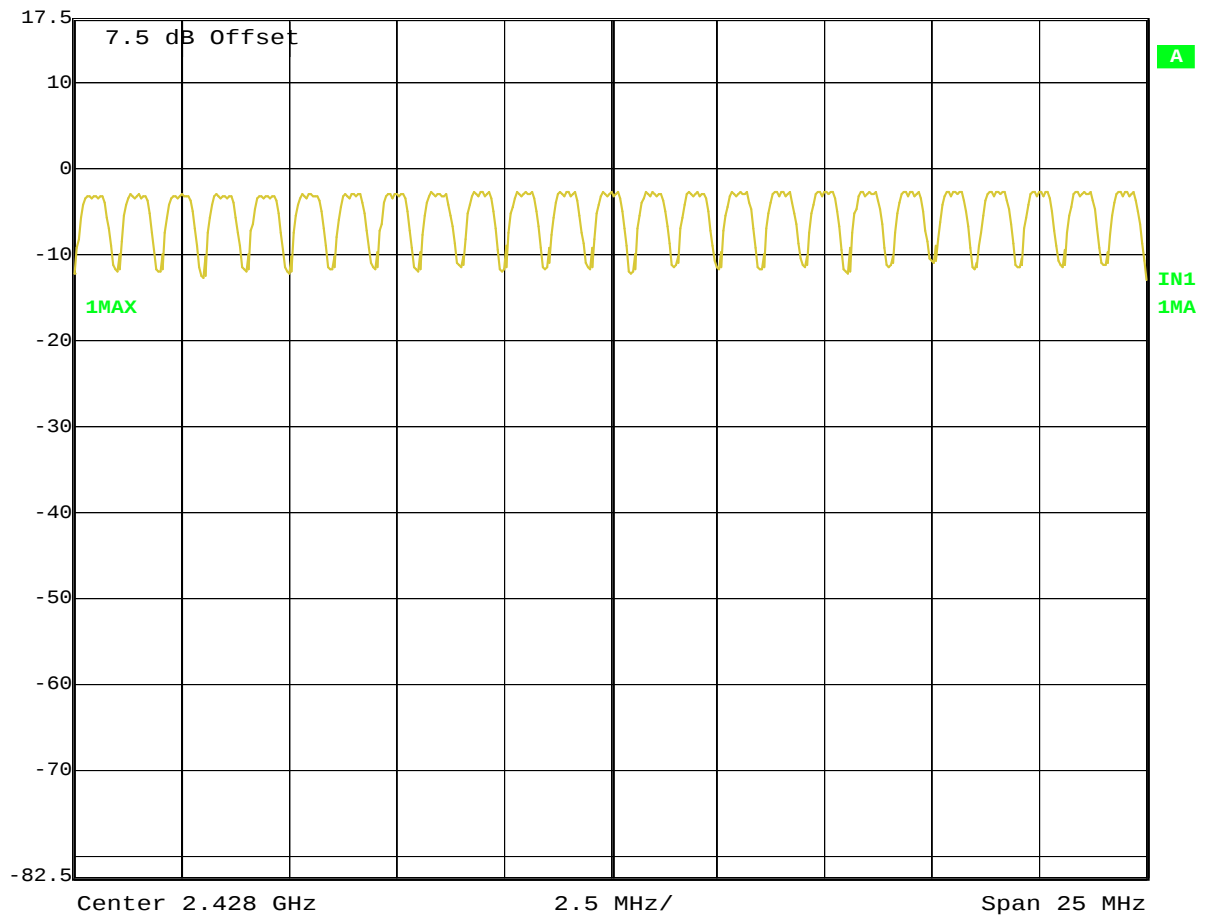
Ref Lvl 17.5 dBm
RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



Title: NUMBER OF HOPPING FREQUENCIES (CH.: 0-13)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:28:09



Ref Lvl 17.5 dBm RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm

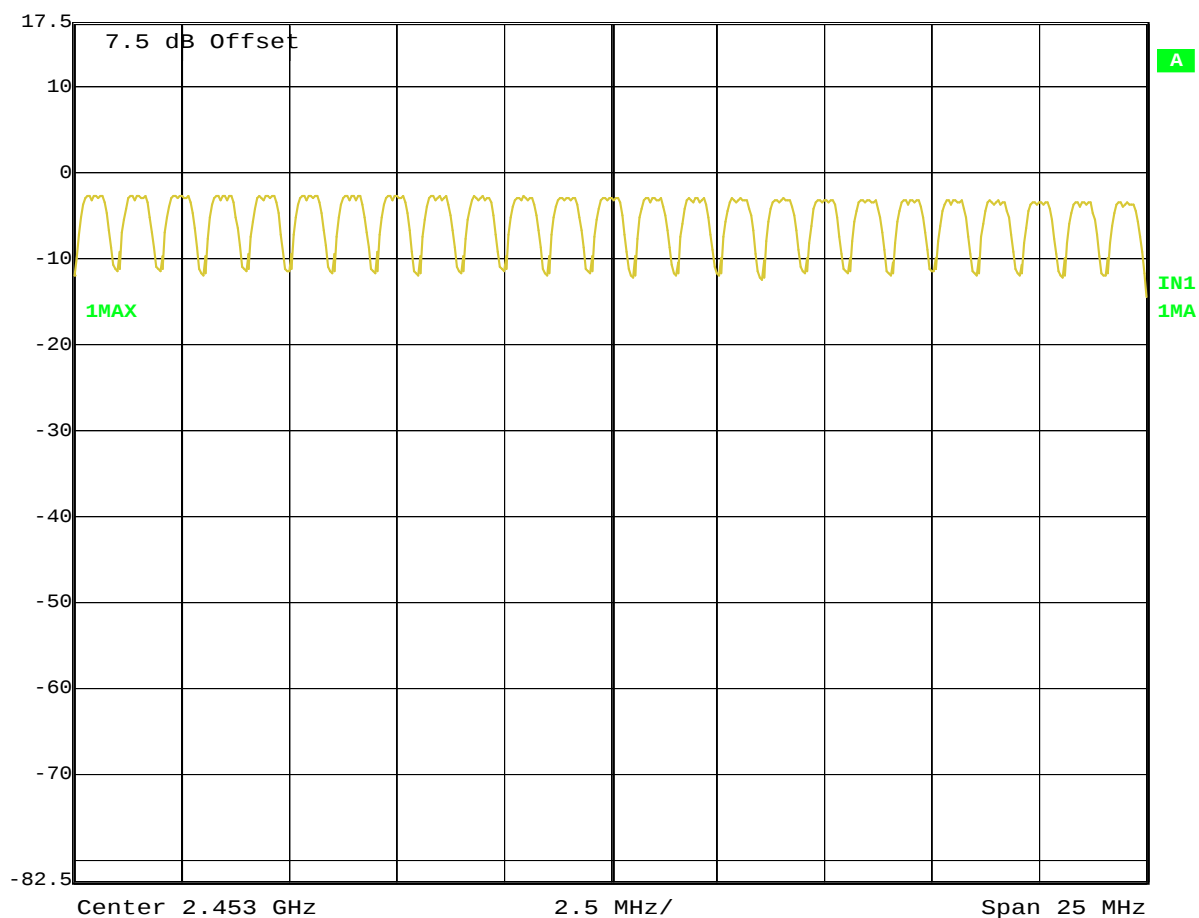


Title: NUMBER OF HOPPING FREQUENCIES (CH.: 14-38)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:26:06



Ref Lvl
17.5 dBm

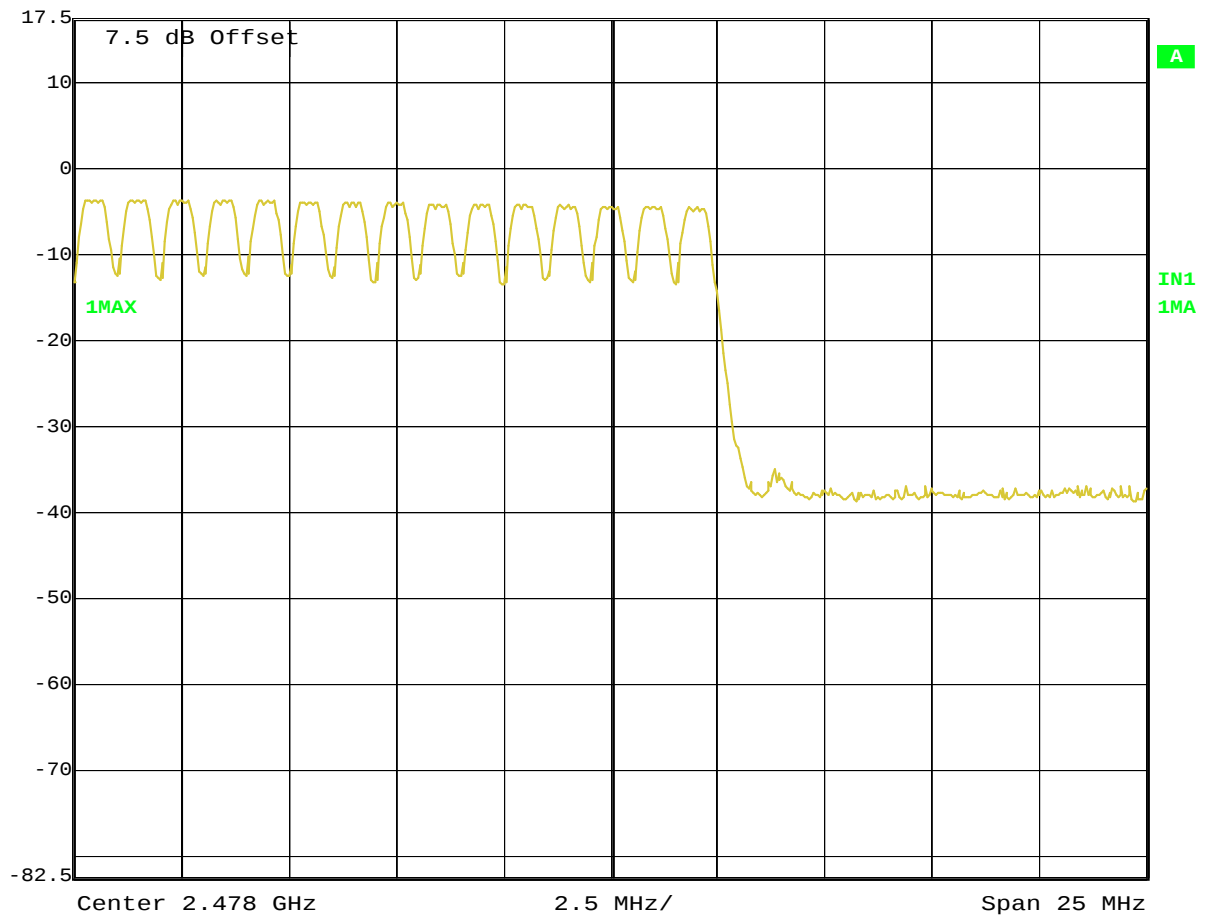
RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



