



COMPANY NAME: TOPAZ3, L.L.C..
EUT: SM-3450 MOBILE RADIO
CLIENT REFERENCE NUMBER: QRTL00-316
WORK ORDER NUMBER: 2000301
FCC ID: 07KSM3450U2

14 PRODUCT DESCRIPTION

TECHNICAL SPECIFICATION FOR

SM-3000

LOW COST 40 WATT MOBILE RADIO

ISSUE 1.0

LAND MOBILE RADIO R&D TEAM

MAXON KOREA

SIGN OFF BY C M CHOI / Y K KIM

MAXON DIVISION	SIGNATURE	DATE
MARKETING MAI		
MARKETING MEL		
MAXKOR		

SM-3000 TECHNICAL SPECIFICATION

TRANCEIVER NOMINAL PERFORMANCE

MODEL:	SM-3000
EQUIPMENT TYPE:	MOBILE RADIO
PERFORMANCE SPECIFICATIONS:	ETS 300-086 TIA/EIA-603
BAND:	UHF/VHF
CHANNEL SPACINGS:	12.5KHz, 20KHz, 25KHz PROGRAMMABLE
RF OUTPUT POWER:	40 / 10 WATT
MODULATION TYPE:	F3E
AUDIO POWER:	5W (10% DIST)
INTERMEDIATE FREQUENCY:	45.1MHz 455KHz
CHANNELS:	99
FREQUENCY SOURCE:	SYNTHESIZER
POWER SUPPLY:	DC +13.8V
TEMPERATURE RANGE:	
STORAGE	80℃ MAX / -40℃ MIN. (EXTREME)
OPERATING	25℃ +/-10 NOM(ROOM TEMP) 60℃ MAX -30℃ MIN.

SWITCHING RANGE TX AND RX (WITHOUT RE-TUNING)

		RX	TX
VHF	V1	136.000-162.000MHz	136.000-162.000MHz
	V2	148.000-174.000	148.000-174.000
UHF	U2	440.000-470.000	440.000-470.000
	U1	400.000-430.000	400.000-430.000
	U5	420.000-450.000	420.000-450.000
	U3	470.000-490.000	470.000-490.000
	U4	490.000-512.000	490.000-512.000
	U6	450.000-480.000	450.000-480.000

TRANSMITTER TEST METHOD IS TIA/EIA-603 FEB 1993

1 CARRIER POWER	NOM.	MAX.	MIN
	40W	<44	>36
2 SUSTAINED TRANSMISSION	METHOD(TX POWER VS TIME)		
	NOMINAL CONDITIONS		
	5	10	30 SEC
	>90%	>85%	>80% POWER
3 FREQUENCY ERROR	<0.5KHz NOMINAL CON. VHF		
	<0.75KHz NOMINAL CON. UHF		
	±5PPM EXTREME CON. VHF		
	±3PPM EXTREME CON. UHF		

4 AUDIO FREQUENCY DEV

WITHOUT SUB AUDIO TONE MODULATION:

CHANNEL SPACING:	(@NOM/EXTREME CONDITIONS)		
	NOM.	PEAK	MIN.
25KHz	3	±5.0	±3.8
12.5KHz	1.5	±2.5	±1.8

WITH SUB AUDIO TONE MODULATION @ 10% PEAK DEVIATION

CHANNEL SPACING:	@ EXTREME CONDITIONS		
25KHz	±5.0 PEAK		
12.5KHz	±2.5 PEAK		
5 AUDIO CHARACTERISTIC:	METHOD AS TIA/EIA-603		
MODE TYPE F3	WITHIN +1/-3dB of 6dB OCT.		
	@300Hz to 2.55KHz for 12.5KHz C.S		
	@300Hz to 3.0 KHz for 25KHz C.S		

6 ADJACENT CHANNEL POWER

25KHz	<70 dBc @nominal conditions
	<65 dBc @extreme conditions
12.5KHz	<60 dBc @nominal condition
	<55 dBc @extreme condition

7 TX SPURIOUS EMISSION(CONDUCTED)

BELOW 1 GHz	<-36 dBm @nominal
BELOW 4 GHz	<-30 dBm @nominal

8 MODULATION SENSITIVITY

At ACCESSORYMIC CONNECTOR	5mV >10mV>20mV 60% PEAK DEV
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9 TRANSMITTER AUDIO DISTORTION (WITHOUT CTCSS)