Title: NUMBER OF HOPPING FREQUENCIES (CH.: 39-63)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:23:17



Ref Lvl 17.5 dBm RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm

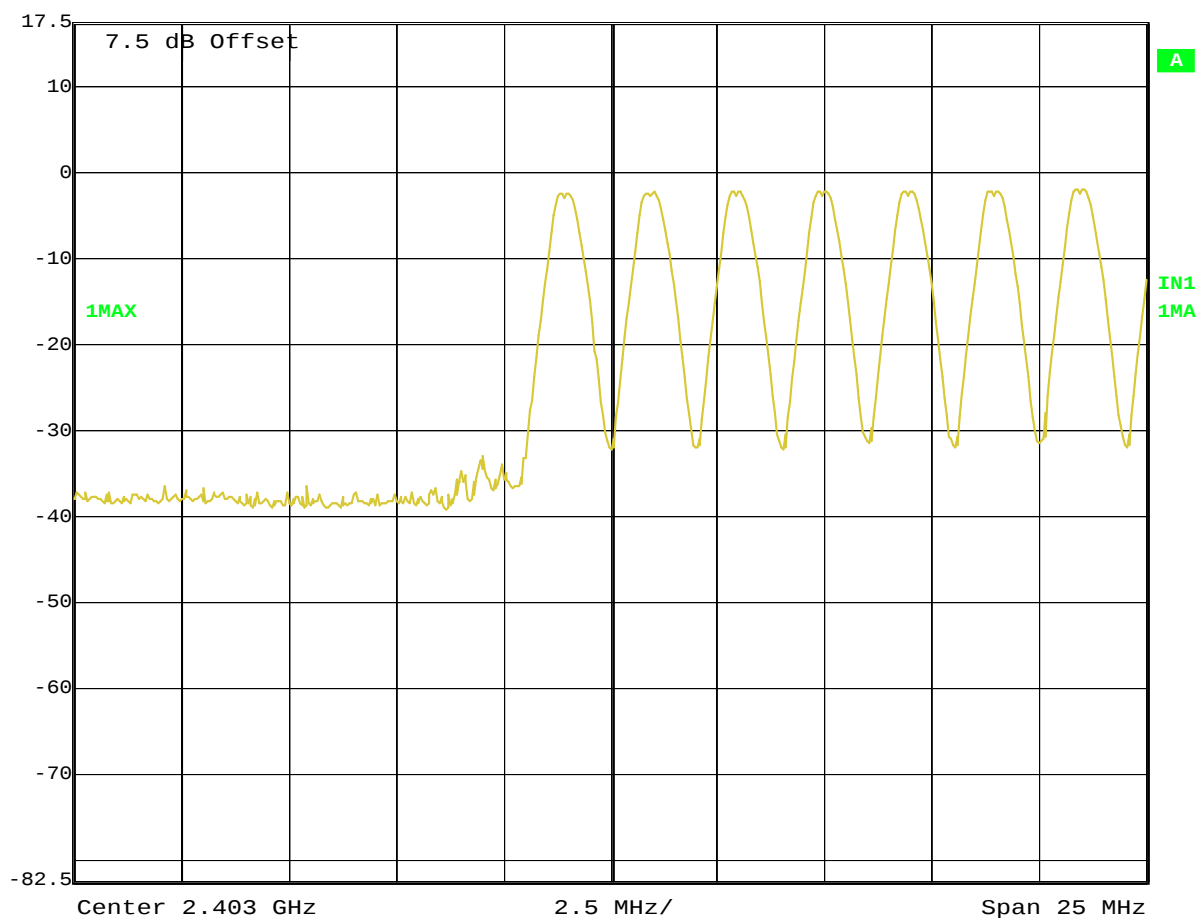


Title: NUMBER OF HOPPING FREQUENCIES (CH.: 64-78)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:19:57



Ref Lvl
17.5 dBm

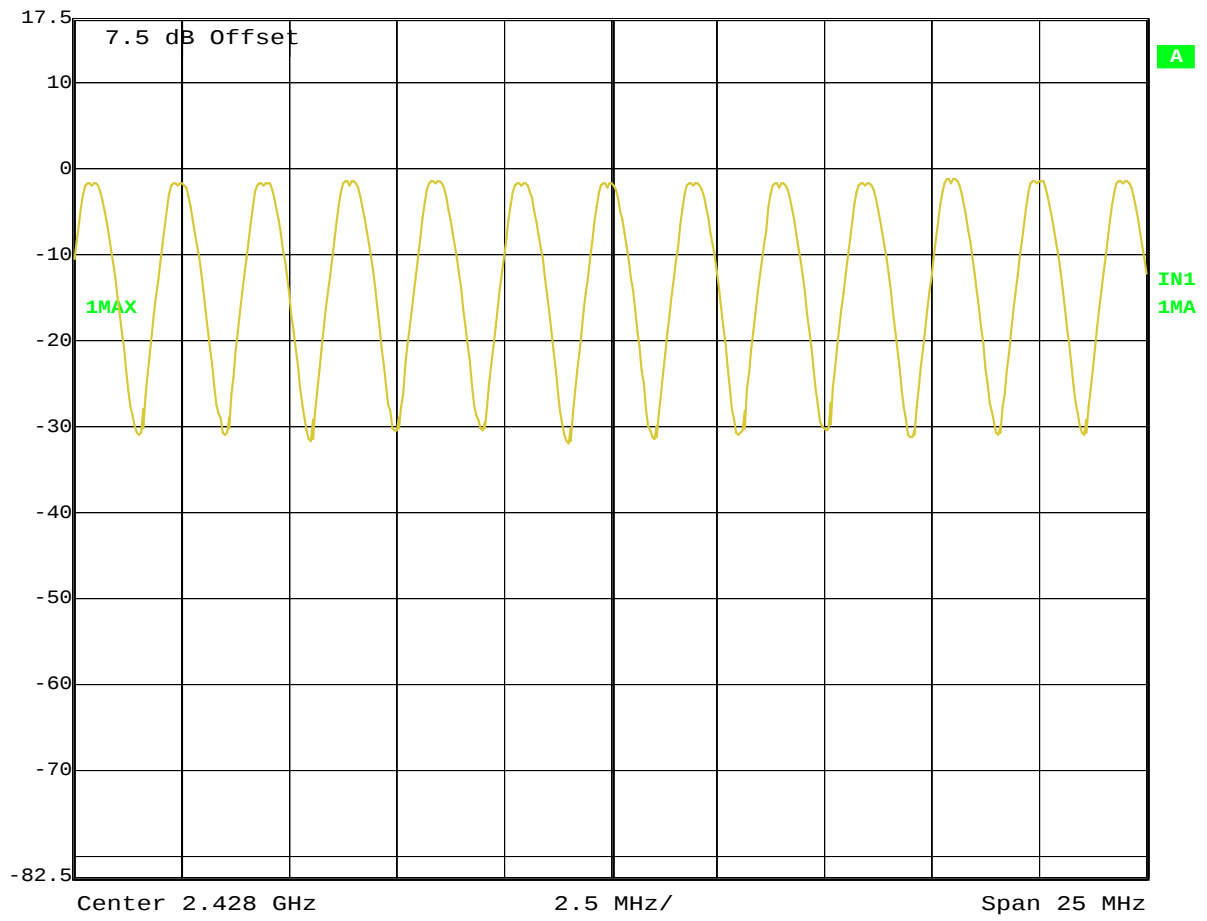
RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



Title: NUMBER OF HOPPING FREQUENCIES (MASTER INQUIRY MODE)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:36:14



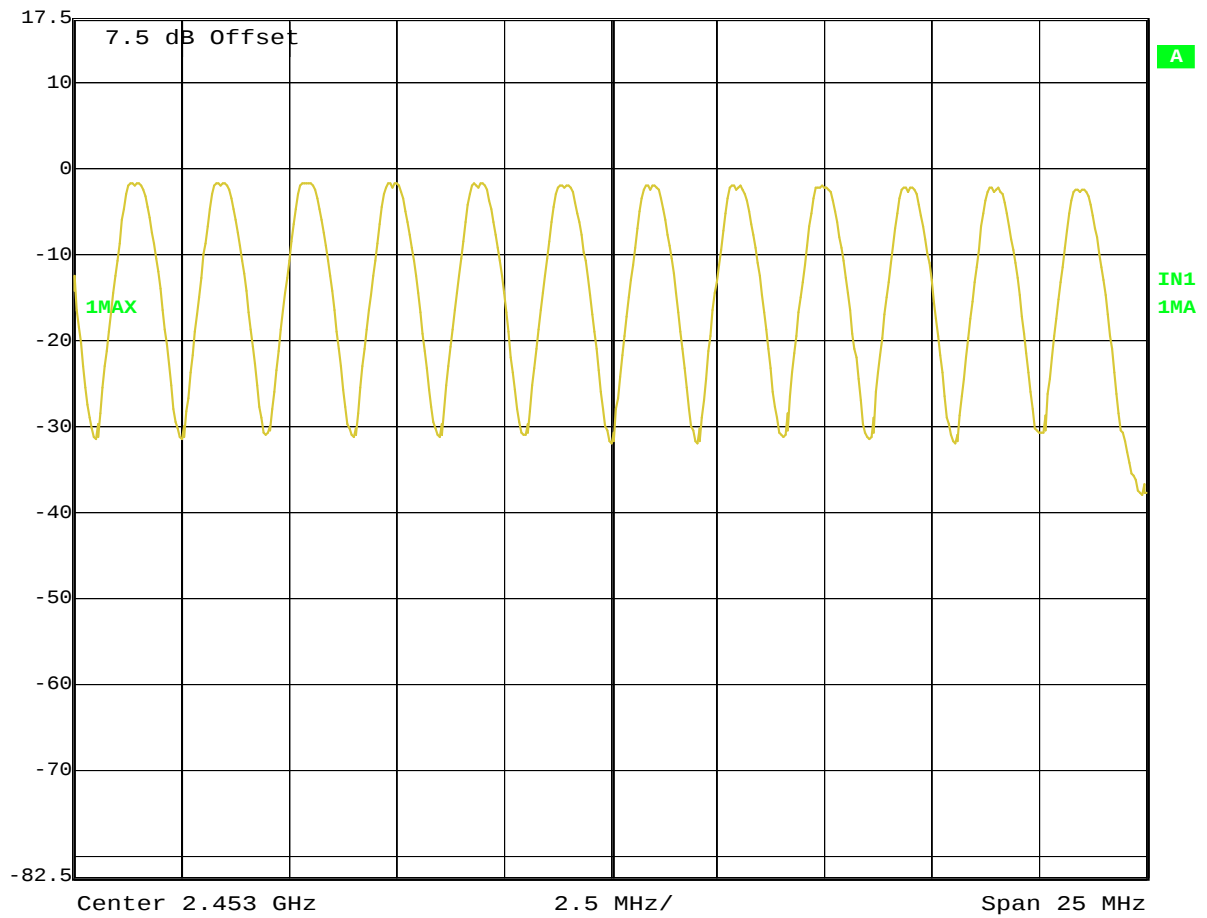
Ref Lvl 17.5 dBm RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



Title: NUMBER OF HOPPING FREQUENCIES (MASTER INQUIRY MODE)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:37:48



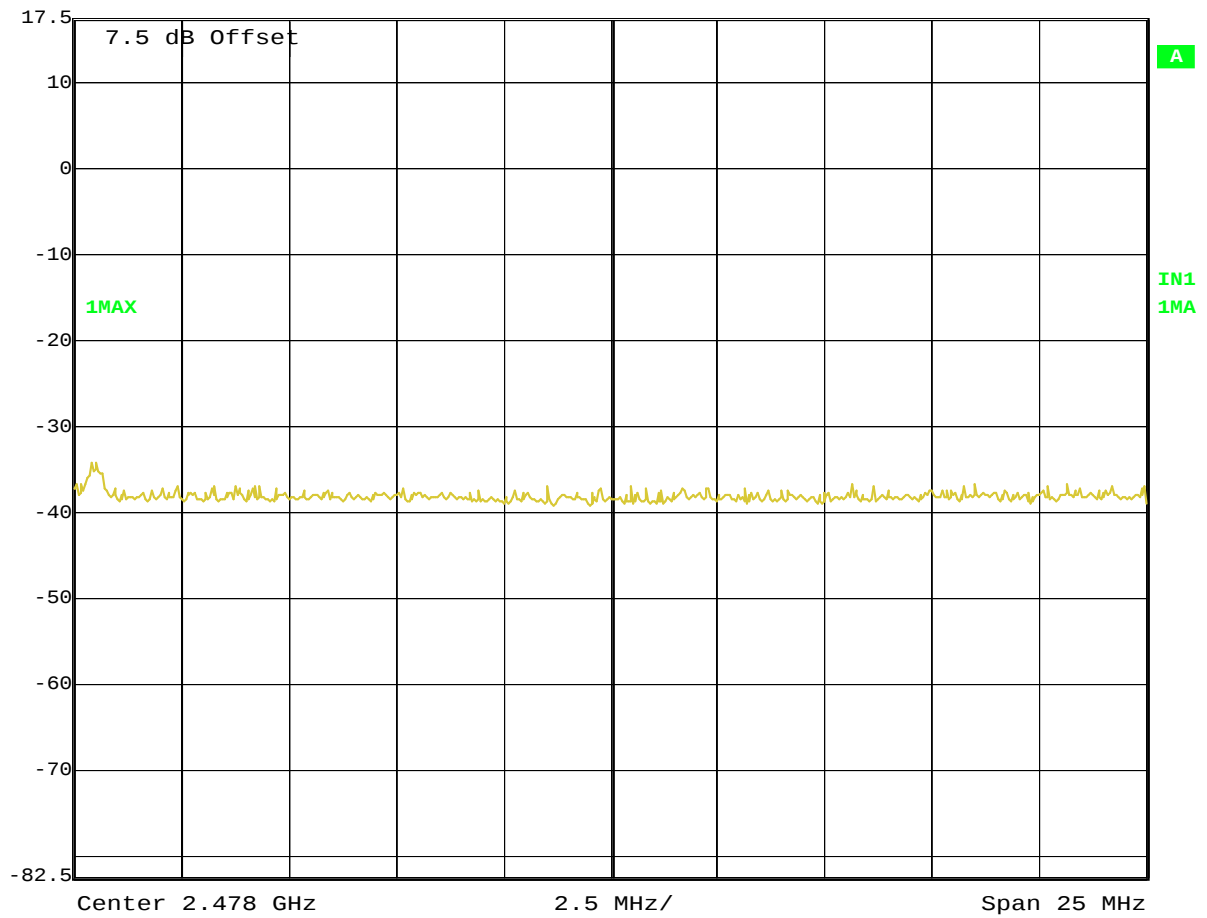
Ref Lvl 17.5 dBm RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



Title: NUMBER OF HOPPING FREQUENCIES (MASTER INQUIRY MODE)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:33:45



Ref Lvl 17.5 dBm RBW 300 kHz RF Att 40 dB
VBW 300 kHz
SWT 200 ms Unit dBm



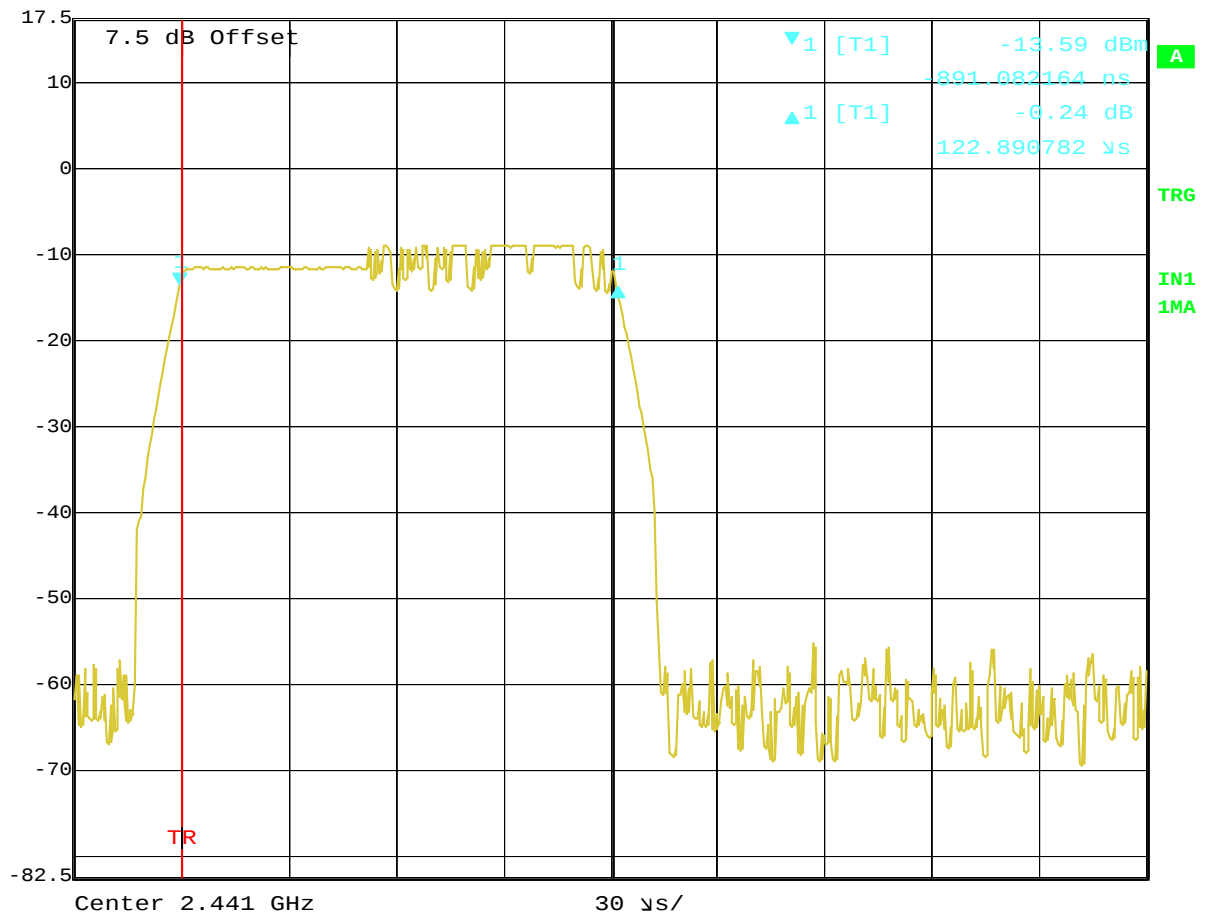
Title: NUMBER OF HOPPING FREQUENCIES (MASTER INQUIRY MODE)
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 12:35:13