@1KHz	<5%
	<10% @extreme condition

10 HUM & NOISE(Residual Modulation) Method as FTZ 17 TR 2049 July 1988

12.5kHz C.S.	>40dB (with PSOPH)
25kHz C.S.	>40dB (with no PSOPH)

11 Modulation Symmetry

<10% Peak Dev
Method(Peak Positive-Peak Negative)

	(@ 1KHz input for nominal dev + 20dB)	
12 Load Stability	No osc at $\geq 10:1$ VSWR all phase angles and suitable antenna	
	No Destory at $\geq 20:1$ All phase angle	
13 Peak Deviation Range Adjustment	(@Nominal/Extreme Conditions)	
Channel Spacing:	(@ 1KHz, Nom. Dev + 20dB)	
	Min.	Max.
25KHz	>3.0	<6.0
20KHz	>2.4	<5.0
12.5KHz	>1.5	<4.0

TX TONE MODULATION CHARACTERISTICS

SUB AUDIO TONES-CTCSS

1 Tone Range	67 TO 250Hz @ 0.3% Accuracy
2 Tone Standard	TIA/EIA-603
3 Non-Standard Tones	50-260Hz @ 0.3% Accuracy
4 Nominal Tone Deviation	15% (10%-20%) Peak System Deviation USA 10% (8%-15%) Peak System Deviation UK
5 Deviation Range Adjustment	0% Min. Peak Dev 20% Max. Peak Dev Method(Using internal control @ nominal conditions)
6 Tone Deviation Variation vs. Tone Freq. and across Switch Range:	<10% Peak Dev(@ 10% Peak system dev) Method(Tone Freq. vs. Deviation)
7 Tone Distortion	5% THD Method(@ 10% Peak system DEVTION)
8 Tx Audio Rejection	>25dB Method (ratio of Peak Dev at 300Hz) and Peak Dev at highest) (Standsrđ tone frequency)
9 Response Time	<10mS (Peak level after Tx on and within 1%accuracy) Method (time to generate tone to 90%)
10 Hum & Noise	>35 WITH PSOPH Method (using any standard CTCSS tone) @10% Peak deviation (Using300Hz HPF nad 3KHz LPF)

SUB AUDIO TONES-DCS

1 Tone Standard	Normal and inverted
2 Tone Deviation	15% $\pm 5\%$ Peak system deviation for MAI 10% $\pm 3\%$ Peak system deviation for MEL
3. Deviation Range Adjustment	0% Min. Peak Dev 25% Max. Peak Dev Method using internal control(@ nominal conditions)
4 Deviation Variation vs.DCS	

Code and Carrier Freq:

±5%

Method(and DCS Code vs.deviation over switching range)

SUB AUDIO TONES-DEVIATION COMPARISON

1 Deviation Difference

<10% Peak Dev

Method(deviation with CTCSS minus deviation with DCS Code 346 @ single channel with no adjustment)
(@ Nominal and extreme conditions)

RECEIVER

Performance without Sub Audio Modulation

1 Sensitivity

12dB Sinad

UHF: <-117dBm, VHF: <-118dBm

(@ Nominal conditions across switching range)

12dB Sinad

UHF: <-115dBm, VHF: <-116dBm

(@ Extreme conditions across switching range)

2 Amplitude Characteristic

<±3dB

3 Adjacent Channel Selectivity

25KHz Channel Spacing

>60dB (@Nominal conditions)

>55dB (@Extreme conditions)

12.5KHz Channel Spacing

>50dB (@Nominal conditions)

>45dB (@Extreme conditions)

4 Spurious Response Rejection

70dB (100KHz -4GHz)

(@NOMINAL CONDITIONS)

(ACROSS SWITCHING RANGE)

Image Response

>70

1/2 IF Response

>70

Others

>70

5 Intermodulation Response Rejection

±25K/50KHz

65dB

±50K/100KHz

65dB

6 Rx Spurious Emissions(Conducted)

(@ Nominal conditions)

9kHz - 1GHz

< -57dBm

1GHz -4GHz

< -47dBm

7 Rx Spurious Emissions(Radiated)

(@Nominal conditions)