Appendix D

Time of Occupancy (Dwell Time)



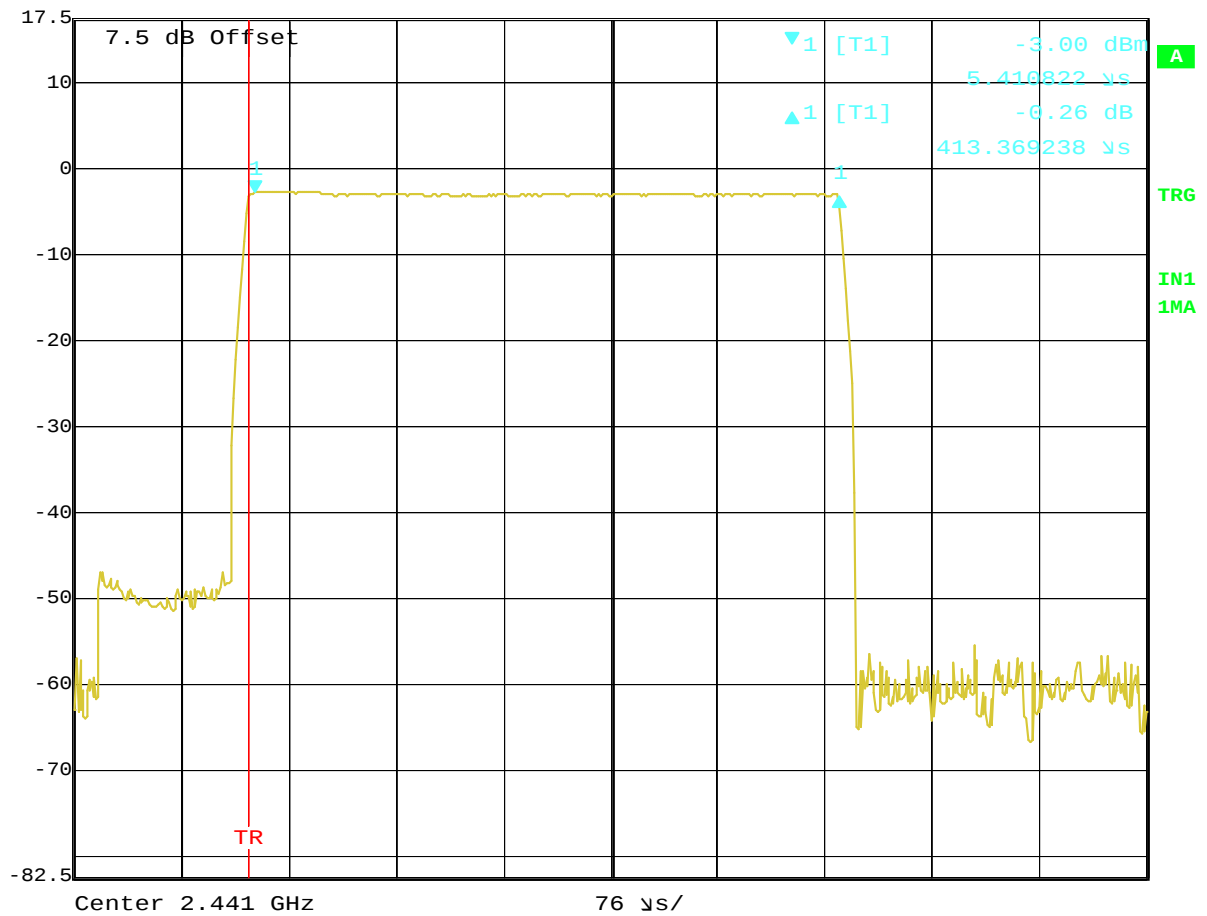
Ref Lvl 17.5 dBm
Delta 1 [T1] -0.24 dB
122.890782 μ s
RBW 1 MHz
VBW 1 MHz
SWT 300 μ s
RF Att 20 dB
Unit dBm



Title: TIME OF OCCUPANCY (INQUIRY MODE) 300 events * 122.890782 μ s= 36.867 ms
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 14:17:33



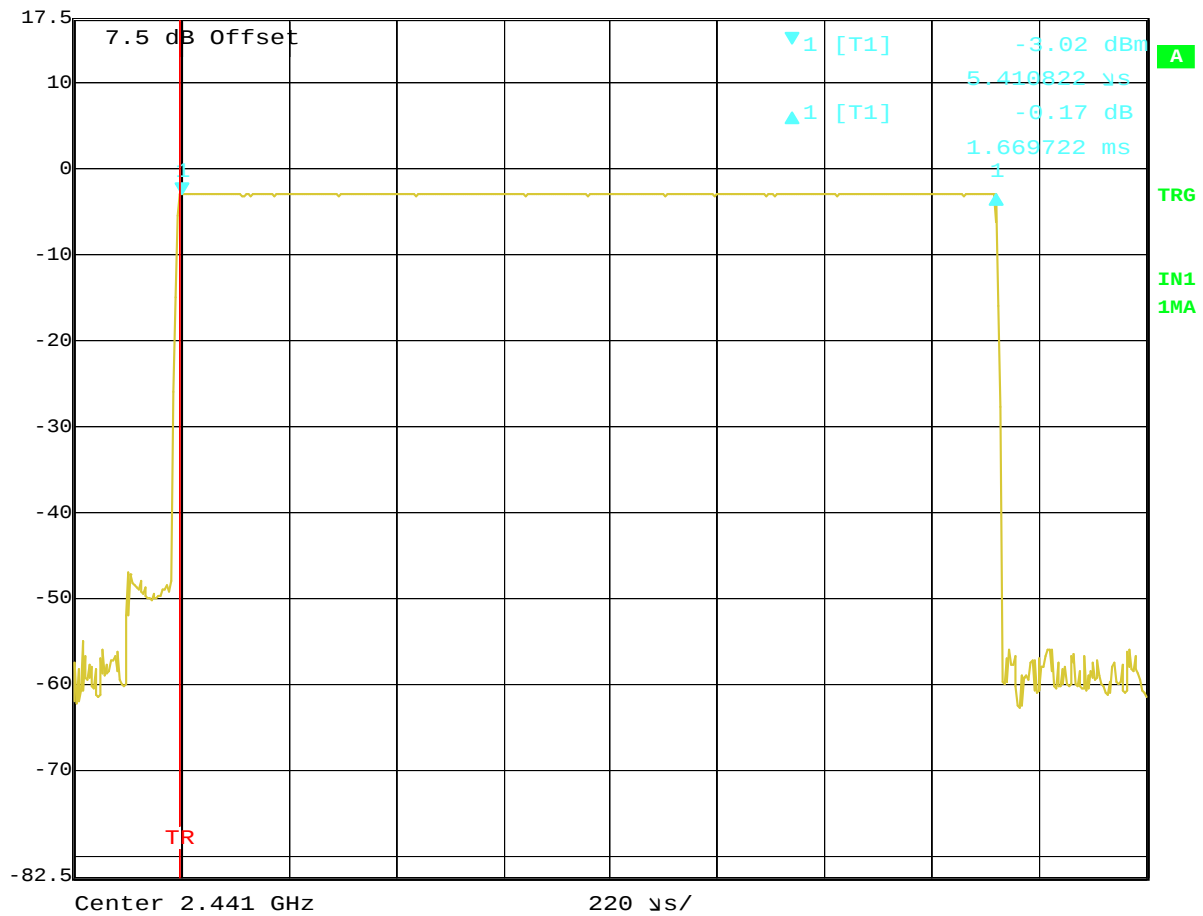
Delta 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -0.26 dB VBW 1 MHz
17.5 dBm 413.369238 μ s SWT 760 μ s Unit dBm



Title: TIME OF OCCUPANCY (HOPPING DH1) 303 events * 413.369238 μ s = 125.250 ms
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 14:41:09



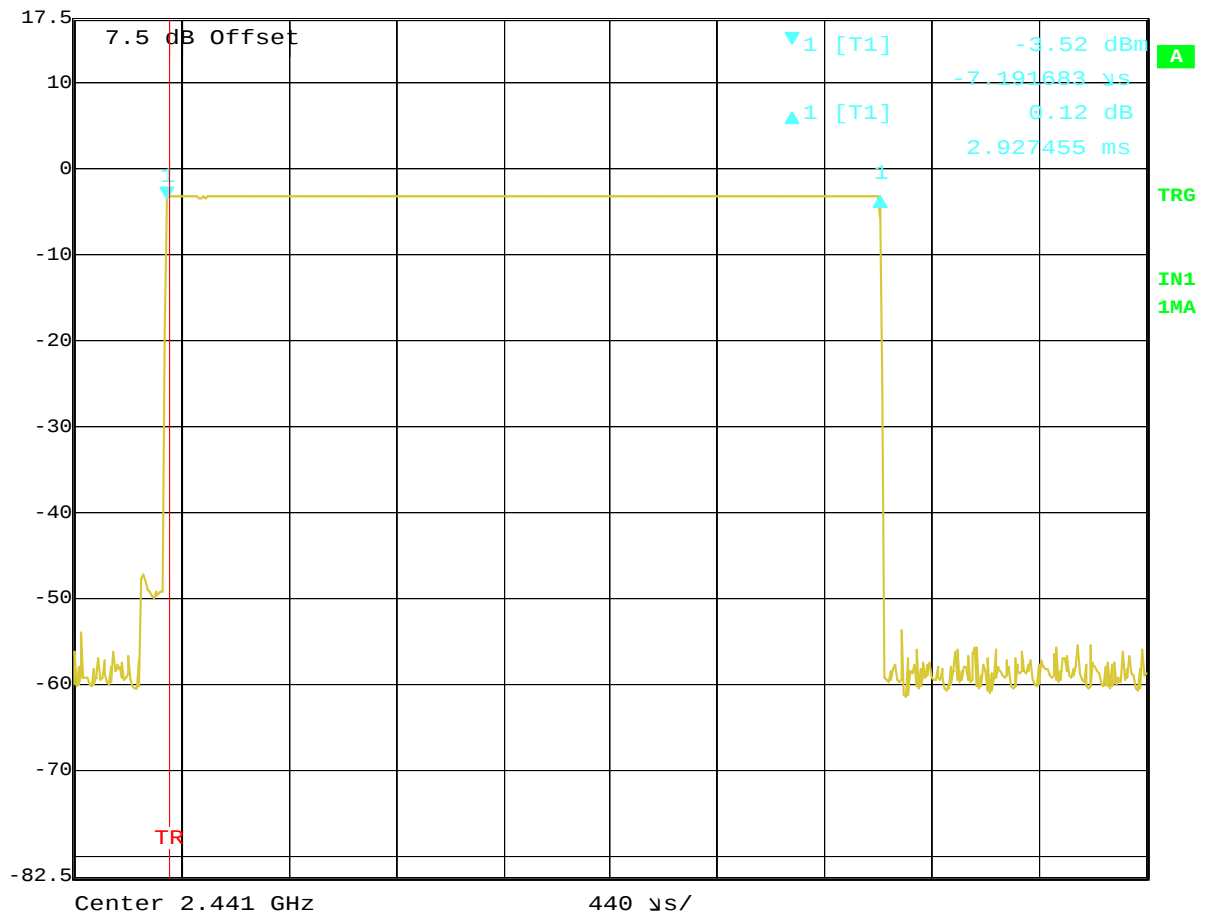
Delta 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -0.17 dB VBW 1 MHz
17.5 dBm 1.669722 ms SWT 2.2 ms Unit dBm



Title: TIME OF OCCUPANCY (HOPPING DH3) 153 events * 1.669722 ms = 255.357 ms
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 14:36:24



Ref Lvl 17.5 dBm
Delta 1 [T1] 0.12 dB
2.927455 ms
RBW 1 MHz
VSW 1 MHz
SWT 4.4 ms
RF Att 20 dB
Unit dBm



Title: TIME OF OCCUPANCY (HOPPING DH5) 102 events * 2.927455 ms = 298.594 ms
Comment A: Syntech information CO., LTD.
Date: 30.AUG.2005 14:06:23

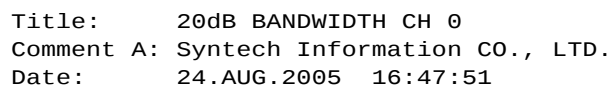


Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

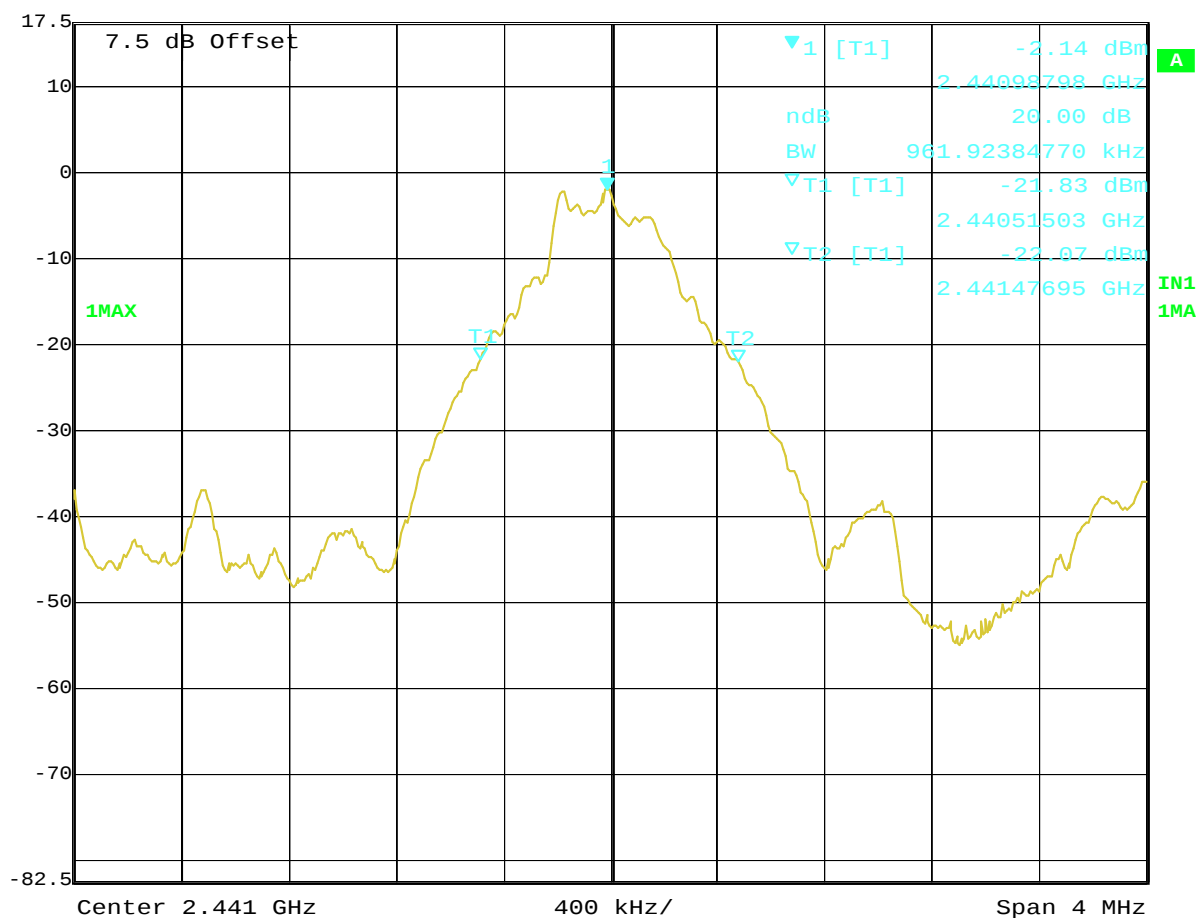
Appendix E

20dB Bandwidth





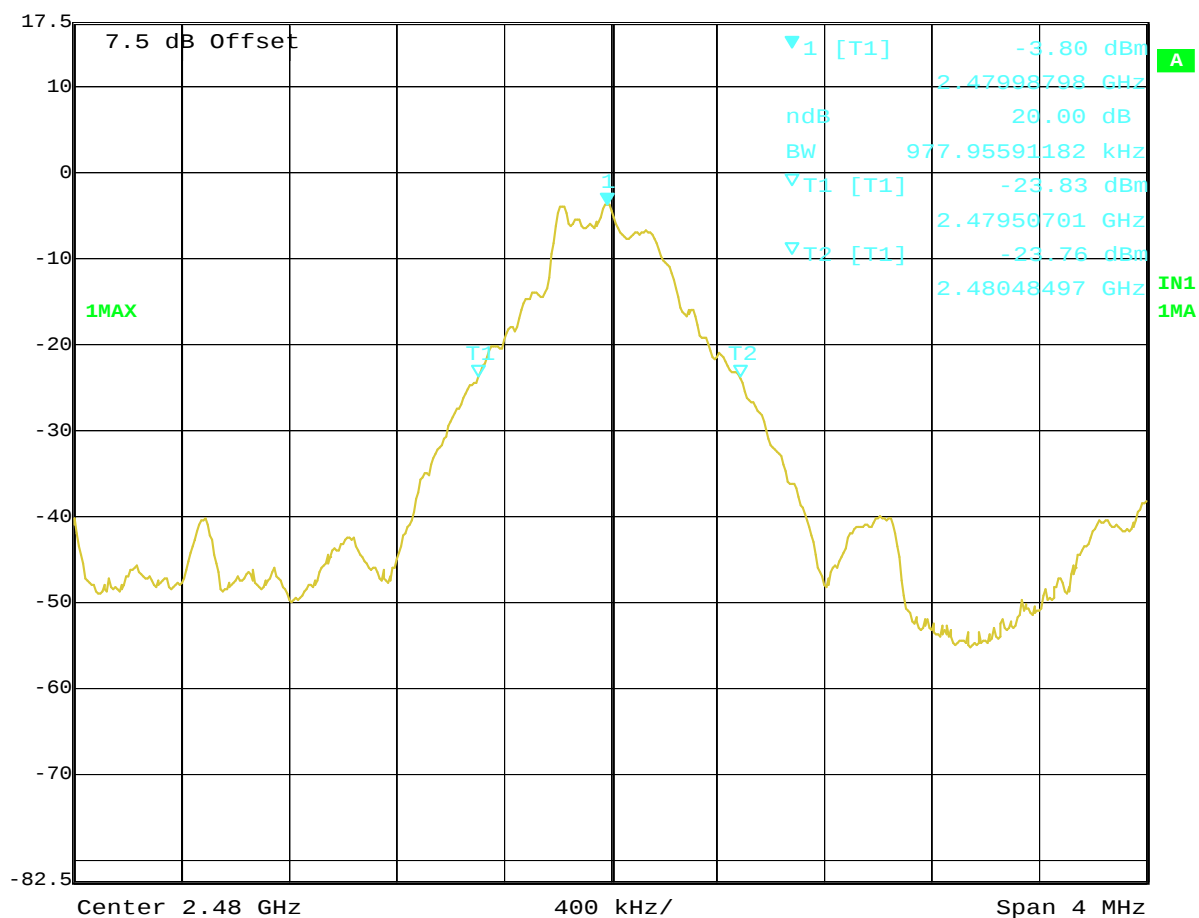
Ref Lvl 17.5 dBm
Marker 1 [T1 ndB] 20.00 dB
BW 961.92384770 kHz
RBW 50 kHz
VBW 100 kHz
RF Att 20 dB
SWT 200 ms
Unit dBm