9kHz - 1GHz

< -57dBm

1GHz -12.75GHz

< -47dBm

8 AF Power

5W (10% DIST)

9 AF Distortion

Method as FTZ 17 TR 2049 July 1988

1kHz

<5% (@nominal conditions)

<10% (@extreme conditions)

10 AF Frequency Response

Method as TIA/EIA-603

MOD TYPE F3

Within +1/-3 dB of Limit WRT 1KHz

(@300Hz to 3KHz for 20/25KHz Cham. Spacing)

11 Rx Hum & Noise

Method as TIA/EIA-607

25KHz CP	<40dB No Psoph.
12.5KHz CP	<40dB With PsoPh.
12 Receiver Response Time	<16mS Method as EIA RS 316 B May 79
13 Squelch THRESH HOLD	8dB UNDER SINAD @Nomal Condition 12dB UNDER SINAD @EXTRIM Condition
14 Squelch THIGHT	15dB OVER - SENSE 10dB UNDER SINAD @Nomal Condition 12dB UNDER SINAD @EXTRIM Condition
15 Squelch Attack Time	Method(Time to Sq. open after signal applied)
rf level at Threshold	<40mS
rf level at Threshold + 20dB	<30mS
16 Squelch Decay Time	Method(Time to Sq close after signal removed)
Min.	5mS
Max.	20mS
17 Antenna Socket Input Match	>10dB return loss Method(Using network analyser over switching range)
18 Local Oscillator Frequency Temp Stability	(-30 to +60deg):1st < 5PPM, 2nd < 15PPM Method(Direct measurement)
19 Local Oscillator Frequency Aging Rate	+/-2PPM/YEAR

RX TONE DEMODULATION CHARACTERISTICS

SUB AUDIO TONES-CTCSS

1 Tone Range	67Hz to 250Hz
2 Tone Standard	TIA/EIA-603 Standard
3 Non-Standard Tones	50-260Hz
4 Decoder Sensitivity	Method (Decrease Signal level(@10% Peak Deviation) (No Audio Tone)
HIGHEST TONE	<= 8dB SINAD
MID TONE	<= 8dB SINAD
LOWEST TONE	<= 8dB SINAD
5 Decoder + Squelch Attack Time	Method (Time to Sq open after RF and tone applied)
Highest Tone	<200mS
Mid Tone	<200mS
Lowest Tone	<220mS
Decoder Only Attack Time	Method (Time to sq open after tone applied with RF Present)
Highest Tone	<120mS
Mid Tone	<130mS
Lowest Tone	<150mS
7 Decoder Decay Time	<75mS Max. Method (Time to sq closed after signal removed)
8 Decoder Bandwidth	Accept $\pm 0.5\%$ Tone Frequency; Reject $\pm 3.0\%$ ToNE Frequency; Method (Offset Tone Freq)
9 RX Audio Rejection	>25dB Method(Radio of Rx Audio Response between 300Hz and

10 False Decoder Probability	Highest Tone Frequency) <1 False/5 Hrs)
11 Hum & Noise	Method(In Windeband FM Noise) >40dB Psoph, >35dB No Psoph (@highest Tone Freq)

SYNTHESIZER

REFERENCE CRYSTAL

Frequency	12.8MHz
Holder Type	HC-18
	<u>Temperature</u> <u>Accuracy</u>
	-30'C to +60C + 5.0PPM
Temperature Characteristic	See Manufacturers Graph
Aging Rate	<2PPM/YEAR IN 1ST YEAR. <1PPM/YEAR THEREAFTER
Lock Time	<10 mS
Tx to Rx same Frequency	< 20 (No Power Saving)
Rx to Tx same Frequency	< 20
Rx to Rx over $\frac{1}{2}$	
Switching Bandwidth	< 20mS
Rx to Tx/Tx to Rx over Switching	
Bandwidth	< 20mS

ENVIRONMENTAL (PERFORMANCE WITHOUT DEGREDEATION UNLESS STATED)

TEMPERATURE	deg C
OPERATING	-30 to +60 with degradation specified @EXTREME
STORAGE	-40 to +80
RECHARGING	-10 to +55
ESD	20kV (C-MIC >=15kV)
VIBRATION	MIL STD 810 C PROCEDURES I ,II ,V AND IEC68 26