Title: 20dB BANDWIDTH CH39
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:48:56



Ref Lvl 17.5 dBm
Marker 1 [T1 ndB] 20.00 dB
BW 977.95591182 kHz
RBW 50 kHz
VBW 100 kHz
RF Att 20 dB
SWT 200 ms
Unit dBm



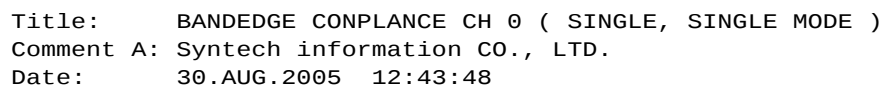
Title: 20dB BANDWIDTH CH78
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 16:50:12

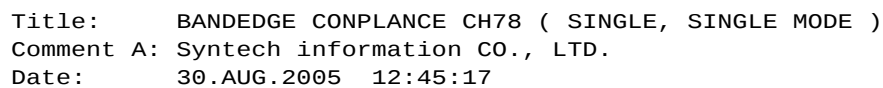
Registration number: W6M20508-6144-P-15

FCC ID: Q3N-3666BASE

Appendix F

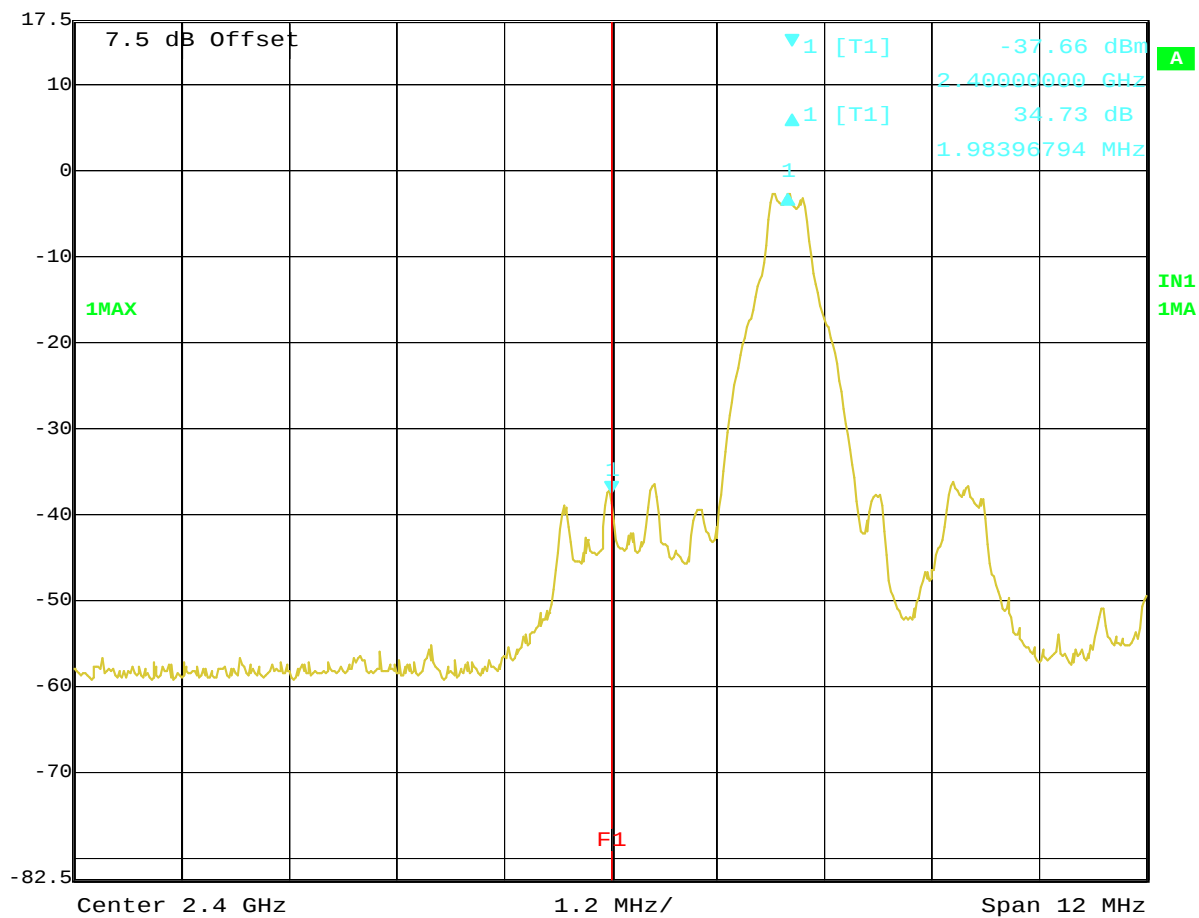
Band-edge Compliance of RF Conducted Emissions







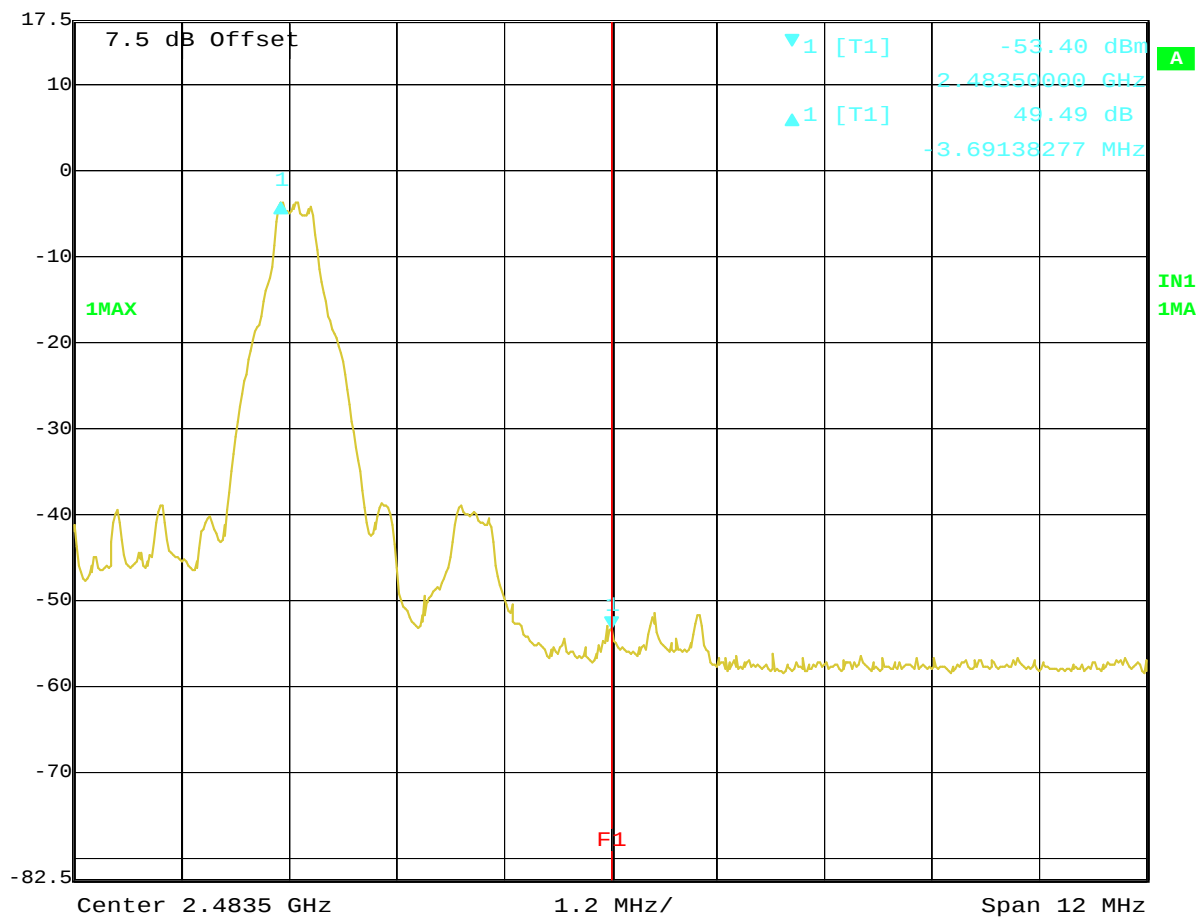
Ref Lvl 17.5 dBm Delta 1 [T1] 34.73 dB RBW 100 kHz RF Att 20 dB
Unit dBm



Title: BANDEDGE COMPLIANCE CH 0 (CONDUCT, HOPPING MODE)
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 17:12:19



Ref Lvl 17.5 dBm Delta 1 [T1] 49.49 dB RBW 100 kHz RF Att 20 dB
-3.69138277 MHz VBW 100 kHz Unit dBm
SWT 200 ms



Title: BANDEDGE COMPLIANCE CH78 (CONDUCT, HOPPING MODE)
Comment A: Syntech Information CO., LTD.
Date: 24.AUG.2005 17:11:19

Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix G

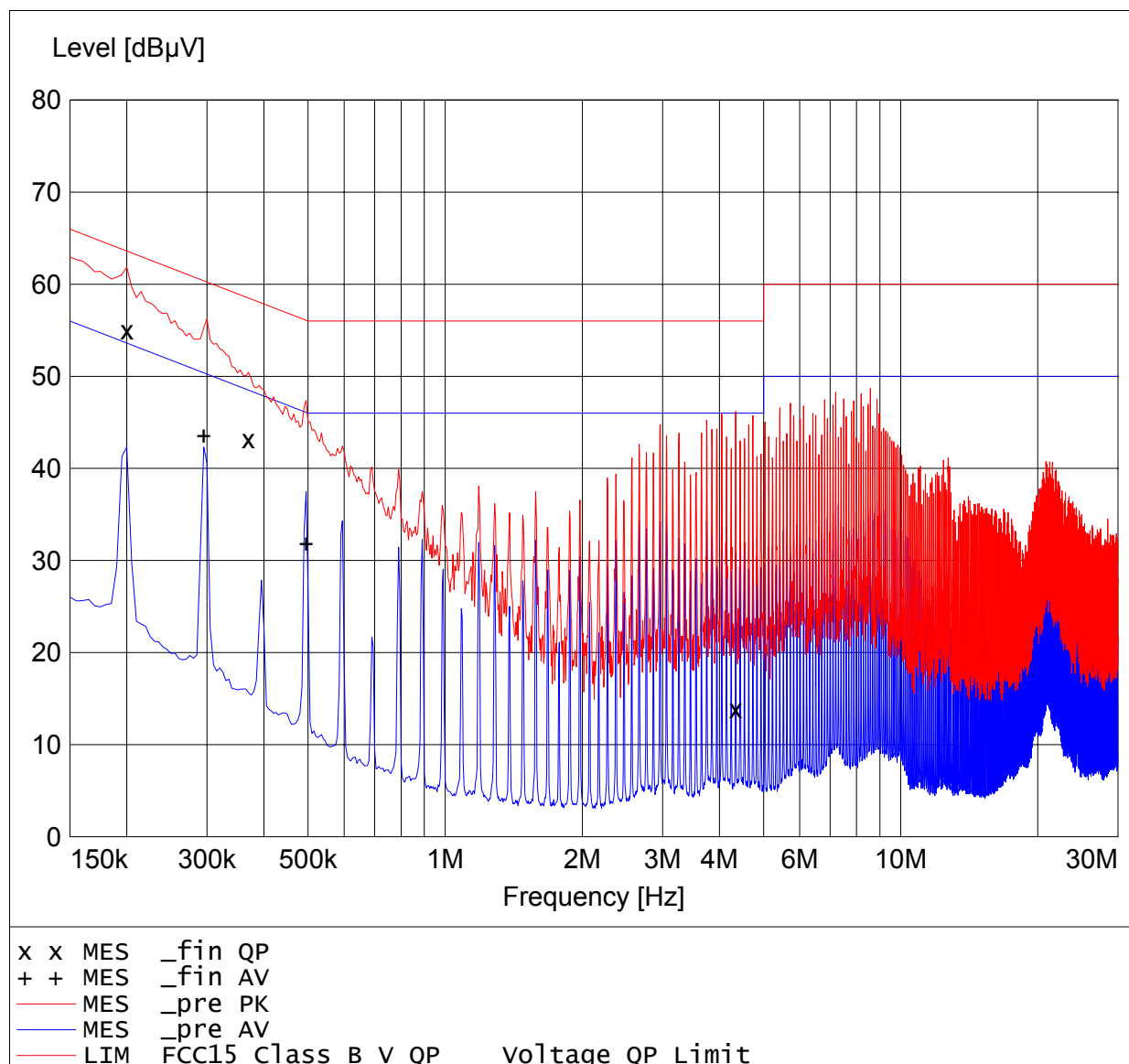
Power Line Conducted Emission

The measurement diagram are wideband pre-scan results; only for reference.

EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle charging MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 N
Comment: model: 3666 mode: active



EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle charging MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 N
Comment: model: 3666 mode: active

MEASUREMENT RESULT: "_fin QP"

9/8/05 3:59PM

Frequency MHZ	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.200000	55.00	10.0	64	8.6	---	---
0.370000	43.20	10.0	59	15.3	---	---
4.345000	13.90	10.1	56	42.1	---	---

MEASUREMENT RESULT: "_fin AV"

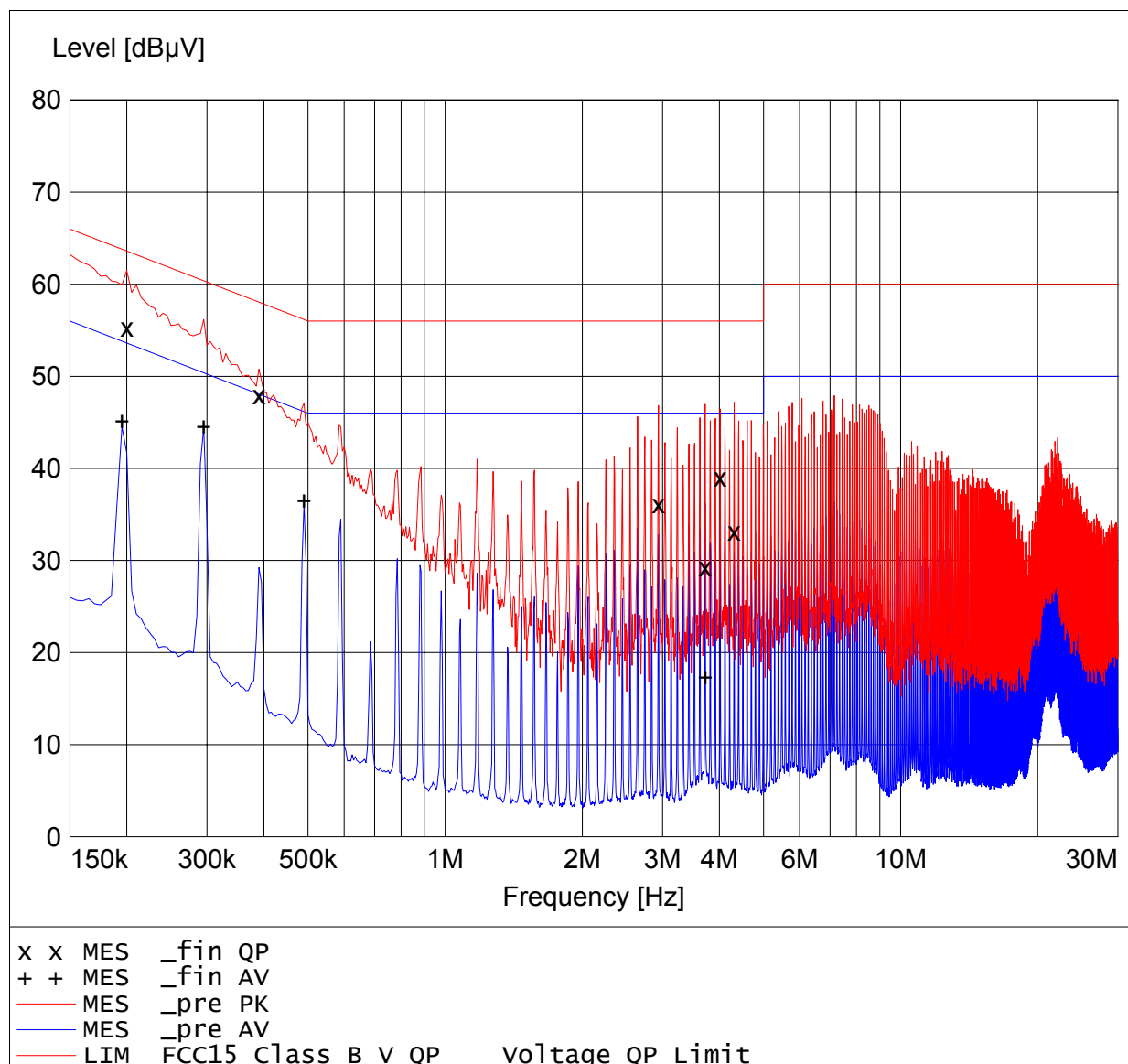
9/8/05 3:59PM

Frequency MHZ	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.295000	43.50	10.0	50	6.9	---	---
0.495000	31.80	10.0	46	14.3	---	---

EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle charging MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 L1
Comment: model: 3666 mode: active



EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle charging MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 L1
Comment: model: 3666 mode: active

MEASUREMENT RESULT: "_fin QP"

9/8/05 4:18PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.200000	55.30	10.0	64	8.4	---	---
0.390000	48.00	10.0	58	10.1	---	---
2.940000	36.10	10.0	56	19.9	---	---
3.725000	29.30	10.1	56	26.7	---	---
4.015000	39.00	10.1	56	17.0	---	---
4.310000	33.20	10.1	56	22.8	---	---

MEASUREMENT RESULT: "_fin AV"

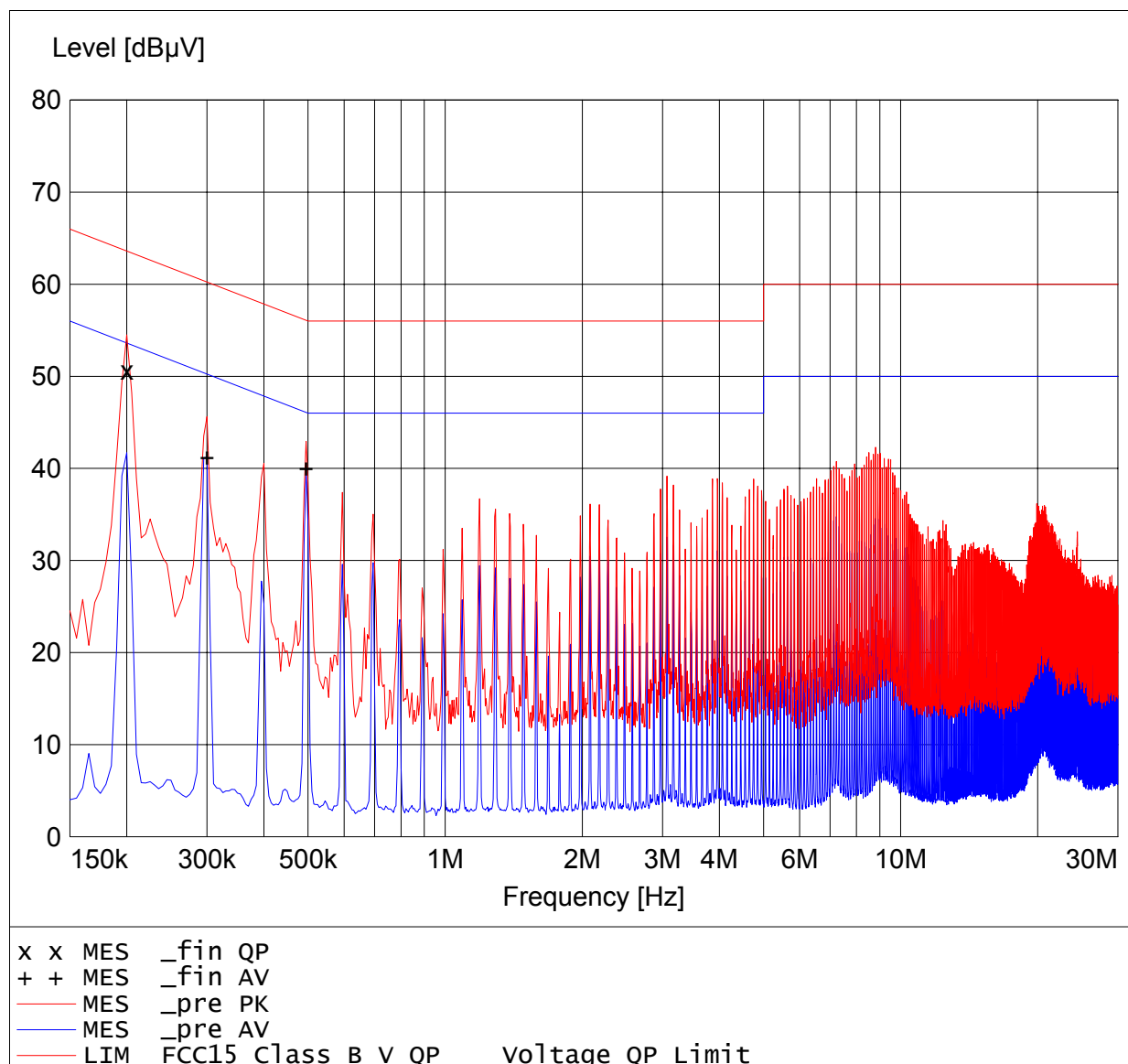
9/8/05 4:18PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.195000	45.10	10.0	54	8.8	---	---
0.295000	44.50	10.0	50	5.9	---	---
0.490000	36.40	10.0	46	9.8	---	---
3.725000	17.30	10.1	46	28.7	---	---

EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle active MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 N
Comment: model: 3666 mode: active



EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle active MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 N
Comment: model: 3666 mode: active

MEASUREMENT RESULT: "_fin QP"

9/8/05 3:36PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.200000	50.60	10.0	64	13.0	---	---

MEASUREMENT RESULT: "_fin AV"

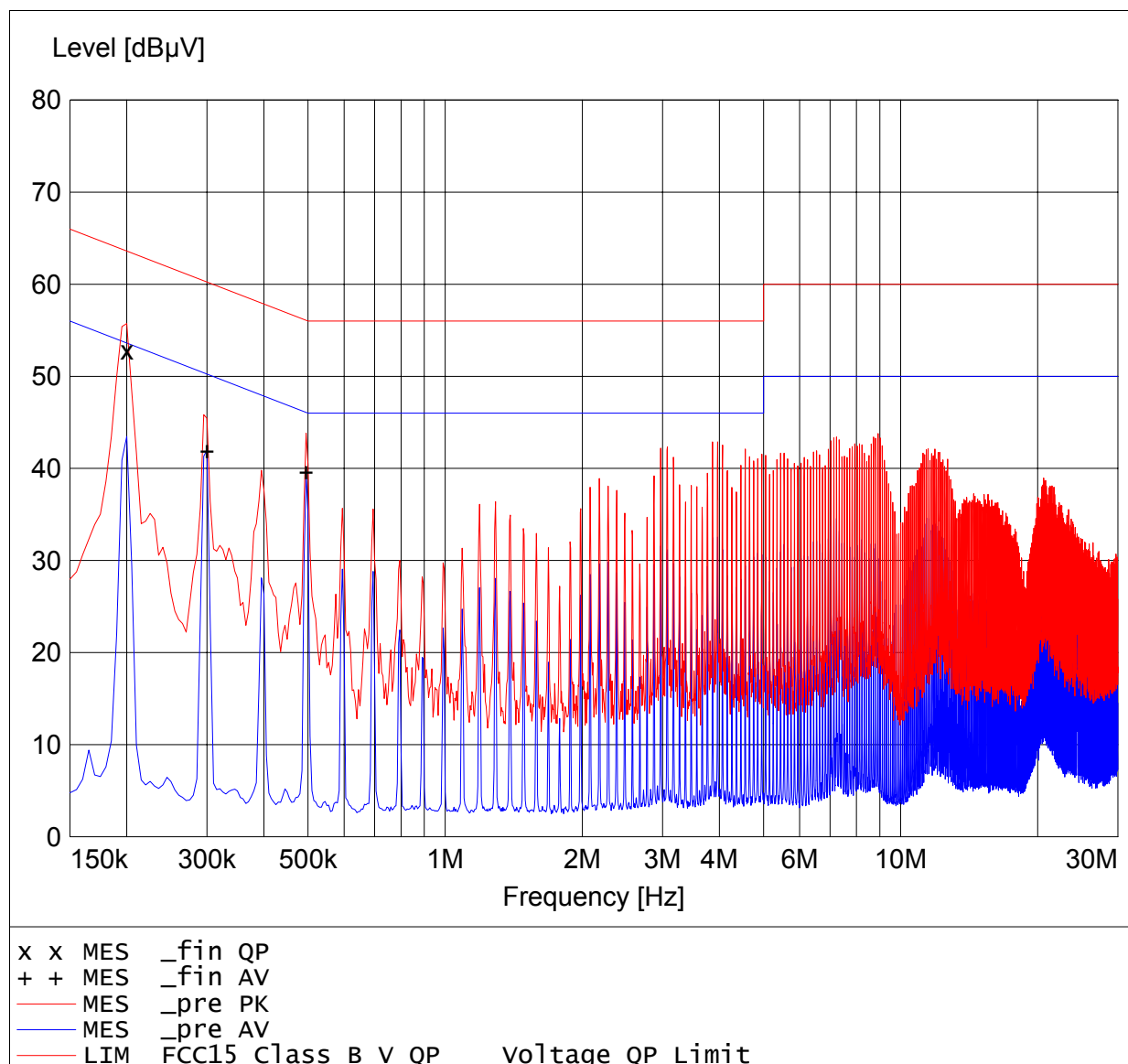
9/8/05 3:36PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.300000	41.10	10.0	50	9.1	---	---
0.495000	39.90	10.0	46	6.1	---	---

EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle active MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 L1
Comment: model: 36666 mode: active



EMI voltage test in the ac-mains according to FCC Part 15

Class B

EUT: Cradle active MODE
Approval Holder: Syntech Information Co.,LTD.
Operating Condition: Unom : 5VDC (ac / dc Adaptor) , Tnom : 23 °C
Test Site: ETS
Operator: Dennis
Test Specification: V-network: ESH3-Z5 L1
Comment: model: 36666 mode: active

MEASUREMENT RESULT: "_fin QP"

9/8/05 2:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.200000	52.80	10.0	64	10.8	---	---

MEASUREMENT RESULT: "_fin AV"

9/8/05 2:52PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.300000	41.80	10.0	50	8.5	---	---
0.495000	39.50	10.0	46	6.6	---	---



Registration number: W6M20508-6144-P-15
FCC ID: Q3N-3666BASE

Appendix H

Pictures